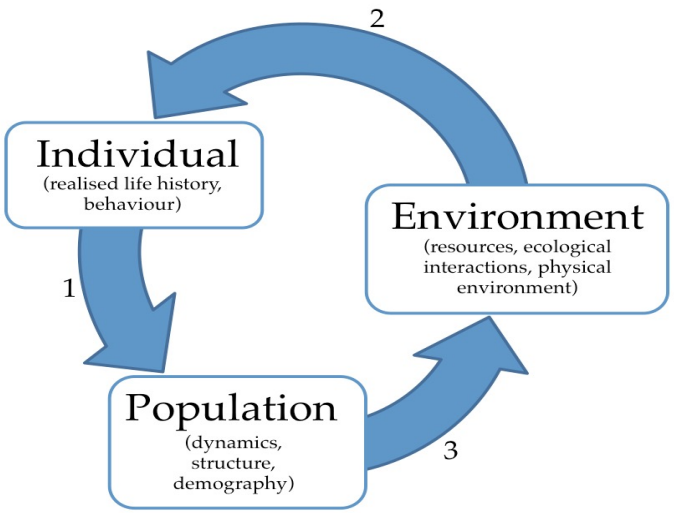
Ankara University
Faculty of Languages, History and Geography
Department of Geography

Population and Environment



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1) **Introduction: The Relationship Between Population and Environment**
2) **Influence of First Civilizations**
3) **Environmental Degradation and Population Growth**
   a. Pollution
   b. Global Warming and Depletion of the Ozone Layer
   c. Deforestation
   d. Decreased Ecological Diversity
   e. Overgrazing

- Since the relationship between environmental problems and consumption is a fundamental relationship, population occupies an important place in the environmental issue.
- The size and growth rate of the population, age, gender and other structural characteristics and spatial distribution have direct or indirect relationships with the consumption patterns and amounts of the population.
- Mainly, population factors lie on the basis of environmental issues. In this respect, in order to understand environmental problems, it is necessary to know the factors related to population well (Toros et al., 1997).

- **The relationship between population and environment is a reciprocal and complex interaction.**

- Population dynamics affect consumption and availability of natural resources.
- These dynamics also determine consumption levels and efficiency, as well as environmental sustainability.
- Although in some cases human numbers have a direct impact on the environment, the relationship between population and environment is not easily understood (UNFPA, 2013).
- Population is a multidimensional concept related to the size, increase, distribution, density and characteristics of the number of people living in an area.

- The environment is just as complex as the population, it includes the qualities of air, water and soil on which humans and other living beings depend (Hunter, 2000).
- There are also mediating factors that complicate and ultimately shape the relationship between population and environment, including scientific, technological, political, institutional and cultural contexts.

- Studies conducted at the global level reveal that one of the two main determinants of the **Ecological Footprint** of humanity is population and the other is consumption (Dietz et al., 2007).
- The most basic relationship between population and environment is that population size acts as a multiplier of activities and consumption, and that each individual in the population is associated with environmental damage (Holdren and Ehrlich, 1974).

- Therefore, along with other factors, the size and change of the population, which is effective in consumption levels, is directly or indirectly related to the environment as a natural result of people's resource needs and their contribution to pollution (Alcamo et al., 2005).
- At the same time, the increase in population plays a role in increasing the demand for air, water and land environments, as it provides both the source and the area where environmental pollutants will be released (Hunter, 2000).

Ecological Footprint: The area of biologically productive land and water required to produce the resources an individual, community, or activity consumes and to dispose of the waste it creates, with current technology and resource management. The Ecological Footprint is expressed in "global hectares" (gha represents the productive capacity of 1 hectare of land over the world's average productivity) (WWF, 2012b: 147-148).

- Since the Ecological Footprint is determined by population, per capita consumption, and resource and waste density, achieving global ecological sustainability requires that the environmental impact in the model remain within the limits determined by nature's carrying capacity (Wackernagel et al., 2002).
- Figures obtained by comparing the world's biological productivity with humanity's demand for natural capital for each year since 1961 provide evidence that human activities have exceeded the biosphere's capacity since the 1980s.
- In 2006, the total global demand exceeded the supply by approximately 40%, that is, "humanity has consumed such a size that it would require 1.4 earths to meet its own demands"(Ewing, et al., 2009:15).
- The natural resource that the planet produces in 12 months, people consume in 8 months.

- In 2007, the Ecological Footprint of per capita consumption in Turkey was 2.7 global hectares, approximately 50% above the global biocapacity per capita.
- This means that if all individuals in the world consume as much as an average Turkish citizen, humanity needs 1.5 planets.
- Turkey is among the countries that are ecologically indebted as it consumes its natural resources more than the rate at which it can renew itself.

- The main reason for the country's transformation from a country with excess biocapacity to a country with a biocapacity deficit is seen as the increase in population (WWF, 2012a).

Population Size and Increase

- It is estimated that the world population will increase by 1 billion in the next 15 years with a moderate increase to reach 8.5 billion and 9.7 billion by the middle of the century.
- All of the projected growth in global population between 2015-2050 (from 6.1 billion to 8.4 billion) is expected to occur in less developed regions, particularly South Asia and Sub-Saharan Africa (UN, 2015b).

- The latest UN estimates show that the population of Africa, which is the fastest growing among the continents and still has 1.2 billion people, will reach 2.5 billion in 2050(UN, 2015b).
- On the other hand, it is predicted that the population of the developed world will remain almost unchanged at 1.2 billion.

- **"Consumption trends are somewhat more difficult to predict than populations because of their relationship to global economic conditions, sustainable development efforts, the resources and bogs on which the global economy depends, and possible feedback to environmental systems" (de Sherbinin et al., 2007).**
- Still, it is known that various consumption indicators are growing at rates that exceed the population growth in the last century.
- Moreover, global GDP is 20 times greater than at the beginning of the 20th century (Alcamo et al., 2005), and carbon dioxide emissions have increased by 3.5% annually over the past century (Marland et al., 2006).

- In some developing countries such as China and South Korea in the Asian region, although the population sizes are not expected to show great changes in the future, the increase in production and the increase in household incomes due to the development rates seem likely to increase the demand for agricultural and non-agricultural goods.

Population Distribution: Fertility Pattern

- **Over the past 50 years, two trends have significantly influenced the distribution of populations around the world.**

1) It is the global fertility pattern resulting from the combination of high and medium fertility persisting in underdeveloped and developing countries and low fertility in developed countries.

- This trend, by changing the natural population growth, has led to an increasing share of the population living in low and middle income countries in the global population.
- UN estimates show that by mid-century, 87% of the world's population will live in the least developed and least developed countries.
- **It is estimated that the population density, which is 23 people per km2 in rich developed countries, will not change until the middle of the century. However, it is predicted that the population density, which is 59 people/km2 in underdeveloped poor countries, will increase to 93.**
- It is highly probable that this increase in density will create unprecedented problems in land use and conservation in underdeveloped countries, increase human impacts on the natural environment, especially in Africa, and create pressure to migrate from this region to Europe (Cohen, 2003).

2) The second trend regarding population distribution is the concentration of the world's population in more and more cities, ie urbanization, with the significant contribution of migration, which is affected by many complex factors.

The world is experiencing the most significant wave of urban growth in history (UNFPA, 2012).

Although 751 million (ie 30%) of the world population lived in cities in 1950; the urban population reached 55% with a size of 4.2 billion in 2018.

This trend is expected to continue throughout the 21st century and the rate is expected to reach 68% (6.68 billion urban population) by 2050(UN, 2018).

