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Population Distribution and Composition

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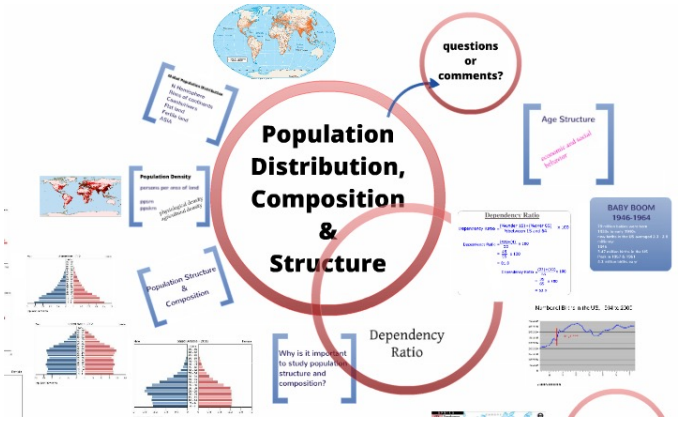


The content of this course is exactly compatible with the program in which the same course is taught in Turkish, and the open course materials prepared by Prof. Dr. E. Murat Özgür are used.

1) Population Distribution

a) Global Distribution Pattern of Population

2) Composition of the Population

a) Gender Structure

b) Age Structure

- Factors Affecting Age Structure
- Population Pyramids
- Measuring Age Structure

3) An Aging World, An Aging Turkey

- **Describing and analyzing spatial distributions is an important aspect of geography.**
- **The questions of where and why things happen are traditionally at the center of the discipline of geography.**
- Therefore, it is necessary to look at the reasons for the spatial distribution of the world population, the age and gender structure of the population, and the elderly population patterns in the world and in Turkey.
- The world population has shown **continuous temporal changes** and **a gradual increase** until 300 years ago.
- A rapid rate of increase over most of human history has gradually become apparent, with large population fluctuations in certain areas such as China and Europe.
- The **fluctuating increase** over time has shown an uneven development across space. **Geographically asymmetrical growth** has emerged because the population of some countries and continents has increased faster than others.

- **Usually when starting an analysis of a particular area (city, county, province, region, country, or a political unit), the number of people in that area is considered the first attribute of the population.**
- Often the initial assessment of a country or region is based on its geographic area and population size.
- **The number of people in a given geographic unit is considered one of the key elements needed for management and research objectives.**
- Population information is not only have a geographic importance. At the same time, it is used in calculating indexes for crime, marriage, divorce, disease incidence, unemployment and employment levels, and many other social and economic events, and for education, agriculture, public works, etc. It is used by the administrations to allocate appropriations in matters.
- **Many disciplines (economics, political science, etc.), as well as private and public organizations (city and regional planners, municipalities, ministries) also need the right population.**

Source: Ministry of Health

- There are many tools that human geographers use to describe population distribution.
- The most common expression of population is the population size of a certain geographical area (for example, the population of Ankara province) or the share of the population living in a particular area in the total population (the proportion of people living in Ankara within the total population of Turkey).

- Often the population will be contained within political/administrative units such as census area, neighbourhood, city, region or country so that reliable and meaningful statistics can be used and refer to a specific point in time.

- It may also be concerned with a specific sub-population group, such as the number of arrivals or immigrants from another region in a particular geographic area.

- Although sufficient on their own, simple numbers tell us little about the geographic distribution or composition of the population in an area.

- One of the widely used methods of showing population distribution is population density, which expresses the degree of clustering of a population within a given area (j).

- Density is the degree of compaction and describes the distribution.
- Density of a certain area is expressed as: $D_j = P_j : A_j$

Population density (Dj): Total population (Pj) *divided to* Total area of that place (Aj)

- Population density is the expression of the relationship between the area of a particular unit and the population there.

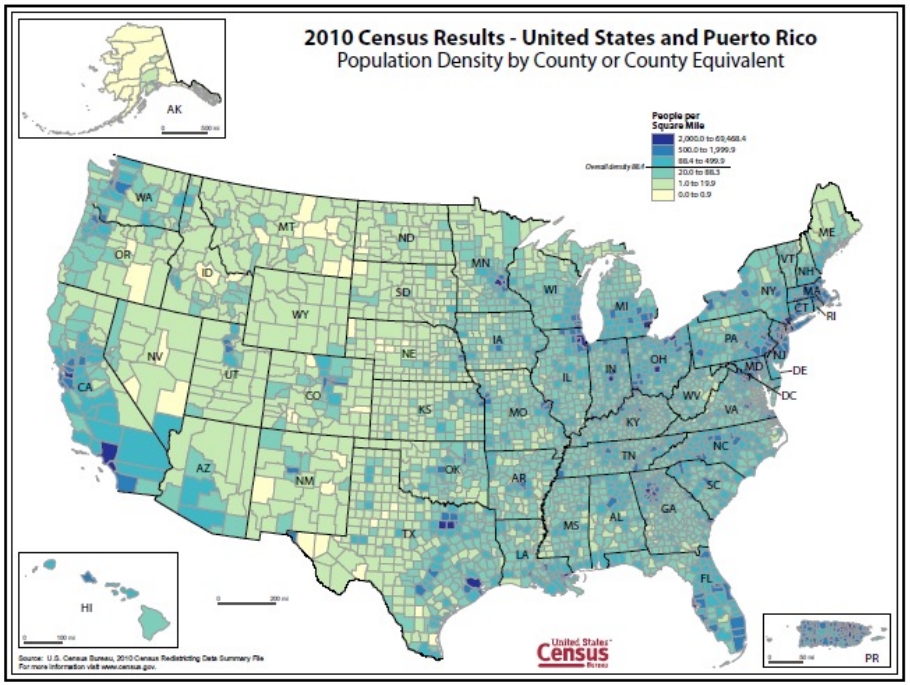
- Density values are suitable for analyzing differences in population distribution, but can often be misleading.
- Although density measures population distribution incompletely, it reflects some physical factors such as the availability of resources and the suitability of climate, as well as human factors such as social and economic resources.
- For example, the population density of China in 2020 is 153 people per km^2 and 7,140 people in Hong Kong.

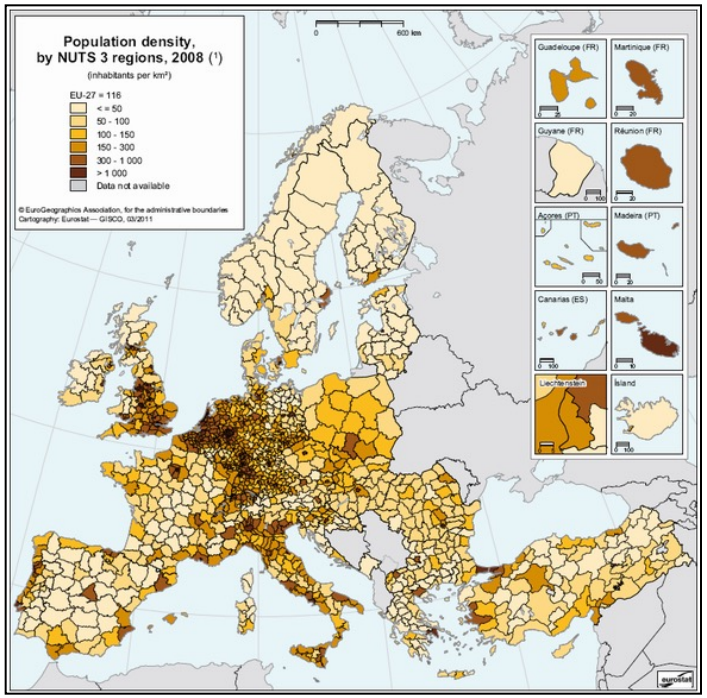
- Population densities vary by country, even by spatial units within a country. 4 people per km^2 in Australia, 502 in the Netherlands (2015), 2892 in Istanbul, 11 (2017) in Tunceli.

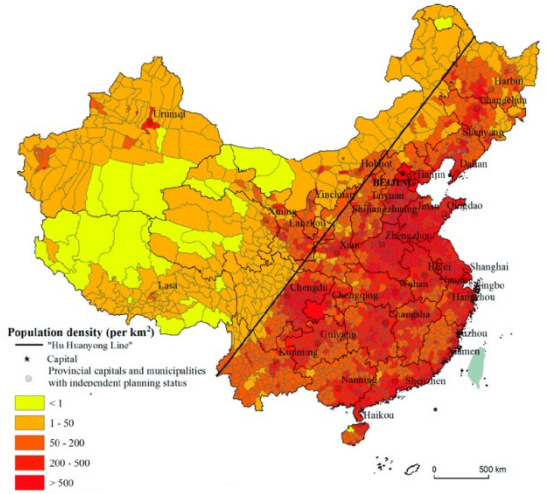
- Small-area states, especially island states such as Aruba (562), Barbados (661), are generally more densely populated. Conversely, densities decrease in states with large surface areas such as the USA (35) and Russia (9).

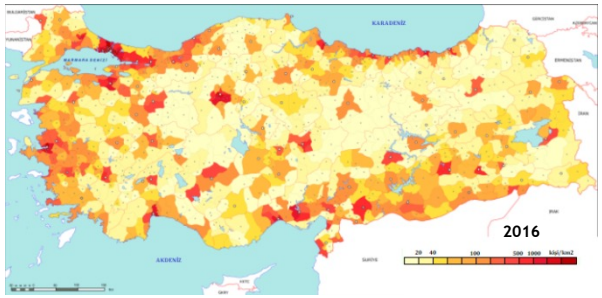
- Population density gives little clue about the human-resource relationship in a country. Rich states in the world with high density (502 people per km^2 in the Netherlands, 351 people per km^2 in the Netherlands) and low density (4 people in Australia, 18 people in Finland) but also high density (246 people in Pakistan, 1,238 people in Bangladesh) and low density (22 people in Sudan, 11 in Chad).

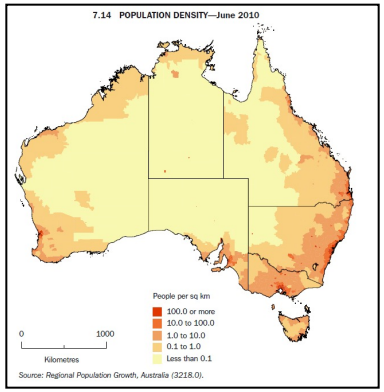
Population Density: USA, EU, Turkey and Australia









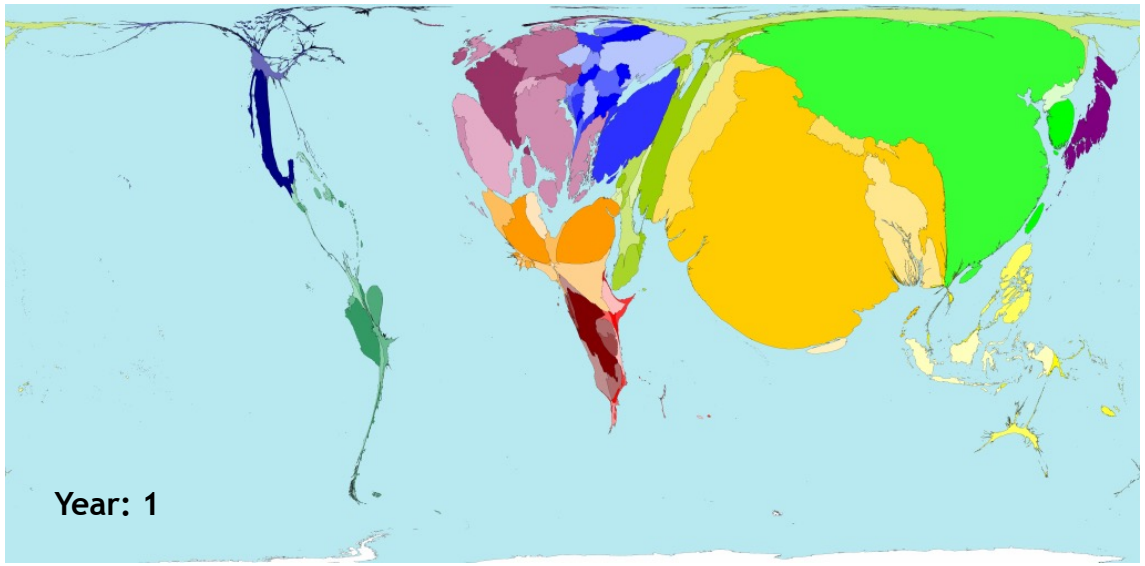


Continental Distribution of World Population: 2019 and 2050

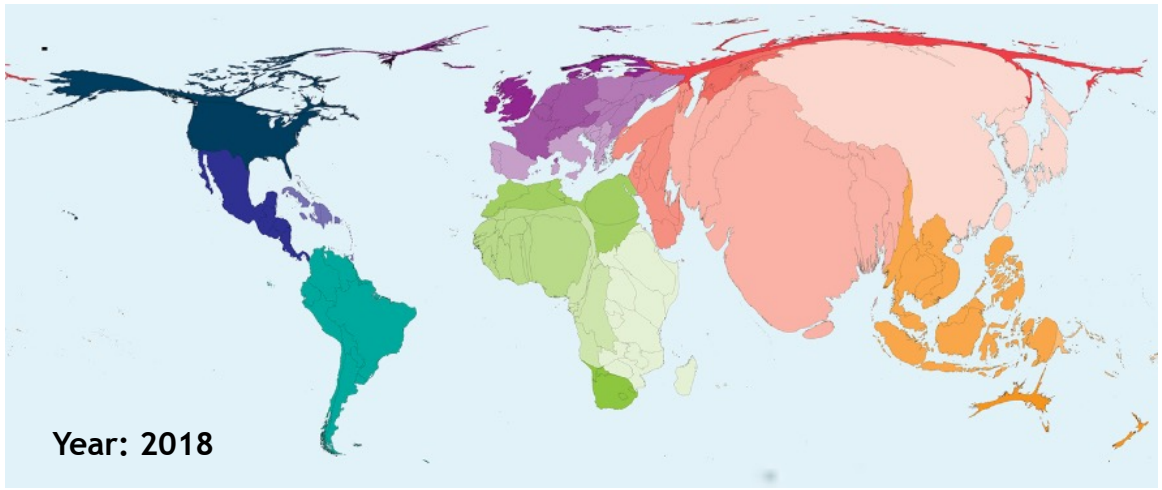
Continent	*Population (million people)**		*Portion in Total Population (%)*		*Area (1000 km²)*	*Population Density (person/km²)*	
	2019	2050	2019	2050		2019	2050
ASIA	4 601	5 257	59.6	53.8	31 796	145	165
AFRICA	**1 308**	**2 528**	**17.0**	**25.9**	**30 333**	**43**	**83**
AMERICA	1 015	1 215	13.2	12.4	40 570	25	30
EUROPE	747	716	9.7	7.3	23 015	32	31
OCEANIA	42	57	0.5	0.6	8 573	5	7
WORLD	7 713	9 773	100.0	100.0	134 288	56	73

* Source: World Population Prospects, 2019

World Population Distribution(Gridded Population Cartograms)



Source: http://www.worldpopulationatlas.org/.



Source: http://www.viewsoftheworld.net/wp-content/uploads/2018/01/TheWorldIn2018.png

- *The distribution of the world's population shows some patterns of inequality and contrast:*

1. **The vast majority of people living on earth live in a small part of the land. Approximately 90% of people are concentrated on 10% of the land.**

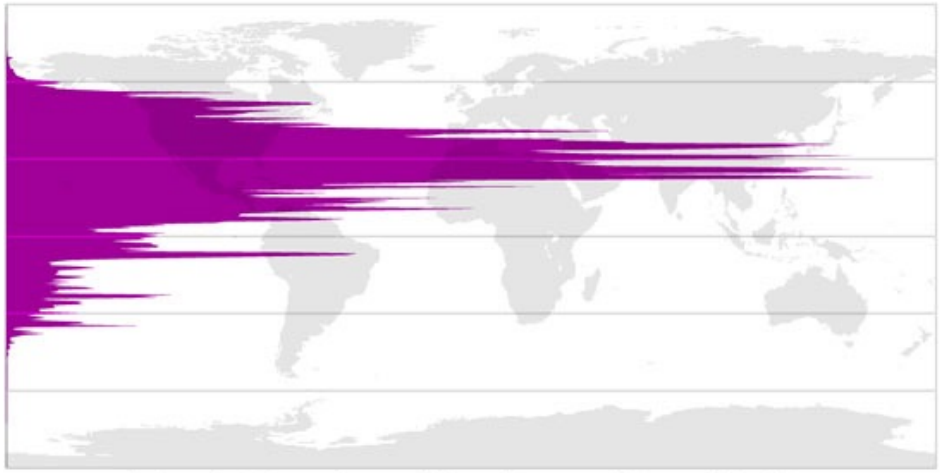
2. More than 90% of the world's population lives north of the equator and less than 10% lives south of it. However, it should be remembered that more than 80% of the world's land area is in the northern hemisphere.

3. **The world population is concentrated on the margins of the continents. Estimates are that almost 50% of them live within a distance of 200 km. A significant proportion of Turkey's population lives in coastal areas.**

4. The population size generally decreases with increasing altitude. About 80% of the world's population lives in areas with altitudes below 500 meters. Apart from the attractiveness of natural resources (mineral and oil fields, etc.) and recreational areas (such as ski resorts), mountainous areas have limitations in terms of economic activity diversity.

