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The Population, Housing And Activities'

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Pedagogical Document for First-Year Students Studying for a Licence in Geography and Territorial Planning.

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The importance of the module:

Population, Habitat and Activities

The importance of the Population, Habitat and Activities module for first-year students in spatial planning lies in the fact that it provides them with the necessary foundations for understanding the relationship between population, housing and human activities, which are fundamental elements in the study and organization of space.

1. Understanding demographic dynamics

This course helps students become familiar with population characteristics such as size, distribution, growth and migration. This is important because urban planning is essentially based on knowledge of the number of inhabitants and their future needs.

2. Learning about housing patterns and types of urbanization

Students study types of housing and patterns of human settlement such as villages, towns and residential neighborhoods, which helps them understand urban development and organization.

3. Understanding economic activities and their impact on the territory

The course introduces students to human activities such as industry, commerce and services, as well as their role in shaping cities and guiding the growth of urban areas.

4. Establishing a link between people and geographical space

The course helps students understand the relationship between population and the environment, and how natural and social factors influence the choice of where to live and work.

5. Building a knowledge base for the discipline of spatial planning

This course provides an essential introduction to other disciplines such as:

- Urban planning
- Urban geography
- Housing policy
- Spatial planning

Conclusion:

The importance of this course is that it gives land use planning students a fundamental understanding of the structure of urban society (population, housing and activities), which then helps them to analyze and plan cities in a scientific and sustainable manner.

TABLE OF CONTENTS

TABLE OF CONTENTS

General Introduction: 9

Part 01 : Concepts and definitions

Definitions of general concepts: 12

1. Agglomeration: 12

2. Main agglomeration: 12

3. Secondary agglomeration. 12

4. Scattered territory (scattered zone): 12

a. Hamlets: 12

b. Localities: 12

c. Isolated building: 12

5. The district: 13

5.1. The agglomerated district: 13

5.2. The scattered district: 14

6. Block: 15

7. Building: 15

8. Population: 15

9. Geographical distribution of the population: 16

9.1. Demographic analysis: 17

9.1.1. Vital statistics: 17

9.1.2. Economic statistics: 19

9.2. Population Geography: 20

9.2.1. Natural growth: 21

Part 02: The population

1. Assessment of the degree of completeness in the RGPH: 25

1.1. The balancing equation 25

1.2. Globality Rate 27

1.3. Census decrease 27

2. Evaluation of RGPH data According to (age and gender) 27

2.1. Data definition: 27

2.2. Data quality assessment: 27

2.3. Division by category: 28

2.4. Undefined category: 28

2.5. Masculinity ratio: 28

3. Undefined population: 30
3.1. Undefined rate: 30
4. Analysis of age quality using the United Nations Secretariat method: 31
4.2. Age ratio: 32
4.3. Divergence on 100: 33
5. Interpretation according to international standards 33
Part 03: The fertility
Introduction: 36
1. Definition of fertility: 37
2. Fertility indicators: 37
3. Total fertility rate (TFR) 37
4. The total fertility rate (TFR) 37
5. Age-specific fertility rate (AFR) 38
6. Net reproduction rate (NRR) 38
7. Geographical importance of fertility: 38
7.1. Influence on population growth and distribution: 38
7.2. Impact on age structure: 39
7.3. Planning and land use: 39
7.4. Understanding regional disparities: 39
7.5. Public policy development: 39
8. Analysis and calculation of fertility: 39
8.1. Types of fertilization: 40
8.2. Method for calculating fertility: 40
8.2.1. Indirect method: 40
8.2.1.1. *Total fertility rate* 40
8.2.1.2. *Total fertility rate* 40
8.2.1.3. Fertility rate by age (T F S A) 40
8.2.1.4. *Overall Fertilization Rate* 40
8.2.1.5. Overall Reproduction Rate) 40
8.2.1. Indirect method: 41
8.2.2.1. *Crude birth rate* 42
8.2.2.2. Comparative birth rate 42
8.2.2.3. *Age structure rate* 42
8.2.2.4. *Age structure effect rate* 42

Conclusion: **43**

Part 04 : Population estimates

Introduction: **45**

1. How is population estimated? **45**

1.1. The growth rate: 46

2. Constant growth rate methods (discrete method) **48**

3. The constant growth rate equation **48**

Analysis: **49**

4. Conclusion: **50**

Part 05: The Activities

Introduction **52**

1. Definition and Concepts: **53**

2. Key employment indicators **55**

2.1. Labour force participation rate: **55**

2. The Main Employment Indicators **56**

2.1. The Labor Force Participation Rate **56**

2.3. The Unemployment Rate **57**

2.5. The economic activity rate by age: **58**

3. Analysis: **60**

General Conclusion: **62**

Référence: **64**

General Introduction :

The Population, Habitat and Activities module takes a geographical and socio-economic perspective aimed at understanding the complex interactions between human societies and the spaces they occupy. It analyses how populations organize themselves, develop their living environment and engage in productive activities to ensure their subsistence and development.

The study of population is a fundamental starting point. It focuses on demographic dynamics such as birth rates, mortality, fertility, life expectancy, and internal and international migration. These phenomena influence population growth, age structure and the spatial distribution of inhabitants. Understanding these factors makes it possible to anticipate needs in terms of infrastructure, housing, education, health and employment. Demographic transitions, pressure on resources and challenges related to an ageing or young population are also central to this analysis.

Housing, meanwhile, represents the visible form of human occupation of space. It can be rural or urban, concentrated or dispersed, planned or spontaneous. The organization of housing depends on natural (climate, terrain, water resources), historical, cultural and economic factors. The rapid urbanization observed in many countries around the world is profoundly transforming landscapes and lifestyles. It poses major challenges such as access to housing, basic services, transport and employment, while rising environmental issues related to urban sprawl and sustainable land management.

Economic activities are the third key focus of this module. These include the primary sector (agriculture, fishing, and mining), the secondary sector (industry, manufacturing) and the tertiary sector

(commerce, services, tourism). Their location and development depend on available resources, infrastructure, technological level, labour force and public policies. Global economic transformations, globalization and technological innovation are constantly changing the organization of activities and their impact on territories.

An integrated approach to these three components highlights the interdependent relationships between population, habitat and activities. Sustained population growth influences urban expansion and demand for jobs; economic development transforms social structures and spatial organization; spatial planning seeks to reconcile development, social equity and environmental protection.

Ultimately, this module provides learners with the tools they need to analyze contemporary territorial dynamics understand the challenges of sustainable development and adopt a critical approach to social, economic and spatial change at different scales: local, national and global.

Part 01:
Concept and definitions

Definitions of general concepts:

1. Agglomeration:

This is a group of at least 100 buildings within the territory of a municipality, located close to each other on the ground. In an agglomeration, buildings must be less than 200 meters apart.

2. Main agglomeration: The agglomeration where the APC headquarters is located is known as the main agglomeration (ACL).

3. Secondary agglomeration: The other agglomerations in the municipality are known as secondary agglomerations (AS).

4. Scattered territory (scattered zone):

When all the urban areas of the same municipality are delimited, the rest of the municipality constitutes the scattered territory or scattered zone. It consists of small groups of dwellings (hamlets, localities). And scattered buildings known as isolated dwellings

a. Hamlets:

This is a group of between 10 and 99 buildings, less than 200 metres apart.

b. Localities:

This is a group of between 2 and 9 buildings less than 200 metres apart.

c. Isolated building:

This is all isolated buildings (far from hamlets and localities) in the scattered area of the municipality.