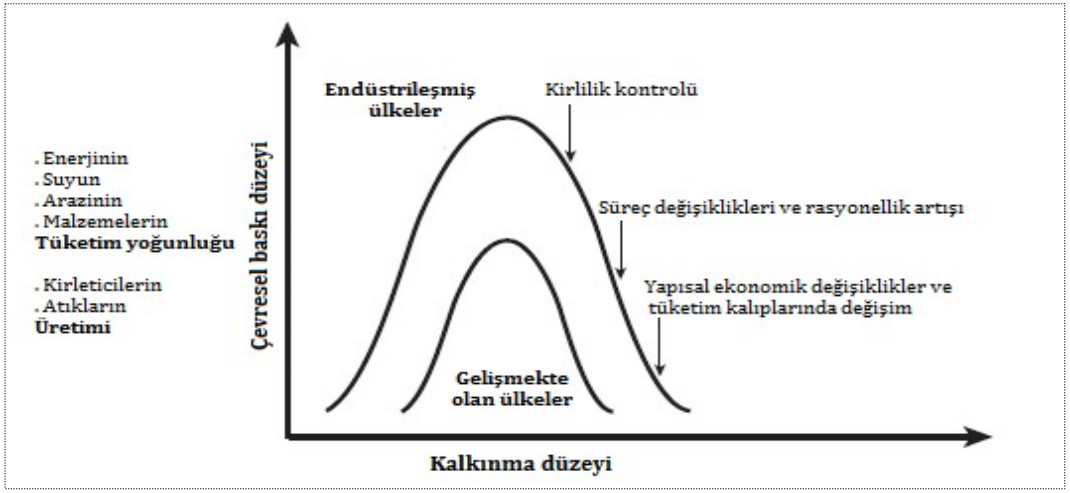
- **In terms of its global effects, not only the number of people, but also the production and consumption patterns are important in order to reach a world that can carry today's and future generations.**

- The increase in the world's population and production, which is combined with unsustainable consumption patterns, puts more and more pressure on the life support capacities of our planet. For this reason, income that increases consumption is accepted as a quality that reflects many socio-economic processes of people and has different environmental effects.

- There is a relationship between countries' economic development (per capita income) and environmental degradation levels, which resembles an inverted U-shaped curve (Environmental Kuznets Curve) (UNEP, 1997).

Consumption and Development / Income

- **Accordingly, there are relatively low environmental pressures in pre-industrial economies. However, with the increase in the level of development, in parallel with the increase in production and consumption in industrial societies, a serious increase in the level of environmental degradation and reaching a turning point is observed (Dinda, 2004).**
- At the advanced level of development (transition to a service economy), environmental pressures are reduced thanks to rational decisions and practices such as pollution control, process changes and structural economic changes.
- In developing countries with low or middle income levels, the desire for rapid economic growth increases the consumption intensity of various substances, the production of pollutants and waste, and therefore the environmental pressure.



Environmental Kuznets Curve
The relationship between economic development and environmental degradation (pressure) levels

- **The relationship between income and environmental pressure within the country and among households is somewhat different. Environmental pressures are likely to be greater at the lowest and highest income levels.**
- Population growth and poverty often interact to produce unsustainable levels of resource use. In addition, high income level is associated with increased production and consumption levels (Hunter, 2000).
- It is argued that if current consumption habits continue, climate change will create supply-demand shortages in basic resources on a global scale, combined with food shortages, loss of biodiversity, fisheries collapse, soil erosion and drinking water pressure (Ewing et al., 2009).

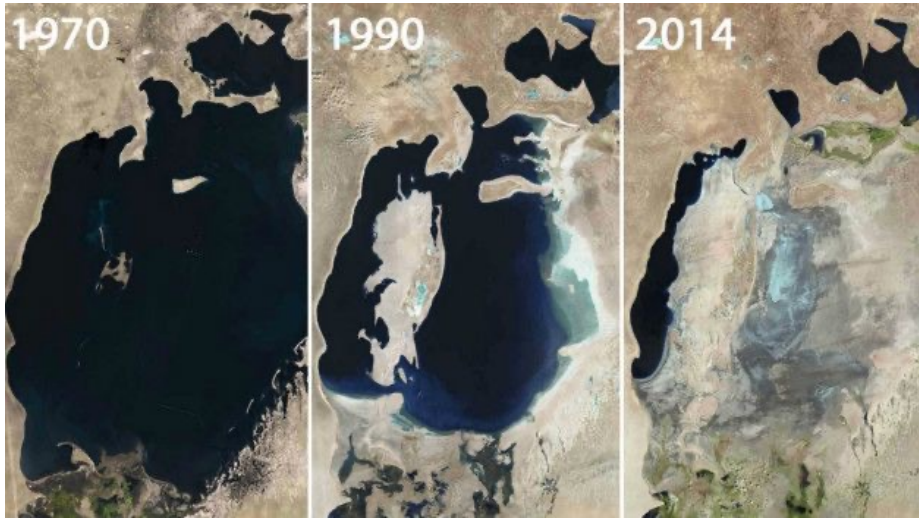
- **Various factors mediate the relationship between population dynamics and the environment. Scientific, technological, institutional, political and cultural aspects of societies interact with demographic and environmental factors.**
- Scientific-technological factors have always had a say in the population-environment relationship. Sometimes scientific advances and technological changes have resulted in more environmental changes than were predicted to result from demographic factors alone (for example, the rate at which land cover is changed is determined not only by population size but also by agricultural technology).

- In some cases, these advances have allowed changes in demographic factors that alter the environment (for example, population redistribution through advances in transportation).
- Technological changes that most affect environmental conditions are usually related to energy use. The consumption of oil, natural gas and coal in the world has increased significantly during the 20th century.

- **Institutional and political structures are important mechanisms in people's response to environmental changes, which can work for better or for worse.**
- Thanks to the international decisions taken against the release of pollutants into the nature, it is possible to withdraw the consumer goods from the market, which increase according to the demands of the population and can have devastating effects on the environment.

- For example, the 1987 Montreal Protocol's limitation of ozone-depleting chlorofluorocarbon emissions led to a rapid decline in its consumption.
- On the other hand, wrong political practices can become the main force behind environmental degradation.
- Irrigation policies related to resource use of the former Soviet Union, which resulted in the drying and pollution of the Aral Sea basin, can be shown as a remarkable example of practices that create negative environmental consequences.

Aral Lake, 1970-1990-2014



The story of the lost lake Aral
Source: BBC, 25 Feb 2015
http://www.bbc.com/turkce/haberler/2015/02/150225_gch_aral_denizi

Aral Sea turned into poisonous desert
Source: Dünya Bulltein, 25 Nov 2015
http://www.dunyabulteni.net/haber/347030/aral-golu-zehirli-cole-donustu

- It includes the meanings and lifestyles that define a society, as manifested by cultural factors, beliefs, values, norms, traditions and symbols.
- **Cultural differences, which are reflected in consumption patterns, attitudes towards natural life and nature conservation, affect people's interaction with the environment.**

- Cultural differences also guide conservation strategies, as various policy interventions require public support and are nurtured by societal values.
- For example, although women in some African countries undertake the responsibility of fundraising due to their gender roles; They do not have the right to inherit from their parents. This lack of access to land ownership reduces their tendency to plant trees for various needs and prevents them from participating in innovative land management practices (Fortmann et al., 1997).

- **Thus, gender roles in traditional societies mediate the population-environment relationship by influencing resource management strategies.**

- **Global population size is linked to land, air and water environments as each person uses environmental resources and contributes to environmental pollution.**
- Rapid population growth is coupled with poverty and lack of access to resources in many countries by generating problems of local environmental degradation, causing resource depletion and hindering sustainable development (UNFPA, 2008).
- Land, water and air are vital for humans, although resource use and waste generation levels vary by individuals and cultures.
- The following points stand out in the connection of population size (and increase) with resource consumption: Environmental pollution, change of land cover, clean water supply.
- However, there are other factors related to environmental degradation that will deeply affect the world and the people living on it, such as global climate change, the depletion of the ozone layer, and the reduction of ecological diversity.

- The water cycle is extremely important to the biochemistry of living organisms. Human settlements are also heavily dependent on water.