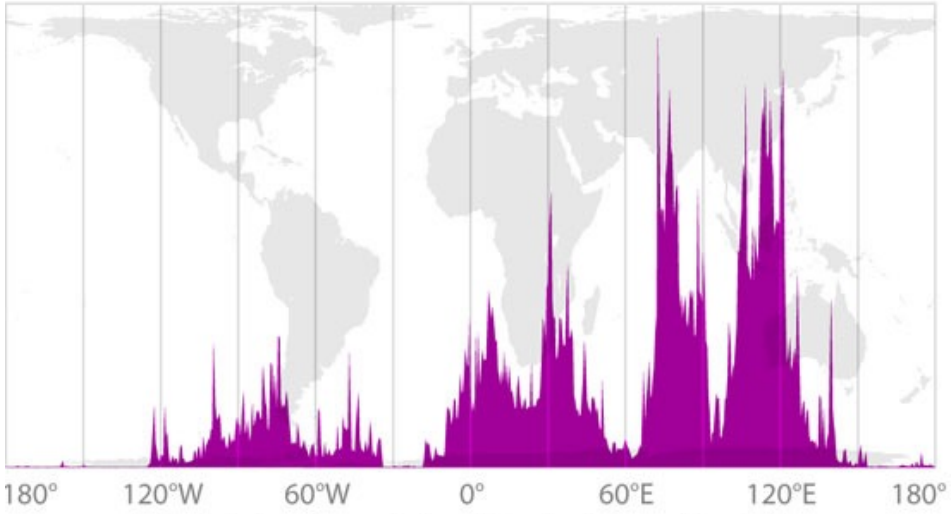
Distribution of World Population by Latitude and Longitude, 2000

The World's Population in 2000, by Latitude



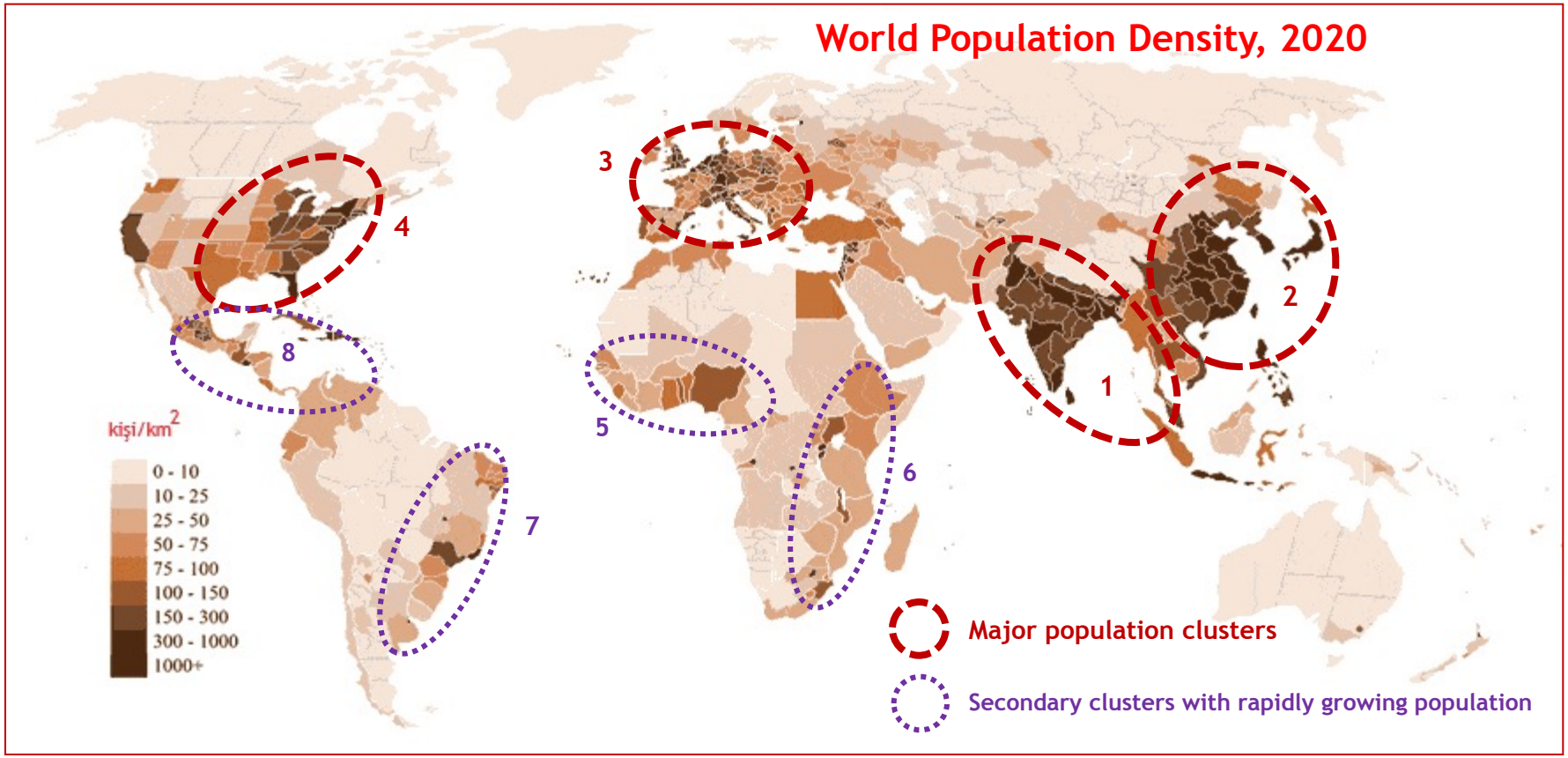
(horizontal axis shows the sum of all population at each degree of latitude)

The World's Population in 2000, by Longitude



(vertical axis shows the sum of all population at each degree of longitude)

Clustering Areas of the World Population



Source: https://www.worldometers.info/world-population/

Most Populous Countries (Millions)

2018	CHINA 1,394	INDIA 1,371	UNITED STATES 328	INDONESIA 265	BRAZIL 209	PAKISTAN 201	NIGERIA 196	BANGLADESH 166	RUSSIA 147	MEXICO 131
2050	INDIA 1,680	CHINA 1,344	NIGERIA 411	UNITED STATES 390	INDONESIA 320	PAKISTAN 307	BRAZIL 231	CONGO, DEM. REP. 216	BANGLADESH 202	ETHIOPIA 191

Major Clustering Areas of World Population, 2018

1) **SOUTH ASIA (1.9 billion):** Includes countries such as India, Pakistan, Bangladesh, Sri Lanka.
2) **EAST ASIA (1.64 billion):** Includes countries such as China, South and North Korea, Japan, Taiwan. In addition, 633 million people live in S.Eastern Asian countries such as Indonesia, Philippines, Thailand, Myanmar, Cambodia and Vietnam.
3) **EUROPE (746 million):** Includes most of the CIS, including the United Kingdom, Russia, EU countries and other European countries.
4) **NORTH AMERICA (365 million):** It includes the especially urbanized eastern parts of the USA and Canada.

Secondary Clustering Areas of the World Population

5) **WEST AFRICA (382 million)** Nigeria (196), Ghana, Ivory Coast come to the fore.
6) **EAST AFRICA (432 million),** Ethiopia(108), Tanzania(59), Kenya(51) and Uganda draw attention.
7) **SOUTH AMERICA (427 million)** countries such as Brazil (210) and Argentina(45)
8) **CENTRAL AMERICA (179 million)** It includes Latin American countries such as Mexico(131) and Guatemala.

World Population by Country

#	Country (or dependency)	Population (2020)	Yearly Change	Net Change	Density (P/Km²)	Land Area (Km²)	Migrants (net)	Fert. Rate	Med. Age	Urban Pop %	World Share
1	China	1,439,323,776	0.39 %	5,540,090	153	9,388,211	-348,399	1.69	38	60.8 %	18.5 %
2	India	1,380,004,385	0.99 %	13,586,631	464	2,973,190	-532,687	2.2402	28	35 %	17.7 %
3	United States	331,002,651	0.59 %	1,937,734	36	9,147,420	954,806	1.7764	38	82.8 %	4.2 %
4	Indonesia	273,523,615	1.07 %	2,898,047	151	1,811,570	-98,955	2.3195	30	56.4 %	3.5 %
5	Pakistan	220,892,340	2 %	4,327,022	287	770,880	-233,379	3.55	23	35.1 %	2.8 %
6	Brazil	212,559,417	0.72 %	1,509,890	25	8,358,140	21,200	1.74	33	87.6 %	2.7 %
7	Nigeria	206,139,589	2.58 %	5,175,990	226	910,770	-60,000	5.4168	18	52 %	2.6 %
8	Bangladesh	164,689,383	1.01 %	1,643,222	1,265	130,170	-369,501	2.052	28	39.4 %	2.1 %
9	Russia	145,934,462	0.04 %	62,206	9	16,376,870	182,456	1.8205	40	73.7 %	1.9 %
10	Mexico	128,932,753	1.06 %	1,357,224	66	1,943,950	-60,000	2.14	29	83.8 %	1.7 %

Densely Populated and Deserted Areas

(1) Hong Kong is one of the most densely populated areas in the world with 7,082 people per km² (mid-2019).
(2) One of the densely populated cities in South Asia: Kolkata (India)
(3) One of the most desolate places in the world: the Great Sahara Desert in North Africa.
(4) Polar regions, one of the leading non-ecumenical areas of the world: The North Pole

Oshodi Market in Lagos (Nigeria)

Analysis of the distribution of the world population points to the importance of some key factors in this distribution:

Natural environmental features (Landforms, climate, soil, water resources, etc.)

The historical development of a particular area and the continuity of the population there

Socio-economic and technical development of a field

Natural factors can explain only part of the uneven population distribution around the world, and help us understand the distribution, especially in sparsely populated parts of the world.

The role of human factors (geographical location, historical events, social and economic structure, organization, technological situation) related to the ability of people to adapt to the geographical environment as a community is greater and increasing.

- Socio-economic and technical development became even more important with the Industrial Revolution and the spread of modernization in the world.

- Increasing technological accumulation has reduced the influence of the natural environment on the distribution of population (double windows, the use of natural gas, reduced the harshness of cold climates, air conditioners made desert environments livable, even attractive).

- With economic development, the basic employment structures shifted from agriculture to the industrial and service sectors concentrated in cities.

- The population redistribution accompanied by modernization took place as people moved from rural areas to urban areas.

- In 2018, 55% of the world's population lives in urban areas.

- The world's urban population increased from 751 million in 1950 to 4.2 billion in 2018.

Urban Population

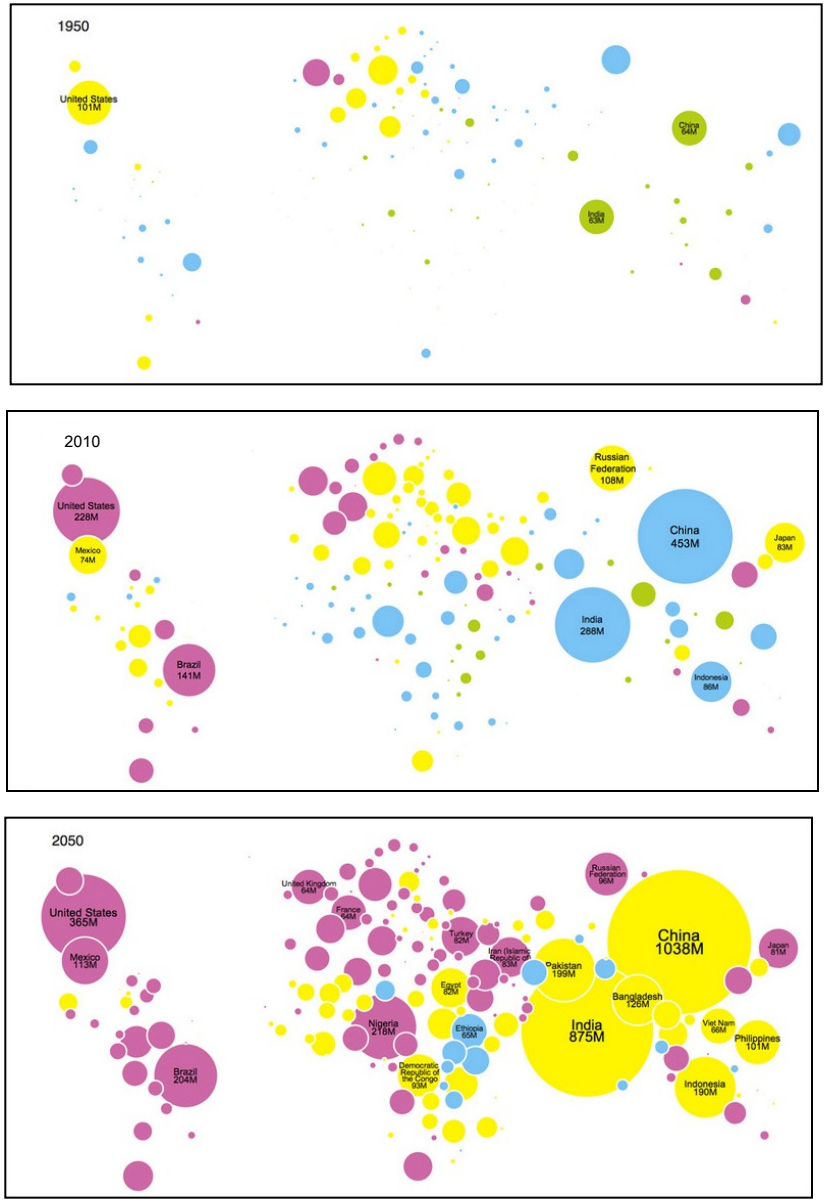
- **The world population has undergone a rapid urbanization process since 1950.**
- In 1950, more than two-thirds (70%) of people worldwide lived in rural settlements; only 30% (750 million people) lived in cities.
- But the situation is very different now. Indeed, in 2007, for the first time in history, the global urban population exceeded the rural population, and since then, the world urban population has continued to grow faster than the rural population.
- It is estimated that 68% of the world population (6.7 billion people) will be urban areas in 2050 and the number of people living in rural areas will decrease to 3.1 billion (United Nations, 2019).
- In other words, the population living in Okumen today is becoming more and more urban. Urban population is increasing and concentrating in a limited number of large centers (Knox and Pinch 2009).

TOTAL, URBAN AND RURAL POPULATIONS AND THEIR AVERAGE ANNUAL RATES OF CHANGE, FOR THE WORLD AND DEVELOPMENT GROUPS, SELECTED YEARS AND PERIODS, 1950-2050

	Population (billions)						*Average annual rate of change (per cent)*				
Development group	*1950*	*1970*	*1990*	*2018*	*2030*	*2050*	*1950-1970*	*1970-1990*	*1990-2018*	*2018-2030*	*2030-2050*
Total population											
World	2.54	3.70	5.33	7.63	8.55	9.77	1.89	1.83	1.28	0.95	0.67
More developed regions	0.81	1.01	1.15	1.26	1.29	1.30	1.07	0.64	0.34	0.17	0.03
Less developed regions	1.72	2.69	4.18	6.37	7.26	8.47	2.23	2.21	1.50	1.09	0.77
Urban population											
World	0.75	1.35	2.29	4.22	5.17	6.68	2.95	2.63	2.18	1.69	1.28
More developed regions	0.45	0.67	0.83	0.99	1.05	1.12	2.06	1.04	0.64	0.46	0.34
Less developed regions	0.30	0.68	1.46	3.23	4.12	5.56	4.02	3.82	2.83	2.03	1.50
Rural population											
World	1.79	2.35	3.04	3.41	3.38	3.09	1.37	1.30	0.41	-0.07	-0.45
More developed regions	0.37	0.33	0.32	0.27	0.24	0.17	-0.48	-0.27	-0.58	-0.95	-1.61
Less developed regions	1.42	2.01	2.72	3.14	3.14	2.92	1.75	1.52	0.51	0.00	-0.37

Source: United Nations-UN (2019). *World Urbanization Prospects ,The 2018 Revision*, s.9. New York: UN

Urbanizing World Population, (1950-2010-2050)



Source: http://www.fastcoexist.com/1679477/watch-the-worlds-urban-population-as-it-balloons

- This urbanization, the transition from a predominantly dispersed rural settlement model to a densely populated urban settlement model, is of course not a new geo-demographic trend. Yet there have been two main waves of urbanization in modern times.

- The first took place between 1750 and 1950 in the Global North (Developed World), particularly in Europe and North America. As a result, the North, which has reached highly urbanized societies, now sees only small increases in the proportion of population residing in urban areas.

- The second wave of urbanization, continuing since 1950, is taking place in the Global South (Least Developed World). While the Least Developed Countries provide the majority of the ongoing urban growth, Asia and Africa are the fastest urbanizing regions.

- A clear consequence of this South-North variation in urban growth today is the convergence of urbanization levels globally.

- Europe's urban population share is expected to reach 85% by 2050, with around ¾ of its population living in urban areas in 2018.

- North America, Central and South America are highly urbanized. In 2018, more than 80% of the populations of these regions are urban, and by 2050 it is estimated that the urban population will be around 90%.

- Oceania is expected to have an almost constant percentage of the urban population, with the urban population share expected to rise from just under 70% today to just over 70% by 2050.

- Africa has a predominantly rural population and is largely rural in appearance. In 2018, just over 40% of its population lived in urban areas. In Asia, the share of the urban population has approached 50% today.

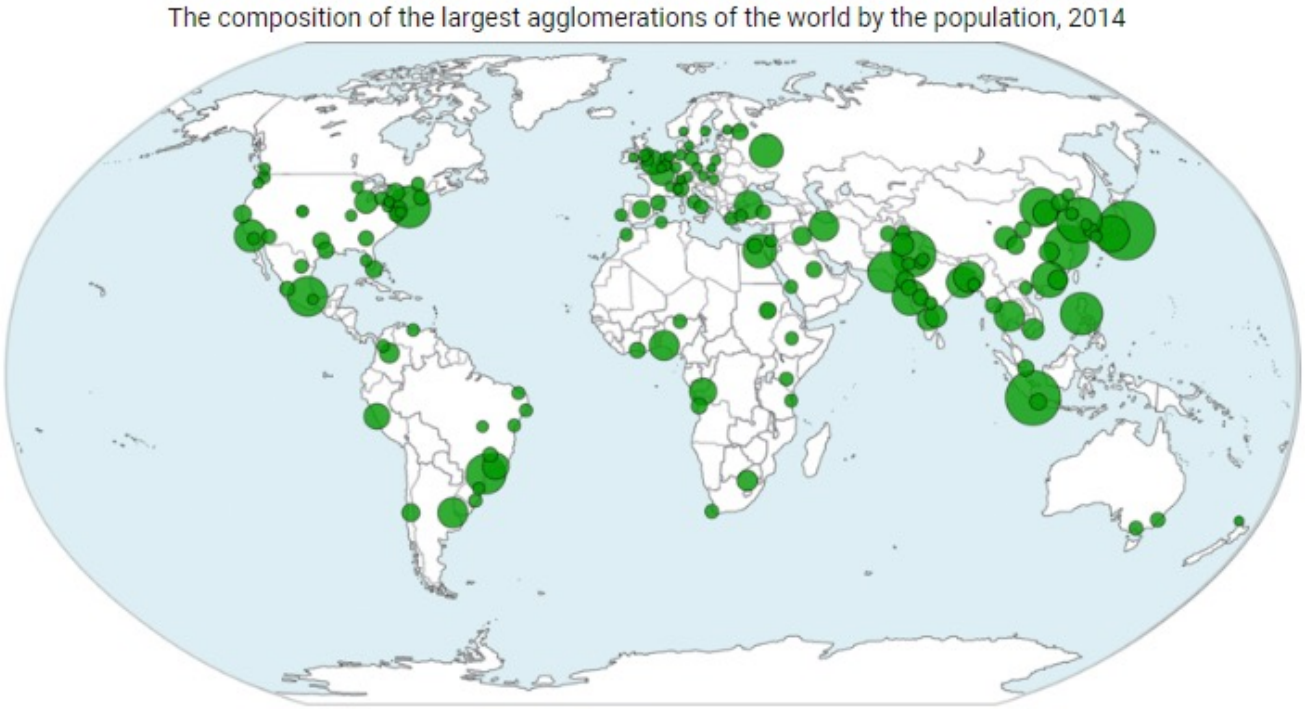
- Africa and Asia are urbanizing faster than other parts of the world. The urban population percentages of these regions are estimated to reach 59% and 66%, respectively, by the middle of the 21st century.

PERCENTAGE URBAN AND RATE OF URBANIZATION OF THE WORLD, BY GEOGRAPHIC REGION, SELECTED PERIODS, 1950-2050

	Percentage urban						*Rate of urbanization (per cent)*				
Geographic region	*1950*	*1970*	*1990*	*2018*	*2030*	*2050*	*1950-1970*	*1970-1990*	*1990-2018*	*2018-2030*	*2030-2050*
World	29.6	36.6	43.0	55.3	60.4	68.4	1.06	0.80	0.90	0.74	0.62
Africa	14.3	22.6	31.5	42.5	48.4	58.9	2.28	1.68	1.07	1.07	0.99
Asia	17.5	23.7	32.3	49.9	56.7	66.2	1.51	1.54	1.55	1.06	0.78
Europe	51.7	63.1	69.9	74.5	77.5	83.7	1.00	0.51	0.22	0.33	0.38
Latin America and the Caribbean	41.3	57.3	70.7	80.7	83.6	87.8	1.64	1.05	0.47	0.29	0.25
Northern America	63.9	73.8	75.4	82.2	84.7	89.0	0.72	0.11	0.31	0.25	0.25
Oceania	62.5	70.2	70.3	68.2	68.9	72.1	0.58	0.01	-0.11	0.08	0.23

Source: United Nations-UN (2019). *World Urbanization Prospects ,The 2018 Revision,* s.26. New York: UN

The growth of big cities is an extraordinary demographic story.