5. The district:

The district is defined as a part of a town or portion of territory of a suitable size defined by census engineers, so that a census officer can census it entirely during the 15-day census period.

There are two types of district.

5.1. The agglomerated district:

This is a district belonging to an agglomeration, composed of one or more blocks, with an average population of 1,050 people to be counted (approximately 150 to 200 households). To help the enumerator count a maximum of 70 people per day due to the high density in these districts.

In exceptional cases, the population of a block may exceed the population of a neighborhood.

Figure (01): Map of a district in an agglomerated area.

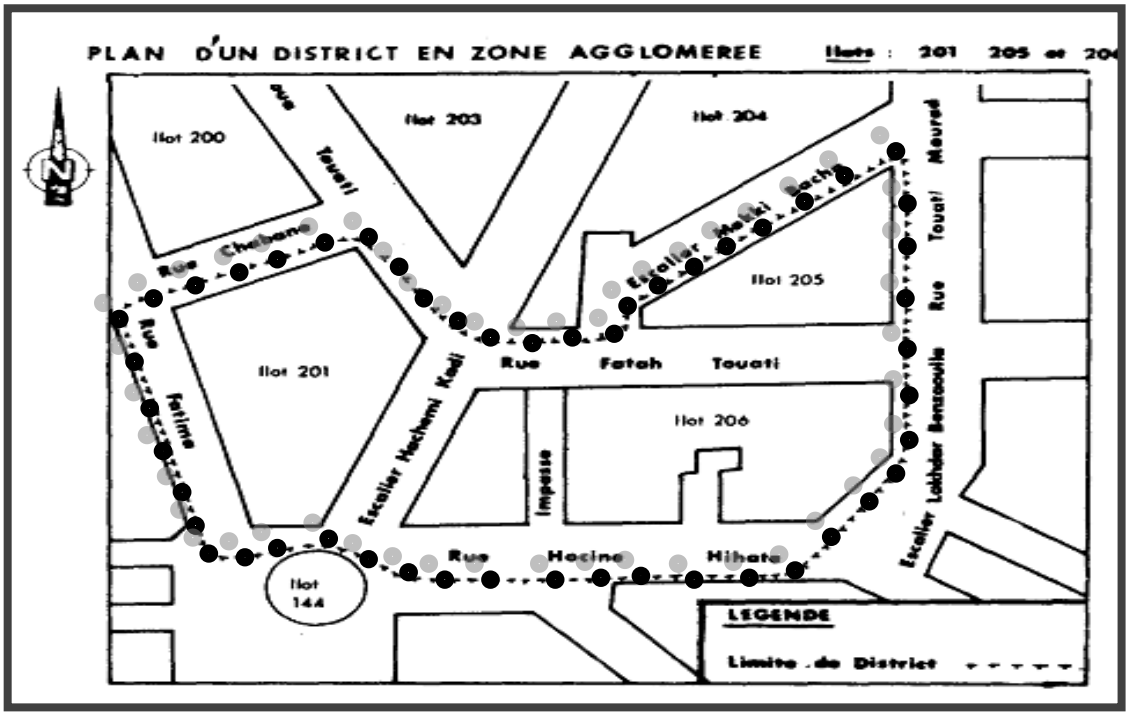
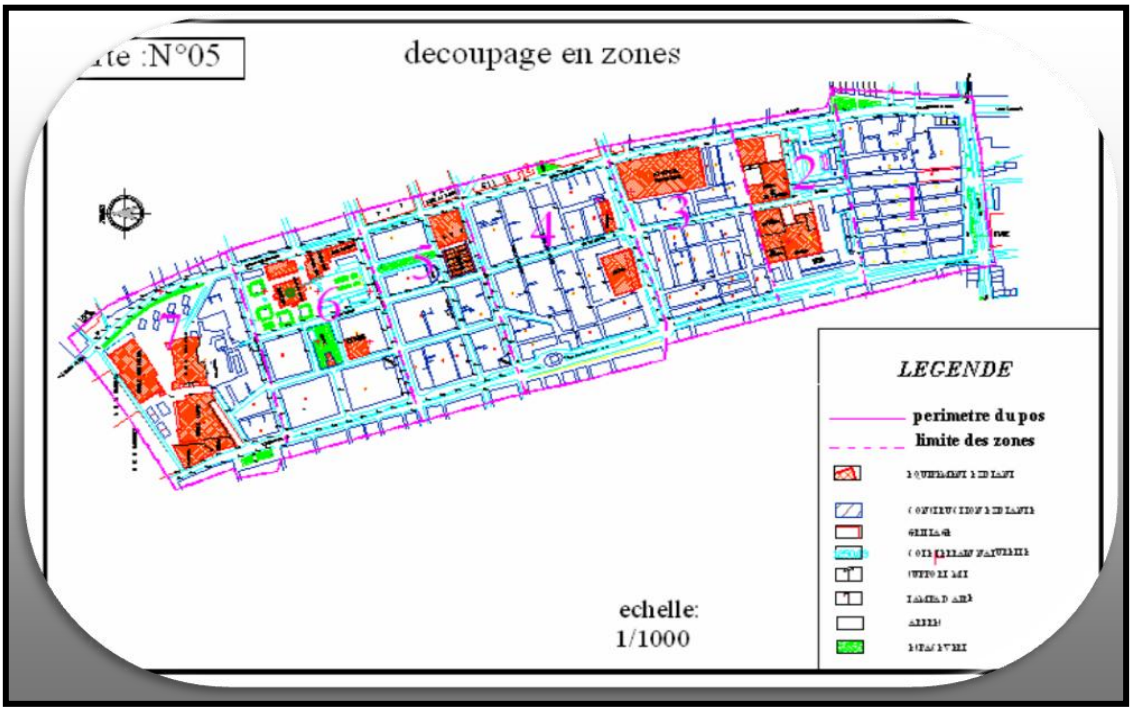


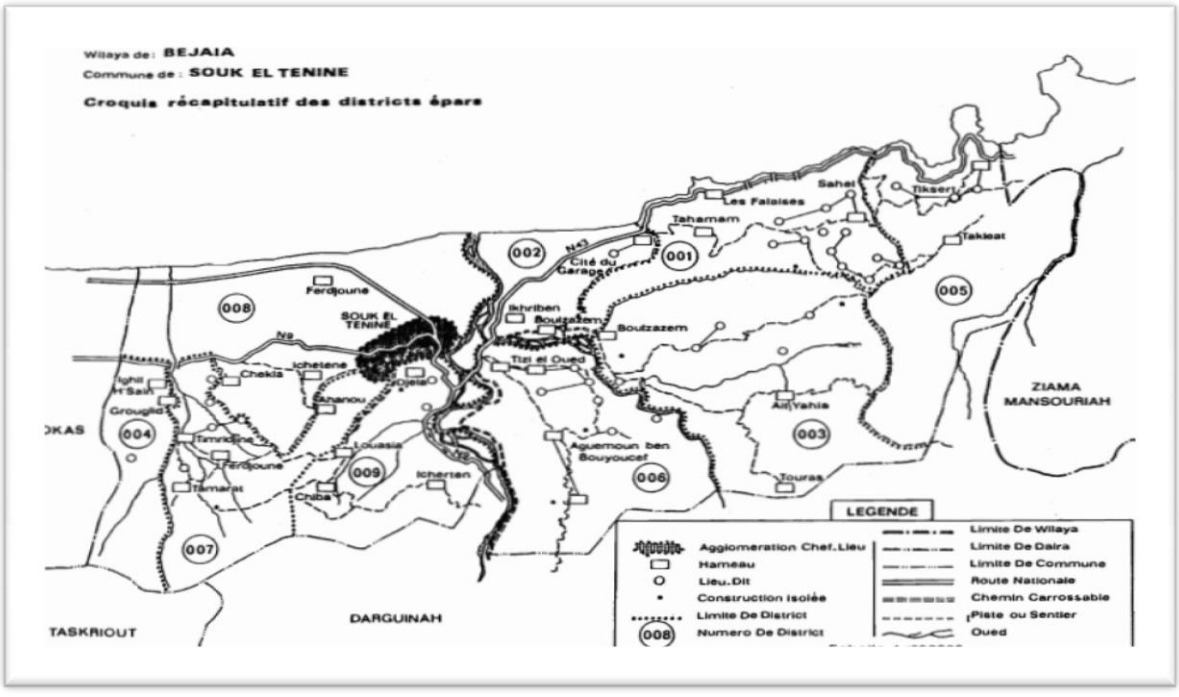
Figure (02): Map of a district in an urban area - Guenani - City of Djelfa.