- It is argued that freshwater scarcity is already becoming a threat to the sustainable development of humanity due to the increasing demand (Mekonnen and Hoekstra, 2016) and it is predicted that continuous population growth will further increase the demand for water and aggravate water scarcity in the future (Gallopin, 2012; Vörösmarty et al., 2000).

- **Currently, globally, most water is used for agriculture (70%), followed by industry (23%) and domestic use (7%) (de Sherbinin et al., 2007).**

- Competition over freshwater resources is increasing due to population growth, economic growth, increase in demand for food and non-food agricultural products, and changes in consumption patterns towards more meat and sugar-based products (Ercin and Hoekstra, 2014).

- **Water and food insecurity lowers the quality of life and leads to migration, resulting in the emergence of environmental refugees.**

- For example, in 2011 alone, 184,000 Somalis had to migrate to neighboring countries due to drought, water and food insecurity, which is one of the major driving factors in the Horn of Africa (UNU-INWEH, 2013).

While the human population has increased numerically, it has also shown a tendency to accumulate geographically, which has increased the possibility of deterioration of the earth's ecosystem.

There are several key factors in environmental degradation:

- Pollution
- global climate change
- depletion of the ozone layer
- Deforestation (deforestation)
- Decreased ecological diversity
- Overgrazing, overcrowding and violence

Influence of First Civilizations

- In order to understand the relationship between the physical environment and human beings in the modern world, it may be useful to reveal the evolution of the human-environment interface and in this context, the following question can be asked: **What effects did previous human societies have on the environment in their lifetime?**
- Archaeological evidence lends strong support to the thesis that previous humans created ecological changes:

- During the Early Pleistocene, there were small-scale human attacks on the environment with no lasting effects; On the other hand, it is claimed that local and regional effects began to be seen in the Late Pleistocene and Neolithic (Hern (1990: 10) The use of fire, the spread of agriculture and the development of agricultural techniques are important events in humans' changing the natural environment (Peters and Larkin, 2005).
- Settlement life and progress in agriculture led to population growth.

- The need for food has increased even more and meeting the need has been possible only through deforestation and changing the ecosystem through clearing agricultural land. Thus, the frequency of ecological disasters increased, and the old agricultural systems collapsed with ecological imbalances caused by the burden on nature.
- Increasing desertification in the semi-arid regions of **North Africa and the Near East** has occurred as a result of misuse of land and overgrazing, rather than due to climate. Efforts to expand agriculture by irrigation in drier areas such as **Mesopotamia** have produced results in the form of salinization and wind erosion.
- **The gathering of more and more people in cities brought the problem of water pollution to the agenda. The Aztecs carried spring water through stone channels to bring clean drinking water to their cities.**
- With the **Industrial Revolution**, urbanization and the growth of cities became the most important source of environmental change.
- Rapidly increasing population and gathering in cities; the flow of large quantities of food, water and other materials into cities; on the other hand, it led to the dumping of significant amounts of garbage, human waste and pollutants outside the city.

Environmental Pollution

- **One of the natural functions of the earth's ecosystem is to absorb and transform waste.**
- Although the waste of a living thing can be useful to others and an input to it; Pollution occurs when the waste is more than the ecosystem can handle.
- **Although it is thought that there are visual, noise pollution and many other pollutants, the main forms of pollution stand out as biological and chemical pollution.**
- Population density often leads to an increase in biofouling, as in ancient civilizations. The overpopulation of people today has led to an increase in pollution almost everywhere.

Environmental Pollution

- As the population increases, the organic wastes of people also increase. In India, only 209 of 3119 towns and cities (about 7%) have wastewater and treatment systems. 114 urban settlements leave their sewers open to the Ganges river, known as the "Holy River".

- 7.3 million faecal coliform bacteria have been detected in the Bogota river.
- The upper limit of this value for drinking water is 100; 200 for safe swimming water.

- Heavy metal contamination of the water main is common in many developing country cities.

Environmental Pollution

- Chemical pollution in connection with modern technology is another product of the growing population.
- Groundwater, rivers, lakes and seas are polluted with the participation of chemical toxic substances.
- The mercury contained in the industrial wastes discharged into the fishing grounds of **Minamata** Bay, Japan, passed to people through the fish caught by the local fishermen and caused the emergence of a disease called Minamata, which devastated them.
- Mercury first enters the atmosphere with industrial emissions from coal plants and then enters soil and water systems.

Environmental Pollution

- **Air pollution is also a result of population growth and concentration in geographically specific locations.**
- Climate changes are made possible by the concentration of people in urban areas and are often accompanied by an increase in airborne pollutants.
- The urban environment contains high amounts of micro-organisms, gases such as carbon dioxide, nitrogen oxides, and various chemical compounds.
- Particles and smoke in the atmosphere shorten the visibility, have many effects on human health, such as eye irritation, asthma, emphysema and other chronic respiratory diseases.

Climate Change

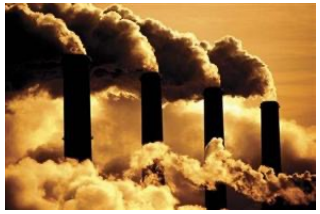
- In the United Nations (UN) Framework Convention on Climate Change, climate change is defined as "a change in climate as a result of human activities that directly or indirectly degrade the composition of the global atmosphere, in addition to natural climate change observed over a comparable temporal period".

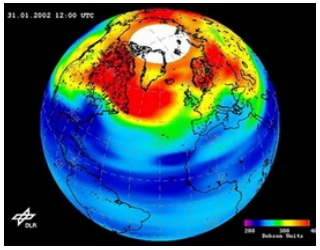
- **Since the Industrial Revolution, in addition to the natural variability in the climate, a new era has been entered in which human activities also affect the climate for the first time.**

- In the Second Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), conducted jointly by the World Meteorological Organization (WMO) and the United Nations Environment Program (UNEP), completed in 1995, it was emphasized that there is **a significant human impact on the global climate and that the climate has changed over the past century.**