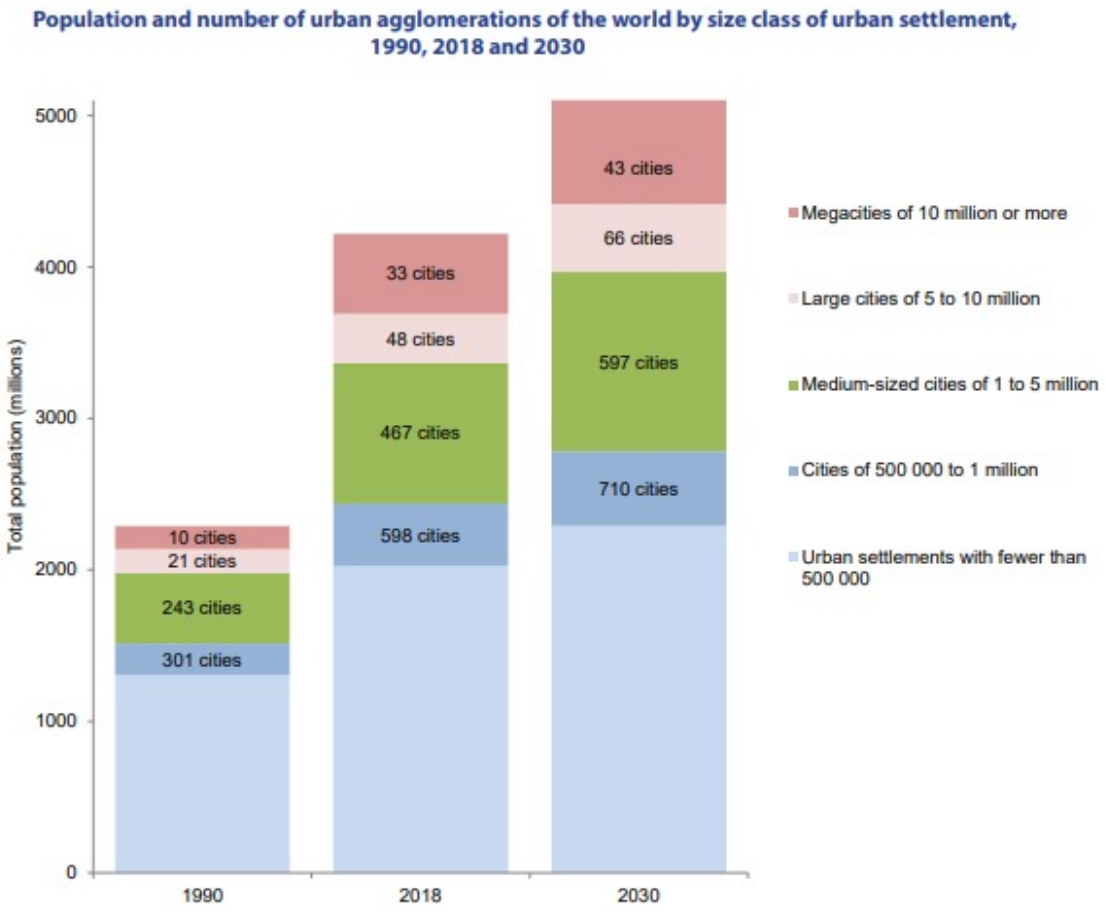


Source: https://www.researchgate.net/figure/The-composition-of-the-largest-agglomerations-of-the-world-by-the-population-2014_fig2_330590726

Growth in major cities and metropolitan areas has been one of the most important demographic stories in past years. The map shows 30 major metropolitan areas by population size in 2014. Cities with a population of 10 million or more are often referred to as mega-cities. In 1950, 117 million people lived in the first 30 metropolitan areas, this number increased to 426 million in 2011. In 1950, 19 of the 30 most populous cities were in industrialized countries. By 2011, this number had decreased to 8. Even in 1950, Delhi wasn't in the top 30, but now it's second only to Tokyo. This extraordinary growth is driven by the rural-urban migration of people seeking better life in cities (PRB, 2013).

Source: Population Reference Bureau, 2013 World Population Data Sheet

- In 2018, there were 548 cities with more than 1 million inhabitants in the world, their number is expected to increase by 29% in 12 years to 706 by 2030.



Data source: United Nations, Department of Economic and Social Affairs, Population Division (2018a). *World Urbanization Prospects 2018.*

One in five people worldwide lives in a city with a population of more than 1 million.

World's population by size class of settlement, 2018 and 2030

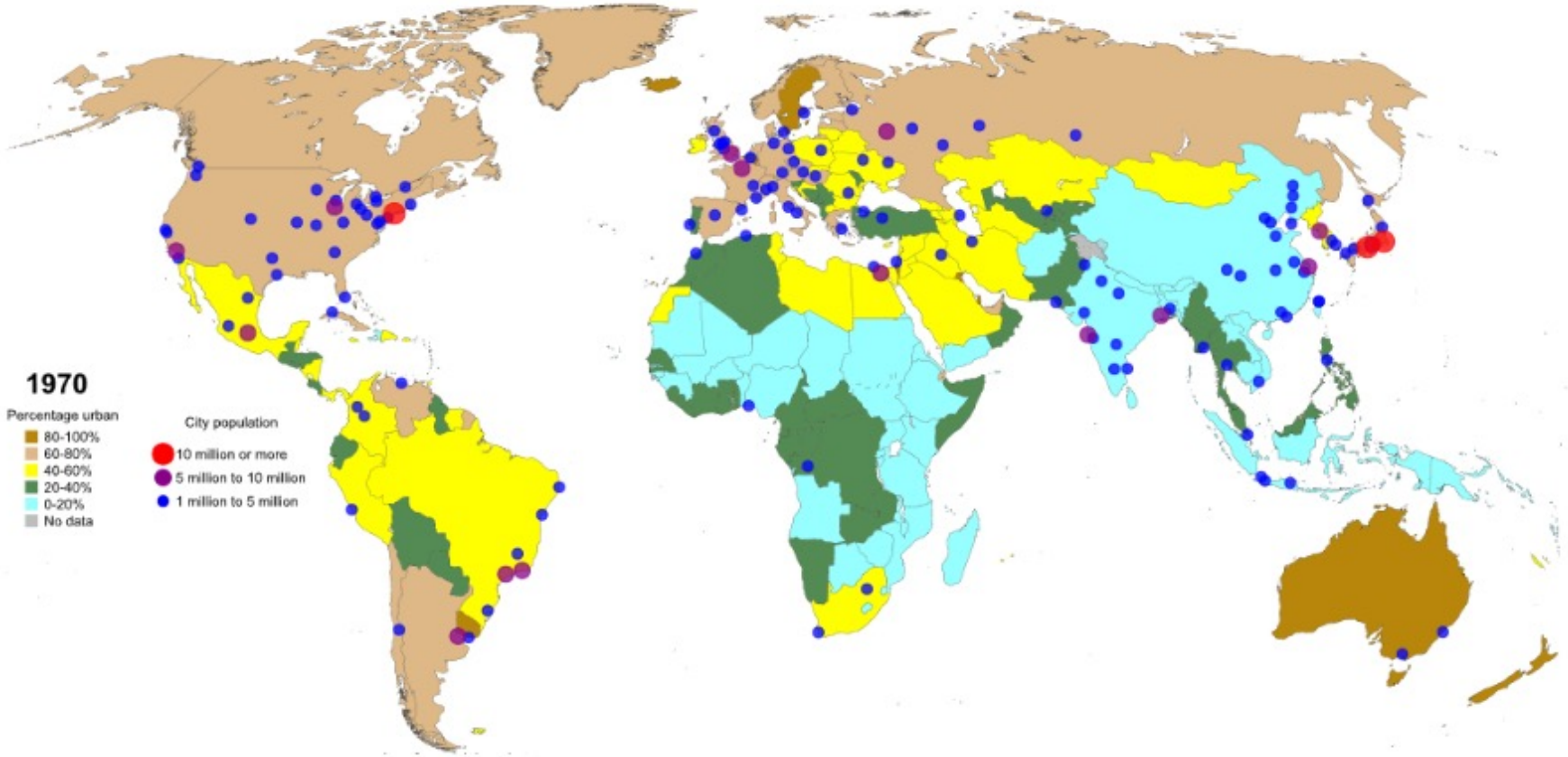
Size class	2018			2030		
	Number of settlements	Population (millions)	Percentage of world population	Number of settlements	Population (millions)	Percentage of world population
Urban	..	4 220	55.3	..	5 167	60.4
10 million or more	33	529	6.9	43	752	8.8
5 to 10 million	48	325	4.3	66	448	5.2
1 to 5 million	467	926	12.1	597	1 183	13.8
500 000 to 1 million	598	415	5.4	710	494	5.8
Fewer than 500 000	..	2 025	26.5	..	2 291	26.8
Rural	..	3 413	44.7	..	3 384	39.6

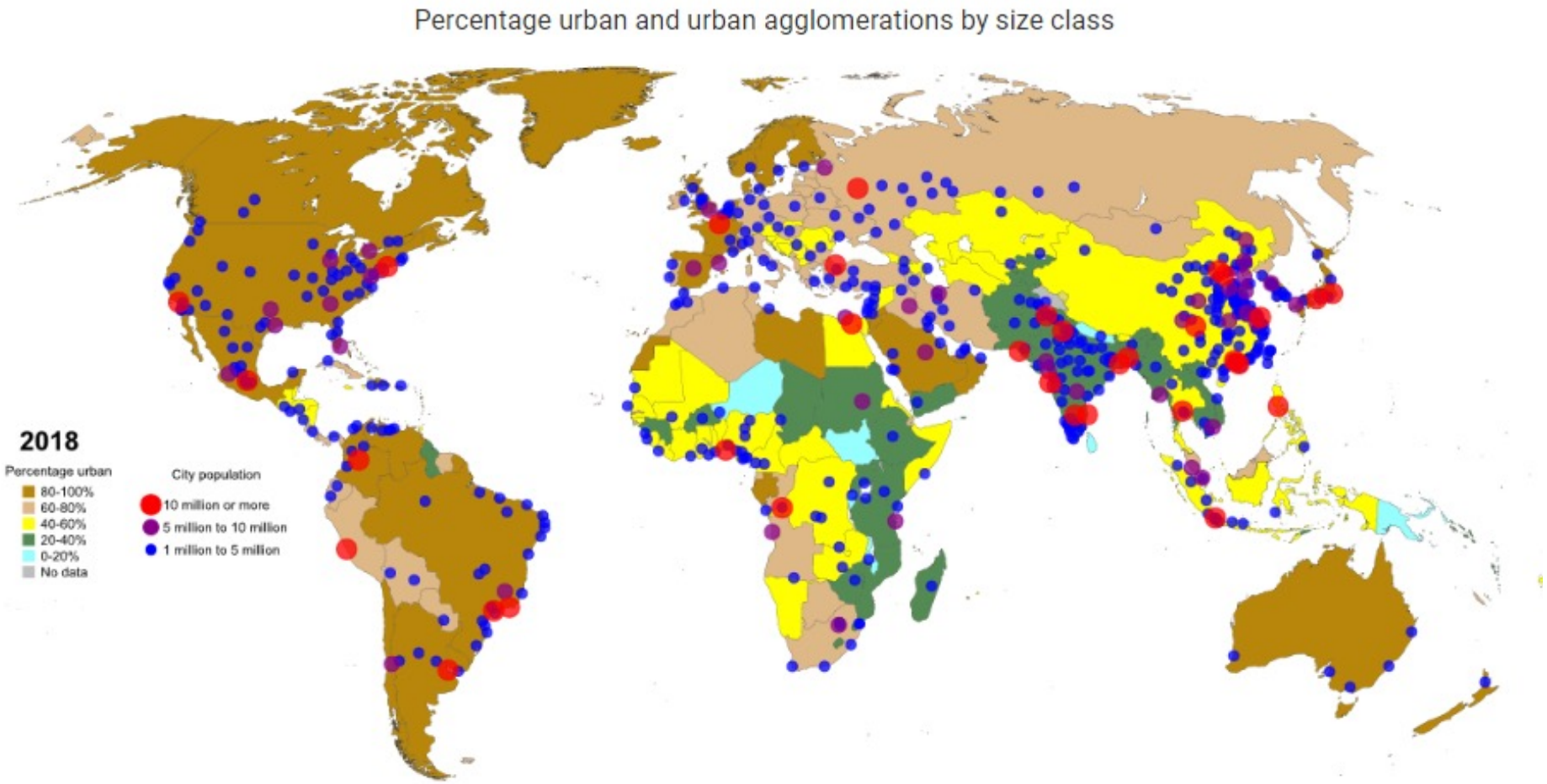
- In 2018, 1.7 billion people (23% of the world's population) lived in a city of at least 1 million.
- In 2030, an estimated 28% of people worldwide (approximately 2.4 billion people) will be concentrated in cities with a population of at least 1 million.
- Between 2018 and 2030, the urban population is projected to increase across all size classes, while the rural population is projected to decrease slightly.
- Rural areas were home to 45 percent of the world's population in 2018 and this rate is expected to drop to 40 percent by 2030.

The world's ten largest cities in 2018 and 2030				
City size rank	City	Population in 2018 (thousands)	City	Population in 2030 (thousands)
1	Tokyo, Japan	37 468	Delhi, India	38 939
2	Delhi, India	28 514	Tokyo, Japan	36 574
3	Shanghai, China	25 582	Shanghai, China	32 869
4	São Paulo, Brazil	21 650	Dhaka, Bangladesh	28 076
5	Ciudad de México (Mexico City), Mexico	21 581	Al-Qahirah (Cairo), Egypt	25 517
6	Al-Qahirah (Cairo), Egypt	20 076	Mumbai (Bombay), India	24 572
7	Mumbai (Bombay), India	19 980	Beijing, China	24 282
8	Beijing, China	19 618	Ciudad de México (Mexico City), Mexico	24 111
9	Dhaka, Bangladesh	19 578	São Paulo, Brazil	23 824
10	Kinki M.M.A. (Osaka), Japan	19 281	Kinshasa, Democratic Republic of the Congo	21 914

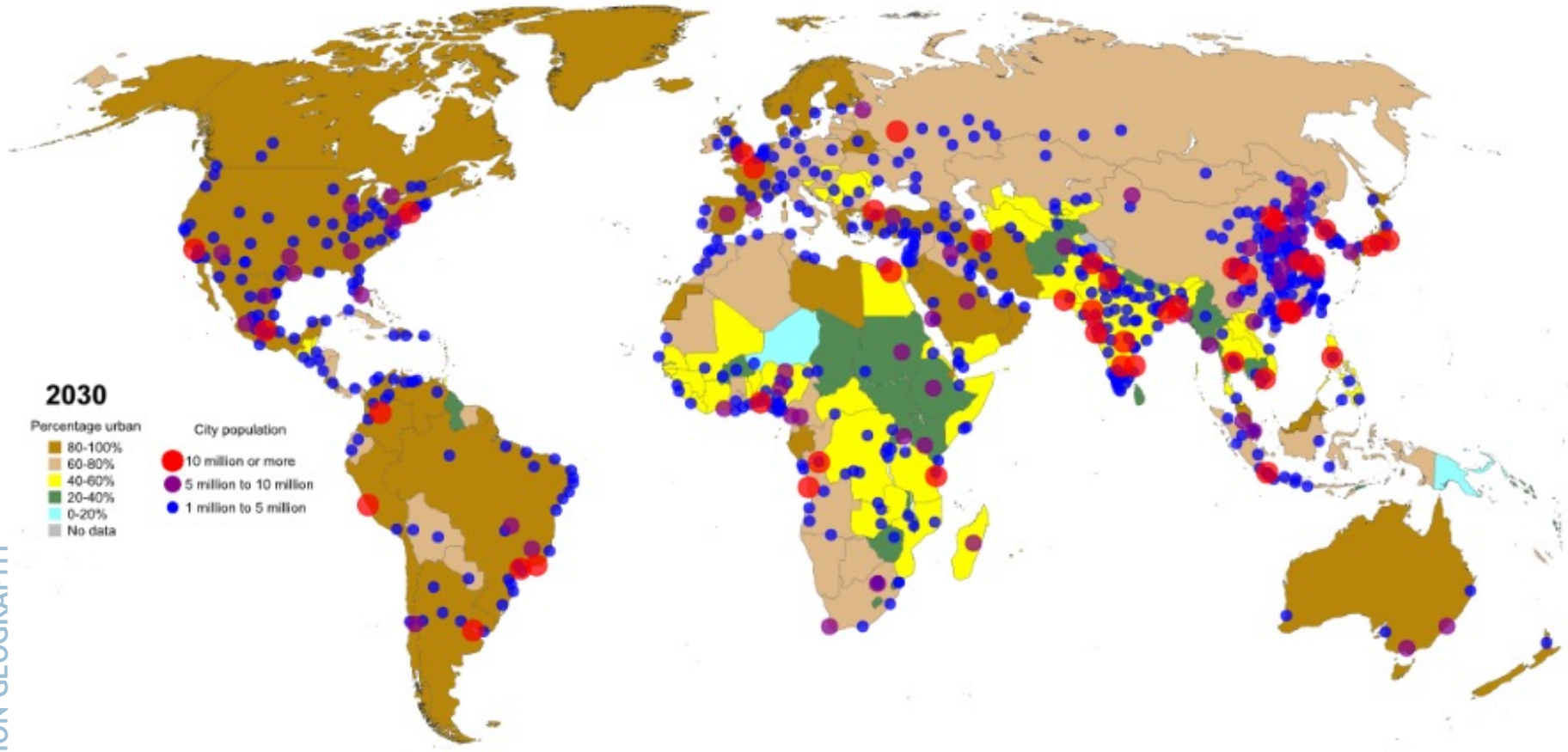
- While Tokyo was the world's most populous city with 37.5 million people in 2018, Delhi is expected to rank first with 39 million in 2030.
- The world's 10 most populated cities are located in the global south, with the exception of Tokyo.