5.2. The scattered district:

This is a district belonging to a scattered area, consisting of one or more hamlets, localities and isolated buildings. It comprises approximately 550 people to be counted.

Figure (02): Sketch Summary of scattered districts



6. Block:

A portion of land in an urban area surrounded by roads (streets, avenues, railways, waterways, etc.) and not crossed by any of them. An block may contain a building, a group of buildings, a square, a public garden or a vacant lot.

7. Building:

A building is constructed or developed by humans. It is solid enough to be used as a dwelling, a place of work or for storing goods or machinery.

This definition includes structures such as shacks, huts, tents, boats, and natural shelters such as caves.

A structure is distinguished from a building by the fact that it has a main entrance and possibly one or more secondary entrances, and by the absence of any internal communication with another neighboring structure.

A structure may consist of one or more dwellings.

8. Population:

Population can be studied in terms of its geographical distribution across different study areas, highlighting demographic disparities at the local or regional level. This analysis involves identifying which areas are densely populated and which areas have a lower density, taking into account the natural, economic and social factors that influence human settlement. At the same time, it is important to examine the distribution of the population between urban and rural areas, as these two spaces have very different characteristics and needs.

Urban areas, which are often more densely populated, are home to economic activities, services, infrastructure and jobs, while rural areas are generally less populated and dominated by agricultural activities and natural resources. Analyzing this distribution provides a better understanding of migration dynamics, urbanization, pressure on public services and infrastructure, and specific needs in terms of education, health and housing. Studying the population according to these criteria therefore provides essential information for local and national development planning, enabling public policies to be adapted to demographic and territorial realities.

9. Geographical distribution of the population:

The geographical distribution of the population refers to how inhabitants are spread across a given territory, whether it be a country, a continent or the entire globe. This distribution is neither uniform nor random; it is influenced by several natural, economic, historical and social factors. Some regions have a high population density, particularly urban areas, fertile plains and industrialized regions, while other areas, such as deserts, mountains and regions with extreme climates, are sparsely populated.

Studying geographical distribution helps us to understand territorial imbalances and their consequences for development. It also helps to analyze the relationship between the population and its environment, as well as the challenges associated with urbanization, land use planning and resource management. Thus, the spatial distribution of the population is a fundamental element in demographic analysis and economic and social planning.

9.1. Demographic analysis:

Demographic analysis is the scientific study of population characteristics and movements using statistical and mathematical methods. It aims to measure, explain and predict changes in the number of inhabitants and their structure. This analysis is based mainly on the observation of fundamental phenomena such as birth rates, death rates and migration, which determine population change over time.

It also makes it possible to examine the composition of the population according to age, sex, marital status, level of education and economic activity. Through specific indicators such as the natural growth rate, fertility rate, life expectancy and dependency ratio, demographic analysis provides essential data for understanding the dynamics of a society.

In addition, demographic analysis plays a fundamental role in development planning. It helps public authorities anticipate needs in terms of education, health, and employment, housing and social protection. Through projections and forecasts, it enables the development of policies adapted to the present and future realities of the population. Demographic analysis is therefore an indispensable tool for ensuring balanced and sustainable development.

9.1.1. Vital statistics:

Vital statistics is a branch of demography that studies fundamental events in human life, such as births, deaths, marriages and divorces. It is based on the systematic collection and official recording of these facts through civil registration and health information systems. These data make it possible to accurately measure key demographic

indicators such as birth rate, death rate, infant mortality rate, marriage rate and life expectancy.

Vital statistics play an essential role in analyzing population trends, as they provide reliable and regular information on demographic changes. They also make it possible to assess the health status of a population, a country's level of development and the effectiveness of public policies on health and social protection. Thus, thanks to vital statistics, decision-makers have accurate tools at their disposal for planning health services, improving living conditions and guiding economic and social development strategies.

Mortality, birth rate, natural growth, age group, sex ratio

9.1.2. Economic statistics:

Economic and sociological statistics are essential tools for understanding the life and functioning of a society. Economic statistics focus on the productive and commercial activities of a country or region. They include the study of agricultural production, which measures the quantity and quality of crops and the contribution of agriculture to the economy. They also encompass industrial production, assessing the quantity of goods manufactured and the performance of different industrial sectors. Economic statistics extend to domestic and foreign trade, tracking the flow of goods sold wholesale or retail, as well as the export and import of goods. Finally, they take into account transport mobility, i.e. the movement of goods and people, which is essential for analyzing market integration and the fluidity of economic exchanges.

Sociological statistics, meanwhile, focus on studying social life and the conditions of the population. They analyze the social status of individuals, their professional activities, their participation in public and private services, and their access to social infrastructure. It also includes data on administration and the civil service, such as the distribution of employees, the nature of their contracts (permanent, temporary, seasonal) and remuneration levels. In addition, it looks at living conditions, particularly the nature of housing, the quality of accommodation and access to basic services such as water, electricity and sanitation. This information provides a comprehensive picture of the social well-being and economic organization of a population.

By combining these two types of statistics, decision-makers can better understand economic and social dynamics identify priority needs and

plan appropriate policies to promote sustainable development and improve the living conditions of the population.

9.2. Population Geography:

The study of population is an essential basis for guiding and controlling economic and social development plans. Indeed, in-depth knowledge of demographic data provides an understanding of the dynamics of a society and enables its transformations to be anticipated. Population size, geographical distribution, age structure, level of education and migratory movements directly influence a country's political and economic choices.

For example, a young and rapidly growing population requires significant investment in education, vocational training and job creation in order to avoid unemployment and social exclusion. Conversely, an ageing population requires the strengthening of health systems, pension schemes and social assistance services. Demographic analysis therefore makes it possible to adapt public policies to the real needs of the population.

In addition, population studies play a decisive role in spatial planning. They help to organize land use, plan the construction of housing, schools, hospitals, roads and other essential infrastructure. They also help to reduce regional inequalities by identifying the most vulnerable or dynamic areas.

Economically, demographic data influences production, consumption and investment. A large working population can be an engine of growth, provided it is well trained and integrated into the labour market. Similarly, household structure and purchasing power guide industrial and commercial development policies.

Finally, the study of population helps to ensure sustainable development. By taking into account available resources and future needs, it promotes balanced management of the environment and national wealth. It is therefore an indispensable strategic tool for any policy aimed at economic progress, social justice and long-term stability.

To this end, the geographical study of population is based directly on the following points:

9.2.1. Natural growth:

The study of population structure by age and gender is a fundamental aspect of demography and population geography. It allows for the analysis of the distribution of different age groups, particularly the working-age population, in relation to the total population. This analysis provides valuable insights into a region's economic potential and its capacity to support local development. It also makes it possible to assess the relationship between the population and the local environment, taking into account available resources, living conditions and existing infrastructure.

