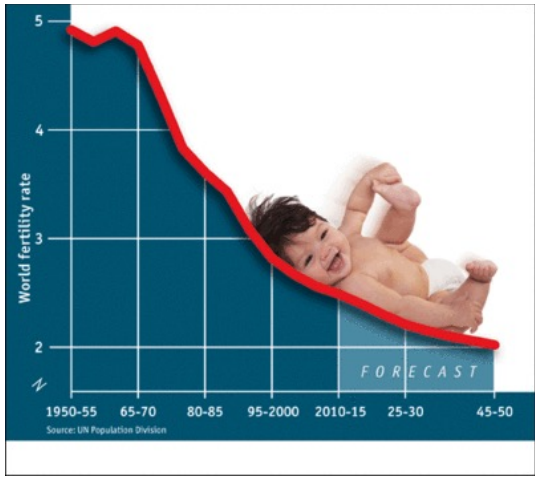
Ankara University
Faculty of Languages, History and Geography
Department of Geography

# Fertility




Ass. Prof. Dr. Ayla Deniz
adeniz@ankara.edu.tr

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) **Measuring Fertility**
   a) Crude Birth Rate
   b) Child-Female Ratio
   c) Overall Fertility Rate
   d) Age Specific Fertility Rate
   e) Total Fertility Rate
2) **Key Determinants of Fertility**
   a) Biological Determinants of Fertility
   b) Social Determinants of Fertility
   c) Economic Determinants of Fertility
3) **Fertility Transition**
4) **Fertility Differences**
5) **Fertility Patterns and Trends in the World**

- **Fertility can be measured by various methods. Let us now briefly consider them, from the simplest to the more complex.**
- **Crude birth rate (CBR) is one of the simplest and most widely used fertility measurement methods.**
- **Crude birth rate is the number of live births in a place in a year divided by the total mid-year population of the same year and is expressed in thousandths.**
- **In other words, it is the number of live births per 1000 population.**

$$CBR = (B : P) \times 1000$$

**B** = Number of live births in a year

**P** = Total mid-year population of the same year

For example, the crude birth rate for 2019 in Turkey is 14.3 per thousand. Whereas, in 2001, there were 20.3 live births per 1000 population.

- **Child-woman rate (CWR) is an indirect measure of fertility.**
- It is mostly used to predict fertility in underdeveloped countries.
- This refers to the number of children under 5 per 1000 women of childbearing age.

$$CWR = ( P_{0-4} : F_{15-49} ) \times 1000$$

$P_{0-4}$ = Total number of children under 5 years old

$F_{15-49}$ = Total number of women in the 15-49 age group

- $CWR_{Turkey} = ( 6345136 : 21547988) \times 1000$
- $CWR_{Turkey} = 295$

- For example, the child-women ratio for 2019 in Turkey is 295 per thousand.

- **General fertility rate (GFR) is a more useful method of measuring fertility than crude birth rate and child-to-female ratio methods.**
- As in calculating the crude birth rate, the number of births in a certain period is used. Instead of the total population, the total number of women of reproductive age (in the age group 15-49) is used.
- **It is obtained by dividing the number of children born in a year by the female population of reproductive age and multiplying the result by 1000.**
- **GFR = ( B : $F_{15-49}$ ) x 1000**

**B** = Number of live births in a year

**$F_{15-49}$** = Mid-year number of total women in the 15-49 age group

For example, for 2019 in Turkey

**GFR = (1183652 : 20327236) x 1000 = 58.2**

The general fertility rate is 58.2 per thousand.

- **Age-specific birth rate (ASFR) is a measurement method that shows the relationship between birth and age.**
- This fertility rate is obtained by multiplying the number of births in a year by women in a certain age group by the mid-year number of women in the same age group, multiplied by 1000.
- Because of its practicality, the fertility rates of women of childbearing age are calculated in five-year-old groups (15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49 age groups).
- Thus, age-specific fertility of the 7-year-old group can be achieved.

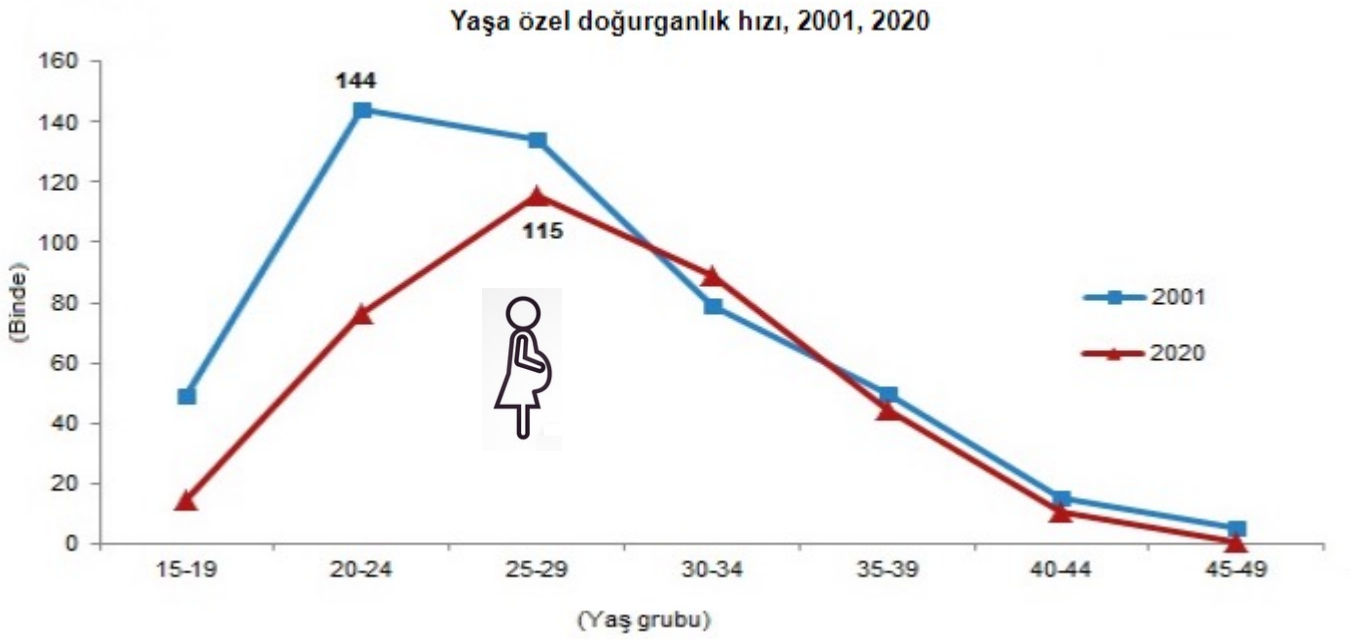
- **ASFR = ( B*a* : F*a* ) x 1000**

**B*a*** = Number of births per year by women in one age group

(for example a=15-19 age group)

**F*a*** = Mid-year number of total women in the same age group

# Measuring Fertility: Age Specific Fertility Rate




Source: TurkStat

| Yıl | Annenin yaş grubu-Age group of mother | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | *15-19* | *20-24* | *25-29* | *30-34* | *35-39* | *40-44* | *45-49* |
| 2005 | 41 | 123 | 123 | 84 | 37 | 14 | 3 |
| 2010 | 34 | 113 | 126 | 88 | 43 | 11 | 2 |
| 2015 | 26 | 104 | 135 | 102 | 50 | 13 | 1 |
| 2018 | 19 | 90 | 128 | 98 | 50 | 12 | 1 |

Source: TurkStat

- **The Total Fertility Rate (TFR) is the most useful fertility measurement method and is like a summary of the age-specific fertility rates of a population.**
- Total fertility rate (TFR) refers to the average number of children a woman can have during her fertile period (ages 15-49).
- The result of adding the age-specific fertility rate of each age group, multiplying the value found by 5, and dividing the resulting value by 1000 gives the total fertility rate.

$$TFR = 5 \sum_{a=1}^{7} B_a : F_a \ : 1000$$

$B_a$ = Number of births of women in an age group (a) in a one-year period

$F_a$ = Mid-year total number of women in an age group (a)

**a**= Age groups by fives

(15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49 a total of seven separate groups)

# Determinants of Fertility

- **There are some biological, social and economic factors that affect fertility levels.**

**1) Biological Determinants**

a) Age

b) Health, Nutrition and Environmental Status

**2) Social Determinants**

a) Marriage Age

b) Prevention of Pregnancy (Contraception)

c) Termination of Pregnancy (Abortion/Abortion)

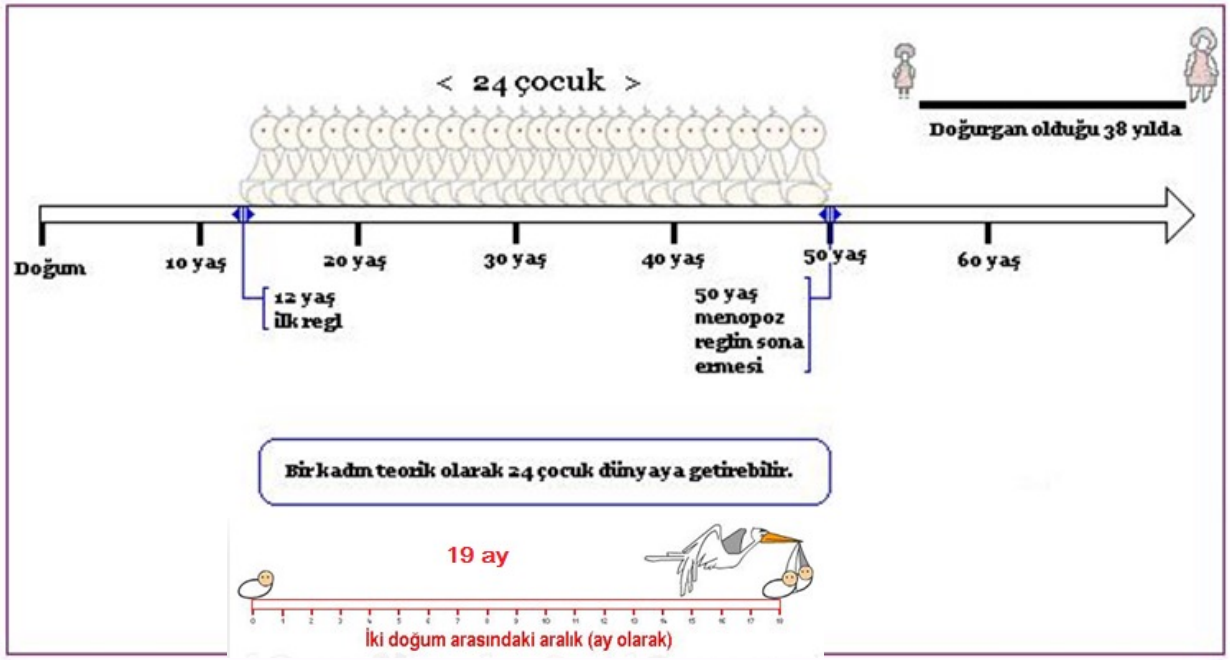
d) Birth Range (Baby Breastfeeding)

**3) Economic Determinants**

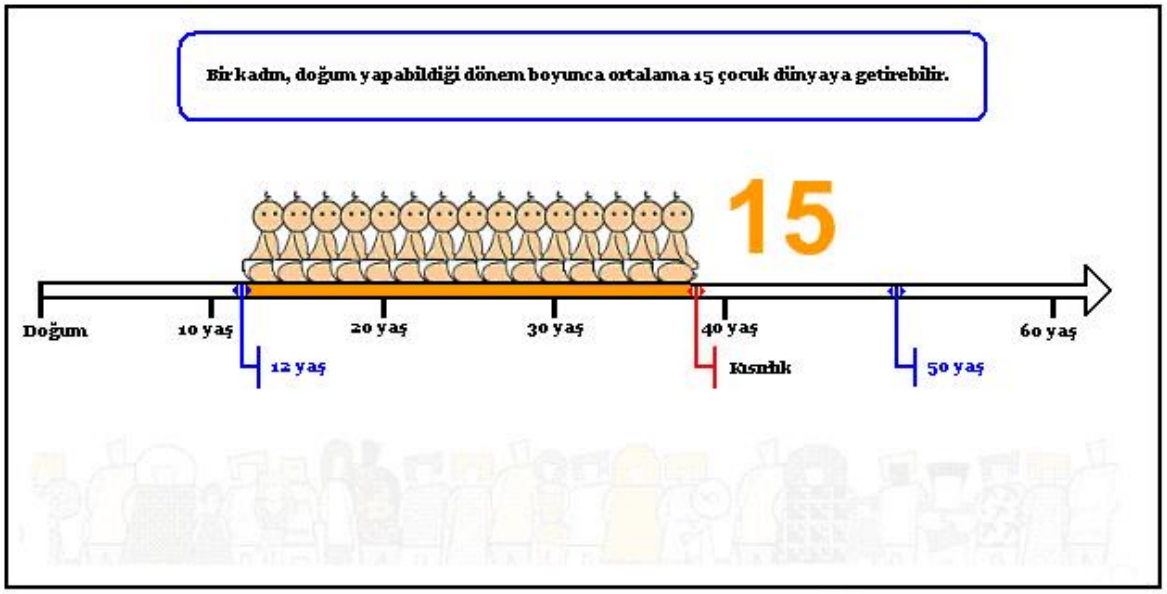
a) Level of Development and Urbanization

b) Child's Value

c) Child's Cost




- In most societies, reproduction is usually carried out by young adults.
- It is often assumed that a woman has been fertile for 35 years, between the ages of 15-49.
- Considering the birth intervals in the fertile age (world average 19 months); theoretically, a woman can have 24 children in a row [biological maximum].