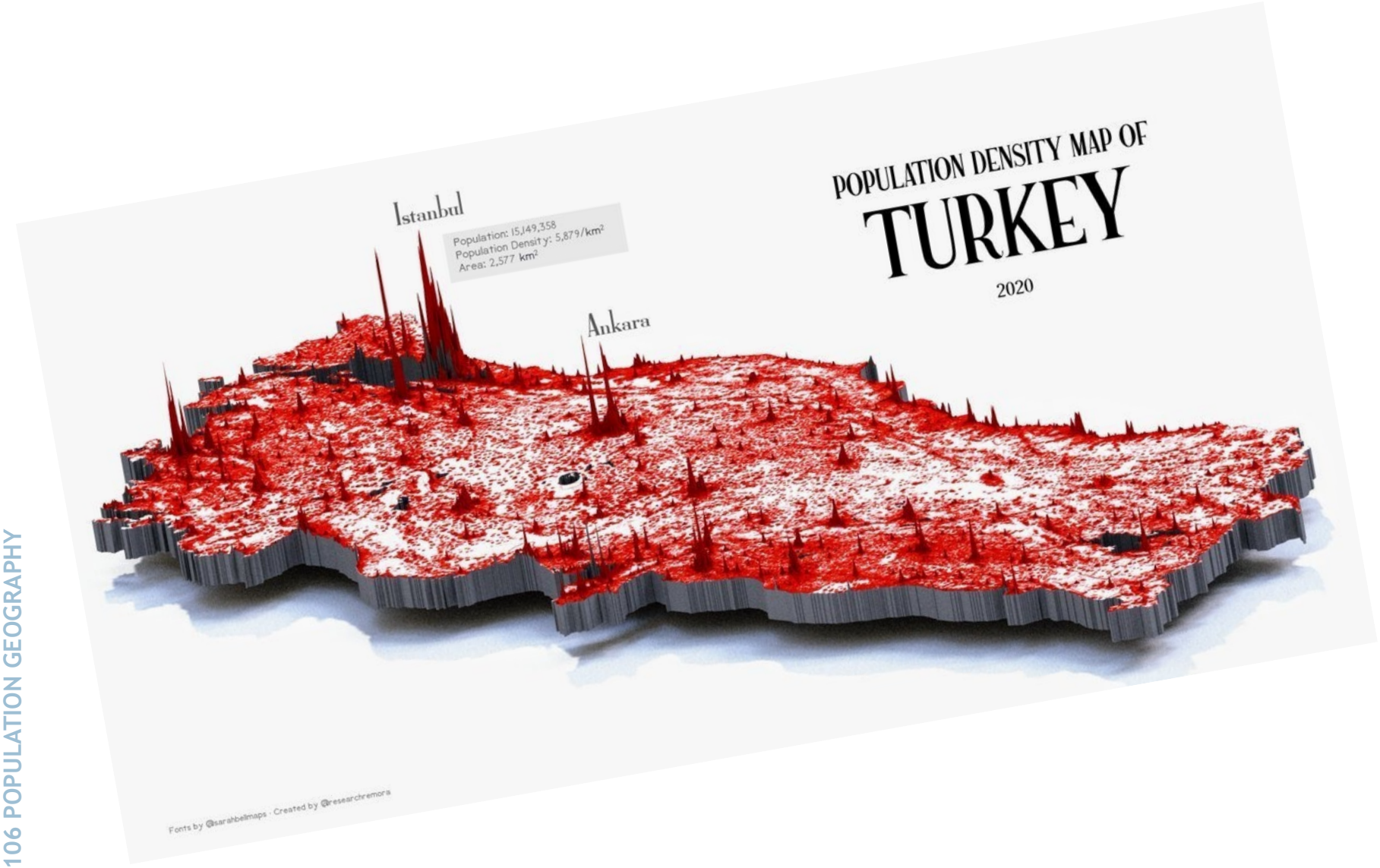
Percentage urban and urban agglomerations by size class




Percentage urban and urban agglomerations by size class
2018
Percentage urban
80-100%
60-80%
40-60%
20-40%
0-20%
No data
City population
10 million or more
5 million to 10 million
1 million to 5 million

Percentage urban and urban agglomerations by size class




POPULATION DENSITY MAP OF
TURKEY
2020
Istanbul
Population: 15,149,358
Population Density: 5,879/km²
Area: 2,577 km²
Ankara
Fonts by @sarahbellmaps · Created by @researchremora

Gender and Age Structure

- Despite having a wide variety of characteristics, gender and age constitute the two main characteristics of a population.

- These two traits are also associated with other population variables such as mortality, morbidity, marriage, fertility, and migration.

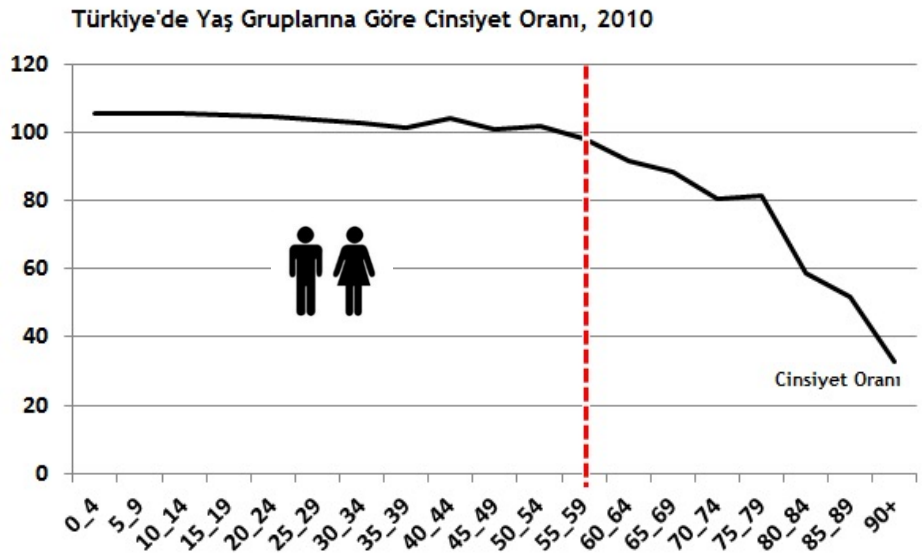
- The gender characteristics of the population within a society have many meanings. So it needs to be watched and taken into account.
- The sex ratio is one of the simplest methods of measuring population structure.
- The sex ratio is defined as the number of men per 100 women.
- A sex ratio of 100 in the population indicates the equality of male and female numbers. A value above 100 indicates the excess of males, and below indicates the excess of females.

- For example, the sex ratio of Turkey for 2019 is as follows:
- **Sex Ratio = (Number of men: Number of women) x 100**

  Sex Ratio $_{2017}$ = (41.721.136 : 41.433.861) x 100

  Sex Ratio $_{2017}$ = 100.7 Sex Ratio $_{1927}$ = 93
- **Absolute difference: 287,275 more than men**

Sex Ratio



Examining the sex ratios and their relationship to other demographic factors such as birth, death, immigration reveals some key facts:

The sex ratio at birth is relatively high in Turkey (106) and many parts of the world (105).

In general, women have lower mortality rates than men at all ages.

However, the male mortality rate increases with age. Therefore, the sex ratio, which is high at birth, changes in favor of women in advanced ages.

For example, for the year 2019 is 37 in the 55-59 age group, 99 and over 90 years old in Turkey.

Global Differences in Gender Structure

- Although men outnumber men by birth, women tend to live longer than men, especially in areas with good health care.
- Therefore, sex ratios in developed regions are expected to be low in developing regions with high maternal mortality and high fertility.
- Few countries in the world have a sex ratio of more than 105 and less than 90.

High gender ratios in an area are largely due to:

- Male immigration
- High female mortality due to poor health conditions
- High fertility creating young age compound
- Undercounting (not counting women)

Global Differences in Gender Structure: Examples from the World, 2010

Countries with a Sex Ratio over 105	
Country	*Sex Ratio*
Qatar	311
UAE	228
Bahrain	166
Kuwait	148
Oman	142
Saudi Arabia	124
Chinese	108
Afghanistan	107
India	107
Jordan	106

Countries with a Sex Ratio of less than 90	
Country	*Sex Ratio*
Latvia	85
Ukraina	85
Russia	86
Estonia	86
Belarus	87
Lithuania	87
Armenia	87
Georgia	89

Source: United Nations, Population Division DESA, *World Population Prospects: The 2010 Revision*

- Much of the economic and social behavior of people is determined by proportions of the population in various age groups.

- The age distribution of the population is the basis for all population analysis for three reasons:

1) **Age is one of the most basic of personality traits one has. What a person is like, what she/he thinks, what she/he does, what she/he needs are closely related to her/his age from birth.**
2) **Population groups are determinants of social and economic importance in a society.**
3) **The skilled population researcher has to uncover meaningful features of the age composition of the population. Because the age structure is closely related to other demographic characteristics such as birth, death, immigration and marriage.**

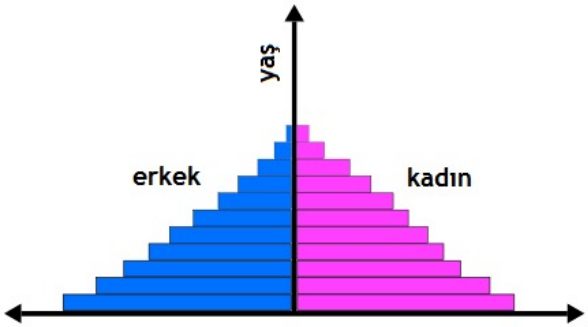
Factors Affecting Age Structure

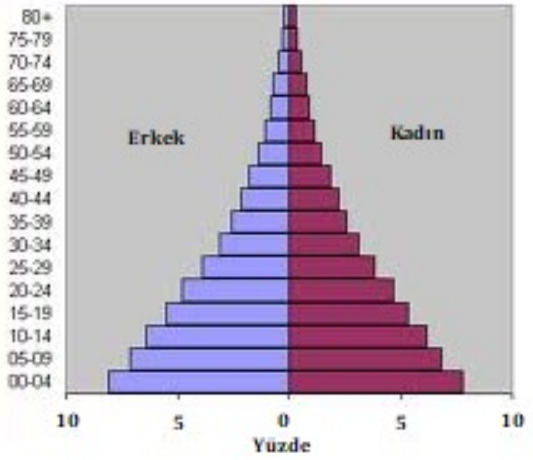
- Numerous factors determine the age structure of a country's population. However, the most important variable is birth rates.
- A population with a high birthrate will have a high proportion of young people.

- Mortality, on the other hand, affects age structure less than fertility.
- Migration has little or no effect on national populations.

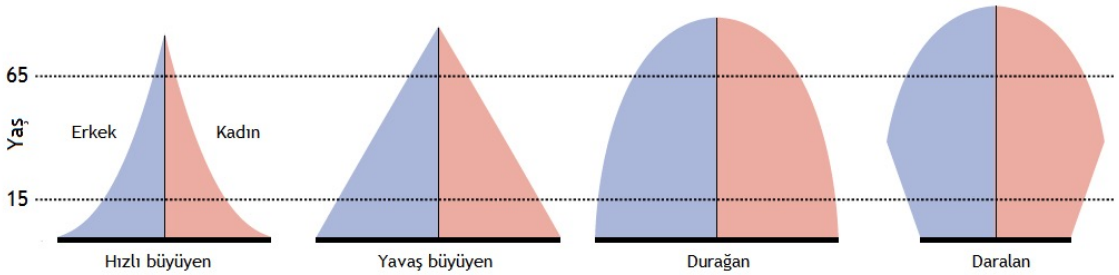
- Migration may affect the age structure more in sub-national parts of a country, region, province, city, or even in an area within the city due to its selectivity (for example, the population aged 20-40 migrates more).

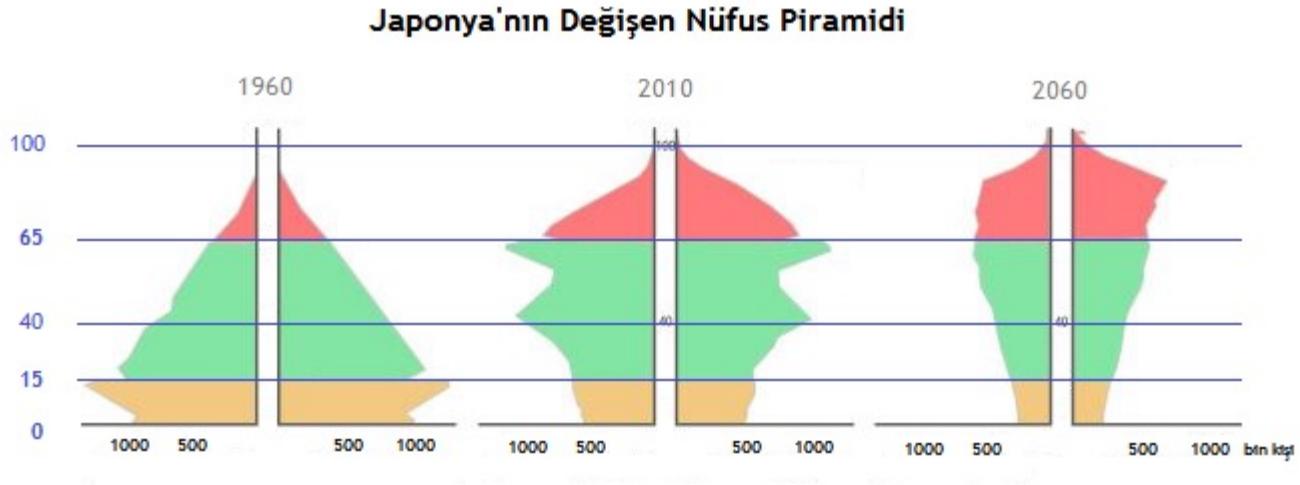
- Disasters such as famine, epidemic and deadly disease or war have twice the impact on the age structure (For example, young people both die in war and lower fertility during war; older people change age structure with increased deaths in epidemics).





- The population pyramid is a useful aid in describing the age structure of a population and gives us information about the social characteristics of the population.
- The population pyramid is essentially two back-to-back bar graphs, with zero representing the vertical midline.
- The number/ratio of people in each population group by gender is shown by horizontal bars, and the vertical axis gives different age groups, usually with a five (or odd) age range.

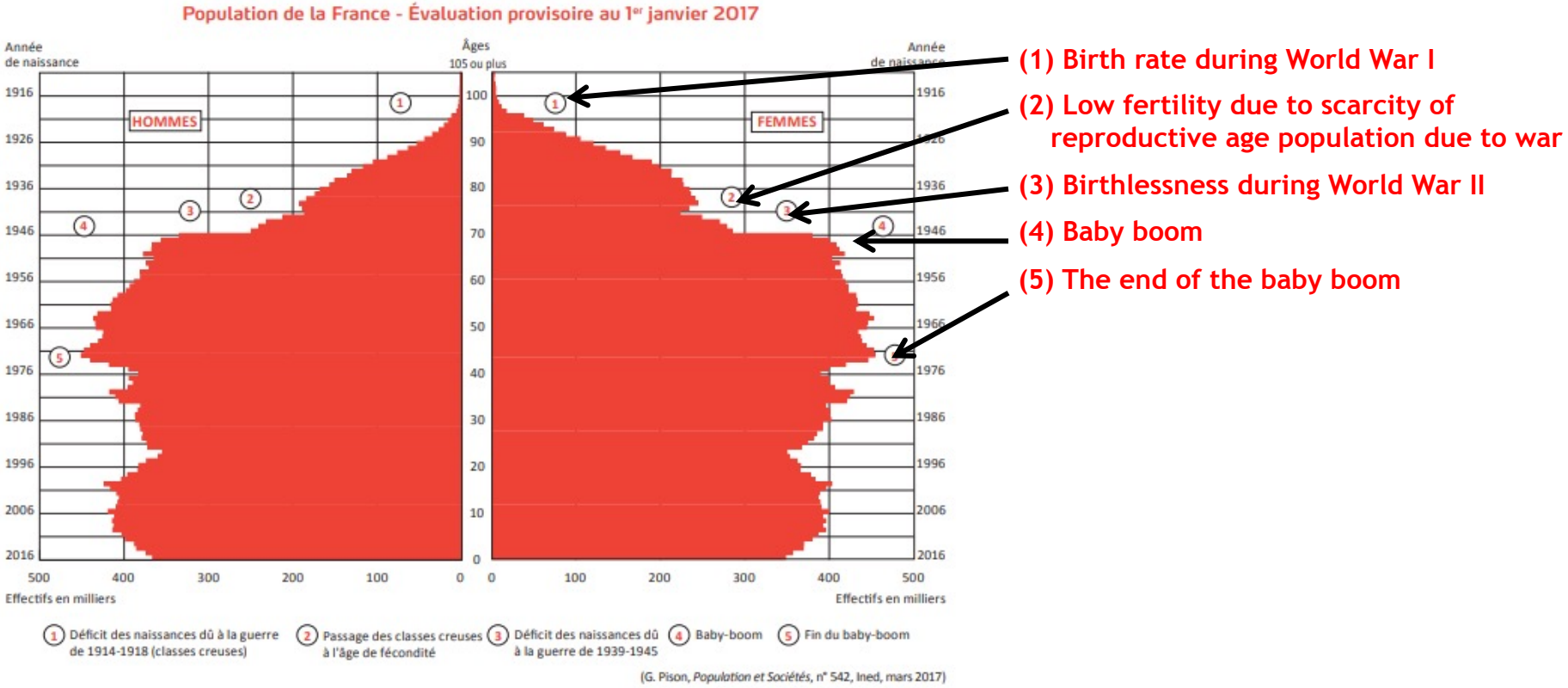


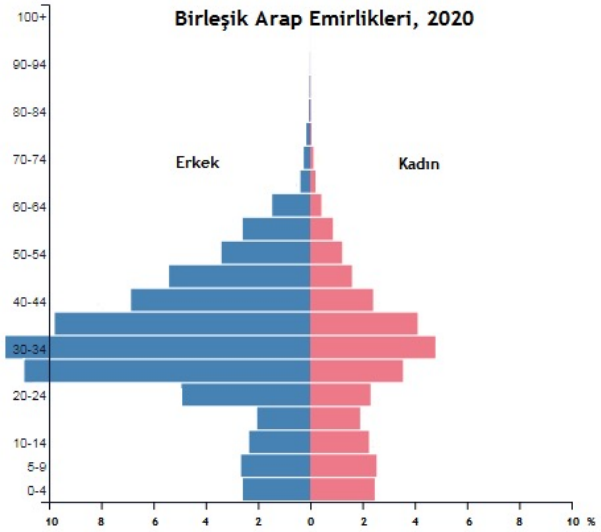


- The shapes of population pyramids vary according to countries, communities and time.
- A national population with a large number of children, broad-based; a national population with low fertility will have a narrow-based pyramid.

Population Pyramids

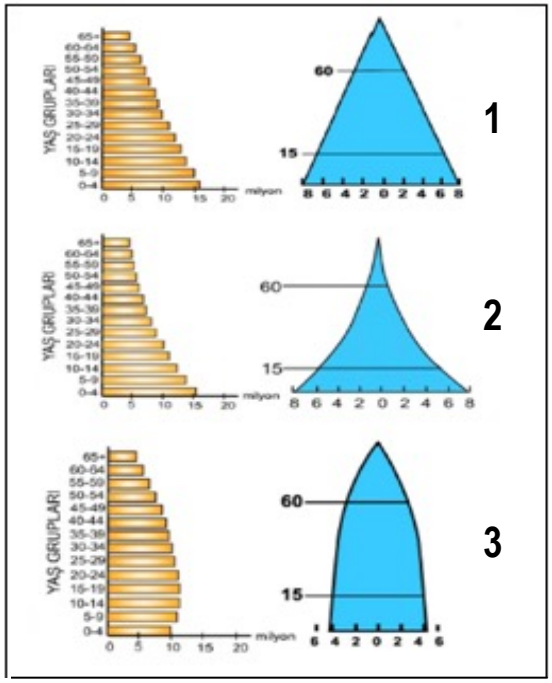
- A pyramid for a particular country reflects the demographic history of that country over the past two or three generations.
- The pyramid can also be affected by mortality rates. During wartime, the death rate for a given age group may increase and the bands in the pyramid representing these groups become shorter.
- The impact of World War II on both births and deaths can be clearly seen in the population pyramid of France.

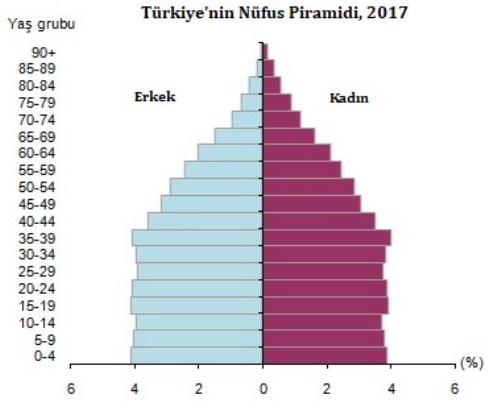




- The selectivity of migration can also change the shape of the pyramid.
- For example, in the Gulf Countries, labor migrants from abroad create a bloat in the working-age population.
- In Dubai's population pyramid, the excess of male population in working age is remarkable.