In addition, the distribution of the population by economic sector — such as agriculture, industry, services and construction — provides information on the active participation of different age groups and genders in the economy. It helps to identify imbalances, such as an excess of young workers in certain sectors or a shortage of skilled labour in others, which is essential for employment planning and vocational training.

In addition, population geography also studies migration phenomena, whether internal or external, seasonal or permanent. Examining population movements provides insight into the causes and

consequences of rural exodus, a phenomenon whereby rural inhabitants migrate to cities in search of employment and better living conditions. These migrations influence the spatial distribution of the population, the density of urban and rural areas, and the economic and social dynamics of territories. Thus, the joint study of age and gender structure and migratory movements provides a comprehensive view of the population and its impact on local and national development.

Conclusion:

Population studies in general are very significant as they disclose the fundamental human and social aspects of a location. If these population studies are carried out in a most professional and technical manner, their concrete outcomes are manifested in different land-use planning changes in both urban and rural areas. Naturally, awareness of the population size, geographical distribution, age and sex composition, as well as migration trends, is a unique instrument for decision-makers and city planners in the appropriate designing of infrastructures, public amenities, residential housing, and economic centers.

Studies like these help people who live in cities to anticipate population growth, plan urban development, manage traffic and public transportation, and forecast the need for schools, hospitals, and recreational facilities in the rural context, studies do not only disclose the extent of human pressure on natural resources, help in the designing of farm projects, and guarantee that the basics services are distributed in a fair way, but also act as a handbook in the delivery of such services.

Therefore, demographic data incorporation into spatial planning represents a guarantee of effective and balanced land management, ultimately leading to a reduction in regional disparities and sustainable development promotion. To cut a long story short, population studies are not simply a matter of statistics, but rather a strategic tool that directs all spatial planning activities towards fulfilling the real needs of residents and maximizing the use of available resources.

Part 02: The population

1. Assessment of the degree of completeness in the RGPH:

The assessment of the degree of completeness of the general population census is based on the following points

- The balancing equation.
- The masculinity ratio.
- The growth rate.

In other words, the degree of comprehensiveness is defined by the total population figures, which are characterized by: The degree of comprehensiveness indicates the proportion of people who question the census upwards or downwards due to errors in the census, both by census takers and those who were themselves counted (such as not limiting themselves to certain neighborhoods, some families not being counted, some families being counted twice,

Therefore, the degree of comprehensiveness in population censuses shows the reality and effectiveness of census data. To this end, we carry out the following steps:

1.1. The balancing equation

1.1.1. Census reduction:

- Not counting (district, city, block)
- Not counting (households)

1.1.1. Census increase:

The degree of comprehensiveness of the RGPH clearly shows the reality and effectiveness of the RGPH data.

These are the two characteristics, and both the decrease and the increase are corrected at the same time. To do this, the following equations must be used:

First Equation:

$$X = x_0 + (N_d - M_d) + (M_i - M_e) \quad \ldots\ldots\ldots\ldots\ldots\ldots 01$$

X = Next RGPH
X0 = Previous RGPH
Nd = Birth rate between the two RGPHs (10 years)
Md = Mortality rate between the two RGPHs (10 years)
Mi = Internal migration
Me = External migration.

Second Equation:

$$\text{Globality Rate} = \frac{\text{Census population}}{\text{Estimated population}} \times 100 \quad \ldots\ldots\ldots\ldots\ldots 02$$

Third Equation:

Census decrease = 100 - Overall rate 03

Exercise 01:

Table N (01): Population figures according to the 1977 General Population and Housing Census – Algiers.

Province	Pop 1977	Pop 1966	Birth rate 66/77	Death rate 66/77	Internal migration	External migration
Algiers	16095466	12096620	6558110	1589079	21350	**234492**
Total	**x**	**x**	**4969031**		**- 213142**	

Solution:

$$X = 12096620 + (4967320) + (- 213142)$$
$$= 12096620 + 4754178$$
$$= 16850798 \text{ (nombre d'habitant estimé)}$$

1.2. Globality Rate $= \frac{16095466}{16850798} \times 100$

= 95.5 %

1.3. Census decrease = 100 - 95.5 %

= 04.5 %

2. Evaluation of RGPH data According to (age and gender)

This involves analyzing and checking the quality of the information collected during the General Population and Housing Census (RGPH) based on the key demographic characteristics of age and gender. This evaluation makes it possible to verify the reliability, consistency, and completeness of the data, identify gaps or anomalies, and ensure that the demographic structure (distribution by age and sex) accurately reflects the population surveyed.

Data evaluation is a methodical process aimed at ensuring the reliability, consistency, and completeness of the information collected during the General Population and Housing Census (RGPH). This evaluation is based on five Key points:

2.1. Data definition:

This involves clarifying the nature of the information collected, its units of measurement, and its demographic characteristics in order to ensure accurate understanding of the data.

2.2. Data quality assessment:

Checking the reliability, internal consistency, and completeness of the data to detect any errors, omissions, or inconsistencies

2.3. Division by category:

Classification of data according to relevant criteria, such as age and gender, in order to facilitate analysis and comparison between different populations

2.4. Undefined category:

Identification of individuals for whom certain demographic characteristics, such as age or gender, have not been reported, this incomplete data is analyzed separately so as not to skew the overall results

2.5. Masculinity ratio:

Calculation of the ratio of men to women in the population an essential indicator for demographic and socioeconomic analyses

Analysis:

In order to apply the five points mentioned above, it is necessary to break down age groups, especially those originally defined in ten-year spans, into five-year groups, this makes it easier to work with the data in different areas such as economy, society, planning, and spatial development.

Besides, the figures have been used in a way that is simple, structured, and consistent, mainly focusing on the five-year groups, which, in turn, allows for a more precise analysis and a more efficient use of the data.
The method for splitting ten-year age groups into five-year groups relies on demographic estimation and proportional distribution techniques to preserve the data's consistency and reliability. This guarantees that the redistribution of the population among the new age groups is done in a way that is faithful to the starting point and that allows for a detailed analysis of the different age groups.

We have the equation:

$$C_{na} = \{ \frac{1}{2} ((c_n + 1) + 1/8 (c_{n-1} - c_{n+1})) \} \quad \ldots\ldots\ldots\ldots 05$$

C_{na}: the first part of the divided category (15–19) --- 20–24)
c_n: the category of the division (15–24)
c_{n-1}: the previous category (10–14) +(05 - 09)
c_{n+1}: the next category. (25-34)

Exercise 02:

Table N (02): Number of population counted by age group

Ages	Census population (hab.)	Correction population (hab.)	Category
0 - 4	138063		0 - 4
5 – 9	142605		5 – 9
10 -14	128759		10 -14
15 - 24	218036	99607	19 -15
		80755	20 - 24
25 - 34	120553		25 - 29
			30 - 34
35 - 39	43448		35 - 39
*	*	*	*
*	*	*	*
*	*	*	*
ND	1456		ND
Total	897920		Total

Solution:

We have the equation:

C_{na} = ½ (cn + 1/8 (c_n-1 – c_n+1)
C_{na} = ½ (180362 + 1/8 (271364 – 120553))
= ½ (180362 + 18851)
= ½ (199213)
= **99607 Hab** **Catégorie: 15 – 19**

C_{nB} = C_{na} – Cna
C_{nB} = 180362 - 99607
Cn_B = 80755 Hab. **Catégorie: 20 – 24**

3. Undefined population:

The undefined population refers to all individuals for whom essential demographic information, particularly age, is not provided or is insufficient in statistical sources. Due to this lack of data, these individuals cannot be included in the age structure of the population, which limits their consideration in demographic and socioeconomic analyses.