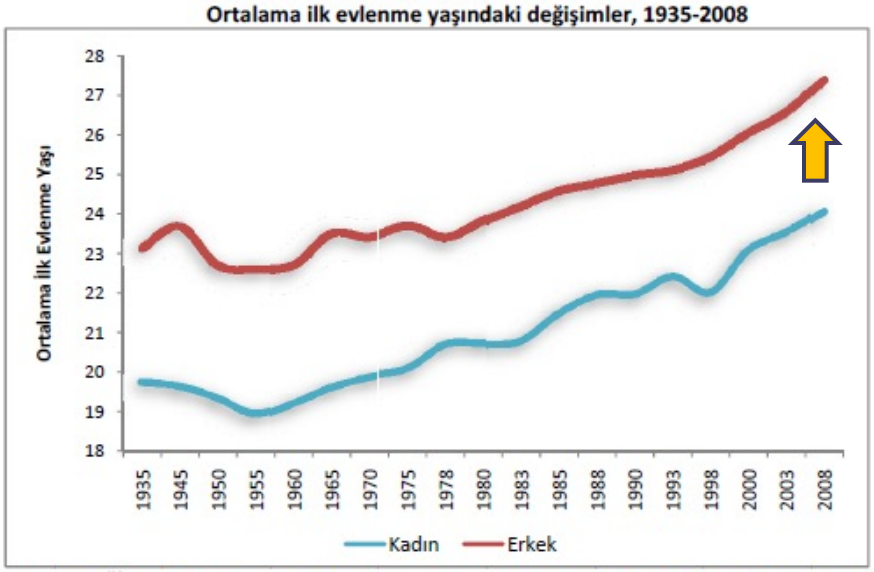



- Age is a biological determinant. Although it is theoretically possible for a woman to have 24 children in a row, fertility declines in the 40s before menopause; therefore, the biological capacity of most women is 15 children (except for multiple births).
- However, in practice in the modern world, it is not possible for most women to give birth to this many children.
- A person's health, nutritional status, and the environment in which he lives are related to his fertility ability. Diseases, especially venereal diseases, malnutrition and environmental conditions adversely affect reproductive ability.

- Having a child is not enough to be fertile, male-female union is required.
- Marriage is an institution that promotes fertility in all societies. The earlier a woman marries in a society; the higher the fertility.

- Considering that having children generally takes place within marriage, a link can be established between the number of children of married couples and the age at first marriage.
- As the age at marriage increases, the number of children decreases.
- Today, women in the world marry at the age of 21 on average, and accordingly, the probable fertility is at most 11 children.

# Social Determinants of Fertility: Marriage, Turkey



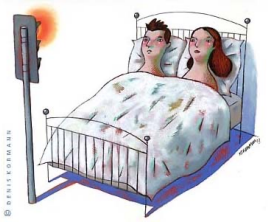

Source: Koç et al., 2010: 28

| Yıl | İlk evlenme yaşı | |
|---|---|---|
| | *Erkek* *Male* | *Kadın* *Female* |
| 2001 | 26,0 | 22,7 |
| 2005 | 26,5 | 23,2 |
| 2010 | 27,0 | 23,7 |
| 2019 | 27,9 | 25,0 |

Source: Turkstat, Marriage Statistics

- The age at first marriage in Turkey has increased for both sexes over the years, reaching almost 28 years for men and 25 years for women in 2019.

# Social Determinants of Fertility: Contraception/Birth Control



- The use of contraceptive methods is also effective on fertility.
- Increased access to birth control methods and the desire to limit family size have helped reduce fertility.
- The rate of use of modern contraception among married women aged 15-49 in the world in 2018 was 56% (62% of those using any method).
- In general, usage rates are high in economically developed countries and low in less developed countries.
- The use of modern contraception is 88% in Norway and 2% in South Sudan.
- Sterilization is often used to prevent further pregnancy after a desired family size has been achieved.
- This procedure is a more popular fertility reduction procedure in developed countries.

- Abortion seen as a contraceptive method in many places, is an important determinant of fertility.
- Abortion is one of the most common forms of modern birth control in the world and is assumed to be a major cause of low birth rates in the developed world.
- It is estimated that the annual number of abortions worldwide is 40-50 million.

- Family preference for male children is an important factor that increases fertility.
- Every year, 1.5 million girls worldwide are missing at birth as a result of prenatal gender selection.

- **The recent dramatic increase in sex ratios at birth is the result of a combination of three factors:**

a. Persistent son preference
b. The tendency to shrink in the ideal family and
c. The rapid spread of modern medical technology that can determine prenatal sex.

- **Due to gender selection, the sex ratio at birth has increased in some countries (normally 102 to 107 male births versus 100 female births).**

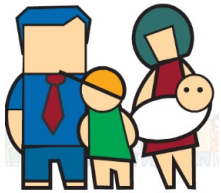
The Three Preconditions of Modern Sex Selection


Sex Ratio at Birth in the Most Affected Countries

| COUNTRY/YEAR | SEX RATIO AT BIRTH |
|---|---|
| China (Mainland) (2009) | 118.1 |
| Azerbaijan (2009) | 117.6 |
| Armenia (2008) | 115.8 |
| Georgia (2006) | 111.9 |
| Montenegro (2005-09) | 111.6 |
| Albania (2008) | 111.5 |
| Vietnam (2010) | 111.2 |
| India (2006-08) | 110.6 |
| Pakistan (2007) | 109.9 |

- Birth interval is the time between two consecutive births.
- As the birth interval gets longer; probable fertility level is decreasing.
- Temporary postpartum infertility and inability to conceive through sexual abstinence are associated with fertility.
- For example, breastfeeding a mother reduces the likelihood of pregnancy for a period of 21 months after birth (although it does not eliminate it).
- In many African societies, infants are breastfed until age two or three, and women may abstain from sexual intercourse for up to 2 years after birth, both of which have the effect of increasing the birth interval.

- There is also a relationship between the level of economic development and urbanization and fertility.
- As the level of development and urbanization increases, fertility decreases.



- The value and cost of the child is also related to fertility.
- Couples often evaluate the cost-benefit of a child before having them.

- The greater the value of the child in developing countries, the higher the fertility rate.

- The value of the child can be thought of as the sum of the good things he or she receives from the child, or to function to meet and serve the needs of the parents.
- The child has both economic and non-economic values.
- Non-economic values are social and psychological.
- It includes the spiritual and social satisfaction that parents derive from having and raising children.
- The child creates non-economic value elements in parents, such as love, a sense of accomplishment, perpetuation of the lineage, and social acceptance.

- **The child has two basic economic values:**

1. The child is a source of financial security for the parents in their old age and in emergencies
2. The child being a productive actor, providing income to the family.

- The economic value of the child is more evident in developing countries, especially in rural areas, and this can also be seen as the main reason for the prevalence of the extended family form in the regions.

- **As society modernizes and reaches higher levels of economic and social development, the economic value of the child decreases.**

- The cost of the child can be divided into two groups as non-economic and economic costs.
- non-economic costs; are the emotional and psychological problems that the child imposes on the parents.
- Economic costs are direct maintenance costs and opportunity costs.
- Direct care costs are monetary expenses that will be spent on the child. These costs include food, clothing, shelter, transportation, education costs and health expenses.

- Opportunity costs include opportunities that require parents to make sacrifices to have and raise children.

- There are three types of opportunity costs, the importance of which varies according to the level of economic development of the countries:

1. Consumption expenses lead to a low standard of living for the family
2. The child's reduction in the family's ability to save and invest
3. Women's refusal to work due to children and thus their possible earnings.




**ABD.de 2013 Yılında Doğan Bir Çocuğun Gelir Gruplarına Göre Tahmini Yıllık Harcamaları**

| Year | Age | Income group | | |
|---|---|---|---|---|
| | | Lowest | Middle | Highest |
| 2013 | <1 | $9,480 | $12,940 | $21,430 |
| 2014 | 1 | 9,710 | 13,250 | 21,940 |
| 2015 | 2 | 9,940 | 13,570 | 22,470 |
| 2016 | 3 | 10,220 | 13,930 | 23,020 |
| 2017 | 4 | 10,470 | 14,260 | 23,570 |
| 2018 | 5 | 10,720 | 14,600 | 24,140 |
| 2019 | 6 | 10,530 | 14,760 | 24,590 |
| 2020 | 7 | 10,780 | 15,110 | 25,180 |
| 2021 | 8 | 11,040 | 15,470 | 25,790 |
| 2022 | 9 | 12,320 | 16,940 | 27,590 |
| 2023 | 10 | 12,610 | 17,340 | 28,260 |
| 2024 | 11 | 12,920 | 17,760 | 28,930 |
| 2025 | 12 | 13,780 | 19,170 | 31,570 |
| 2026 | 13 | 14,110 | 19,630 | 32,330 |
| 2027 | 14 | 14,450 | 20,100 | 33,100 |
| 2028 | 15 | 14,840 | 21,370 | 36,680 |
| 2029 | 16 | 15,200 | 21,880 | 37,560 |
| 2030 | 17 | 15,560 | 22,400 | 38,460 |
| **Total** | | **$218,680** | **$304,480** | **$506,610** |

*Estimates are for the younger child in husband-wife families with two children and assume an average annual inflation rate of 2.4 percent.

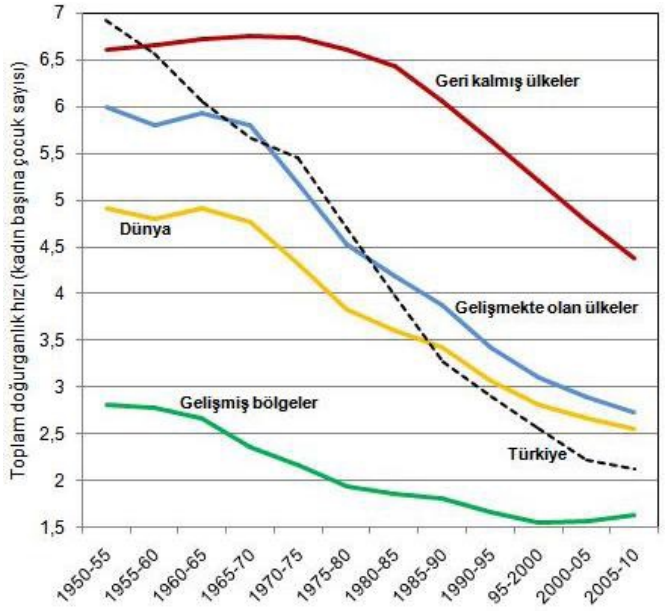
Source: Expenditures on Children by Families, 2013: 21
http://www.cnpp.usda.gov/sites/default/files/expenditures_on_children_by_families/crc2013.pdf

- Fertility transition refers to the decline of fertility from high to low levels in a society due to various factors.
- Such a transition is taking place across the world and in different parts of the world.

## High Fertility

**NATURAL FACTORS dominate;**
Number of women of childbearing age

Socio-economic conditions affect fertility rate and family size.




## Low Fertility

**HUMAN FACTORS dominate;**
Spouses' preference and decision on family size

Effective contraception with abortions and contraception

Government policies and incentives are effective in family planning.