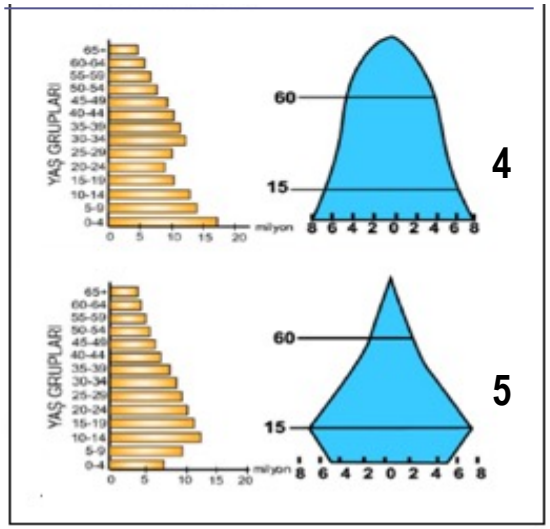
Population Pyramids





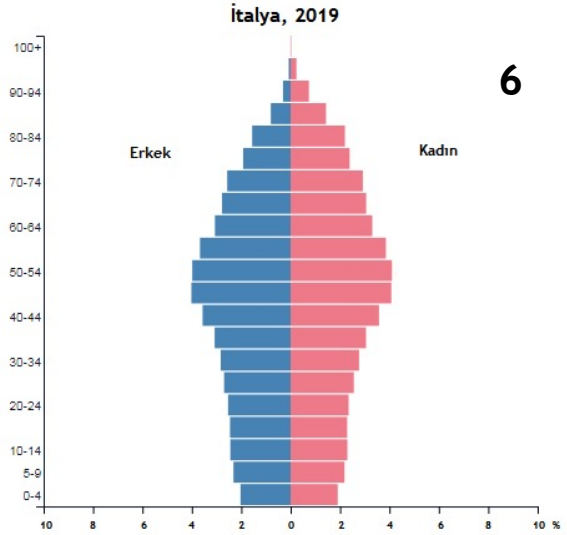
- By comparing the population pyramids of different countries, we can divide the age structure of the population into certain general categories:

1. **It is a pyramid with the shape of a regular triangle. It represents a country with high birth and death rates. Today there are few countries that show the shape of this pyramid. It was a common pyramid type for many countries in the 18th and 19th centuries.**
2. **The second type of population pyramid; With its narrow top, wide base and concave sides, it depicts a low death rate and a high birth rate, especially in the youngest age group. The pyramids of most underdeveloped countries/regions are similar to this type.**
3. **The population pyramid, showing the beehive shape, reflects relatively low birth and death rates, a high median age, and a stable population. The pyramid of developed countries/regions mostly fits this type.**



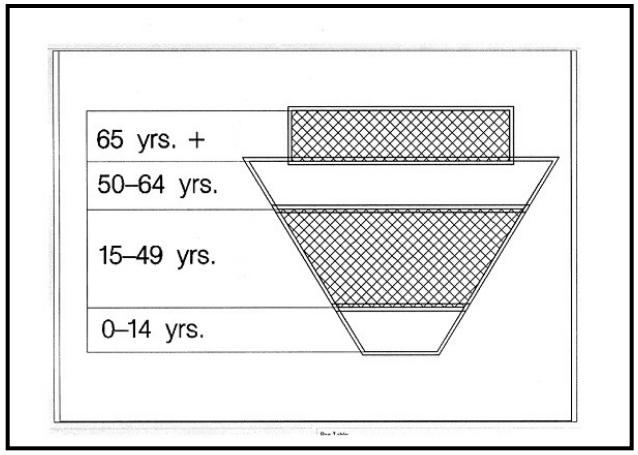
4) The bell-shaped pyramid represents a demographic trend where birth and death rates fell first, but then rebirth rates increased. USA in the 1950s and 1960s.

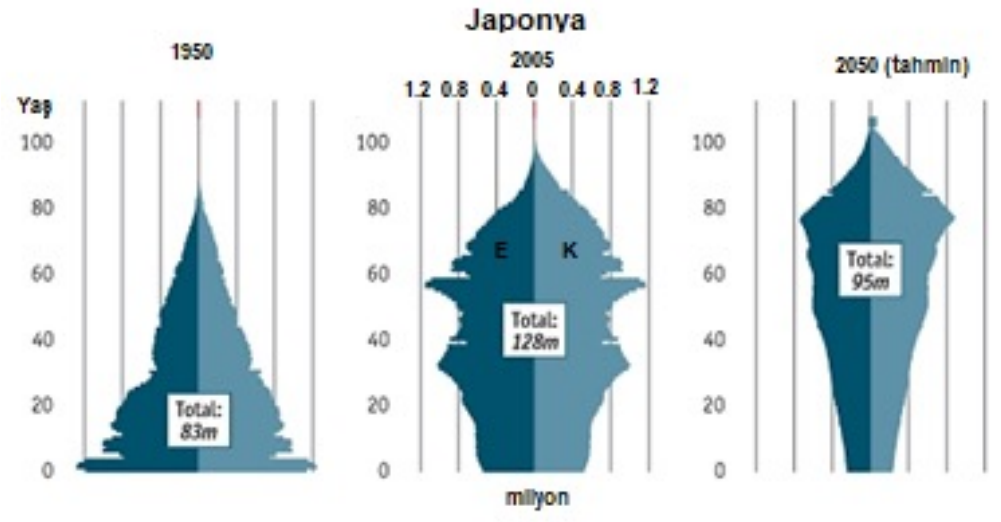
5) Changes in birth and death rates are reflected in the shape of this population pyramid. This pyramid, in particular, bears the traces of the sudden drop in birth rates. China in 1980.



6) In the developed world, depending on the increase in life expectancy and the decrease in births, the ice cream appearance has begun to appear in the cone, which has a narrow base, widens towards advanced ages, then narrows again. eg. Italy, Japan.

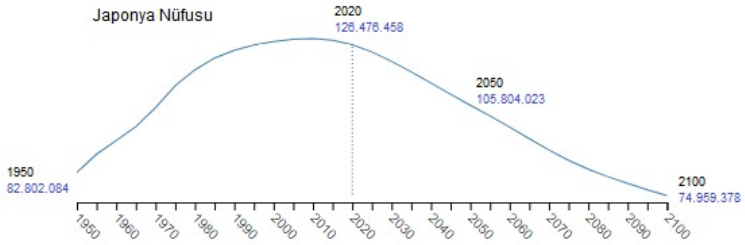
Population Pyramids: Japan, 2050

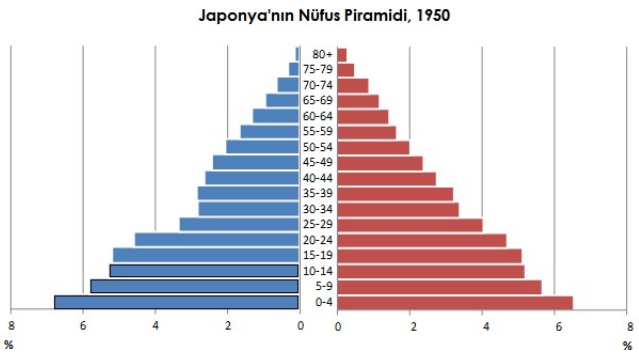




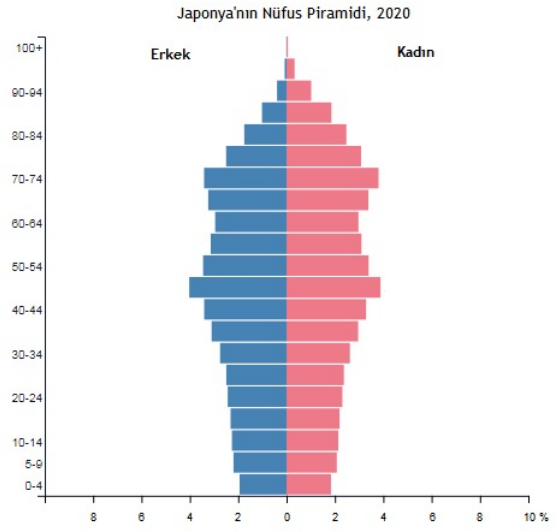
- Japan's population pyramid in 2050 will take shape to reflect the growth of the elderly population in low-fertility societies and the shrinking young population to care for them.
- Many European countries such as Japan, Russia, are rapidly becoming this, while Canada, Australia and East Asia are likely to join them in the future.

Population Pyramids: Japan, 1950 and 2020



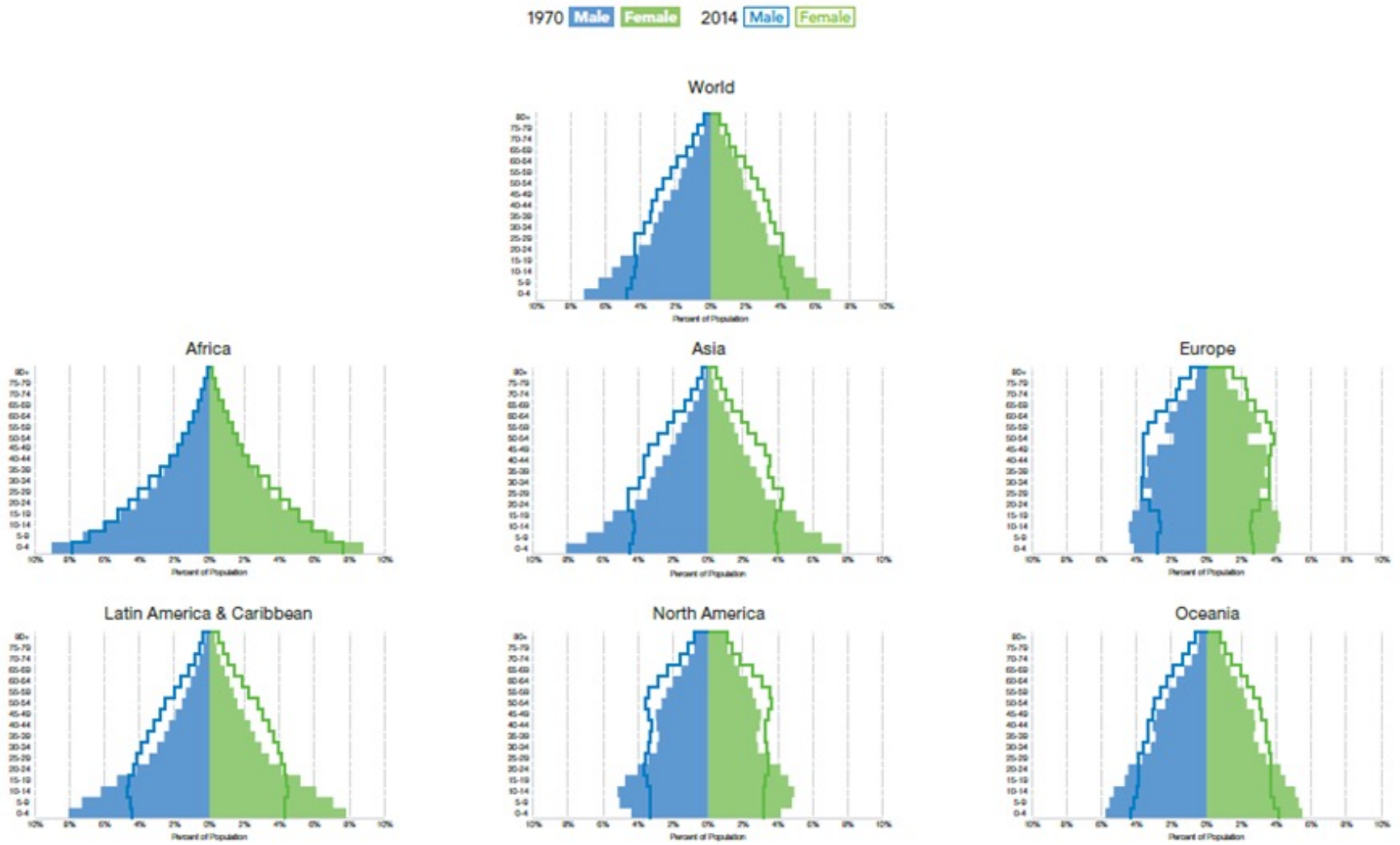


1950'de Japonya genç bir nüfus yapısına (medyan yaş: 22.3) ve orta düzeyli doğurganlık hızlarına (TFR: 3.00) sahiptir. Erkek nüfusun 25-34 yaşlardaki daralması II.Dünya Savaşı'ndaki kayıplar nedeniyledir.



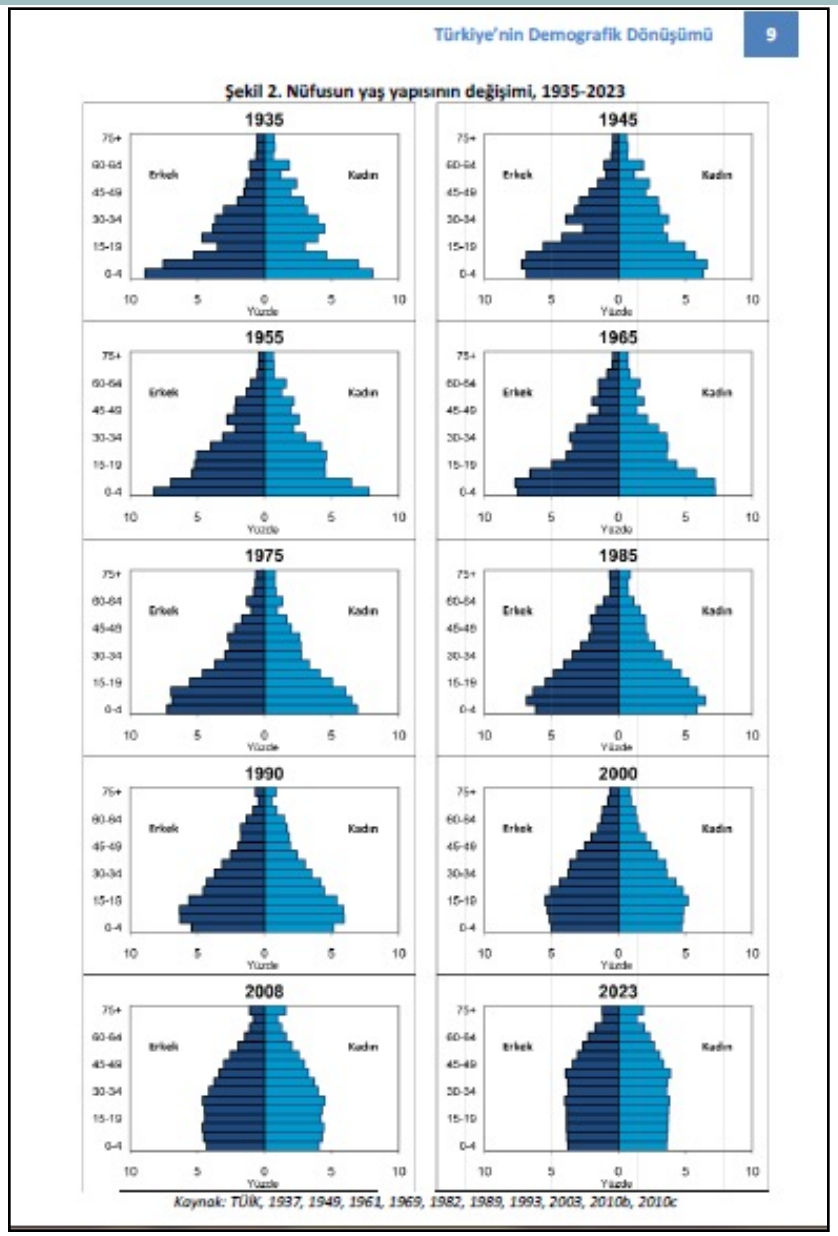
Population Pyramids

- Age structure varies differently across continents between 1970 and 2014..

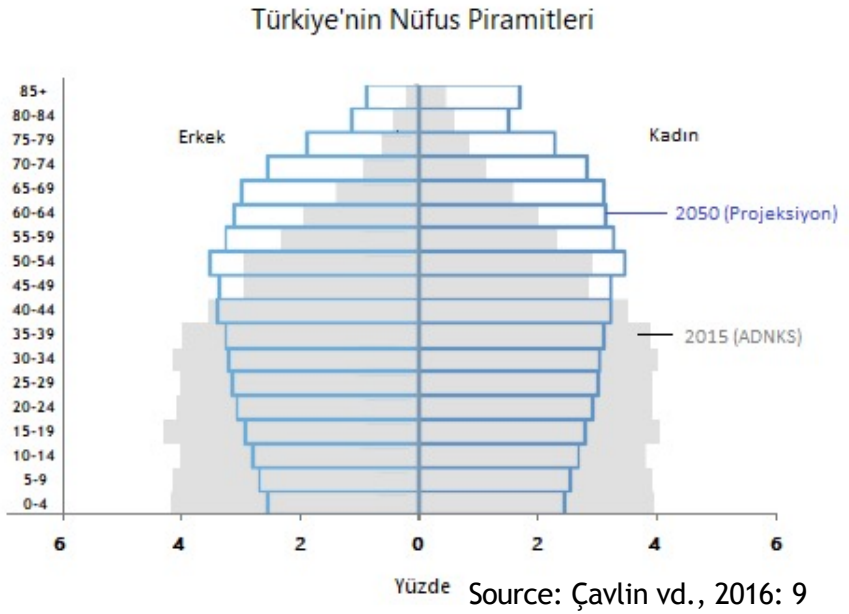


SOURCE: United Nations Population Division, *World Population Prospects: The 2012 Revision* (New York: United Nations, 2013).

Population Pyramids of Turkey



- As a reflection of the transformation in age structure with the passing of time, Turkey's population pyramid has also changed.
- Change defines the transition from a high fertility and young population to a low fertility and aging society.



Source: Çavlin vd., 2016: 9

Source: http://www.hips.hacettepe.edu.tr/TurkiyeninDemografikDonusumu_220410.pdf

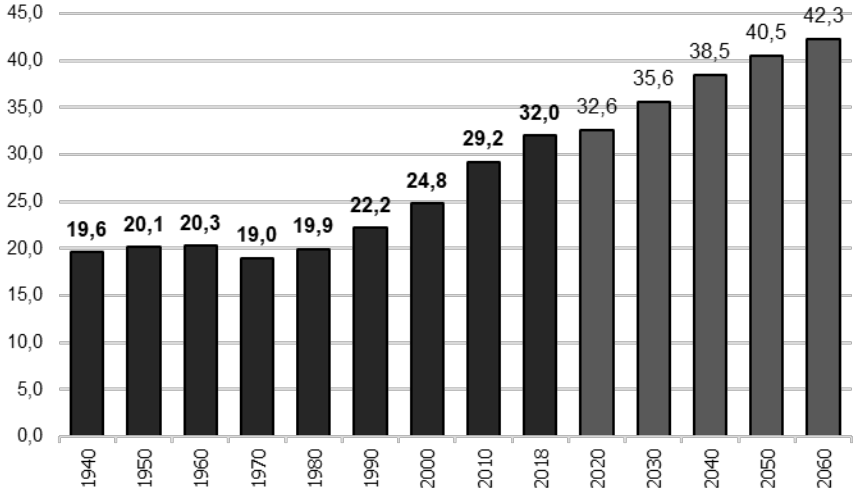
Median age is the age that divides any population into two numerically equal groups.