3.1. Undefined rate:

$$\text{Undefined rate} = \frac{\text{Number of undefined population}}{\text{Number of Pop counted - ND population}} \text{ x Number of population per category}$$

Example:

ND = 1456 inhabitants.

$$\text{ND rate} = \frac{1456}{897920 - 1456}$$

$$= 0.002$$

ND rate + 1

We have:

(ND rate + 1) x (Number of people per category)

$$\text{ND rate} = (0.002 + 1) \times (142605)$$
$$= (1.002) \times (142605)$$
$$= 142890 \text{ Hab}$$
$$= 142890 - 142605$$
$$= \textbf{285 Hab.}$$

4. Analysis of age quality using the United Nations Secretariat method:

The age analysis is carried out in the following steps:

4.1. Calculation of the sex ratio:

The sex ratio is a demographic indicator that compares the number of men to the number of women in a given population. It is commonly used in geography and demography to analyze the structure of the population by gender. The sex ratio is calculated by dividing the number of men by the number of women and then multiplying the result by 100. This indicator thus makes it possible to determine whether there are more men or more women in a population and to observe any imbalances according to age, location, or the period studied.

$$\text{Masculinity ratio} = \frac{\text{Population Number of Men}}{\text{Population Number of Women}} \times 100$$

The sex ratio falls within a range considered normal, meaning that there is a relative balance between the number of men and women in the population studied. A value between 95% and 105% means that there are approximately as many men as women, with no significant demographic imbalance.

The sex ratio is significantly reduced, meaning that there is a significant imbalance between the number of men and women. This situation may reflect a disruption in the census, particularly due to data collection errors, underreporting of certain population categories, or difficulties related to the context of the count. Such a discrepancy may therefore call into question the reliability of the results and requires in-depth analysis to identify the causes.

To calculate the results in column No. 05 (the deferent tubes followed by masculinity rates), refer to column N: 04, That is, the next category minus (-) the previous category.

Note: all results are positive (+).

4.2. Age ratio:

a demographic indicator that expresses the proportion of a population belonging to a given age group in relation to the total population. It is generally expressed as a percentage and can be used to analyze the age structure of a population, identify dominant groups, and assess demographic dynamics.

Table (03): Age quality index according to the United Nations Secretariat method

Catégories	Population hab.		Masculinity ratio		% age		Divergence per 100	
	Men	Women	%	D S %	Men	Women	Men	Women
0 – 4	1188	1156	102.77	-	-	-	-	-
5 – 9	909	882	103.06	0.29	90.49	92.65	9.51	7.35
10 – 14	821	748	109.76	6.70	/	/	/	/
15 – 19	/	/	/	/	/	/	/	/
20 – 24	/	/	/	/	/	/	/	/
25 – 29	/	/	/	/	/	/	/	/
30 – 34	/	/	/	/	/	/	/	/
35 – 39	/	/	/	/	/	/	/	/
40 – 44	/	/	/	/	/	/	/	/
45 – 49	/	/	/	/	/	/	/	/
50 – 54	/	/	/	/	/	/	/	/
55 – 59	/	/	/	/	/	/	/	/
60 – 64	139	135	102.96	/	/	/	/	/
65 – 69	101	96	105.21	2.25	99.51	90.57	0.49	9.43
+75	64	77	83.12	-22.09	126.73	160.42	-26.73	-60.42
Total				**106.83**			**91.63**	**93.53**

Tab 03 : Exemple **D S %: the deferent ducts of the follow-up masculinity rate.**

To determine the age rate, the age categories (population numbers) must be observed and the following formula applied:

$$\text{Age rate} = \frac{\text{Category (Population size)}}{\text{½ (next category + previous category)}} \times 100$$

4.3. Divergence on 100:

Divergence on 100 is an indicator expressing the relative difference between an observed value and a reference value, reported to 100, in order to standardize the deviation and facilitate comparison between different areas or periods.

Divergence on 100 = Age rate – 100

$$K = \frac{(3X \sum DS)}{n-2} + \frac{\text{Men divergence}}{n-2} + \frac{\text{Women divergence}}{n-2}$$

$$n - 2 = 13$$

$$K = \frac{(3X106.83) + 91.63 + 93.53}{13}$$

$$K = 38.71\ \%$$

Result:

The K indicator is a statistical tool used by the United Nations Secretariat to assess the quality of age data in a census or demographic survey. It measures the degree of regularity or irregularity in the age distribution of a population.

5. Interpretation according to international standards

In general:

- **K < 20 :** Very good quality data
- **20 ≤ K<40 :** Acceptable data but with moderate irregularities
- **K ≥ 40 :** Poor quality data, significant distortions

With **K = 38.71%,** the value is at the upper limit of acceptable quality, very close to the threshold indicating poor quality.

This means:

- Significant irregularities in age reporting
- Probable preference for certain numbers (e.g. ages ending in 0 or 5)
- Possible errors in age approximation
- Average reliability of data for detailed analyses (fertility, age-specific mortality, etc.)

The value obtained for the K coefficient (38.71%) indicates average quality of age data, with significant irregularities in age reporting. Although the data remain usable for general analyses, the probable presence of numerical preferences and rounding errors limits their reliability for detailed demographic studies.

Part 03: The fertility

Introduction:

Population dynamics is a major subject in the field of human geography. Besides the increase or decrease of population, it also reveals an understanding of where populations are distributed geographically and how they impact socio-economic and urban development. Fertility is the main factor among others that affect change significantly and causes the transition from one generation to another as well as the changing structure of a population.

Recently, fertility has gone beyond the traditional biological concept of Reproduction as it is influenced by social, economic, cultural, and political factors. Besides, different spatial measures that cause fertility will have significant consequences. For example, areas with a high birth rate may become a magnet for the young while areas with low birth rates will be characterized by the elderly and declining populations, such is the case with many developed countries.

So fertility and these memory measures will be very important, because fertility is one of the most important indicators in human geography and demography. It is used not only in predicting the growth of population, in preparing for infrastructure and services, but as well in reflecting differences of regions at both national and international levels.

1. Definition of fertility:

Fertility refers to the average number of children a woman can have or has actually had during her reproductive life, generally between the ages of 15 and 49.

Unlike fertilization, which is an individual biological process (the fusion of an egg and sperm), fertility is a statistical and collective concept used to assess the reproductive behavior of female populations and study long-term demographic trends.

It is a key indicator for analyzing population growth or decline, age structure and future developments in different areas.

2. Fertility indicators:

Fertility cannot be measured directly, but through several specific demographic indicators.

3. Total fertility rate (TFR)

The TFR represents the average number of children a woman would have if she followed the age-specific fertility rates observed at a given time.

- A TFR of 2.1 children per woman corresponds to the replacement threshold for generations (long-term population maintenance)
- An ISF above 2.1 indicates a growing population.
- An ISF below 2.1 reflects a potential population decline.

This indicator makes it possible to analyze the overall fertility of a territory and to compare populations between countries or regions.

4. The total fertility rate (TFR)

The TFR expresses the number of births per 1,000 women of childbearing age (15–49 years).

- It allows the fertility of a population to be assessed over a given period.

- It is a useful indicator for measuring annual fertility and observing its evolution over time.

5. Age-specific fertility rate (AFR)

The AFR indicates the average number of children born per 1,000 women in each specific age group.