- **Education has a critical role in the fertility transition.**

- Obtaining a career
- prestigious profession
- Participation in lifelong activities

*Evaluation:*
*The value of motherhood and child*
*The economic cost of the child*
*Decision: FEW KIDS!*

Decreased death rate → Decreased economic value of the child → Child restricting adult activities → Family transformation

EDUCATION

FERTILITY TRANSITION

Weakening in the enforcement of cultural norms → Intellectual diffusion → Rising marriage age → Increasing access to family planning services

Source: Yüceşahin, 2010

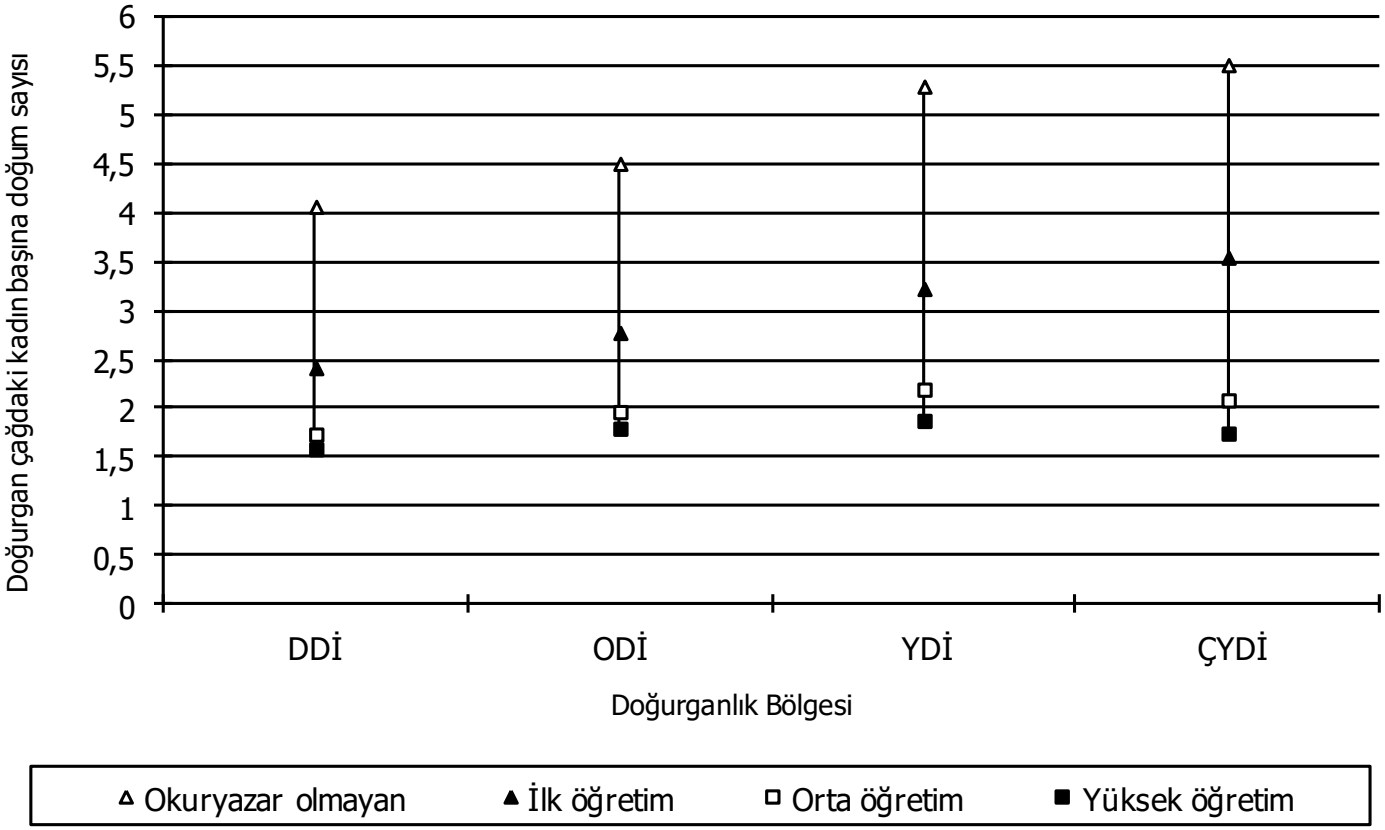
- Fertility varies. These are useful and important in explaining spatial and temporal differences in fertility.
- The most important fertility differences include rural-urban, income, education, and racial-ethnic differences.

- Fertility is related to the level of urbanization. Generally, fertility in rural areas is higher than in urban areas.
- Fertility is related to levels of economic development (income) measured as GDP per capita. In general, fertility increases as income falls.

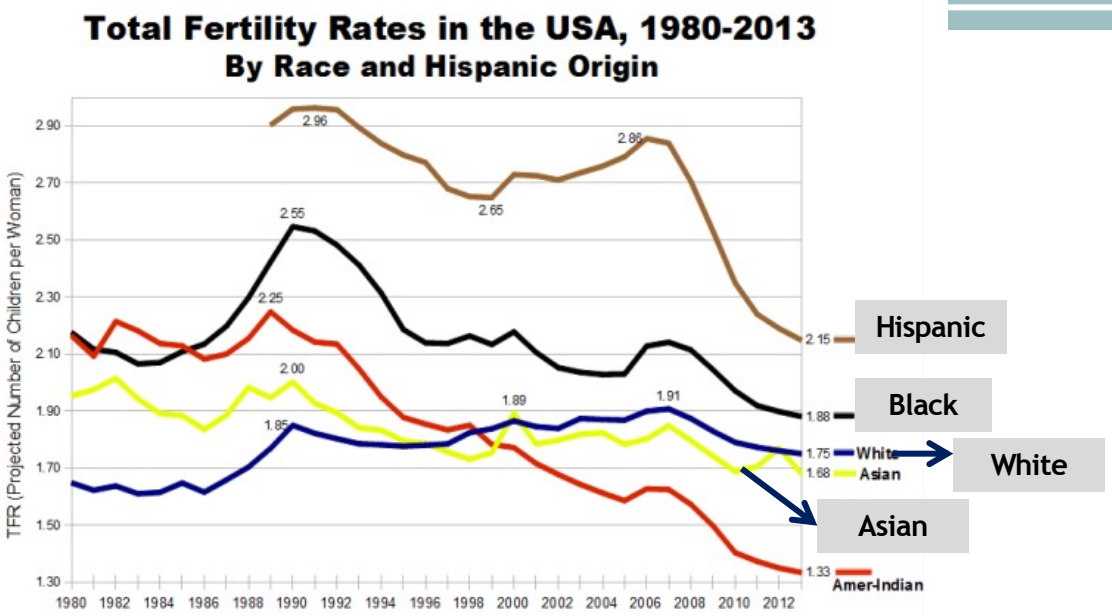
- Like income, education also exhibits a negative relationship with fertility. As education increases, fertility decreases.
- Different racial and ethnic groups also have different fertility levels. For example, the fertility level of women of Kurdish origin in Turkey is higher than that of other ethnic groups.
- In some cases, religious and professional differences may also be effective in fertility differences.

# Education Level-Fertility Relationship: Turkey, 2000

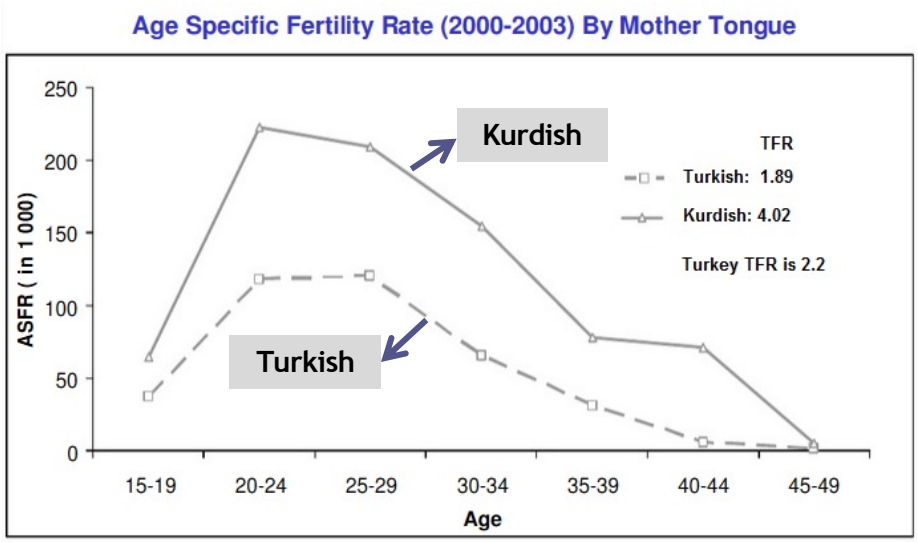





Source: Yüceşahin ve Özgür, 2008



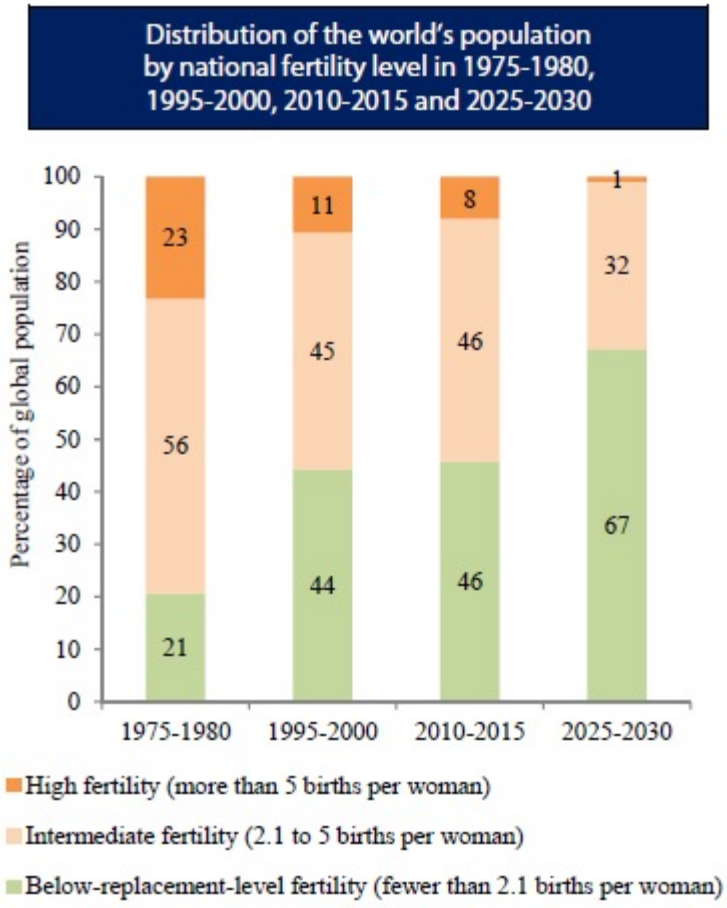

Source: https://hailtoyou.wordpress.com/2015/12/21/total-fertility-rates-by-race-in-the-usa-1980-2013/




Source: Yavuz, 2006

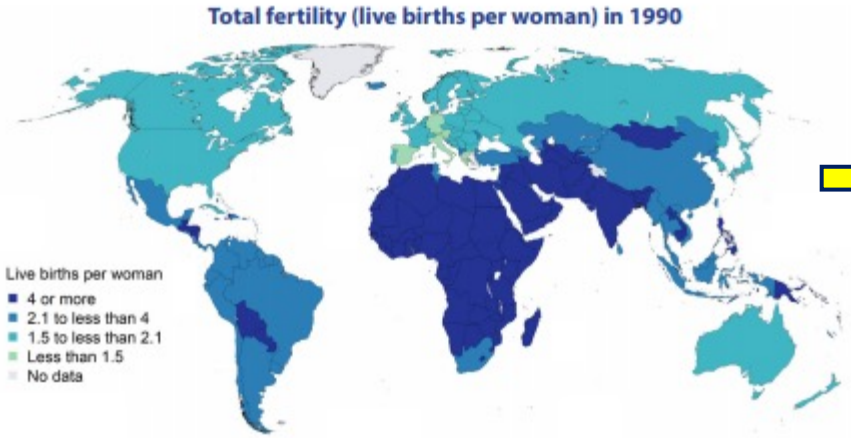
✓ **Fertility changes over time and across space.**

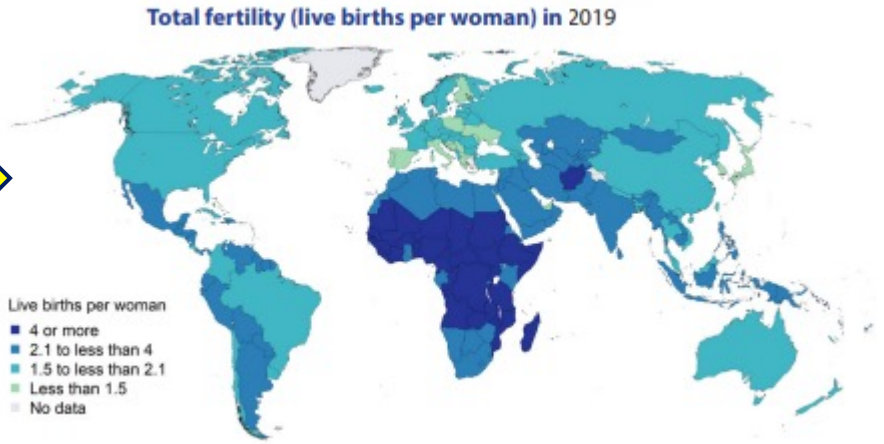
✓ Distribution of world population according to national fertility levels; It shows that the share of high fertility in the global population has declined rapidly over the years, while low fertility has increased.