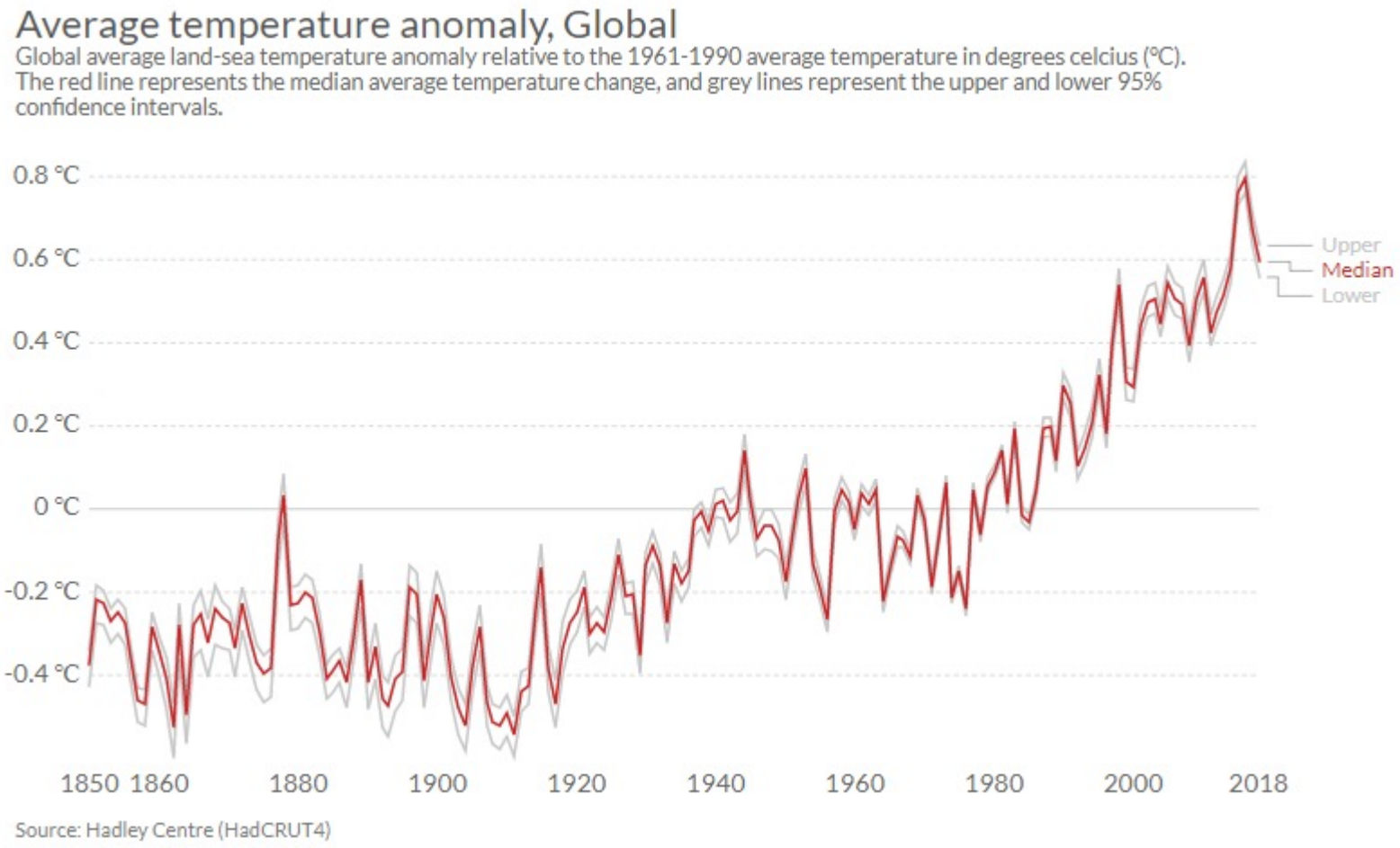
- **Today, there is a need for more industrial production thanks to the urbanization fed by immigration, rapid population growth and changing living standards all over the world.**
- Increasing urbanization pollutes the environment and atmosphere to a great extent, especially with greenhouse gases emitted from industrial and residential areas, and increases the warming trend of the air on a global scale.
- *Thus, the earth's atmosphere, especially the part from the living sphere (biosphere) to the upper atmosphere (stratosphere), is polluted.*
- **As a result of the destruction that humanity has done and is still doing on land and water in the last hundred years, the composition of the soil and water, as well as the air, is deteriorating significantly.**
- Finally, people have greatly affected the climate and the climate has greatly affected the people, and in the third millennium, humanity faced the problem of global climate change (Kadıoğlu, 2008).

Global Warming





- Global warming is considered one of the most important global environmental problems today. Due to global warming, there is a risk that glaciers will melt, the general level of the seas will rise, and as a result, productive agricultural areas and coastal cities will be flooded.
- The global warming caused by the greenhouse effect also causes global climate changes, and the climate, atmosphere and soil structure of the world are changing in a negative way that cannot be compensated.
- **The two main causes of global warming are the depletion of the ozone layer and the hydro-carbon emissions released into the atmosphere.**
- The production of chlorine-bearing chloro-fluorocarbons (CFCs), which are mostly used in industrial production processes such as cooling and cleaning, is considered the main cause of ozone depletion.

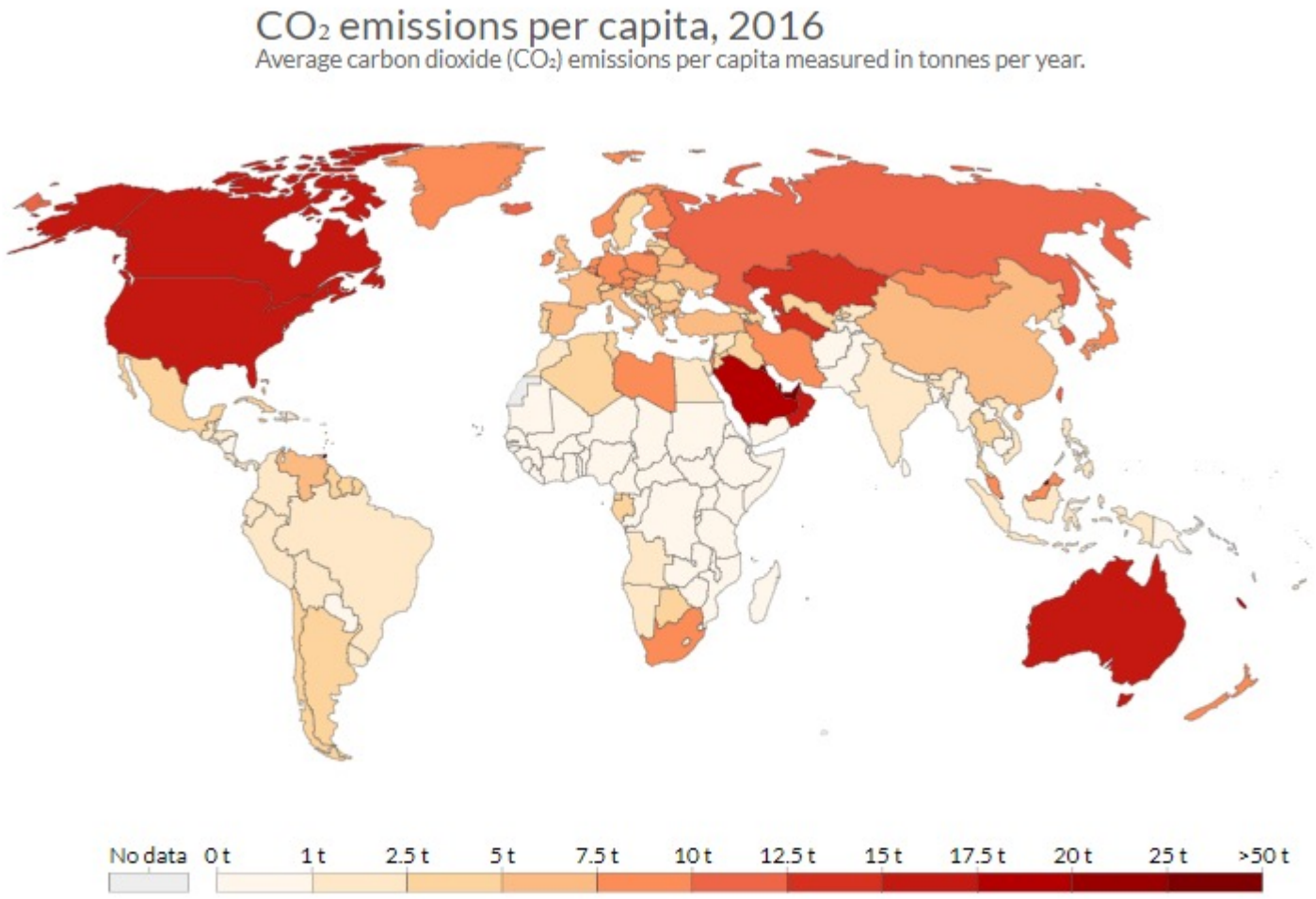


Source: https://ourworldindata.org/co2-and-other-greenhouse-gas-emissions

- According to the scenarios made by the Intergovernmental Panel on Climate Change (IPCC) for the year 2030, the possible climatic hazards (extreme meteorological events) in an increasing trend are as follows:

1. Earphones
2. Heat waves
3. Forest fires
4. Heavy rains (sudden and urban flood events)
5. The number and severity of tropical storms, typhoons
6. Negative effects on agriculture, livestock, fresh water storage
7. Agricultural pests
8. The spread of insects that carry diseases such as malaria and malaria by leaving the area where they are normally found (Kadıoğlu, 2008).