- It reveals the most fertile ages, making it possible to identify reproductive trends by age group.
- It is particularly important for family planning policies and forecasting educational and health infrastructure needs.

6. Net reproduction rate (NRR)

The NRR measures the number of daughters a generation of women would have if current fertility and mortality conditions persisted.

- An NRR of 1 indicates exact replacement of the generation.
- It takes into account not only fertility, but also female mortality before the end of the reproductive period.

7. Geographical importance of fertility:

7.1. Influence on population growth and distribution:

Variations in fertility directly influence population size and density. Regions with high fertility often experience high demographic pressure, while areas with low fertility may experience ageing and population decline.

7.2. Impact on age structure:

Fertility determines the proportion of young people, working-age people and older people. A young population requires investment in education and health, while an ageing population requires more care and services for older people.

7.3. Planning and land use:

Fertility is an essential indicator for forecasting future needs in terms of infrastructure and services: schools, hospitals, housing, employment, transport, etc.

It enables planners and governments to anticipate demographic changes at local and national level.

7.4. Understanding regional disparities:

Analysis of fertility reveals significant geographical disparities:

- Developing countries generally have high fertility rates.
- Developed countries have low fertility rates, often below the replacement threshold.

These differences explain the stark contrasts in demographic dynamics, which influence the economy, migration and territorial development.

7.5. Public policy development:

Fertility provides a scientific basis for population policies: growth regulation, social service planning and targeted interventions in reproductive health.

8. Analysis and calculation of fertility:

- Degree of fertility
- Types of fertility
- Methods of calculating fertility

8.1. Types of fertilization:

First type: 15 ‰ ……Low…… stable
Second type: 15 - 30 ‰ …….. Average……semi-stable
Third type: 30 --40 ‰ ……strong……unstable

8.2. Method for calculating fertility:

8.2.1. Indirect method:

8.2.1.1. $$\textit{Total fertility rate} = \frac{\textit{Birth rate}}{\textit{Population}} \times 1000$$

8.2.1.2. $$\textit{Total fertility rate} = \frac{\textit{Birth rate}}{\textit{Number of women}} \times 1000$$

8.2.1.3. Fertility rate by age (T F S A)

Table (04): Fertility by age (T F S A)

Category	Women	Birth rate	TFSA
15 – 19	33454	1059	31.66
20 – 24	31683	5269	166.30
25 – 29	23059	5695	246.98
30 – 34	20503	4869	237.48
35 – 39	16770	2870	171.14
40 – 44	11687	1121	95.92
45 – 49	9881	169	17.10
Total	**147037**	**21052**	**966.57**

8.2.1.4. $$\textit{Overall Fertilization Rate} = \frac{\sum \textit{TFSA} \times 5}{1000}$$

8.2.1.5. Overall Reproduction Rate = Overall Fertilization Rate x 0.488 (f/F)

0.488 (f/F): international Average

8.2.1. Indirect method:

- age structure is the primary factor linked to fertility
- To correct or eliminate the effect of age structure using the Indirect method we have: United Nations standards (**1.7.7.6.4.1**)
- The standards (**1.7.7.6.4.1**) are classified according to the level of Fertility in all countries of the world
- The difference in fertility in different societies is directly linked to economic, social and cultural factors

Table (05): United Nations standards (1.7.7.6.4.1)

Category	Women	Standards	Women x Standards
15 – 19	542466	1	542466
20 – 24	421669	7	2951683
25 – 29	413074	7	2891518
30 – 34	37890	6	227340
35 – 39	304463	4	1217852
40 – 44	237911	1	237911
45 – 49	.Neglected this category (45–49) because female fertility is greatly reduced		
Total	1957473	//////////////////////	8068770

Data:

Number of births: 578396 inhabitants

Average population: 5895624 inhabitants

$$\textbf{8.2.2.1. } \textit{Crude birth rate} = \frac{\textit{Birth rates}}{\textit{Population}} \textit{ x 1000}$$

$$\textbf{8.2.2.2. Comparative birth rate} = \frac{\textit{Recorded births}}{\sum \textit{(Number of women x Standards)}} \textbf{ x 1000}$$

$$\textbf{8.2.2.3. } \textit{Age structure rate} = \frac{\textit{Crude birth rate}}{\textit{Comparative birth rate}} \textit{ x 100}$$

$$\textbf{8.2.2.4. } \textit{Age structure effect rate} = \textit{100 - Age structure rate}$$

Conclusion:

The review of fertility indicators depicts a vivid demographic pulse with relatively high fertility levels, primarily among the younger and middle reproductive will groups.

Fertility measures by age-specific fertility rates (ASFR) reveal that fertility peaks at the age of 25-29 (246.98 ‰) and remains quite high at the 30-34 ages (237.48 ‰). Such figures imply that most reproductive activities are going on within the central reproductive ages, a situation that is aligned with a relatively young population and early to moderate childbirth timing.

By adding the ASFRs, the Total Fertility Rate (TFR) can be estimated as:

This number greatly exceeds the replacement level of 2.1 children per woman, indicating that the population is undergoing a demographic growth of the.

Moreover, below is the crude birth rate derived from the whole data :

Crude Birth Rate ≈ 98.1‰

This is yet another confirmation of a very high birth rate, which, by the given typology, is even categorized in the third group (30-40‰ : very high and unstable fertility), pointing to substantial demographic pressure.

On the contrary, the second United Nations based indirect method also discloses that fertility is mostly a matter of the age structure of the population. The sheer youthfulness of a population can increase birth figures even when reproductive behavior is stable.

Part 04:
Population Estimation

Part 04 : Population estimates

Introduction:

Population estimation is a statistical process that aims to determine the number of inhabitants in a given territory at a specific point in time, or to predict its future evolution. It is an essential tool for governments, institutions and international organizations, as it enables effective planning of public policies, particularly in the areas of health, education, employment, housing and infrastructure.

Traditionally, demographic data is collected through national censuses, conducted periodically by official bodies such as the ONS. Between censuses, estimates are based on statistical methods that incorporate data on births, deaths and migration.

Population estimation is not limited to simple counting. They involve the use of demographic models, probabilistic analyses and sometimes advanced technological tools in order to obtain reliable results. At the global level, institutions such as the United Nations regularly publish population projections that help to understand global trends such as population growth, ageing and urbanization.

Population estimation therefore plays a fundamental role in understanding demographic dynamics and in short- and long-term strategic decision-making.

1. How is population estimated?

Population estimation involves determining the number of inhabitants in a given territory on a given date, especially between two official censuses. This estimation is based on precise demographic and statistical methods.

1.1. The growth rate:

The population growth rate is defined as the difference between the population at the end of a period and the population at the beginning of the period, relative to the average population.

This should not be confused with the population growth rate, which is defined as the difference between the population at the end of a period and the population at the beginning of the period, relative to the population at the beginning of the period.

The total balance per thousand inhabitants is equivalent to the growth rate. It is the sum of the natural balance (births minus deaths) and the migratory balance (arrivals minus departures due to migration plus statistical adjustments).

How is the population growth rate calculated?

The growth rate, often used to express the average annual change over a period of several years, is calculated using the following formula:

$$\textbf{Rate of increase} = ((P_n / P_o)^{1/n} - 1) \times 100$$

Pn = Previous population number

Po = Next population number

N = Number of years between the two periods.