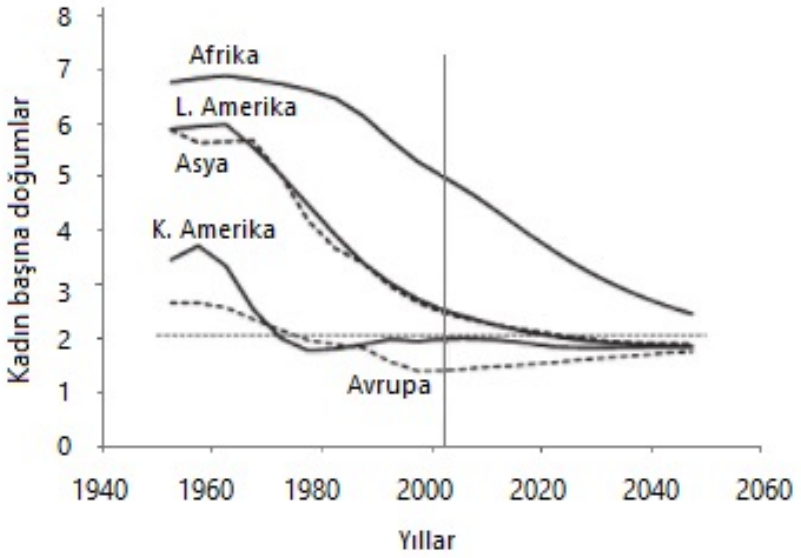



Source: United Nations, 2017a: 1

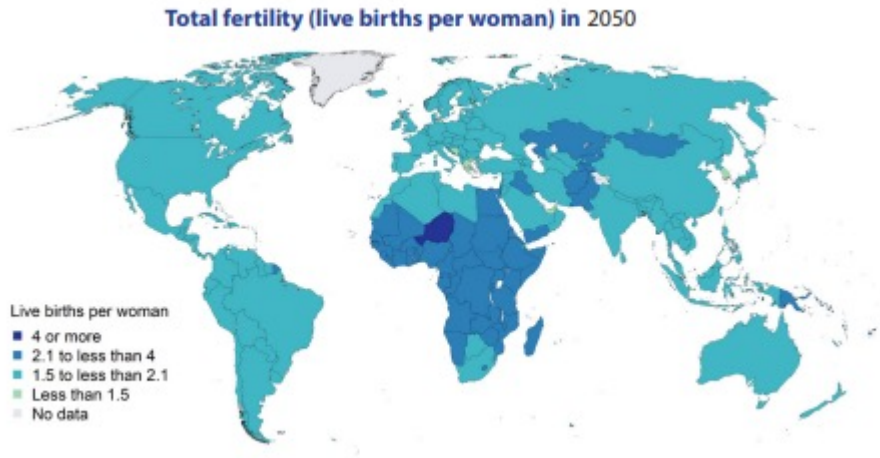
- **Fertility is declining, although not at the same level, in all major regions of the world.**