- An increase in the median (or median) age indicates that a society is getting older, and a decrease indicates that it is getting younger.
- The median age of the world population is estimated to increase by 10 years in the first half of the new century.
- The increase is expected to occur in all developed regions.

Measuring Age Structure: Median Age

- The median age has been increasing rapidly in Turkey since the 2000s.
- The median age, which was around 20 years old in the middle of the 20th century, is expected to double to around 40 years of age by the middle of the 21st century.

Median Age in Turkey, 1940-2060

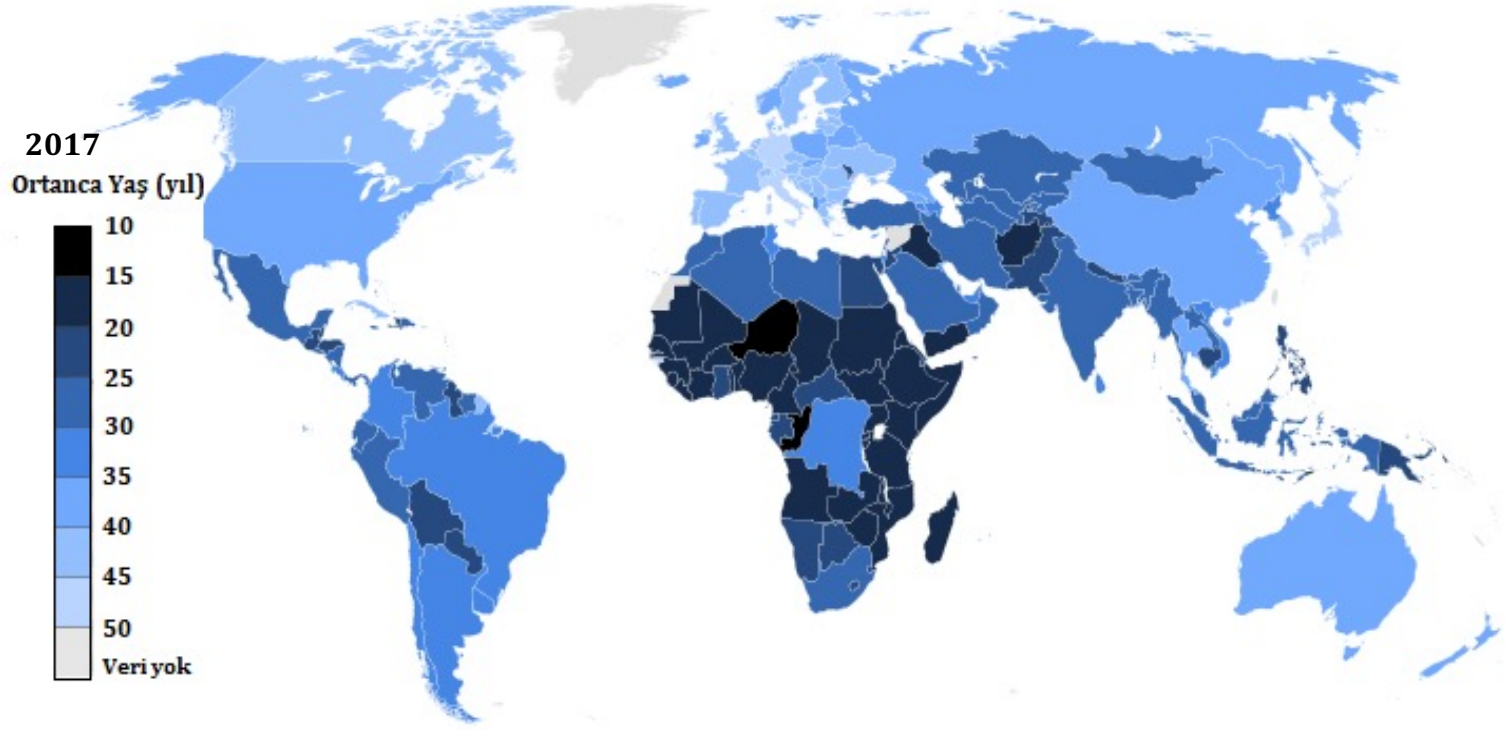


- The median age in Turkey, which was 29.7 in 2011, became 31.7 in 2017. It is 31.1 in men and 32.4 in women. The provinces with the highest median age are Sinop with 39.7, Balıkesir with 39.4 and Kastamonu and Edirne with 38.9 respectively. The provinces with the lowest values are Şanlıurfa with 19.6, Şırnak with 20.1 and Ağrı with 20.9 (TÜİK, 1 February 2018).)

Türkiye	Yaş	1950	1975	2000	2025	2050
Ortanca yaş (yıl)		20.1	19.3	24.9	33.2	38.7

Median Age, World 2017

- The median age in developed countries is 13 years higher than in developing countries and 20 years more than in less developed countries.
- The median age is low in economically underdeveloped regions such as Africa and higher in developed regions such as Europe.
- The median age for Europe is twice that of Africa.

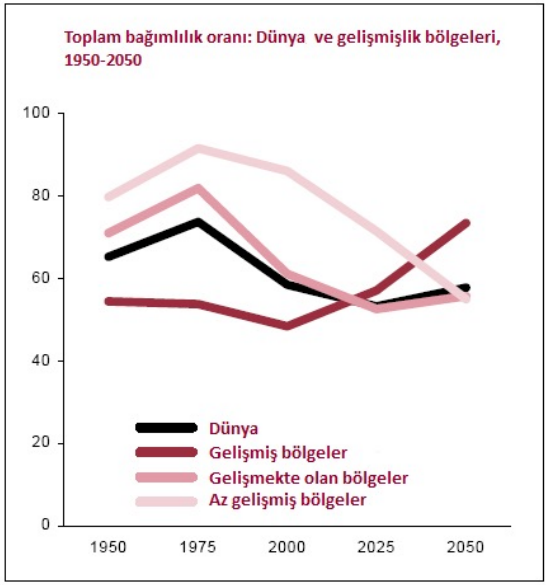


Source: https://commons.wikimedia.org/wiki/File:2017_world_map,_median_age_by_country.svg

Total Dependency Rate

The total dependency ratio is the number of people under the age of 15 and over the age of 65 per 100 people in the age group of 15-64.

- The total dependency ratio shows the relationship between the sum of the young and old population and the working age population.
- This is the ratio of children and the elderly who are dependent on the working-age population to the population aged 15-64 who are employed or likely to work.
- Although the total dependency ratio in the world has decreased over time, it is expected to increase again and the dependency ratio composition is expected to change in favor of the elderly.

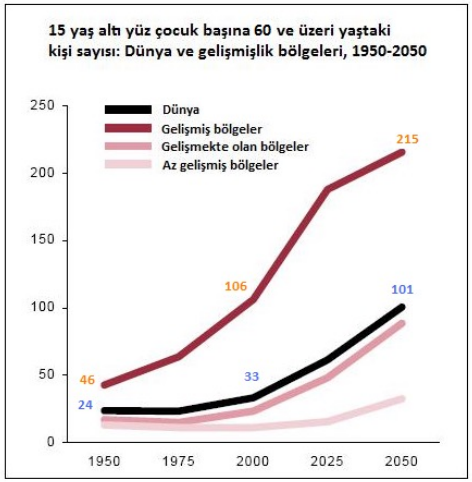


Source: Özgür, 2010a

Aging Index

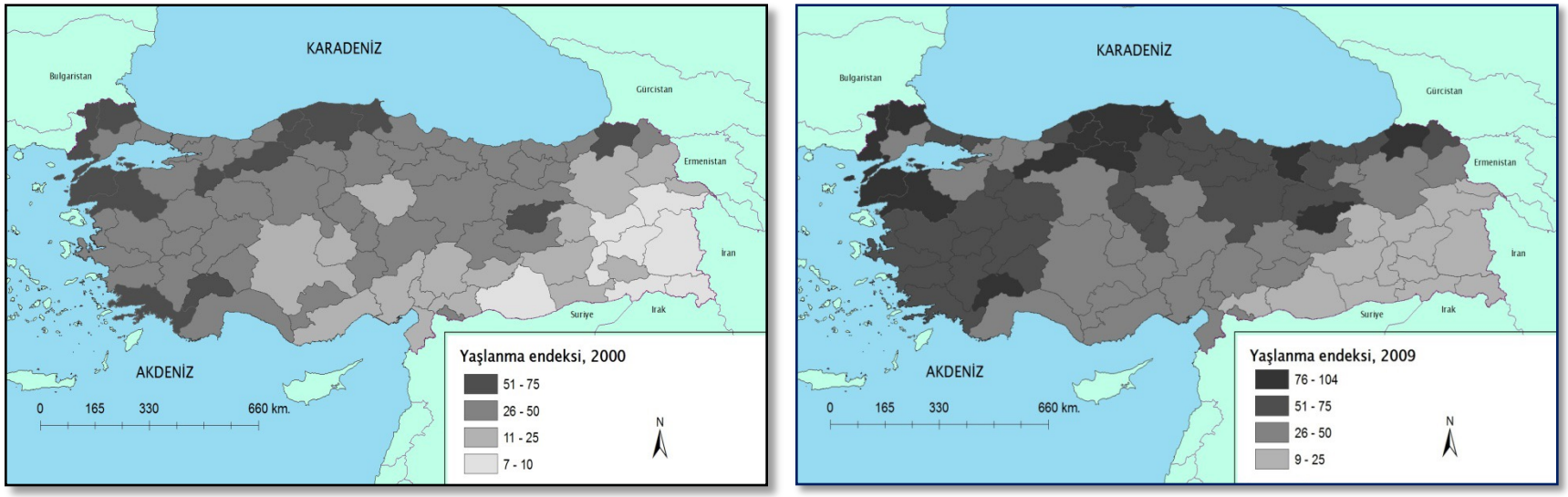
The aging index is the number of people aged 60 and over per 100 people under the age of 15.

- The aging index shows the relationship between the young population and the elderly population.
- If the number of young people in a society does not increase or decrease; On the other hand, if the number of elderly people increases, the index value increases and indicates that the society is getting older.
- It is estimated that the aging index in the world will triple in the mid-21st century compared to the beginning of the century.
- The index is still quite high in developed regions and tends to increase rapidly in developing countries.



Source: Özgür, 2010a

Aging Index Patterns in Turkey, 2000 and 2009



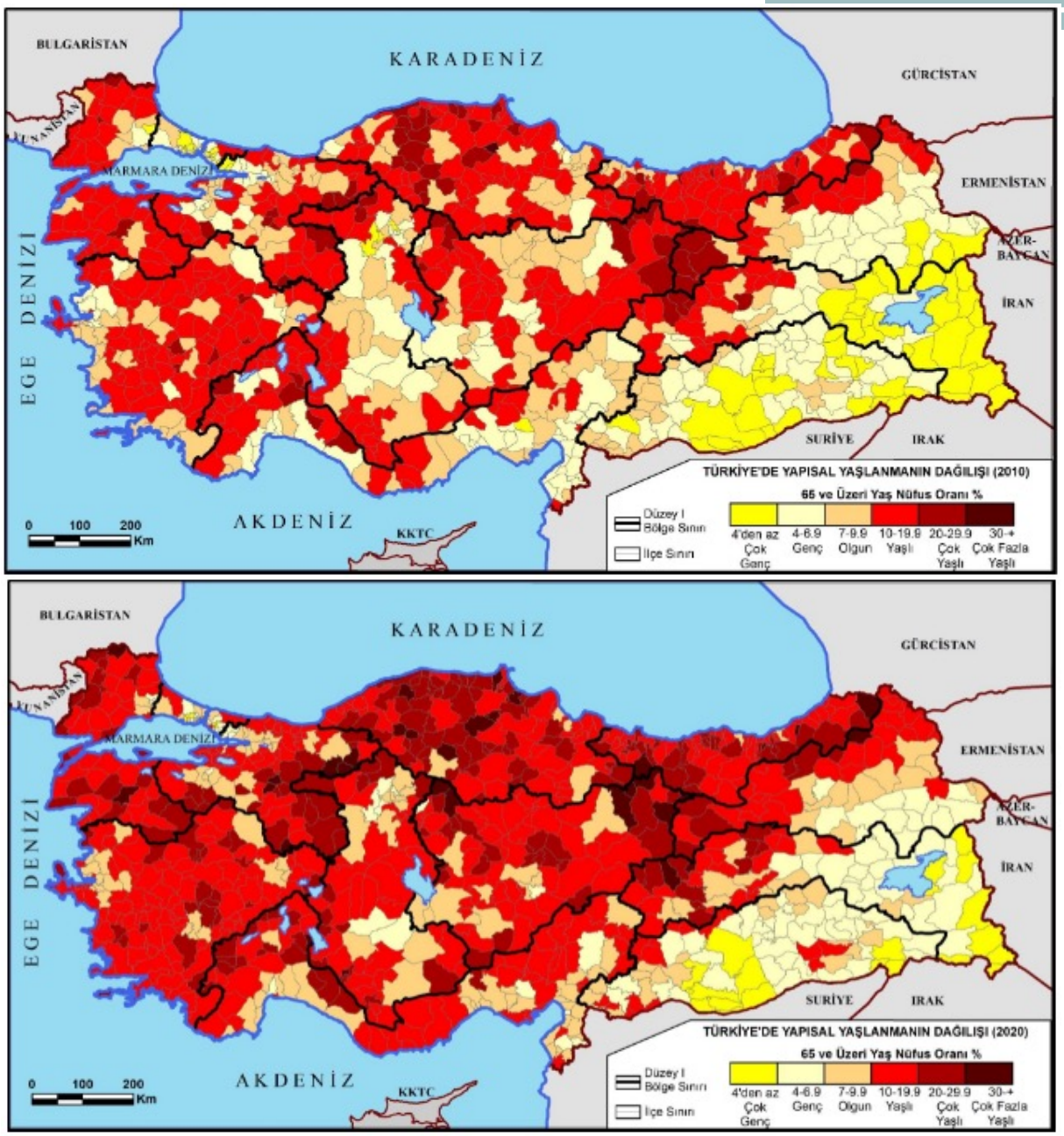
Source: Özgür, 2010b

- Aging is more noticeable in the northern and western parts of the country.
- Aging is spreading across the country.
- Signs of aging are weaker in southeastern Turkey.

Distribution of Numerical Aging by Districts in Turkey in 2010 and 2020

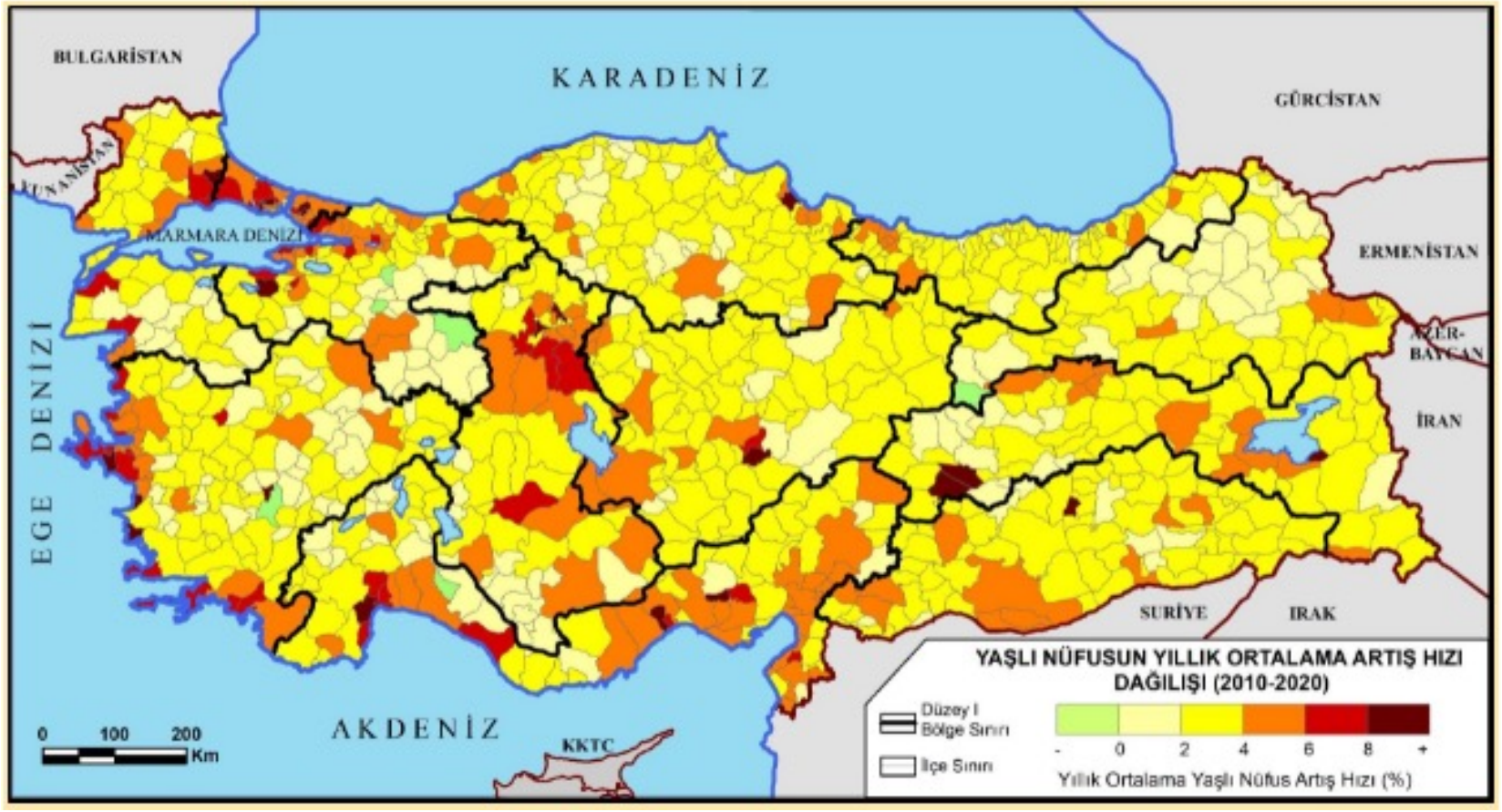
Source: Yakar and Özgür, 2022

Distribution of Structural Aging by Districts in Turkey, 2010 and 2020



Source: Yakar and Özgür, 2022

Annual Average Growth Rates of the Elderly Population by Districts in Turkey (%), 2010-2020

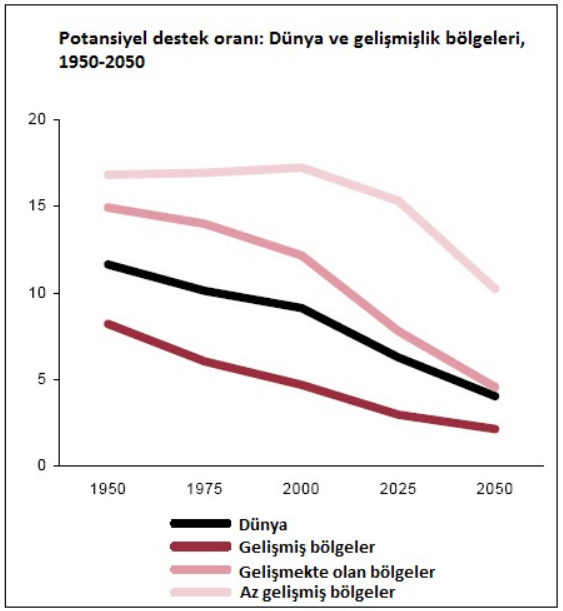


Source: Yakar and Özgür, 2022

Potential Support Ratio

The potential support ratio is the number of people aged 15-64 per person aged 65 and over.