Exemple:

Rate of increase = $((332500/241849)^{1/10} - 1) \times 100$

$= (1.0323 - 1) \times 100$

$= (0.0323) \times 100$

= 3.23 %

Table (03): Population growth - province of Djelfa- Algeria

RGPH	Population number	Rate of increase %	Observation
1966	241849	//	//
1977	332500	3.23	Sustained growth
1987	494494	4.05	Acceleration
1998	797706	4.40	Peak growth
2008	1090578	3.18	Slowdown
2013	1311075	3.75	Moderate recovery

General trends:

✔ Rapid and continuous population growth

✔ Likely young population

✔ Significant pressure on :

- Housing
- Employment
- Infrastructure
- Social services (education, health)

The population grew steadily throughout the period, with:

- A phase of very rapid expansion (1980s–1990s)
- A slowdown in the early 2000s
- A moderate recovery after 2008

This trend is typical of a region undergoing demographic transition, where growth remains high but is gradually beginning to stabilize.

How can we estimate population numbers?

There are several methods for estimating future population numbers, based on mathematical equations and assumptions about population growth rates.

Here are the main methods for estimating future population:

2. Constant growth rate methods (discrete method)

This is another commonly used method, especially when the annual growth rate is known and constant. This method simply applies a growth percentage for each year.

3. The constant growth rate equation

$$P_t = P_o \times (1+r)^t$$

Pt: the population at the moment (after: t – years)

Po: the population at the initial time.

r : the annual growth rate.

t : the number of years of estimation.

The population of the city of (x) is 1,000,000 inhabitants with an annual growth rate of 2%.

Estimate the population in: 10 years, 15 years, 20 years, and 5 years.

Solutions: (t = 10).

$$P_t = P_o \times (1+r)^t$$

$$P_t = 1000000 \times (1+0.02)^{10}$$

$$= 1000000 \times 1.219$$

$$= \mathbf{1219000\ Hab}$$

Analysis:

Based on current demographic data and observed population growth trends, it is estimated that within ten years, the number of inhabitants will reach approximately 1219000. This projection reflects a significant increase compared to the current population, suggesting not only natural growth due to births exceeding deaths, but also the possible impact of migration flows. Such population growth will have significant social and economic implications, particularly in terms of infrastructure planning, public services, education and health. These forecasts therefore enable authorities and planners to better anticipate future needs and put in place appropriate policies to support the harmonious and sustainable development of the territory .

4. Conclusion:

Population estimation is a central pillar of planning and management in modern societies. It is not limited to simply counting inhabitants, but also provides an understanding of the demographic dynamics of a territory analyses its trends and predicts its future development. The methods used-censuses, analyses of natural movement (births and deaths), net migration, and statistical projections-provide reliable tools for decision-makers.

The accuracy of these estimates depends on several factors: the quality of the available data, the rigour of the models used, and the consideration of exceptional events such as natural disasters, health crises, or mass migration. A well-conducted estimate not only enables effective planning of infrastructure, education, health and housing, but also allows for the anticipation of social and economic issues such as population ageing, urbanization and pressure on employment.

Finally, population estimates help prepare for the future by providing a clear picture of demographic trends. It transforms figures into indicators for action: every birth, every death and every migration influences society, and analyzing them provides a better understanding of the past, helps to manage the present and enables us to plan for the future.

In short, estimating the population is not only an administrative or scientific necessity, it is an indispensable tool for sustainable development.

Part 05: The Activities.

Introduction

The study of employment is one of the major areas of focus in economic geography and active demography. Work is not only a means of subsistence for individuals, but also a central factor in the organization of societies and territories. The spatial distribution of the working population, the level of employment and the structure of economic activities have a profound influence on the growth, development and planning of urban and rural areas.

Employment indicators make it possible to quantify and analyze individuals' participation in the labour market, understand sectoral transformations and identify regional or national disparities. These indicators are not limited to simply measuring the number of people in employment or unemployment; they also provide information on the quality of employment, sectoral distribution and a territory's capacity to absorb its working population.

In a global context marked by globalization, rapid urbanization, technological change and social inequalities, understanding these indicators is essential for planning sustainable development, anticipating infrastructure needs and formulating appropriate public policies. Thus, the study of employment is not only a matter for economics, but also an essential tool for human geography, as it allows us to link population, space and economic activity in a concrete way.

1. Definition and Concepts:

Employment is defined as all paid or productive activities carried out by a person of working age, generally considered to be between 15 and 64 years old. It refers to any situation in which an individual participates in the production of goods or services in exchange for remuneration, whether in the form of wages, profits, fees, or other types of income. Employment is therefore a central element of economic and social integration, as it enables individuals to meet their needs, improve their living conditions, and contribute to national wealth.

Unlike a narrow conception limited solely to formal wage employment, that is, declared employment governed by a contract and regulated by labor law the notion of employment is broader. It also includes self-employment, such as that of traders, artisans, farmers, or members of the liberal professions, who work on their own account. Moreover, in many countries, informal employment plays an important role: this refers to undeclared or unregulated activities, often characterized by the absence of social protection and legal guarantees.

Finally, employment may also take the form of underemployment, when individuals' work fewer hours than they would like or hold positions below their qualifications. Underemployment reflects an insufficient use of the labor force and serves as an indicator of labor market difficulties. Thus, employment is not limited to merely having a job, but rather refers to a complex reality that reflects the quality, stability, and working conditions of professional activity.

The labor force includes all individuals of working age, generally defined as persons aged 15 to 64, who participate in the labor market. It comprises both those who are employed (employed persons) and those who are unemployed but actively seeking work and available to work (the unemployed). However, it does not include inactive individuals, such as students who do not work, retirees, homemakers, or those who are not seeking employment.

The labor force represents a fundamental indicator for analyzing a country's economic dynamics. It constitutes the main productive force, as it includes individuals who directly contribute, or are ready to contribute, to the creation of goods and services. Its size and structure (by age, gender, level of education, or sector of activity) strongly influence economic growth, productivity, and public finances.

Furthermore, the labor force serves as the basis for calculating several key labor market indicators, such as the labor force participation rate, the employment rate, and the unemployment rate. It therefore makes it possible to assess the degree of economic participation of the population and to analyze the efficiency of the labor market, that is, its ability to provide jobs for those who wish to work. In short, the labor force is a central element for understanding the economic and social issues related to employment and development.

Employment indicators are statistical tools used to measure:

- participation in the labor market (labor force participation rate)
- the level of employment (employment rate)
- unemployment and its characteristics
- the sectoral distribution of jobs
- the quality and security of employment (underemployment and informal employment)

2. Key employment indicators

2.1. Labour force participation rate:

The labour force participation rate measures the proportion of the working-age population generally defined as people aged 15–64, who are actively participating in the labour market. It includes both individuals who are employed (active population) and those who are not employed but are actively seeking work and are available for work (unemployed). In other words, it takes into account not only those who are working, but all those who are offering their labor.

This indicator makes it possible to assess the level of participation of a population in the economic life of a country. A high activity rate means that a large proportion of people of working age are present in the labor market, which may reflect good economic dynamism or a strong need to work. Conversely, a lower activity rate can be explained by continued studies, early retirement, family responsibilities, discouragement in the face of unemployment or other situations of inactivity. The activity rate thus constitutes an essential tool for analyzing the structure of the labor market and the economic and social developments of a country.

$$\text{Activity rate} = \frac{\text{Active population}}{\text{Total population}} \times 100$$

- It makes it possible to assess a population's level of participation in the labor market.
- Low participation rates may reveal barriers to employment for certain groups, particularly women, young people, or rural populations.

Note:

- **The upper threshold ranges between 30–55% in highly developed countries.**
- **The average threshold ranges between 20–30% in developing countries.**

2. The Main Employment Indicators

2.1. The Labor Force Participation Rate

The labor force participation rate measures the proportion of the working-age population generally defined as individuals' aged15–64 who actively participates in the labor market. It includes both those who are employed (employed persons) and those who do not have a job but are actively seeking one and are available to work (the unemployed). In other words, it does not only take into account people who are working, but all those who are offering their labor.