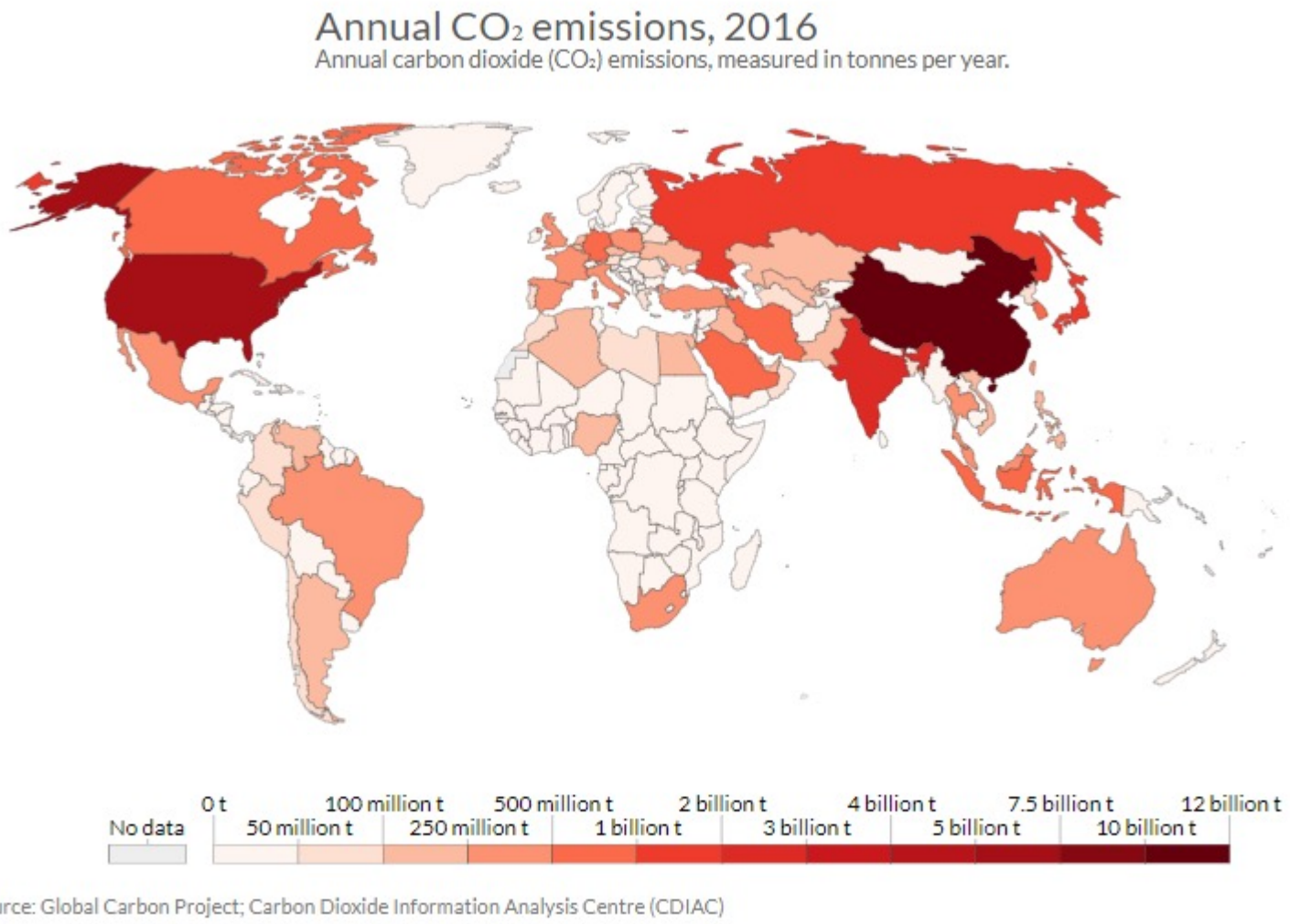
CO2 Emissions Per Capita, 2016



Source: https://ourworldindata.org/co2-and-other-greenhouse-gas-emissions

- The highest CO2 emissions per capita in the world are given to the atmosphere by developed countries such as the USA, Canada and Australia. On the other hand, these values are very low in underdeveloped African countries.

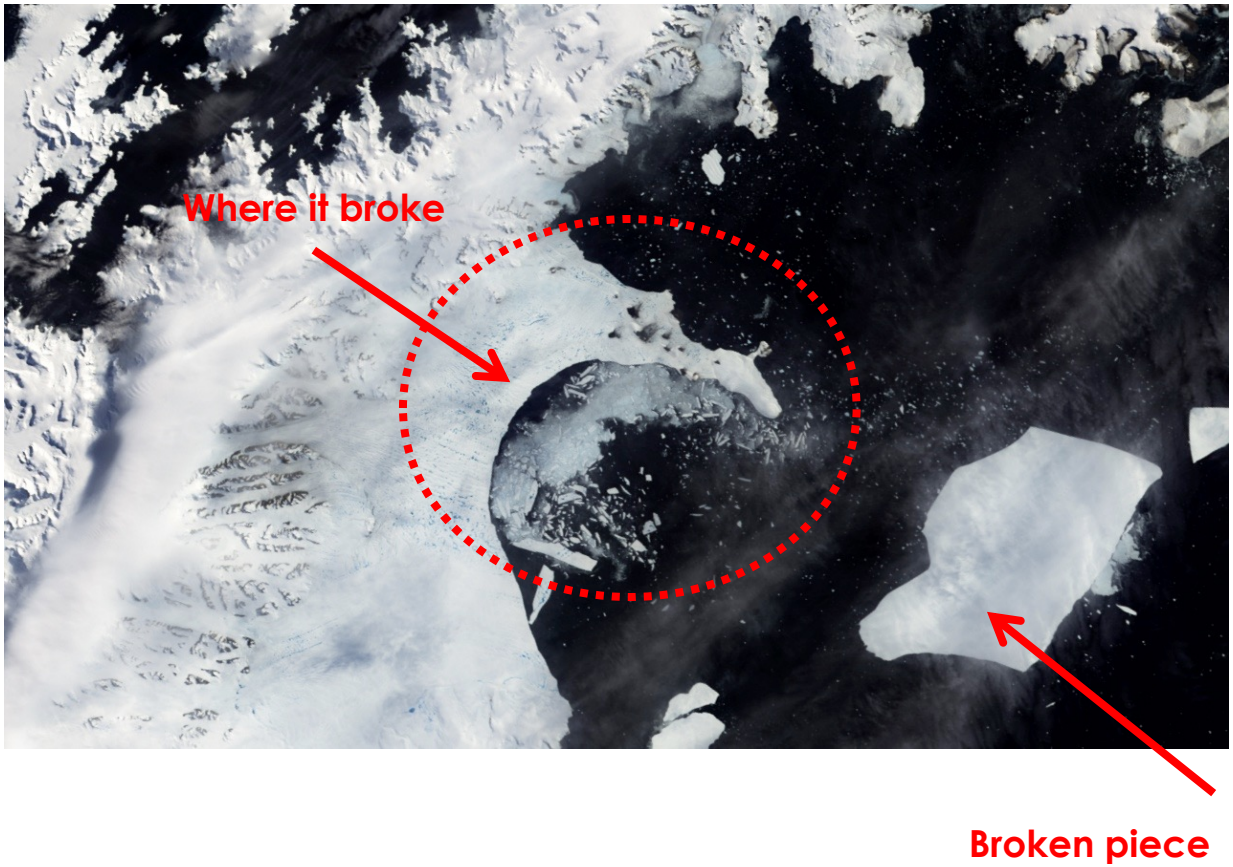
Annual CO_2 Emission, 2016



Source: https://ourworldindata.org/co2-and-other-greenhouse-gas-emissions

Climate Change: Larsen B glacier melted and ruptured in Antarctica, January 31, 2002