- The potential support ratio is obtained by dividing the population aged 15-64 of working age (adult population) by the population over 65 (elderly).
- It expresses the level of support of the workers and producers to the elderly population.
- If the elderly population increases, but the mature population does not increase/decrease, potential support ratio decreases and economic and social problems appear.
- This means that the health and care costs of the elderly cannot be met, pension funds are in trouble.
- Potential support ratio is declining rapidly in the world and in Turkey.

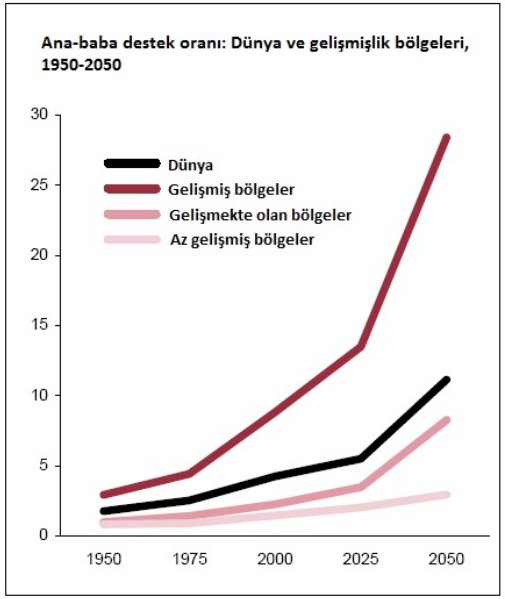


Source: Özgür, 2010a

Parent Support Ratio

The parent support ratio is the number of people 85 and older per 100 people in the 50-64 age group.

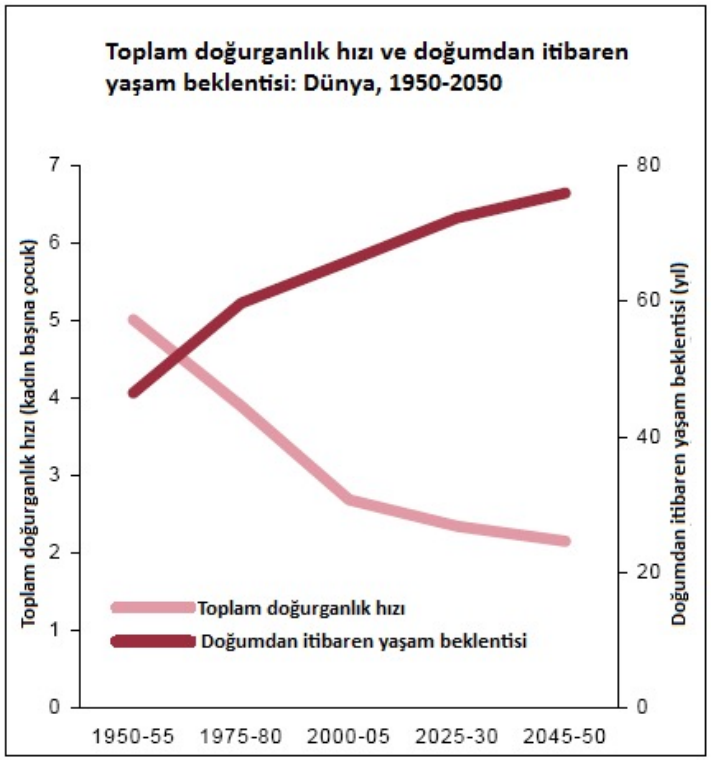
- It shows the relationship between the population group that has started to age and is preparing to go out of the working age (50-64 years old) and the highly aged population (over 85 years old).
- While the potential support rate is decreasing in the world and in Turkey, the rate of parental support is increasing.
- The increase in this indicator also indicates that aging has reached advanced dimensions.



Source: Özgür, 2010a

- Aging is the gradual loss of physical and spiritual strength of individuals, irrespective of time.
- Population aging is the phenomenon of changing the age structure of a population, reducing the share of children and young adults in that population and increasing the proportion of older people relatively.
- Population aging is changing the demographic structure around the world, closely associated with the decline in fertility and the rise in life expectancy (Özgür, 2020).
- In other words, global population aging is related to the demographic transition process in which fertility and mortality decline from high levels to low levels, and in this context, the age structure of the world population is reshaped in favor of the elderly population.

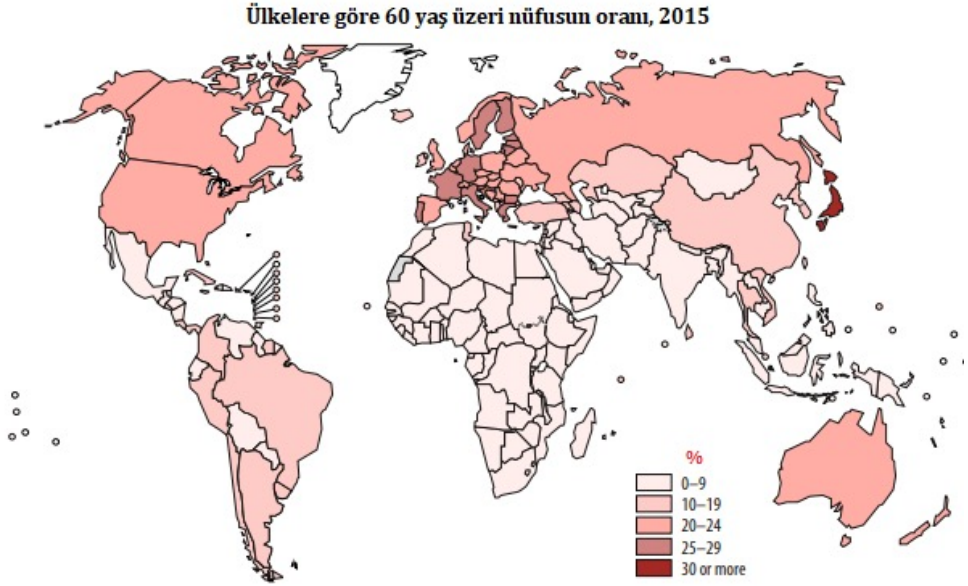
- **The aging of the population in a society is closely related to the decline in fertility there and the increase in life expectancy at birth.**

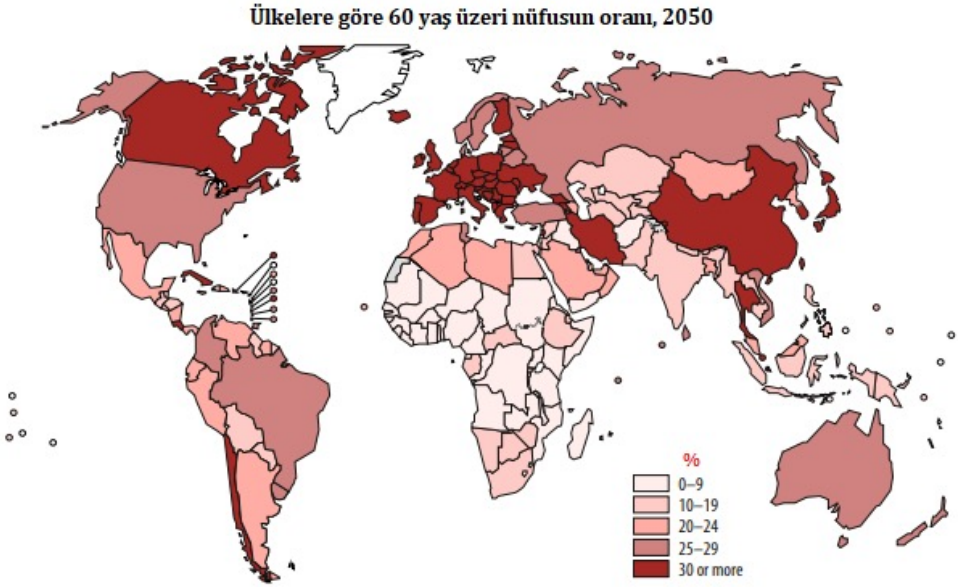


Source: United Nations, 2002. World Population Ageing 1950-2050.

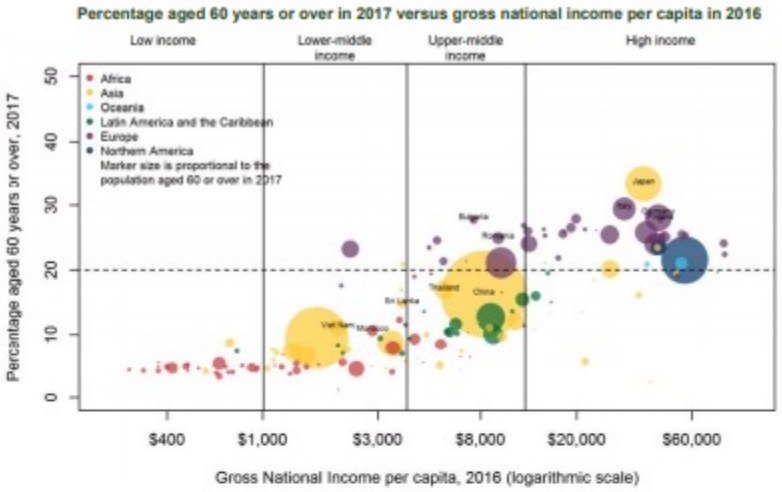
- There are two main reasons for the aging of the population.
- The first is the increase in life expectancy: On average, people around the world live longer.
- Much of the increases in life expectancy seen around the world reflect lower mortality among younger people than older people who live longer. This is a parallel progression to the historically unprecedented socio-economic development that has taken place globally over the past 50 years. Globally, life expectancy at birth in 2015 was 71 years for both sexes, increasing by nearly 24 years since 1955. The increase was 13.6 years in developed countries (78.4 years), 28 years in underdeveloped countries (70.5 years), and 26.5 years in underdeveloped countries (62.7 years) (UN, 2017).

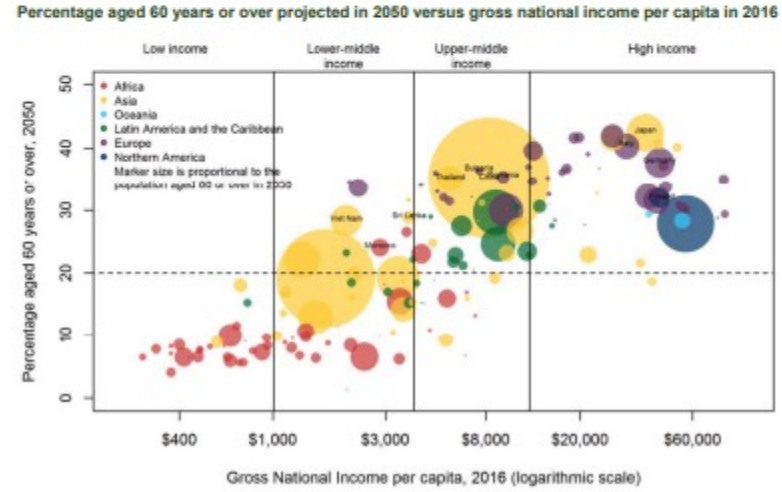
- The second reason populations are aging is declining fertility rates.
- This is likely due to parents realizing that their children are now more likely to survive than in the past, increased access to contraception, and changing gender norms.
- Prior to recent developments in socio-economic development, fertility rates in most parts of the world ranged from 5 to 7 children per woman (many of whom did not survive to adulthood). In 2019, these rates fell to or below the level needed to maintain the current size of populations (2.1 children per woman).
- The aging trend in the world population seems to continue in the coming years.
- Migration at the local level is also associated with the aging of the population.



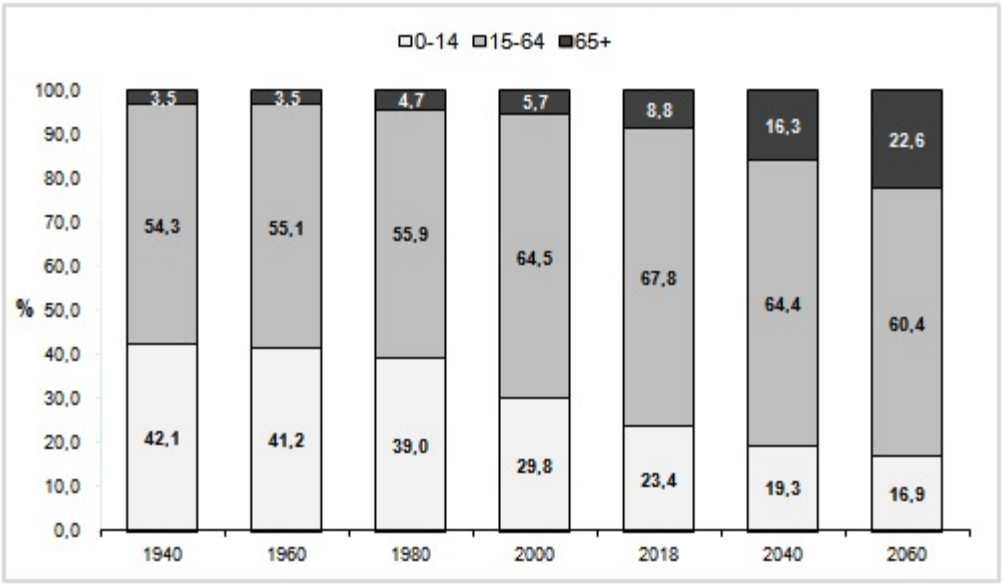


World Health Organization, 2015: 44





United Nations, 2017a



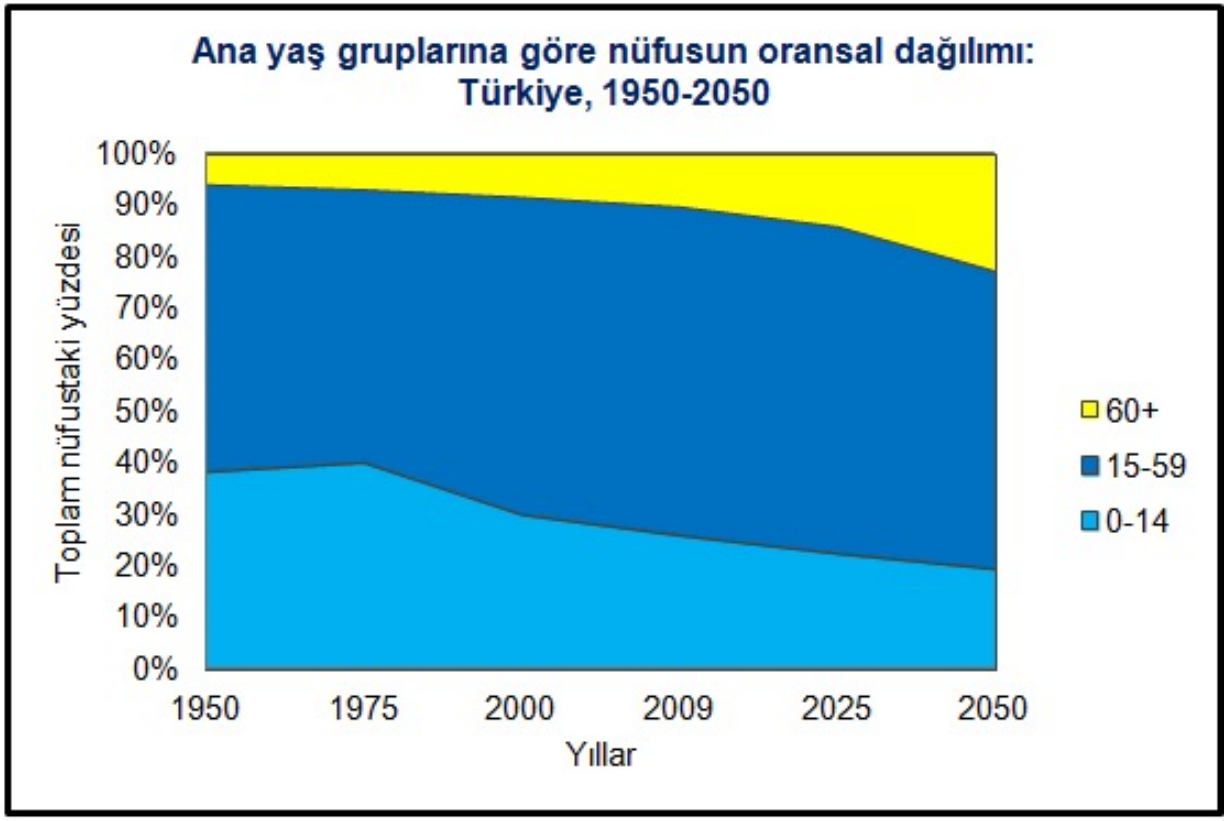
Age 65 and over
2040: % 16,3
1940: % 3,5

Under 15 years old
2040: % 19,3
1940: % 42,1

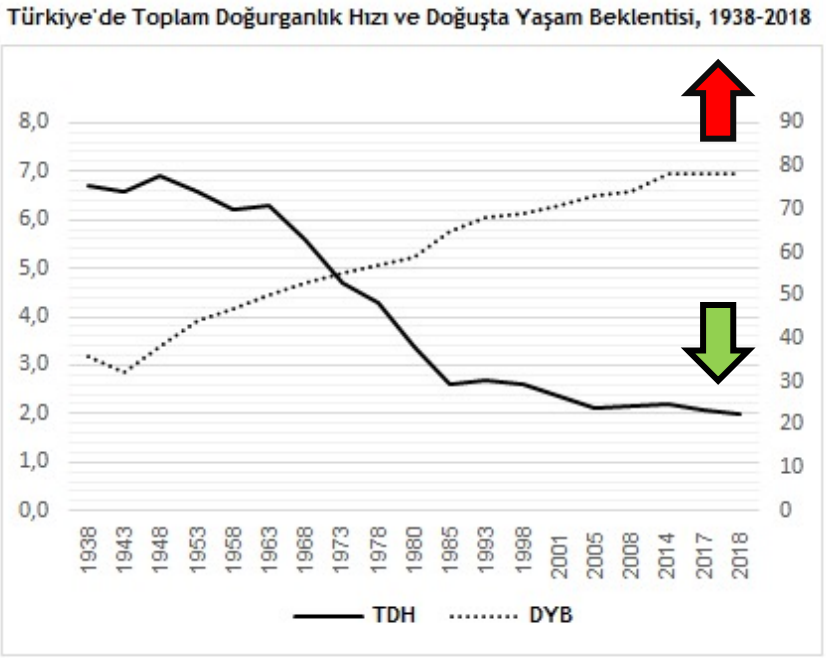
- Turkey is going through a demographic transformation process and the country has entered a new demographic regime since the 2000s (Koç et al. 2010).
- One of the important facts of the demographic transformation experienced in Turkey is the aging of the population and this phenomenon changes the age composition of the population (Eryurt, 2014).
- In recent years, there have been serious changes in the national age structure in Turkey and an aging trend is observed in the population of the country.
- Turkey is experiencing a structural change by leaving the young population structure and transitioning to the elderly population structure (Koç et al., 2010).

Change in the Age Structure of the Population: Turkey, 1950-2050

- Thus, the balance between young and old is changing throughout Turkey.