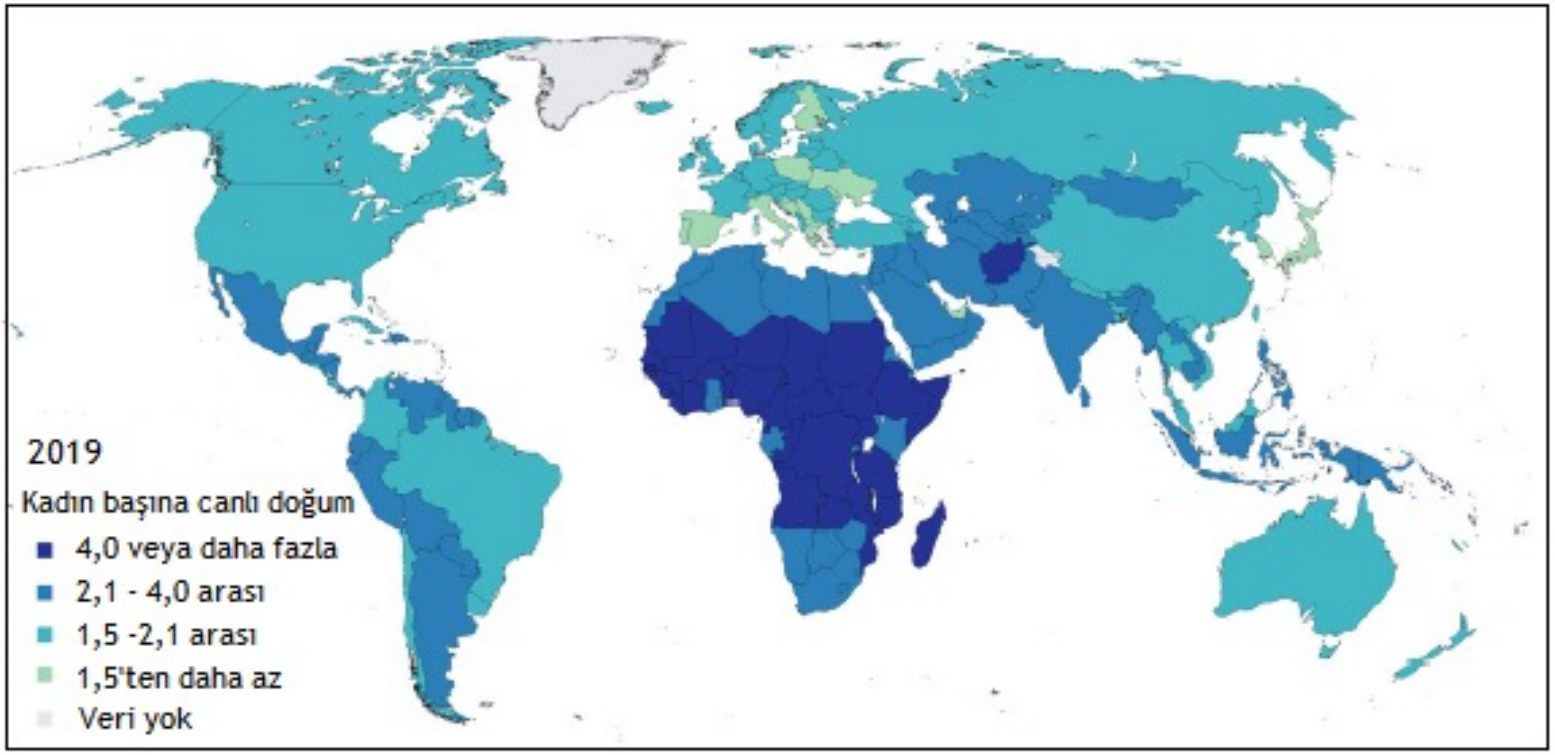




Source: Bongaarts, 2009

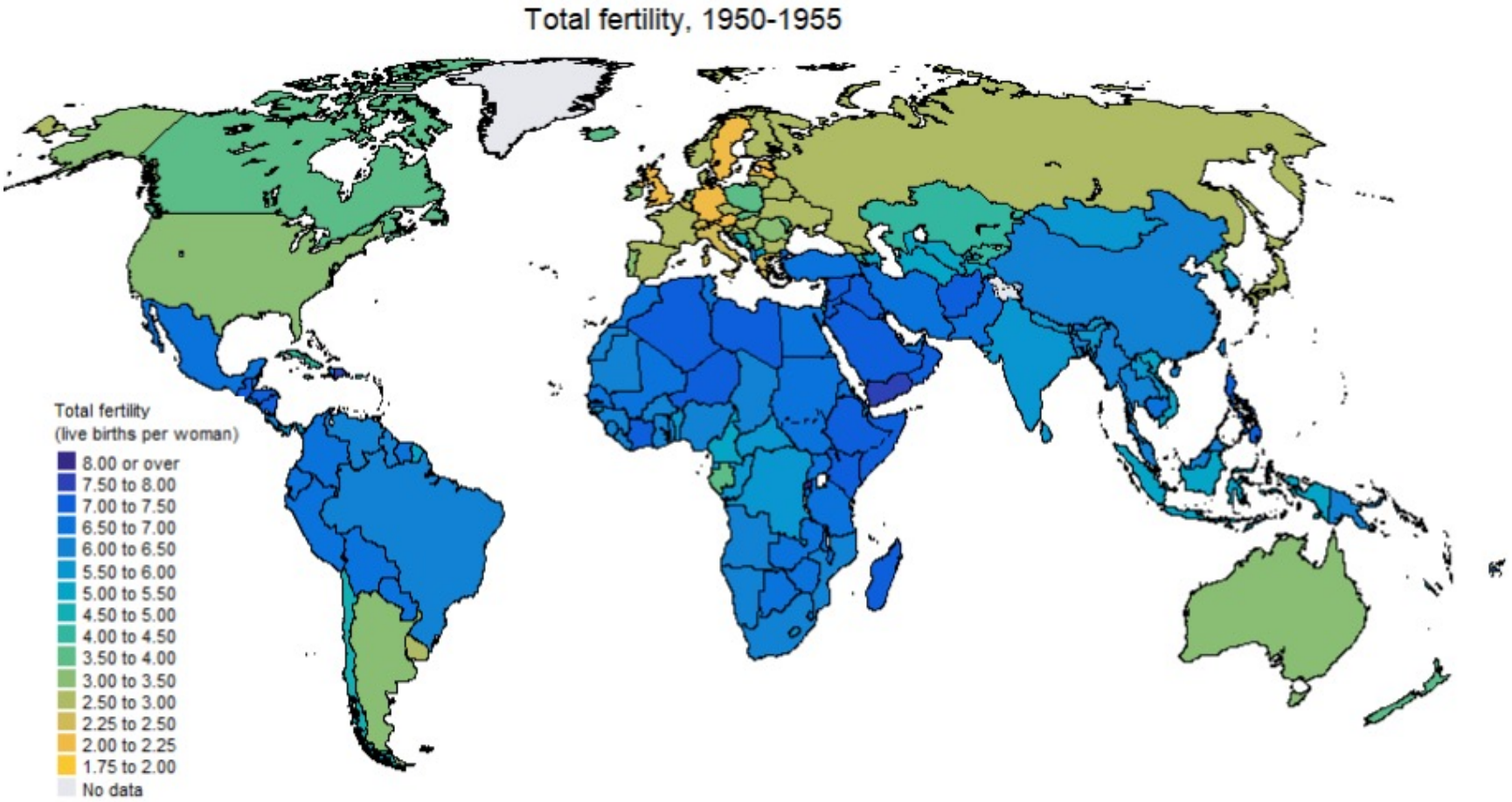



Source: United Nations, 2019: 26

# Spatial Fertility Patterns

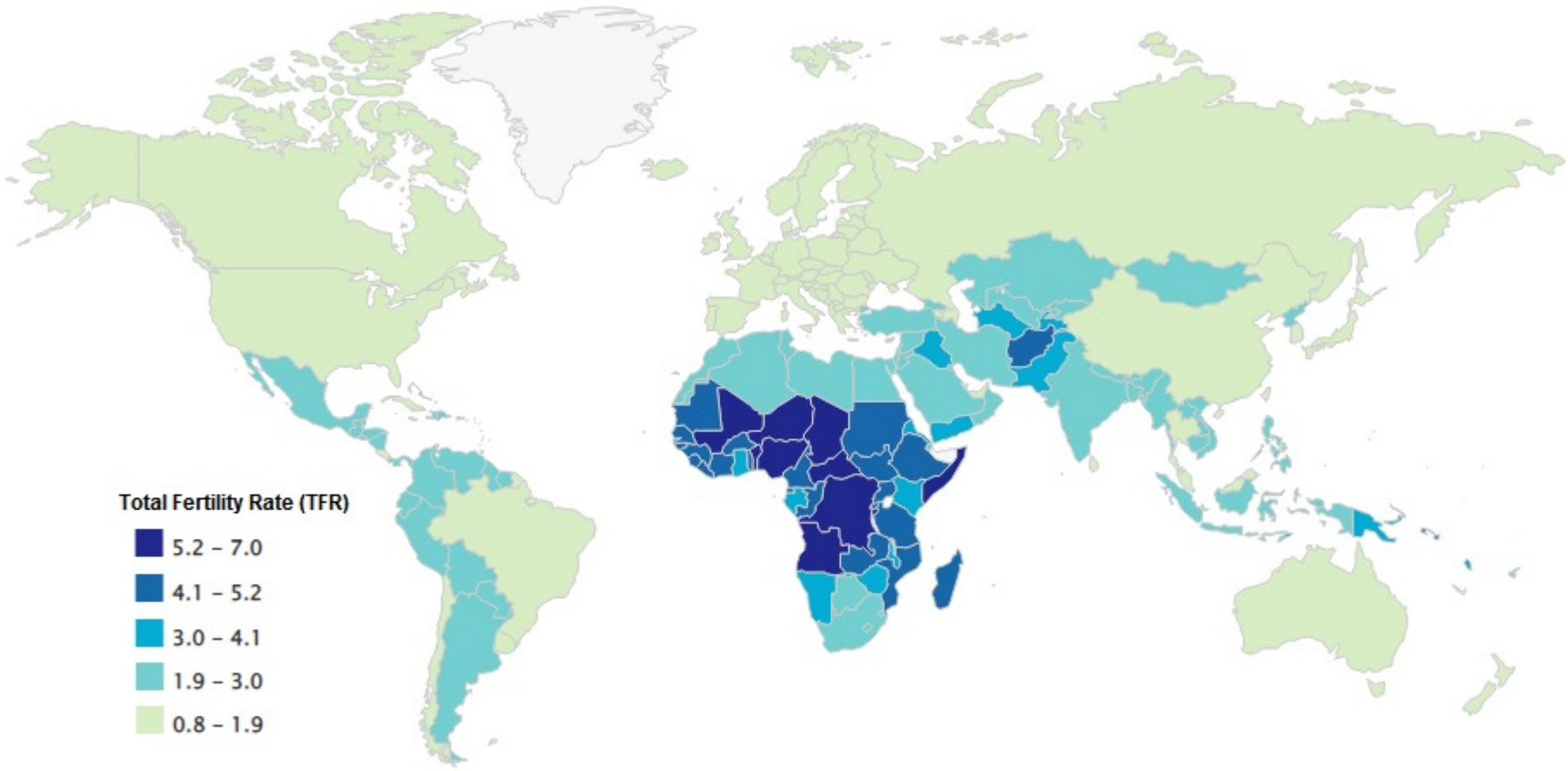


# Change of Spatial Fertility Patterns




Source: https://population.un.org/wpp/Maps/

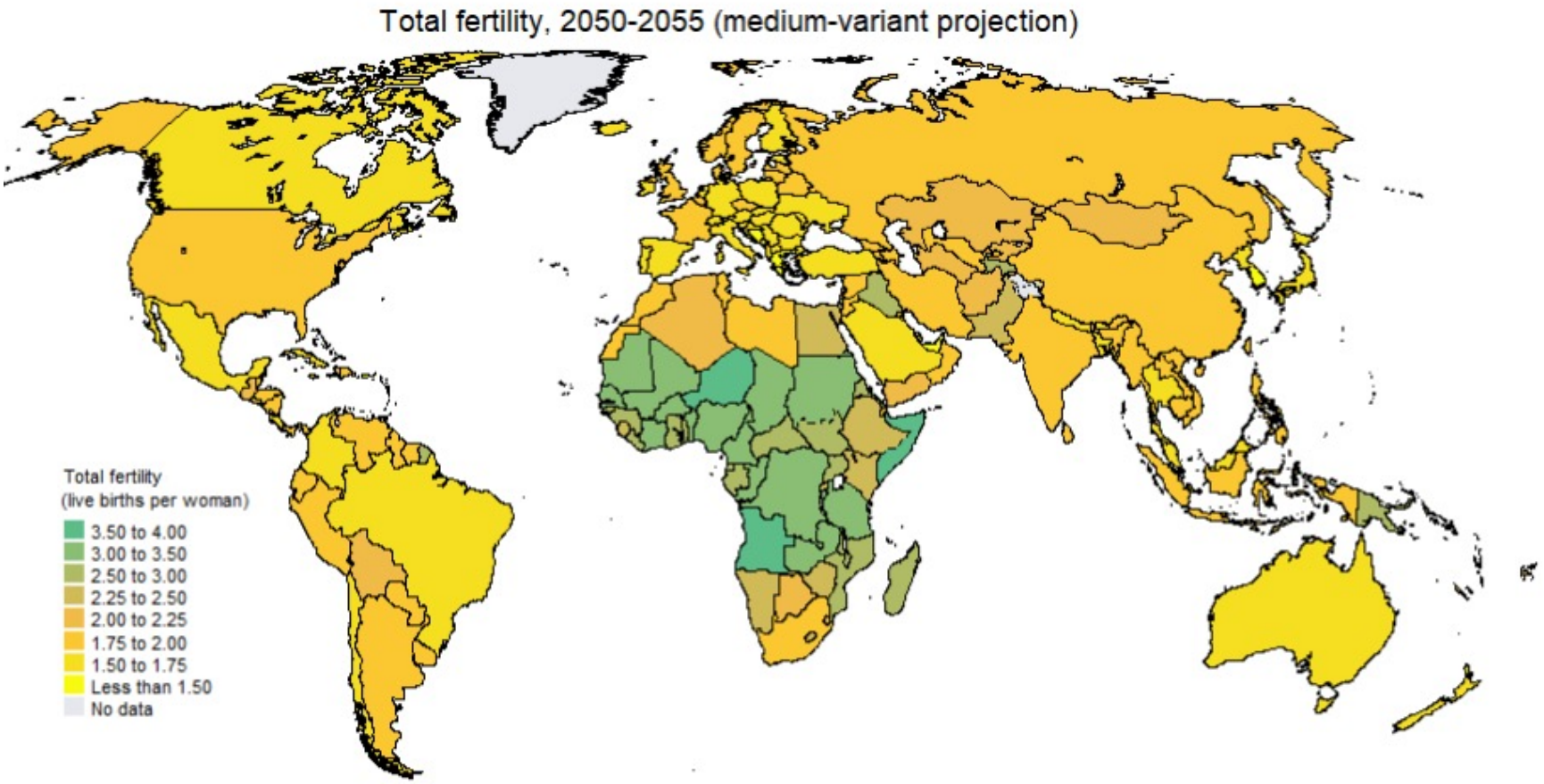
# Spatial Patterns of Total Fertility Rate, 2020



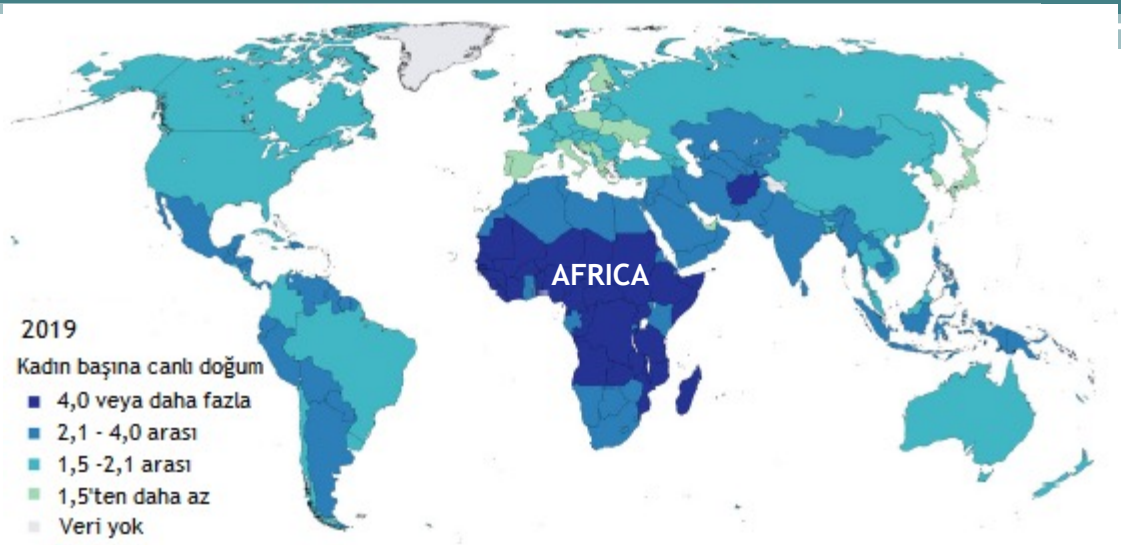

**Total Fertility Rate:** The average number of children a woman would have assuming that current age-specific birth rates remain constant throughout her childbearing years (usually considered to be ages 15 to 49).

Kaynak: https://www.prb.org/international/indicator/fertility/snapshot

# Change of Spatial Fertility Patterns

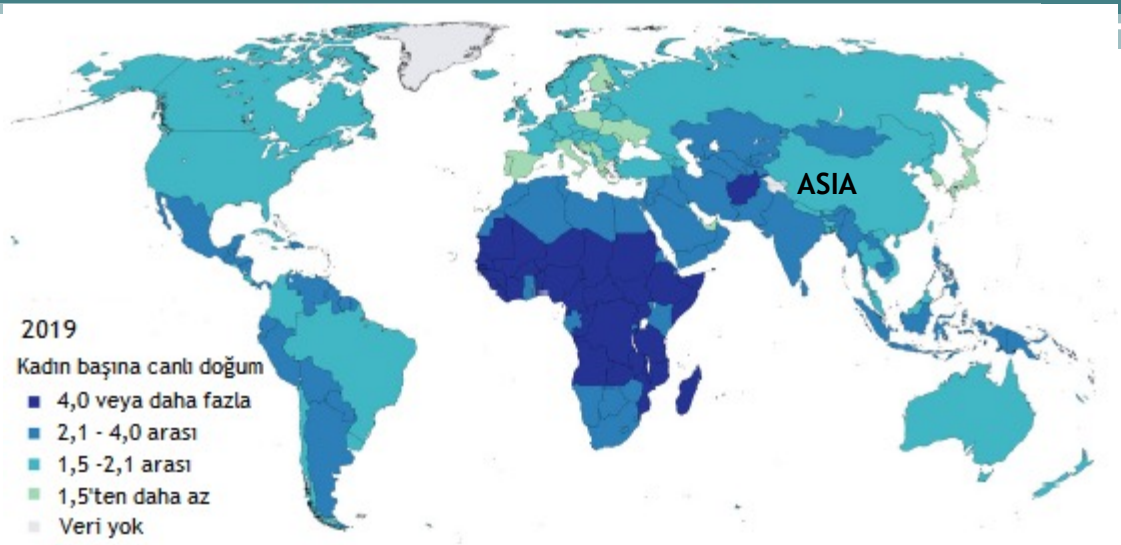



Source: https://population.un.org/wpp/Maps/



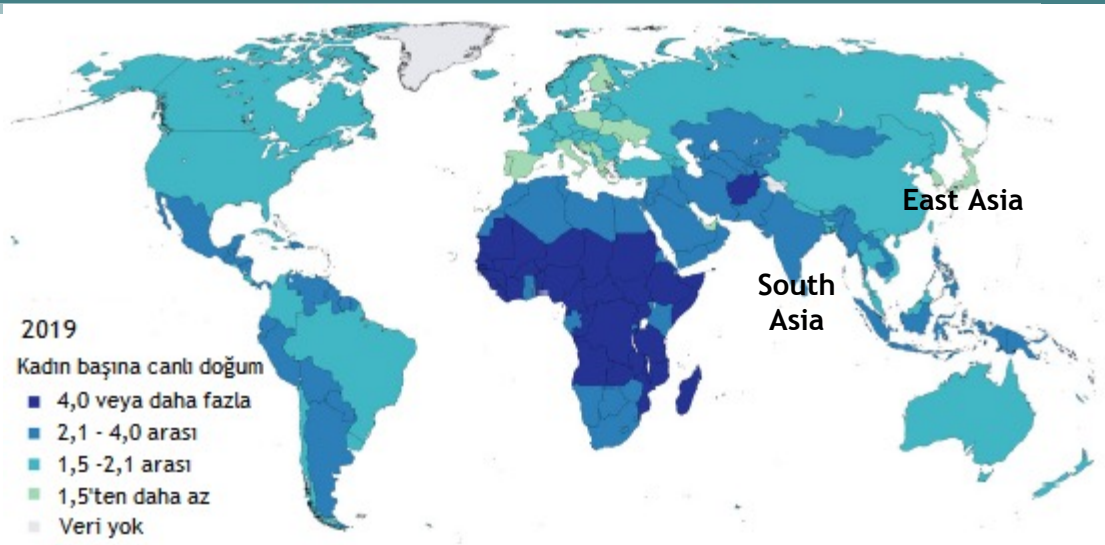

- The total fertility rate (TFR) in Africa for the period 2015-2020 is 4.4 children per woman.
- However, in many African countries, especially in the Central African (5.5) and West African countries (5.1) located in the region called Sub-Saharan Africa, the TFR is above 5.0.
- For example, TFR is 7.0 in Niger, 6.0 in the Democratic Republic of the Congo, 5.9 in Mali and 5.8 in Chad.
- In contrast, fertility is relatively low in North Africa (3.3), but especially in South Africa (2.5), relative to the rest of the continent.
- Tunisia (2.2) and South African Republic (2.4) located in these regions, respectively, constitute an exception for the continent.