- **Satellite observations since 1978 show that the areal spread of Arctic sea ice decreases by an average of 2.7% per decade (Parkinson et al., 2000).**
- *In the northern hemisphere, alpine alpine glaciers have also been in decline, both spatially (glacial retreat) and volumetric, since the beginning of the last century.*



Source: http://www.nasa.gov/topics/earth/features/larsen-collapse.html

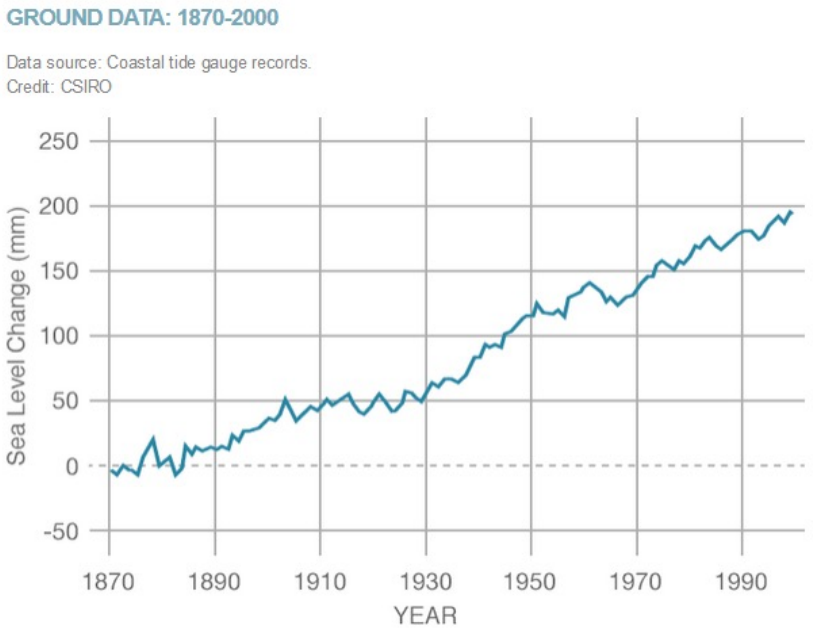
Aletch (Valley) Glacier (Switzerland) since 1865, 3.4 km. declined.

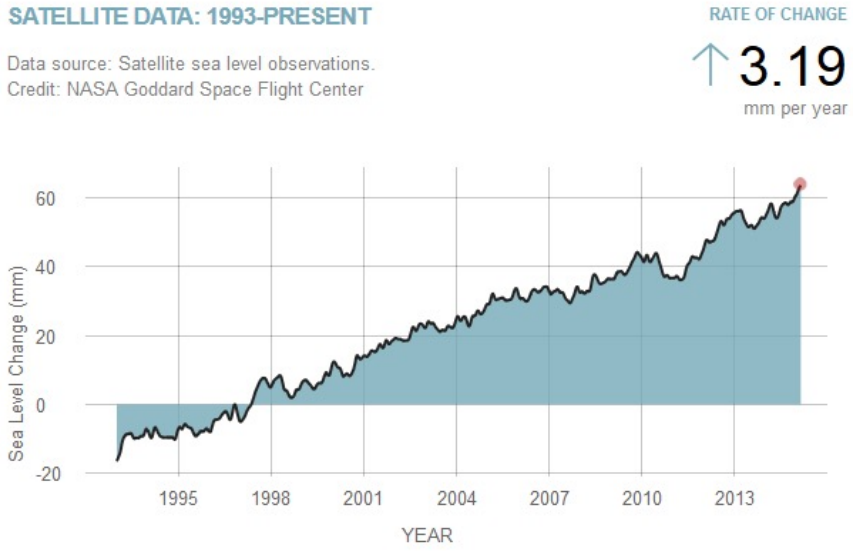
The decline of the Qori Kalis Glacier (Peru) 1978-2011

Global Warming: Changes in Global Sea Level

- According to the tide and sea level measurement records; global mean sea level has risen by about 10-25 cm during the last century from the end of the 19th century to the present (IPCC, 1996).
- A significant portion of this rise in global sea level is predicted to be associated with the observed increase in global average temperature over the same period.
- Over the same period, warming in mean temperatures and consequent thermal expansion of the oceans accounted for 2-7 cm of observed sea level rise, while melting of mountain glaciers and cap glaciers accounted for 2-5 cm of rise (IPCC, 1996).

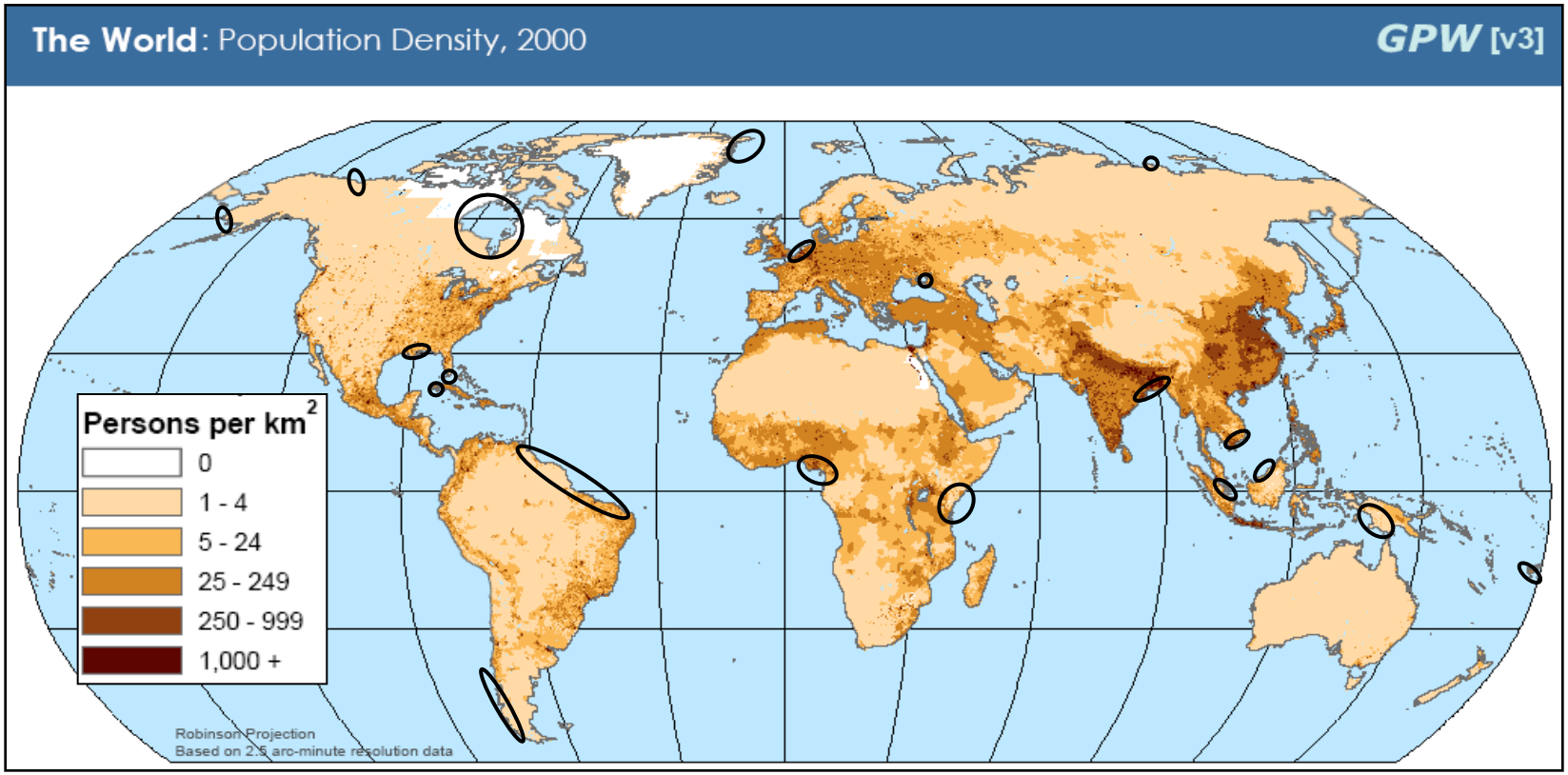
Sea Level Changes





Kaynak: http://climate.nasa.gov/vital-signs/sea-level/

Areas to be Affected in the Case of World Population Density and 1 meter rise in sea level