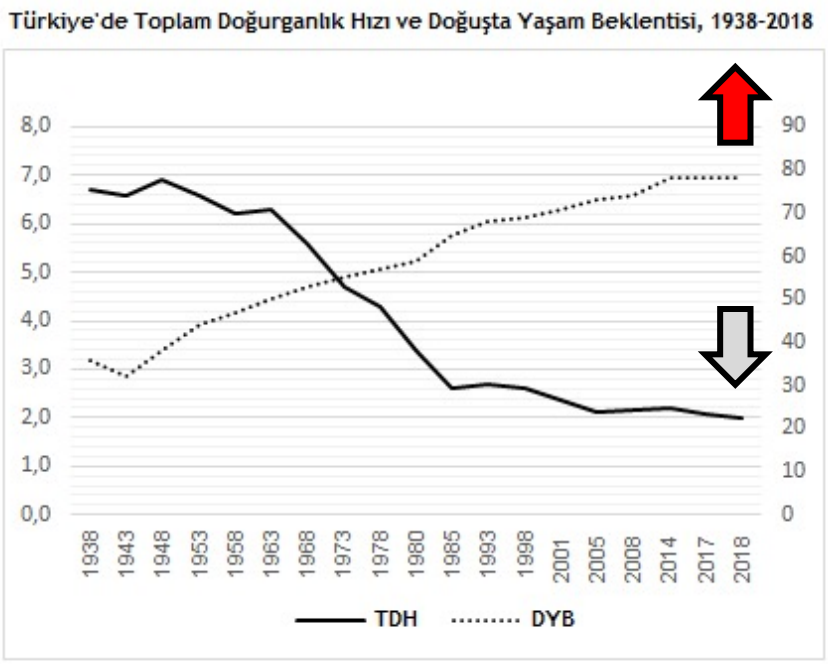
	ÇOCUK	YAŞLI
1950	65	10
2000	36	10
2009	25	10
2050	10	12



- Fertility decline has been the primary determinant of population aging in Turkey.
- During the last half-century in Turkey, the total fertility rate (TFR) has declined below the national renewal level (2.1 children per woman).

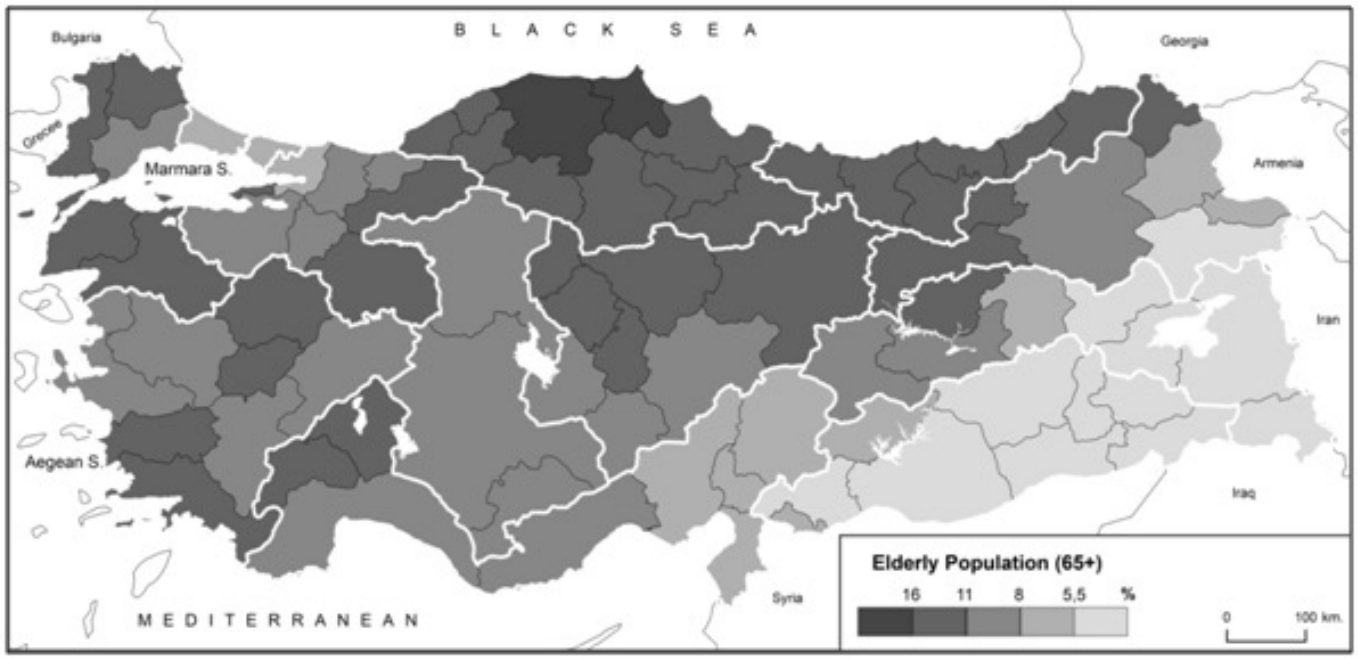
- As a result of the pronatalist population policies implemented in Turkey, the TFR was around 6-7 until the mid-1960s. However, since the mid-1960s, when urbanization accelerated and antinatalist population policies began to be implemented, fertility began to decline.

- TDH, which decreased to 3 children at the end of the 1980s and to the renewal level in the 2000s, decreased even below this level with 1,99 children per woman in 2018 (TurkStat, 17 May 2019).



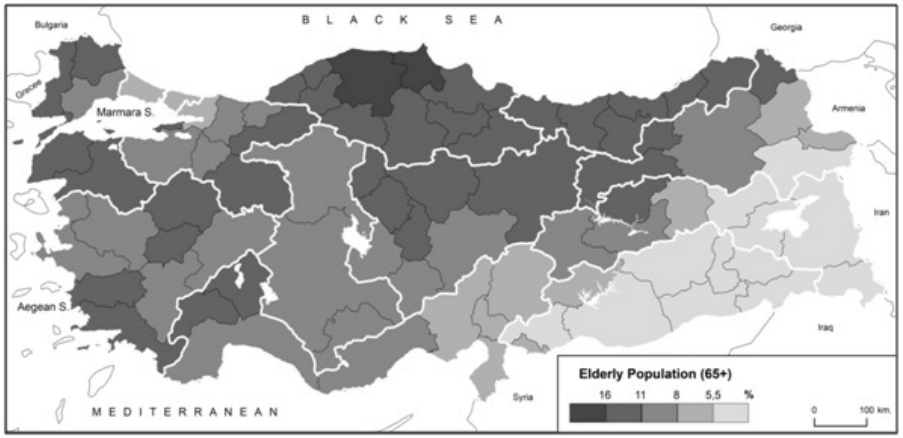
- Life expectancy at birth in Turkey has increased to almost 25 years, from 51-55 years in 1967 (Koç et al., 2010) to 75-81 years in 2014-2016 (TurkStat, 2017).
- It is estimated that this increase will continue in the future, reaching 80 years for both sexes (77 years for men and 82 years for women) by 2025 (TurkStat 2018b).

- Life expectancy at birth in Turkey, except for the Second World War; it tends to increase continuously (Koç et al., 2010).
- This increase was more affected by the improvement in infant mortality rate and under-five mortality rate rather than the improvement in adult mortality (Koç et al., 2010).
- In addition, it is thought that the improvement of general health and hygiene conditions and the expansion of health insurance coverage are also effective in the increase in life expectancy (Koç, 2014a).

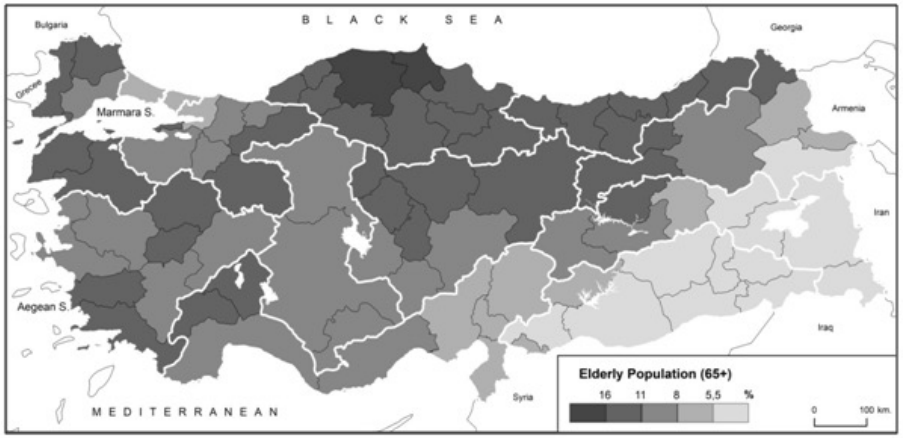


Bir yerdeki yaşlı nüfusun toplam nüfus içindeki payının % 8-10 arasında olması, o yerin nüfusunun yaşlı, %10'un üzerinde olması ise çok yaşlı olduğu anlamına gelmektedir(TÜİK, 2015:1).

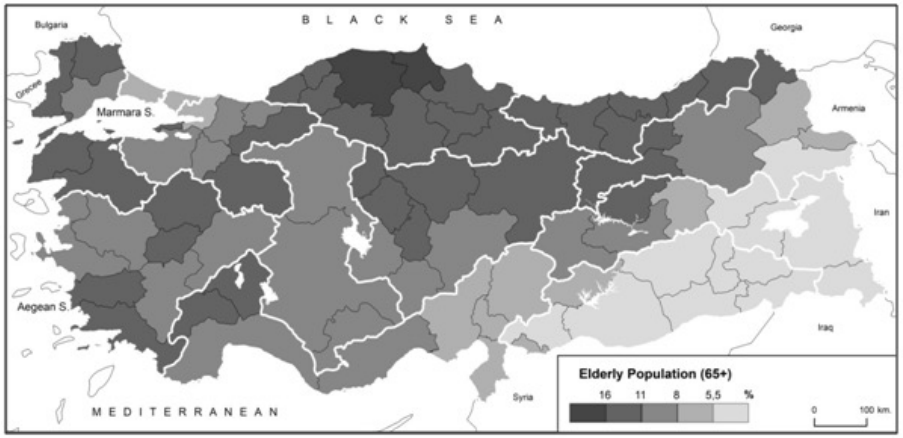
- There are significant differences in the spatial pattern of the age structure of the population in Turkey, and it is not possible to talk about the same level of elderly population distribution all over the country (Özgür, 2013).
- In Turkey, three different aging zones are identified in outline: (1) Areas with very old population, (2) Areas with elderly population, and (3) Areas with young or aging population.



- In the northern and western areas of Turkey, a very old society structure is dominant in general, and this structure is much more pronounced in some provinces such as Kastamonu and Sinop.
- The Western Black Sea, Eastern Black Sea, Western Marmara and Aegean regions are the geographical units with the country's highest proportion of elderly population (between 11% and 13%), and the Central Anatolian Region joined them in 2018.
- The determinants of the high level of aging in regions with very old populations are low fertility rates and often prolonged out-migration in the literature, especially for the Western and Eastern Black Sea regions.
- The downward trend in low fertility rates and infant mortality rates in the period 2009-2017; this indicates that the problem of aging will become more severe in the future in areas with very old populations.



- The second group is the areas with elderly population, where the elderly population ratios (about 8-9%) are determined roughly at the level of Turkey's average.
- These areas include those in the early stages of aging and regions that seem close to the very old group (East Marmara).
- There are demographic signs that aging will continue in regions in this group as well.
- Firstly, fertility rates have regressed to the replacement level, and even tend to fall below this level.
- In addition, infant mortality rates continue to decrease and life expectancy continues to increase.



- The third group areas, which include the Eastern Anatolian regions of Turkey and Istanbul, generally have low rates of elderly population (between 4.9% and 7.9%) compared to other regions of Turkey, with either a young/adult population (Southeastern Anatolia or like Istanbul) or an aging population (Northeast Anatolia).
- In this pattern, 2.5 per woman in the eastern regions of Turkey; even TDH exceeding 3.0 children; In Istanbul, on the other hand, internal migration has been effective as this region has been a national migration target for many years.
- Declining fertility and infant mortality rates and rising life expectancy trends in the eastern regions, as well as negative net migration rates, indicate that aging will spread to these regions in the future.

Aging and Population Aging: Turkey-Statistical Regions, 2018

Population aged 65 years and over, TFR and InMR(‰) by statistical regions of Turkey

Code	Statistical Regions (SR)	Population aged 65 years and over, 2018							TFR		InMR	
		% SR	Total (T)	Male (M)	Female (F)	(T) %	(M) %	(F) %	2009	2017	2009	2017
TR8	West Black Sea	8,7	622509	278412	344097	13,3	11,9	14,6	1,84	1,66	13	7,3
TR9	East Black Sea	5,0	359853	155970	203883	13,2	11,5	15,0	1,86	1,71	11,4	9,1
TR2	West Marmara	6,3	451474	204048	247426	12,6	11,3	14,0	1,54	1,69	13,3	7,5
TR3	Aegean	16,5	1189009	527992	661017	11,3	10,1	12,6	1,69	1,74	14,3	7,8
TR7	Central Anatolia	5,8	419156	185327	233829	10,3	9,1	11,5	2,16	1,96	11,9	8,7
TR4	East Marmara	10,1	724105	322621	401484	9,1	8,1	10,1	1,77	1,86	12,8	7,2
TR5	West Anatolia	9,5	681831	297310	384521	8,6	7,5	9,6	1,83	1,83	13,4	7,9
TR6	Mediterranean	12,1	872295	396572	475723	8,3	7,6	9,1	2,20	2,16	13,7	9,2
TRA	North East Anatolia	2,4	174554	78030	96524	7,9	6,9	8,9	2,91	2,62	12,6	11,3
TR1	Istanbul	14,0	1006545	428520	578025	6,7	5,7	7,7	1,77	1,79	11,4	7,4
TRB	Central East Anatolia	3,5	254662	111714	142948	6,5	5,6	7,4	3,00	2,63	17,3	12,4
TRC	South East Anatolia	6,0	430211	183616	246595	4,9	4,1	5,6	3,59	3,34	17,5	12,6
TR	Turkey	100,0	7186204	3170132	4016072	8,8	7,7	9,8	2,10	2,07	13,9	9,2

- The place where people live and the population density in these places are as important as the age and gender structure of the population.
- All of this has social, economic, political-administrative, environmental and even public health consequences. In an increasingly urbanized world, this issue becomes even more important. Because the density of the population will affect the cost, effectiveness and quality of the services to be provided.
- The age structure of the population affects societies in terms of economic (employment, consumer market, etc.), social (family, intergenerational relations, social security, retirement, care, etc.), demographic (fertility, mortality, morbidity, etc.).
- For example, as in the last global corona virus epidemic, crowded and densely populated environments have been identified as a very important factor in the spread of epidemic diseases, as they increase physical contact between people.
- There is a close relationship between population aging and health. Again, in the last global pandemic, it has been seen that the elderly population is at greater risk.

Çavlin, A., Adalı, T., Kumaş, A. (2016). *Türkiye Nüfusuna Güncel Bir Bakış*. Ankara: Nüfusbilim Derneği ve UNFPA.

Eryurt, M.A. (2014). Türkiye'de Yaşlı Nüfus ve Yaşlılık Dönemiyle İlgili Yaşam Tercihleri. In *Türkiye Aile Yapısı Araştırması: Tespitler, Öneriler,* 88-109. İstanbul: TC Aile ve Sosyal Politikalar Bakanlığı.

Hennig, B.D. (2011). Planet of People: From 2.5 to 10 billion in 150 years. Views of the World. http://www.viewsoftheworld.net/?p=1889

Koç, İ. (2014a). Türkiye'de Doğurganlık Seviyesi ve Örüntüsünün Değişimi: 1968-2011. In *Türkiye Aile Yapısı Araştırması: Tespitler, Öneriler,* 170-195. İstanbul: TC Aile ve Sosyal Politikalar Bakanlığı.

Koç, İ. (2014b). Türkiye'de Aile Yapısının Değişimi: 1968-2011 . In *Türkiye Aile Yapısı Araştırması: Tespitler, Öneriler,* 22-53. İstanbul: TC Aile ve Sosyal Politikalar Bakanlığı.

Koç, İ.; Eryurt, M.A.; Adalı, T.; Seçkiner, P. (2010). *Türkiye'nin Demografik Dönüşümü*. Ankara: Hacettepe Üniversitesi Nüfus Etütleri Enstitüsü.

Newbold, K.B. (2014). *Population Geography: Tools and Issues*. (2nd edition). Lanham, Maryland- USA : Rowman and Littlefield Publishers.

Özgür, E.M. (2013). Türkiye nüfusundaki doğurganlık düşüşü ve yaşlanma eğilimi. *Dernekler Dergisi 23 (2013/2),* 30-35.

Özgür, E.M. (2010a). Yaşlanan Bir Dünya Nüfusu. *Ankara Üniversitesi Türkiye Coğrafyası Araştırma ve Uygulama Merkezi-Bölgesel Coğrafya Anabilim Dalı Konferansları*, 16 Mart 2010, Ankara.

Özgür, E.M. (2010b). Türkiye'nin Yaşlanma Sürecine Coğrafi Bir Bakış. 1.Ulusal Nüfusbilim Kongresi, 10 Ekim 2010 ODTÜ Kültür ve Kongre Merkezi, Ankara.

Özgür, E.M. (2020). Aging as a new socio-demographic reality of Turkey: Processes, patterns and outcomes. In Recep Gulmez & Suat Tuysuz (Eds.), *The New Turkey: Politics, Society and Economy,* Chapter 3, (pp.77-131) New York: Nova Science Publishers (baskıda)

Peters, G. L., Larkin, R.P., (2005). *Population Geography: Problems, Concepts, and Prospect*, Eighth Edition, Dubuque: Kendal/Hunt Publishing Company.
Population Reference Bureau-PRB (2013). *World Population Data Sheet 2013*. Population Reference Bureau. http://www.prb.org/pdf11/2011population-data-sheet_eng.pdf (03.03.2012)
Population Reference Bureau-PRB (2016). *World Population Data Sheet 2016*. Population Reference Bureau.
Rowland, D.T. (2006). *Demographic Methods and Concepts*. New York: Oxford University Press.
Türkiye İstatistik Kurumu-TÜİK (01 Şubat 2018). Adrese Dayalı Nüfus Kayıt Sistemi Sonuçları, 2017. TÜİK Haber Bülteni Sayı: 27587.
Turkish Statistical Institute-TurkStat. 2019. *Birth Statistics, 2018*. 17 May. Turkish Statistical Institute Press Release No: 30696.
United Nations (2017a). *World Population Ageing 2017*. NewYork: Department of Economic and Social Affairs, Population Division (ST/ESA/SER.A/408).
United Nations (2017b). *World Population Prospects The 2017 Revision: Volume II: Demographic Profiles*. New York: Department of Economic and Social Affairs Population Division
United Nations (2012). *World Population Prospects: The 2010 Revision*. United Nations, Population Division, DESA,
United Nations (2002). *World Population Ageing: 1950-2050*. United Nations, Population Division, DESA,
United Nations-UN (2019*). World Urbanization Prospects,The 2018 Revision*. New York: UN
Worldmapper (2012). Worldmapper ,Gridded Population Cartograms http://www.worldpopulationatlas.org/ (03.03.2012)
World Health Organization (2015). *World Report on Ageing and Health*. Geneva: World Health Organization.
Yakar, M. & Özgür, EM (2022). Türkiye'de nüfus yaşlanmasının mekânsal Örüntüleri [Spatial patterns of population ageing in Turkey]. *Coğrafya Dergisi*, (hakem incelemesinde).
Yüceşahin, M.M.; Özgür, E.M. (2008). Regional fertility differences in Turkey: Persistent high fertility in the southeast. *Population, Space and Place*, 14, 135-158.