# Spatial Fertility Patterns and Trends : Asia, 2015-2020

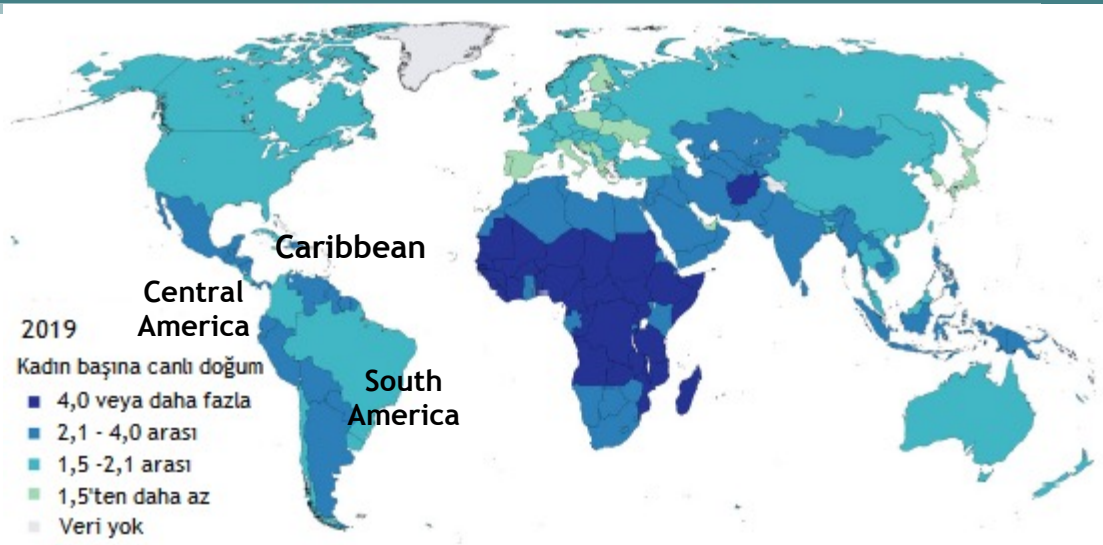



- The fertility pattern in Asia, the world's most populated continent, is very different from Africa.
- The TFR in the Asian continent is 2.2 and the continent's highest fertility rates are in Central (2.8) and Western Asia (2.7).
- In regions of Asia, large variations are found at the country level.
- TFR per woman in Central Asia in Tajikistan (3.6) and Kyrgyzstan (3.0), West Asia, Yemen (3.8) Palestine and Iraq (3.7) and Israel (3.0) 3.0 and above; In the UAE (1.4) and Turkey, Azerbaijan, Kuwait (2.1) and Bahrain (2.0), the refresh rate is around or below.

# Spatial Fertility Patterns and Trends : Asia, 2015-2020

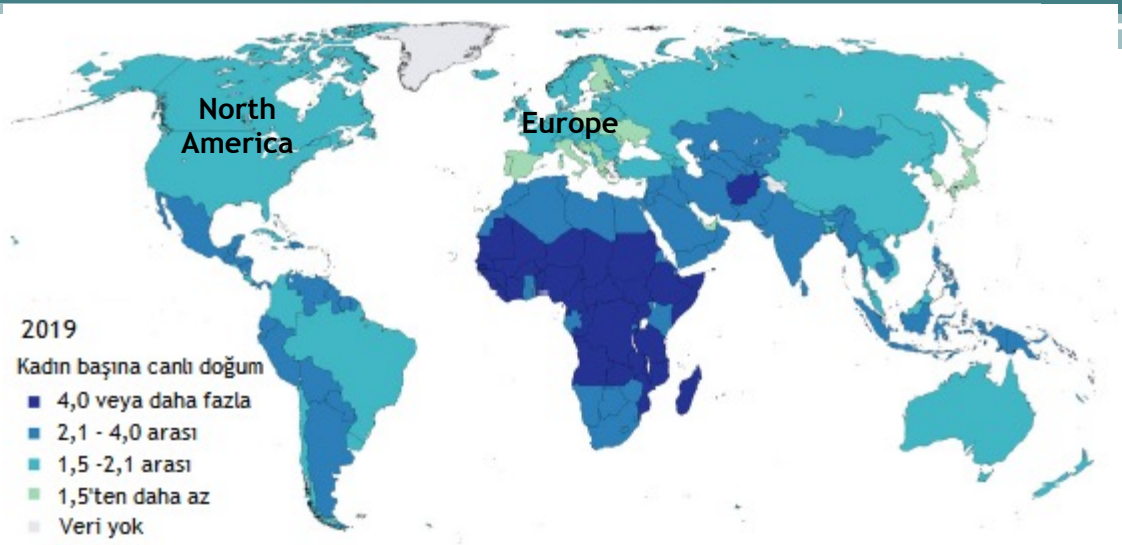



- East Asia contrasts with West Asia with a total fertility rate of 1.7.
- Fertility here ranges from 2.9 children per woman (Mongolia) to 1.1 children (South Korea). The most significant pace in this highly populated region is low fertility in the People's Republic of China (TFR: 1.7).
- TDH is 2.4 in South Asia and 2.2 in India, another population giant of the world. India's population continues to increase despite trying fertility control for more than 30 years.
- Two countries with high fertility are noteworthy in this region: Afghanistan (4.6) and Pakistan (3.6).
- TFR, which is 2.2 across Southeast Asia, is quite low in countries such as Singapore (1.2) and Thailand (1.5), while it is 4.1 in Timor-Leste.

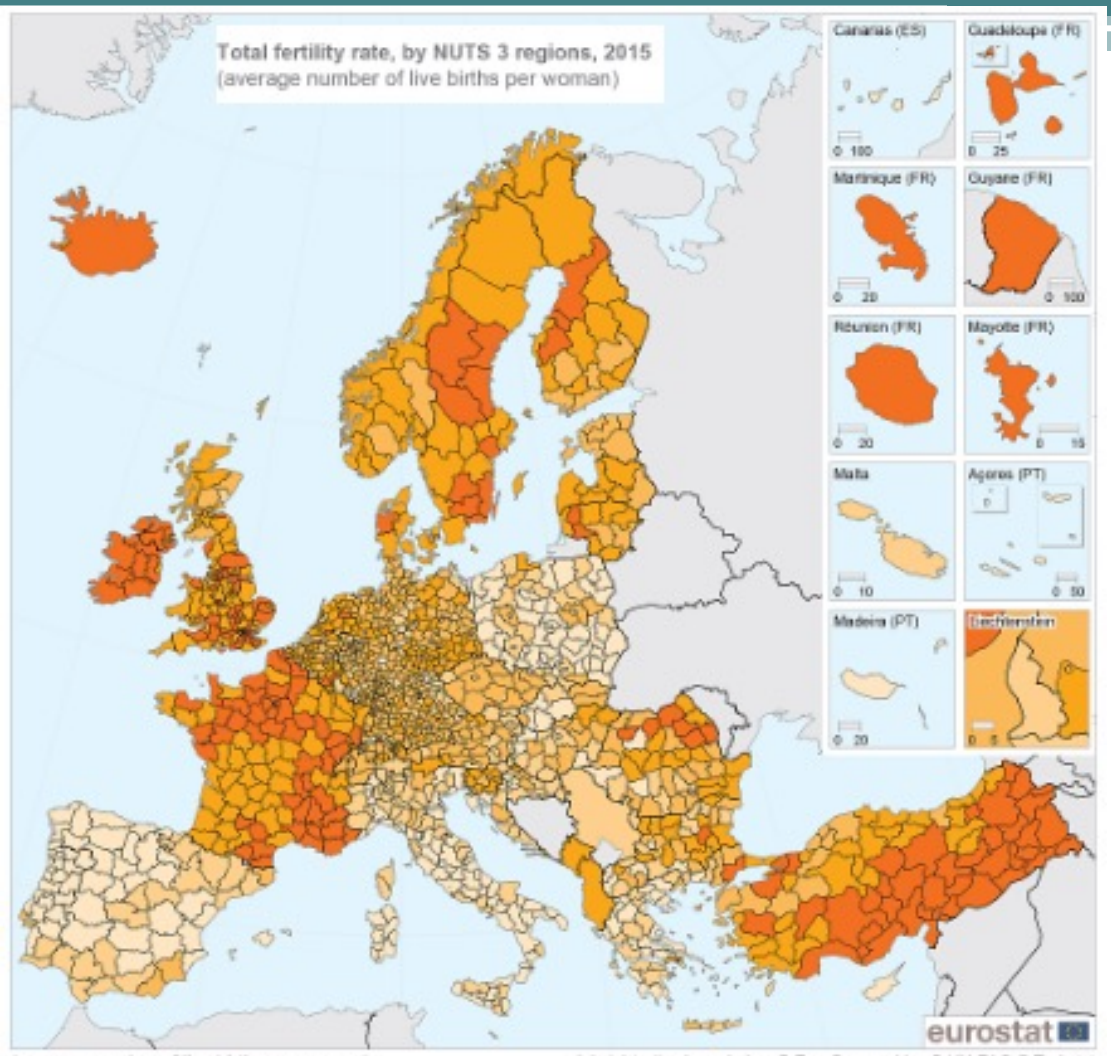



- In Latin America and the Caribbean, the total fertility rate is 2.0 children per woman, just below the population replacement level.
- As in Asia, there are differences in fertility between countries (TDR 3.0 in Haiti and 2.9 in Guatemala versus 1.2 in Puerto Rico).
- Although the rate seems relatively high in Central American (2.2) countries, the differences with other regions tend to decrease and almost close (2.2 in the Caribbean and 1.9 in South America).
- The TFR is 1.7 in Brazil, 2.1 in Mexico, and 2.3 in Argentina, which are the most populous countries of Latin America.

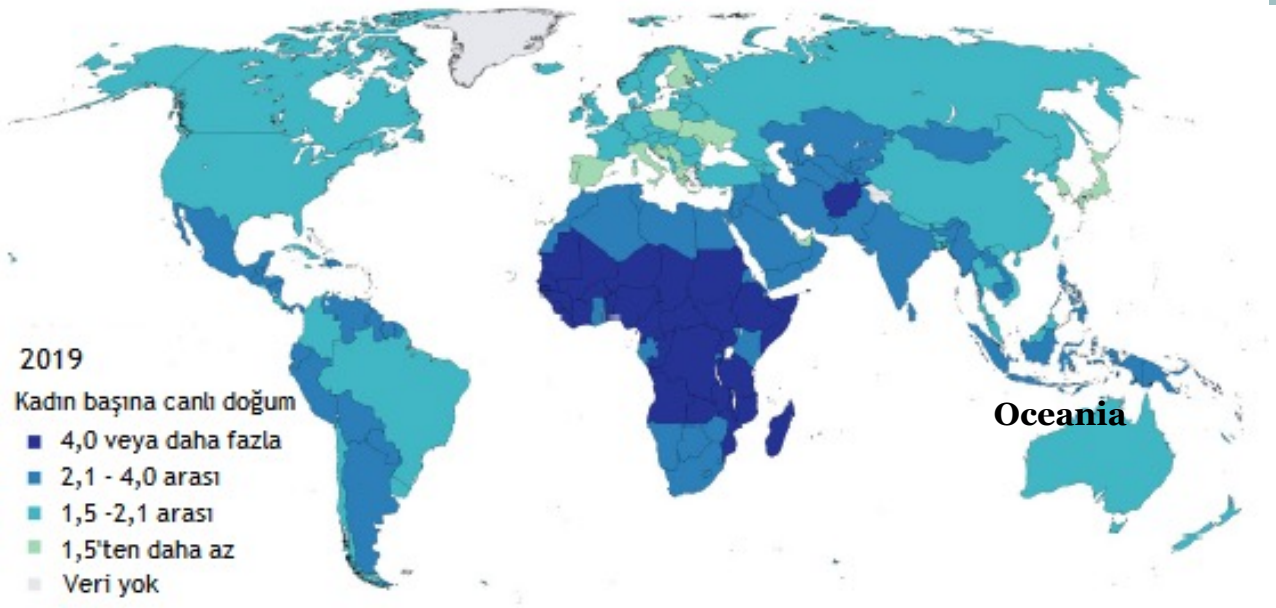
# Spatial Patterns and Trends of Fertility: North America and Europe




- The total fertility rate, which is 1.8 across North America, is 1.5 in Canada and 1.8 in the USA. Although both natural population growth rates are slow (0.2% and 0.3% respectively), these rates are compared to some other developed countries (Japan -0.3%, Germany -0.2% and Russia 0.0%). This leads to a significant increase in demand for energy and resources.
- Europe is the region with the lowest fertility rate on a continental scale and is below 2.0 in all countries (the lowest values are in Portugal, Greece, Italy and Spain: 1.3 children per woman).
- Fertility in the south of the continent has the lowest values, but the differences between regions/countries are not great.