This indicator makes it possible to assess the level of a population's participation in a country's economic life. A high participation rate means that a large share of working-age individuals is present in the labor market, which may reflect strong economic dynamism or a high necessity to work. Conversely, a lower participation rate may be explained by continued education, early retirement, family

responsibilities, discouragement due to unemployment, or other situations of inactivity.

The labor force participation rate is therefore an essential tool for analyzing the structure of the labor market and the economic and social developments of a country.

$$\text{Labor Force Participation Rate} = \frac{\text{Labor Force}}{\text{Total population}} \times 100$$

- It is a direct indicator of a territory's ability to create jobs.
- It also makes it possible to compare economic performance between regions or countries and to identify areas with strong economic dynamism.

2.3. The Unemployment Rate

The unemployment rate measures the proportion of the labor force that is without a job but actively seeking employment.

$$\text{Unemployment Rate} = \frac{\text{Unemployed Population}}{\text{Labor Force}} \times 100$$

Example of Calculation:

Table No. (01): Demographic Data – Algeria, 1977

	Employed Population	Unemployed	Labor Force	Total population	Labor Force Participation Rate	Employment Rate %	Unempl--oyment Rate%	Dependency Rate
M	2198738	647517	2846255	7773060	**77.25**	**36,62**	**22,75**	**3.54**
F	138234	23310	205697	787431	**67.20**	**26.12**	**11.33**	**5.70**
Tot	2336972	670827	3051952	8560491	**76.57**	**35.65**	**21.98**	**3.66**

Analysis:

- The male labor force participation rate **(77.25%)** is higher than the female rate **(67.2%)**, indicating stronger male participation in the labor market.
- The male employment rate **(36.62%)** is significantly higher than that of females **(26.12%).**
- The male unemployment rate **(22.75%)** is higher than the female rate **(11.33%),** although this difference may be influenced by inconsistencies in the female data.
- The female dependency rate is very high **(5.72%),** meaning that each active woman economically "supports" nearly 3 inactive people.
- verall, the labor market appears to be characterized by:**
    - Low economic participation.
    - Relatively high unemployment.
    - High economic dependency (significant dependency rate).

2.5. The economic activity rate by age:

The economic activity rate by age is calculated as follows

$$\text{Economic activity rate by age} = \frac{\text{Occupied Population by category}}{\text{Total population of the same category}} \times 100$$

Table (02): Employed population by category

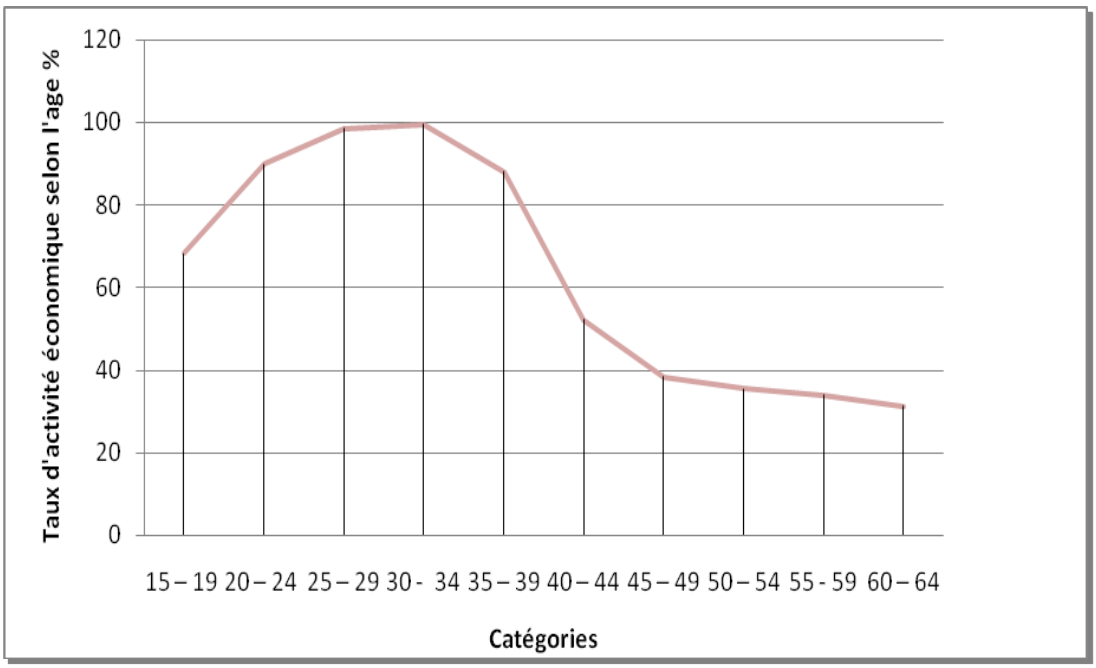
Category	Total population	Occupied Population	Economic activity rate by âge %
15 – 19	35342	24140	68
20 – 24	27699	24900	90
25 – 29	25485	25140	99
30 - 34	21086	20980	99
35 – 39	16626	14660	88
40 – 44	12508	6523	52
45 – 49	9795	3754	38
50 – 54	6925	2460	36
55 - 59	6582	2243	34
60 – 64	6083	1900	31
Totale	311933	*	**636**

$$\text{The total working years} = \frac{\sum (\text{Economic activity rate by âge})}{100}$$

$$= \frac{636 \times 5}{100} .$$

$$= 32 \text{ ans}$$

Fig (01) : Economic activity rate by âge



3. Analysis:

The graph shows the economic activity rate by age and highlights changes in labour market participation over the life cycle. It can be seen that the activity rate starts at a relatively low level in the 15–19 age group. This is mainly due to further education and this is mainly due to the pursuit of education and initial training, which delay the actual entry into working life.

Subsequently, the activity rate increases sharply and continuously in the following age groups. This increase reflects the gradual integration of young people into the labour market as they complete their education and enter their first job. This increase continues until it reaches a maximum threshold, generally corresponding to the 30–34 age groups. At this stage, the majority of individuals are professionally integrated, enjoy a certain degree of stability and participate fully in economic activity.

After this peak, the activity rate begins to decline gradually with advancing age. This decline can be explained by several factors: occupational burnout, health problems, early retirement or permanent departure from the labour market. As the years of work accumulate and individuals age, the proportion of economically active people decreases, reflecting the natural cycle of working life

.

GENERAL CONCLUSION

General Conclusion:

The study of the ***Population, Habitat and Activities*** module highlights the close and interdependent links between demographic dynamics, spatial organization, and the development of economic activities. The population is the main actor in spatial planning: through its growth, mobility, and needs, it shapes housing patterns and directs productive activities.

Housing, whether rural or urban, reflects the level of development of a society as well as the natural, social, and economic conditions that influence its organization. Its evolution particularly marked by increasing urbanization illustrates the profound transformations affecting territories at different scales.

Economic activities, for their part, represent the driving force of development. Their distribution and diversification influence regional attractiveness, job creation, and the improvement of living conditions. However, these dynamics can also generate spatial imbalances, social inequalities, and environmental pressures.

Thus, understanding the interactions between population, housing, and activities makes it possible to analyze contemporary challenges related to spatial planning, sustainable development, and social justice. This module therefore encourages the adoption of a comprehensive and critical perspective on spatial and economic transformations, in order to promote harmonious, balanced development that respects future generations.

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