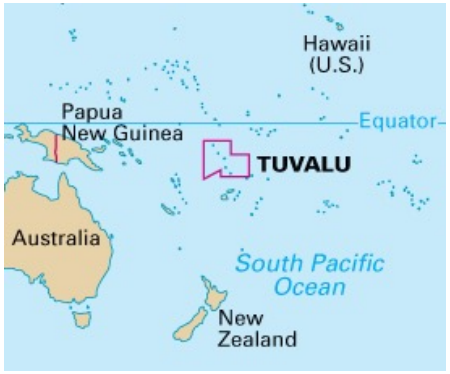


Africa: Nigeria, Cameroon, Gabon, Somalia, Kenya, Tanzania; Asia: Russia, Vietnam, India, Bangladesh, Malaysia, Indonesia

Australia & West Pacific: Papua New Guinea, Australia, Fiji and Sth Pacific Islands; Europe & Middle East: Netherlands, Greenland, Ukraine and UK coastline

South America: Venezuela, Guyan, Suriname, French Guiana, Brazil and Chile ;North America: USA, Canada and Cuba

Sea Level Rise: Tuvalu Islands




Kids wait out tidal flooding on Funafuti Tuvalu Feb 2005. © 2005 Gary Braasch One-time print only


High tides surround home on Tuvalu, Pacific


Ocean © 2005 Gary Braasch

- **The transformation of natural areas into cropland, grassland, urban areas, water storage areas and other man-made landscapes represents the most visible and pervasive form of environmental change.**
- Meeting the resource needs of a growing population has ultimately forced people to make changes in some land use patterns.
- Agriculture and deforestation are two important forms of anthropogenic land use transformation, and agricultural land is being expanded while forests are being cut back by human causes.
- **It is estimated that the world forest cover is about 4 billion hectares (31% of the land surface) and 1.8 billion hectares of forest loss has occurred over 5000 years (Food and Agriculture Organization-FAO, 2012).**
- Although population dynamics play a central role in land use changes, studies have shown that together with other factors such as population, market forces, political and institutional structures, they create a synergistic result (de Sherbinin et al., 2007).

Deforestation

- **One of the key factors in environmental degradation is deforestation, brought about by the destruction of forests to meet the diverse needs of the growing population.**
- Deforestation or forest clearing is the removal of a forest or trees from the land that is then converted to non-forest use.
- Over the centuries, the increase in the world population has brought about the decrease in forest areas. Trees were cut for the use of firewood and for field clearing.
- From the tropics to the tundra, the beauty and tranquility of forests around the world inspires us all. We know that 8 out of 10 species found on land live in forests. About 750 million people, 60 million of whom are Indigenous, also live in forests.
- Deforestation is a phenomenon that can disrupt the lives of local communities and sometimes have devastating consequences.

Deforestation

- Forests provide a wide variety of resources for all of us, including food, wood, medicine, fresh water, and the air we breathe. Without trees, the ecosystem that supports the human population could crumble.
- Therefore, there is an imperative to protect the world's most important forests to sustain the diversity of nature, benefit our climate, and support human well-being.

- **In some parts of the world, such as Algeria, Tunisia, and Morocco, forests that once covered 30% of the country's area have now declined to 10%.**
- It is estimated that 98% of forests in Haiti have disappeared. As the forests are destroyed, the surface waters created by the precipitation cannot be stopped, the upper layers of the soil are carried and thinned.

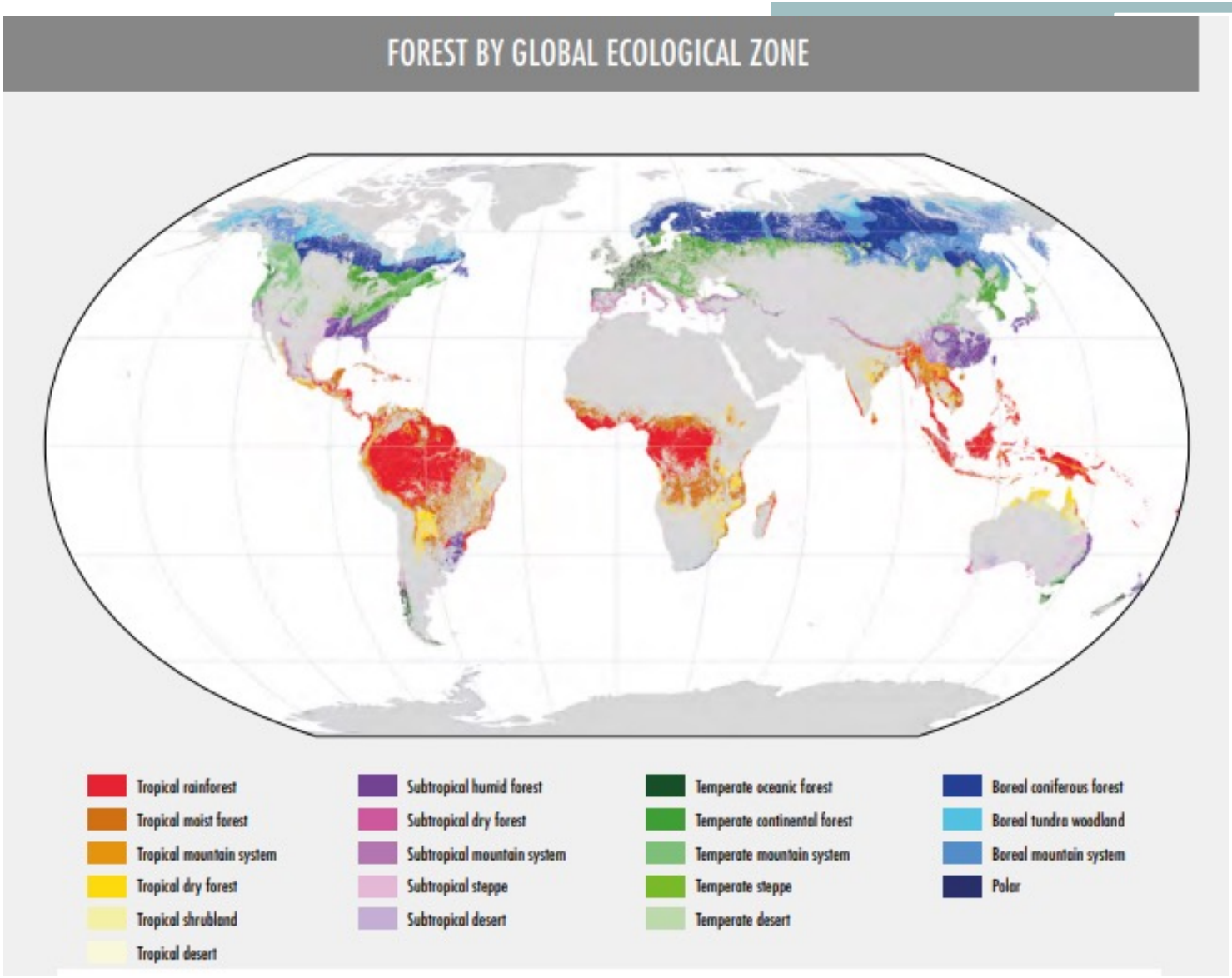
Deforestation

- **The consequences were seen during Hurricane Jeanne in 2004, which killed hundreds of Haitians. Population growth, which left the islanders facing poverty, aggravated all other problems of Haiti (Larkin and Peters, 2005).**
- Today, forests are being cut down at an even faster rate than tree planting.
- Although deforestation has been known for centuries to cause floods, local climate changes, and strong soil erosion, little has been done about it.