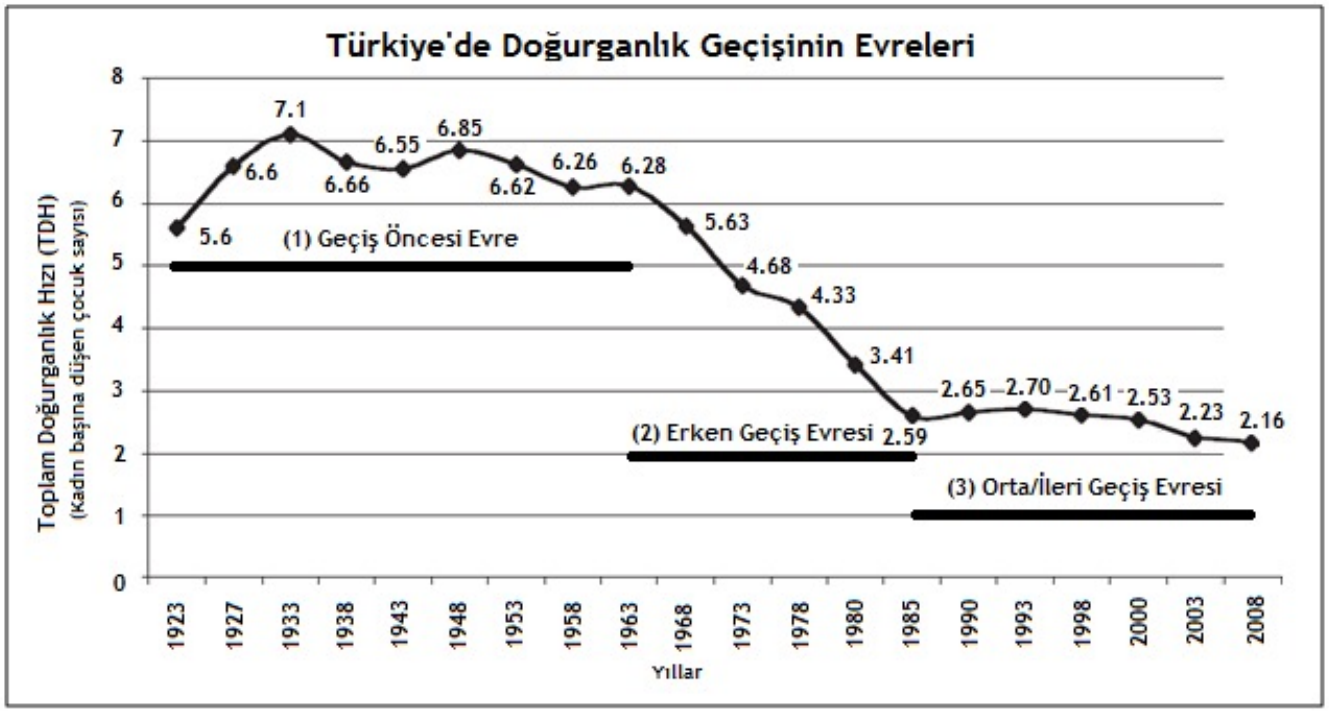



Source: Eurostat




- The TFR in Oceania is 2.4, but varies by region to reflect their advanced differences:
- TFR is low in Australia (1.8) and New Zealand (1.9), and high in Papua New Guinea (3.6), Samoa (3.9) and the Solomon Islands (4.4).

# Fertility Transition: Turkey, 1923-2019




2018: 2.00
2019: 1.88

Source: Yüceşahin and Özgür, 2008; 2010 TNSA-2008 and prepared by reference to Yüceşahin, 2010.

**I. Pre-transitional phase (1923-1963): Increasing trend, high fertility**

**II. Early transition phase (1963-1985): Significant and rapid decreases, 11.5% decrease**

**III. Intermediate/Advanced transition phase (1985-2007): Mild to minor declines**

# Entry Pattern of Provincial Fertility Transition in Turkey


Source: Yüceşahin, 2009: 14

# Total Fertility Rate: Turkey, 2001-2019

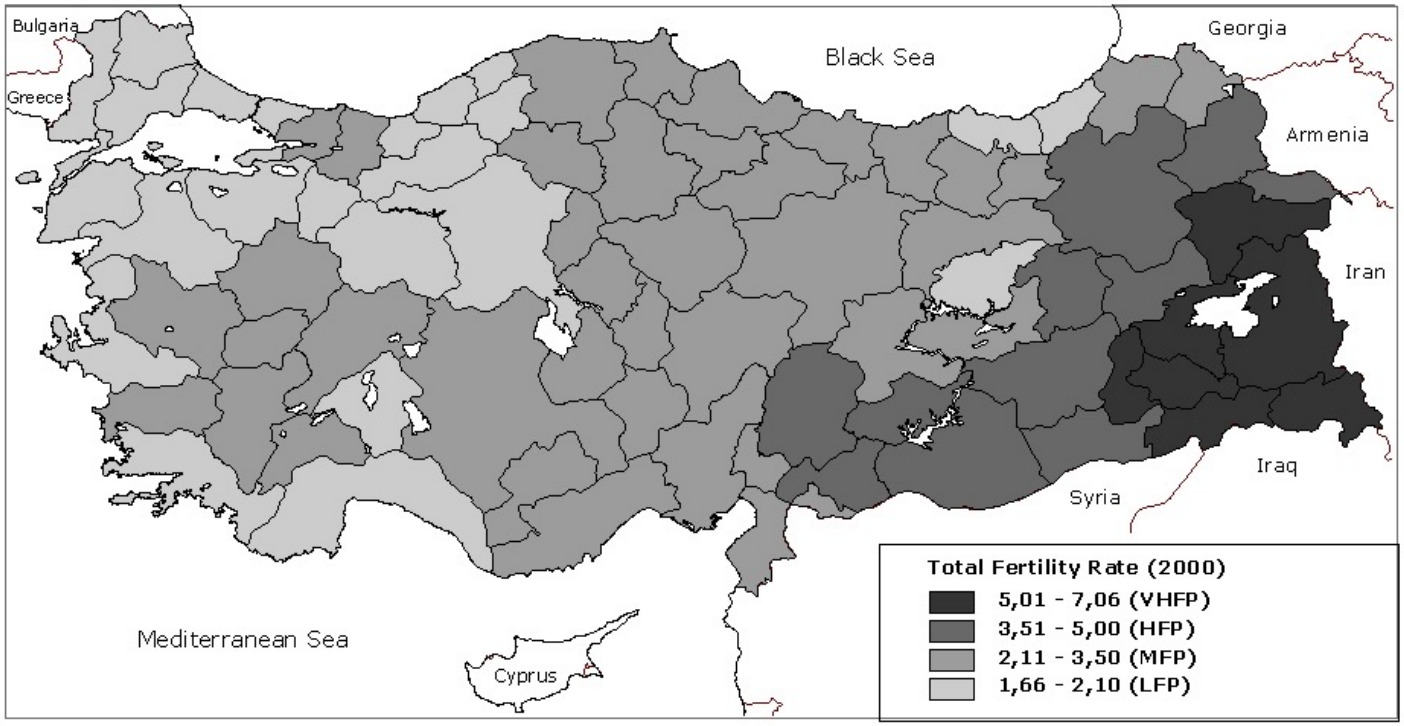
- According to TUIK data; While the total fertility rate (TFR) in Turkey was 2.38 children per woman in 2001, it became 2.11 children in 2016.

- In 2018, the average number of children a woman could have during her fertile period was 2.00 children and in 2019 1.88 children. This indicates that fertility has fallen below the population replacement level.

- The fertility rate in Turkey fell below the population renewal level in 2018. However, there are regional fertility differences.
- TFR is higher in eastern regions, above 2.50 children per woman.
- Except for the three eastern regions, TFR is above the renewal level in the Mediterranean Region as well.
- In other regions, the fertility levels are below the national average and the replacement level.
- Especially in the Black Sea, West Marmara and Aegean regions, TFR is lower than 1.70.
- This pattern of regional distribution is closely related to traditional norms and women's education and participation in non-agricultural employment.

# Total Fertility Rate: Turkey, 2000

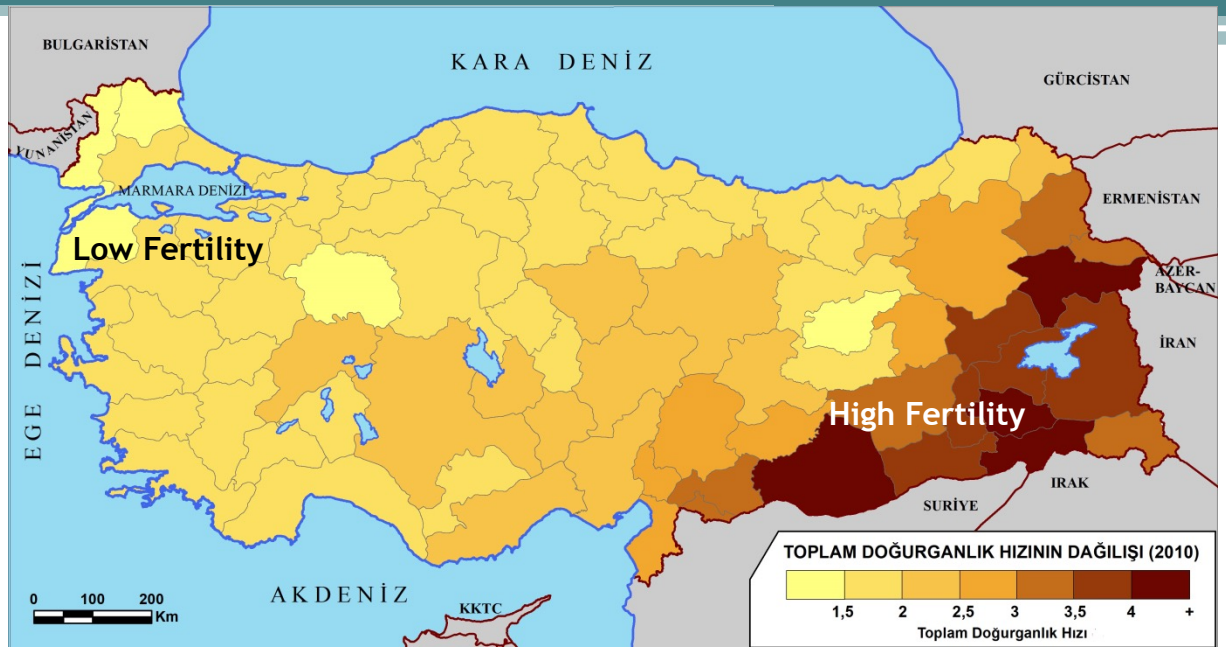


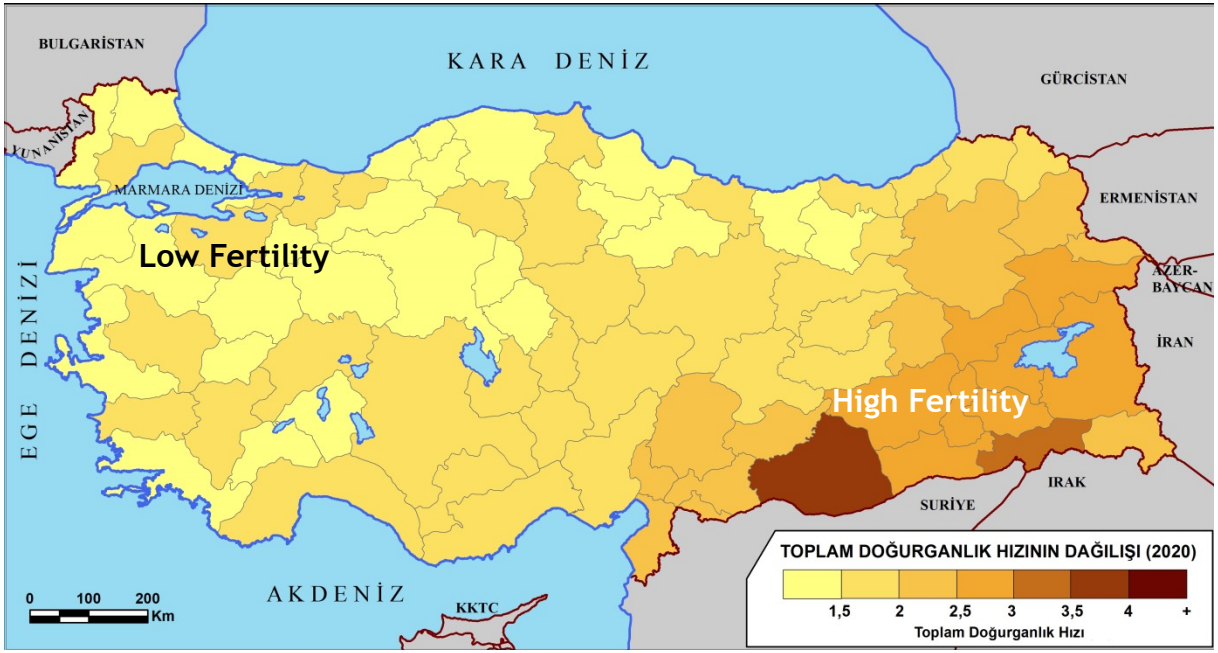



Source: Yüceşahin and Özgür, 2008

# Total Fertility Rate: Turkey, 2010 and 2020



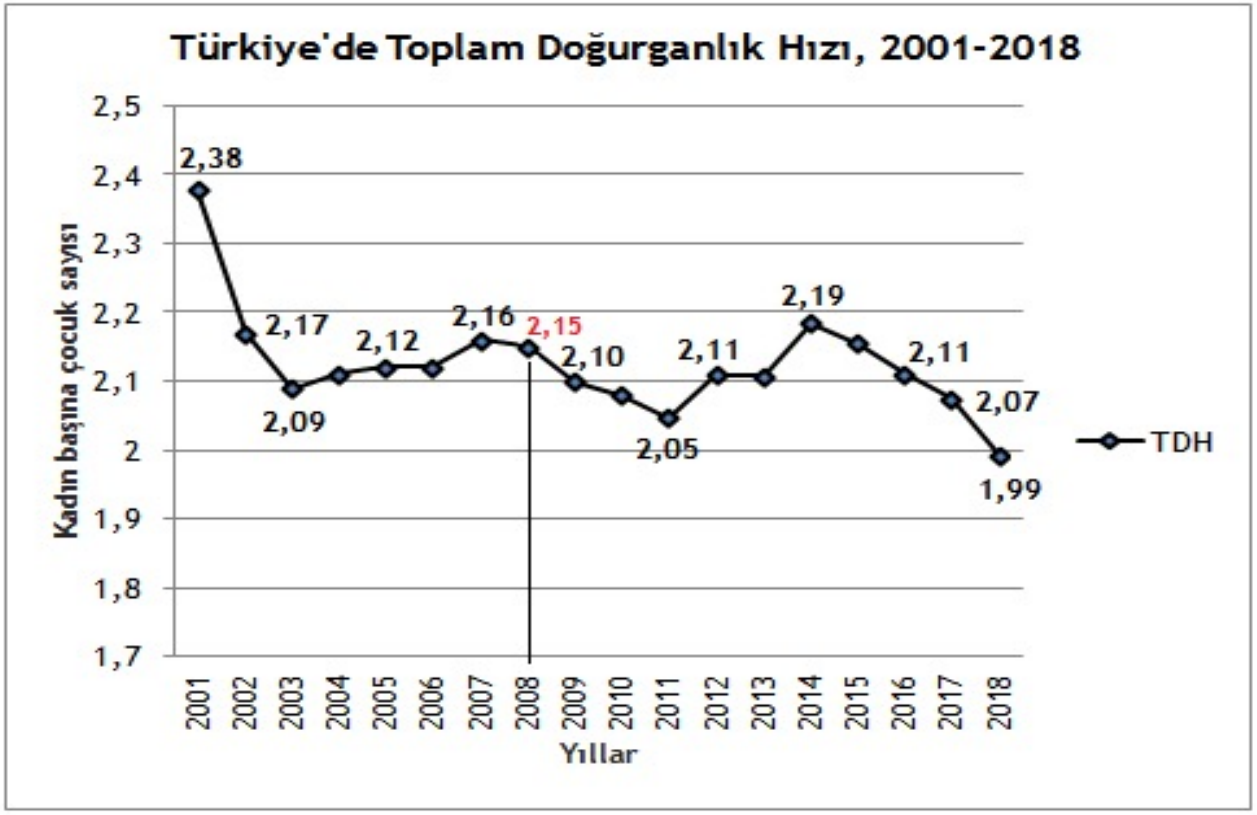



Source: Prepared by Prof. Dr. Mustafa Yakar.

# Current Trend in Total Fertility Rate (TFR), Turkey

- **The "Three Child Discourse" was first voiced by the government in 2008.**
- After this date, TFR fluctuates around the population renewal level (2,10).
- However, it should be noted that TFR decreased below 2.00 for the first time in the history of the Republic of Turkey in 2019.
- According to the current outlook, a strong positive effect of the discourse on the national fertility level is not observed.




Source: TurkStat

# Total Fertility Rate: Turkey, 2018

Toplam doğurganlık hızının en yüksek ve en düşük olduğu 10 il, 2018

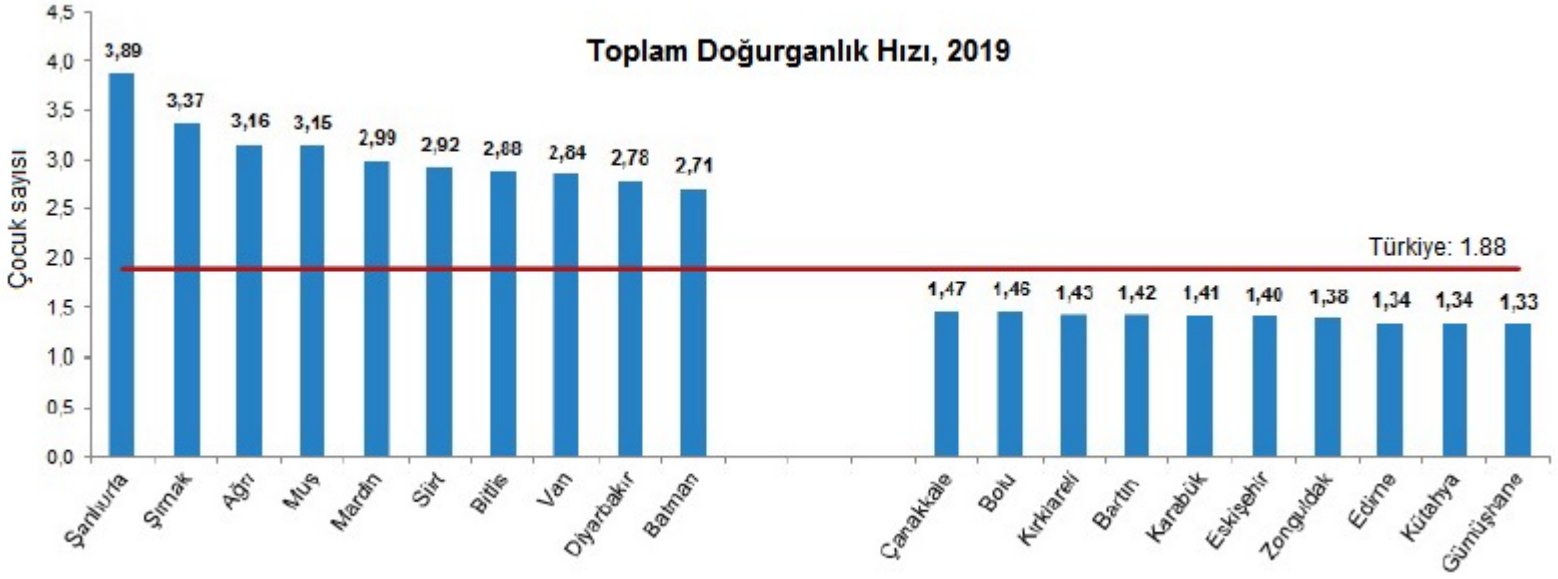
(Çocuk sayısı)

| En yüksek iller | Toplam doğurganlık hızı | En düşük iller | Toplam doğurganlık hızı |
|---|---|---|---|
| Şanlıurfa | 4,13 | Gümüşhane | 1,30 |
| Şırnak | 3,60 | Kütahya | 1,43 |
| Ağrı | 3,26 | Zonguldak | 1,43 |
| Muş | 3,23 | Edirne | 1,43 |
| Siirt | 3,16 | Bartın | 1,47 |
| Mardin | 3,12 | Kırklareli | 1,48 |
| Bitlis | 3,06 | Karabük | 1,49 |
| Diyarbakır | 2,96 | Eskişehir | 1,49 |
| Van | 2,95 | Bolu | 1,52 |
| Batman | 2,90 | Kastamonu | 1,54 |

- The province with the highest total fertility rate was Şanlıurfa with 4.13 children in 2018. This province was followed by Şırnak with 3.60 TDH, Ağrı with 3.26, Muş with 3.23 children and Siirt with 3.16 children.
- The province with the lowest total fertility rate was Gümüşhane with 1.30 children. This province was followed by Kütahya, Zonguldak and Edirne with a TDH of 1.43.

# Total Fertility Rate: Turkey, 2019





# References


- Başkaya, Z. Ve Özkılıç, F. (2017). Türkiye'de doğurganlıkta meydana gelen değişimler (1980-2013) *Uluslararası Sosyal Araştırmalar Dergisi*, 54, 404-423.
- Bongaarts, J. (2009). Human population growth and the demographic transition. *Philosophical Transactions of the Royal Society B*, 364, 2985-2990.
- Duben, A.; Behar, C. (1996). *İstanbul Haneleri: Evlilik, Aile ve Doğurganlık, 1880-1940*, İstanbul: İletişim Yayınları.
- Gilles, K., Feldman-Jacobs, C. (2012). When technology and tradition collide: From gender bias to sex selection. Population Reference Bureau, Policy Brief. https://pdfs.semanticscholar.org/e782/285e6c852b7b3df46e80681b114b4bf18df9.pdf
- Guttmacher Institute (2012). Facts on Induced Abortion Worldwide. http://www.who.int/reproductivehealth/publications/unsafe_abortion/induced_abortion_2012.pdf?ua=1
- Hacettepe Üniversitesi Nüfus Etütleri Enstitüsü-HÜNEE (2019). *2018 Türkiye Nüfus ve Sağlık Araştırması*. Ankara: Hacettepe Üniversitesi Nüfus Etütleri Enstitüsü. http://www.hips.hacettepe.edu.tr/tnsa2018/rapor/TNSA2018_ana_Rapor.pdf
- Kağıtçıbaşı, Ç. (1982). *The Changing Value of Children in Turkey*. Honolulu, Hawaii: East-West Population Institute.
- 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.
- Özbay, F. (1978). Türkiye'de Doğurganlık Düzeyine ve Değişmelerine Etki Eden Ara Değişkenler. *Türkiye'de Nüfus Yapısı ve Nüfus Sorunları, 1973 Araştırması* içinde, Ankara: Hacettepe Üniversitesi Yayınları.
- Özgür, E.M. (2010). Uluslar arası göçün gelişmiş toplumlarda yarattığı etnik değişim: Yeni bir demografik geçiş mi? *Ankara Üniversitesi, Coğrafya Bölümü Seminerleri*, 4 Mayıs 2011, Ankara.
- Peters, G. L., Larkin, R.P., (2005). *Population Geography: Problems, Concepts, and Prospect*, Eighth Edition, Dubuque: Kendal/Hunt Publishing Company.
- Rowland, D.T. (2006). *Demographic Methods and Concepts*. New York: Oxford University Press.
- Shorter, F.C. Macura, M. (1982). *Trends in Fertility and Mortality in Turkey 1935-1975*. Washington: Committee on Population and Demography, U.S. National Academy of Sciences, National Academy Press.
- Türkiye İstatistik Kurumu-TÜİK (02 Mart 2017). Evlenme ve Boşanma İstatistikleri, 2016. TÜİK Haber Bülteni Sayı: 24642.
- Türkiye İstatistik Kurumu-TÜİK (18 Mayıs 2017). Doğum İstatistikleri, 2016. TÜİK Haber Bülteni Sayı: 24647

# References


- United Nations (2015). World Fertility Patterns 2015: Data Booklet. United Nations, Department of Economic and Social Affairs, Population Division
- United Nations (2017a). Population Facts. United Nations, Department of Economic and Social Affairs, Population Division, 2017/3.
- United Nations (2017b). *World Population Prospects The 2017 Revision: Volume I: Comprehensive Tables*. New York: United Nations.
- United Nations (2017c). *World Population Prospects The 2017 Revision: Volume II: Demographic Profiles*. New York: United Nations.
- United Nations (2019). World Population Prospects 2019 Highlights. New York: United Nations.
- United States Department of Agriculture-USDA (2007). *Expenditures on Children by Families, 2007*. United States Department of Agriculture, Center for Nutrition Policy and Promotion Miscellaneous Publication Number 1528.
- Van De Kaa, D. (1999). Europe and Its Population: The Long View. In D. Van De Kaa, H. Leridon, G.Gesano and M. Okólsk (Eds.), *European Populations: Unity in Diversity,* pp.1-49. Dordrecht: Springer.
- Yavuz, S. (2006). Ethnic Differences in fertility transition in Turkey. https://www.academia.edu/10243248/ETHNIC_DIFFERENCES_IN_FERTILITY_TRANSITION_IN_TURKEY
- Yüceşahin, M.M. (2009). Türkiye'nin Demografik Geçiş Sürecine Coğrafi Bir Yaklaşım. *Coğrafi Bilimler Dergisi*, 7 (1), 1-25.
- Yüceşahin, M.M (2010). Küresel Demografik Geçiş ve Türkiye. *Ankara Üniversitesi Türkiye Coğrafyası Araştırma ve Uygulama Merkezi Konferansları* 18 Mayıs 2010, Ankara.
- 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.