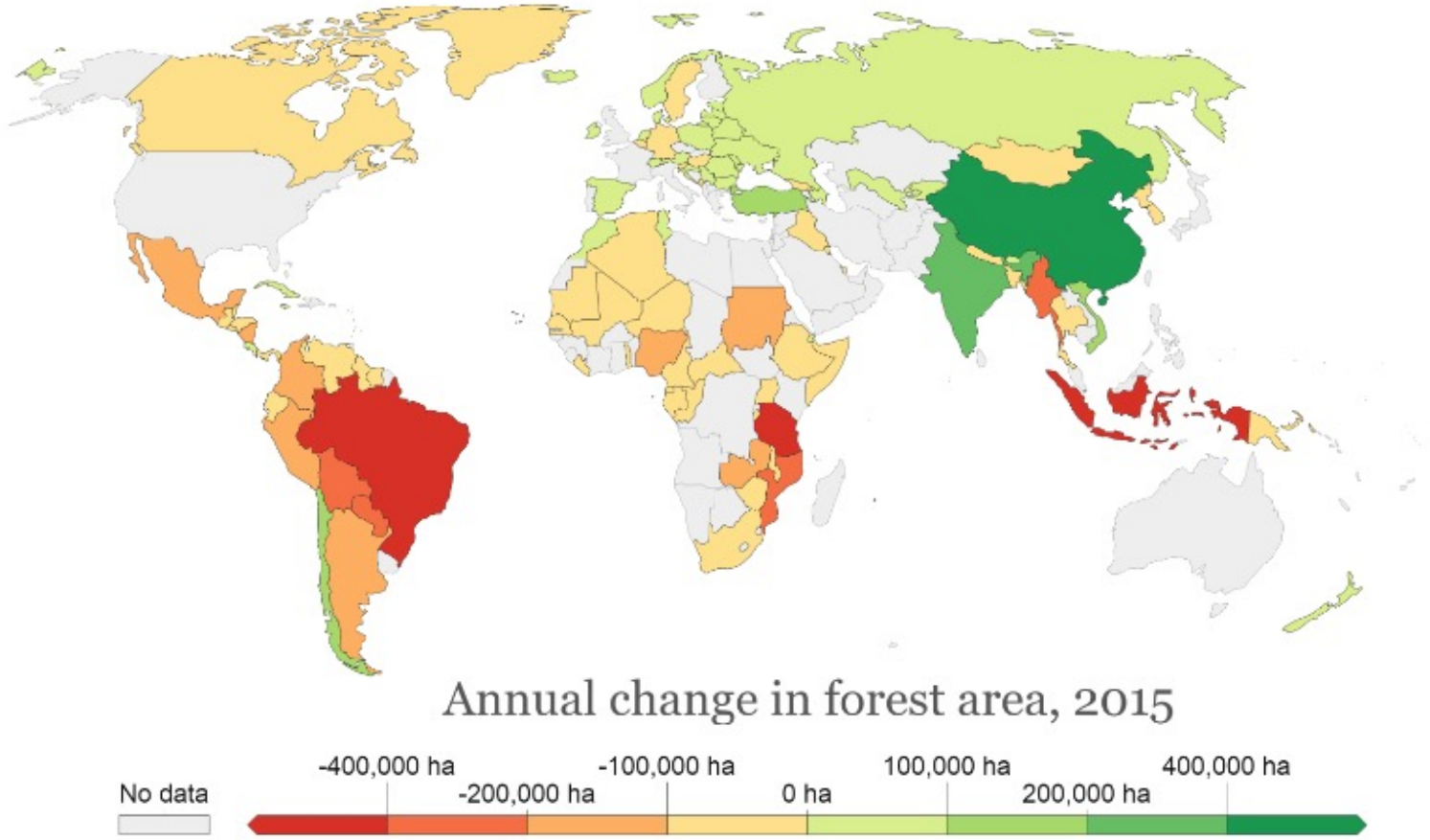
Causes of Deforestation

- The following factors stand out in deforestation:

1. The need for arable land
2. Animal grazing
3. Commercial agriculture and livestock (especially palm plantations for palm oil production)
4. Mining and drilling
5. Firewood supply
6. Sawing wood for lumbering (for paper, furniture and house construction)
7. Making space for housing and urbanization



Source: FAO and UNEP, 2020: 19

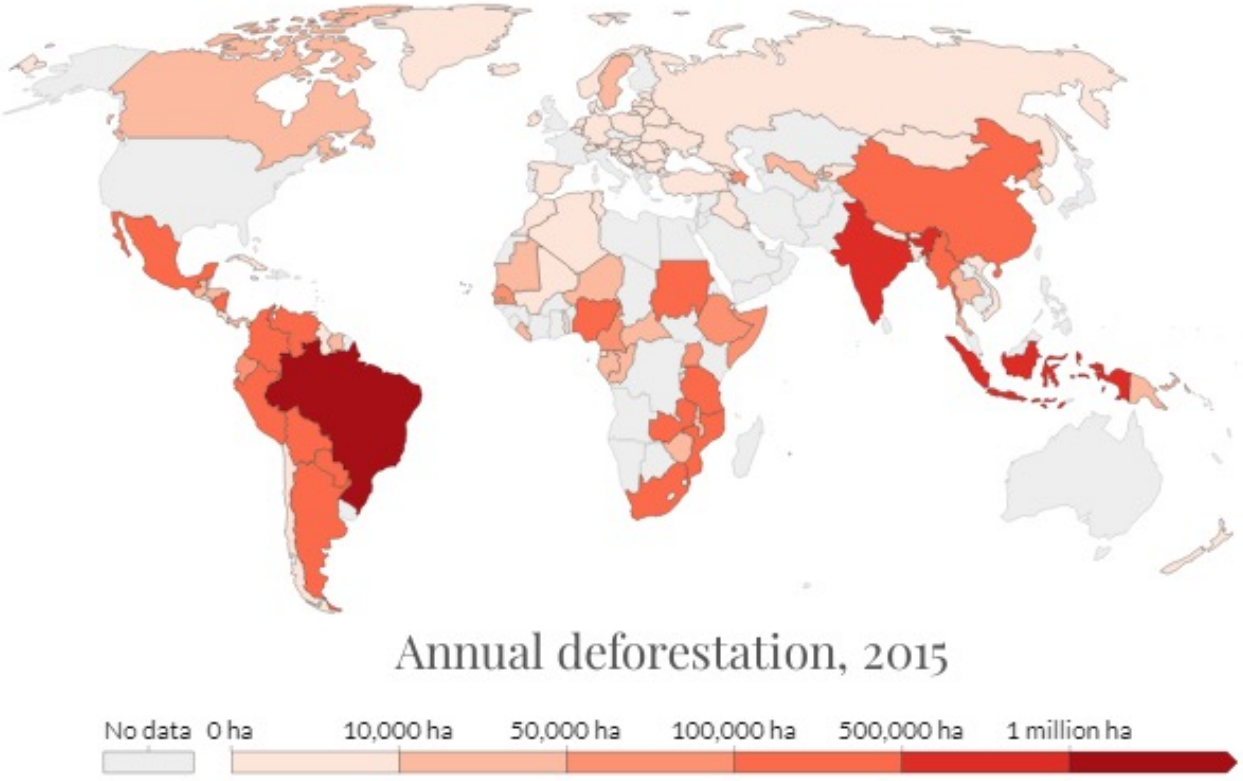


Kaynak: https://ourworldindata.org/deforestation

ANNUAL RATE OF FOREST AREA CHANGE

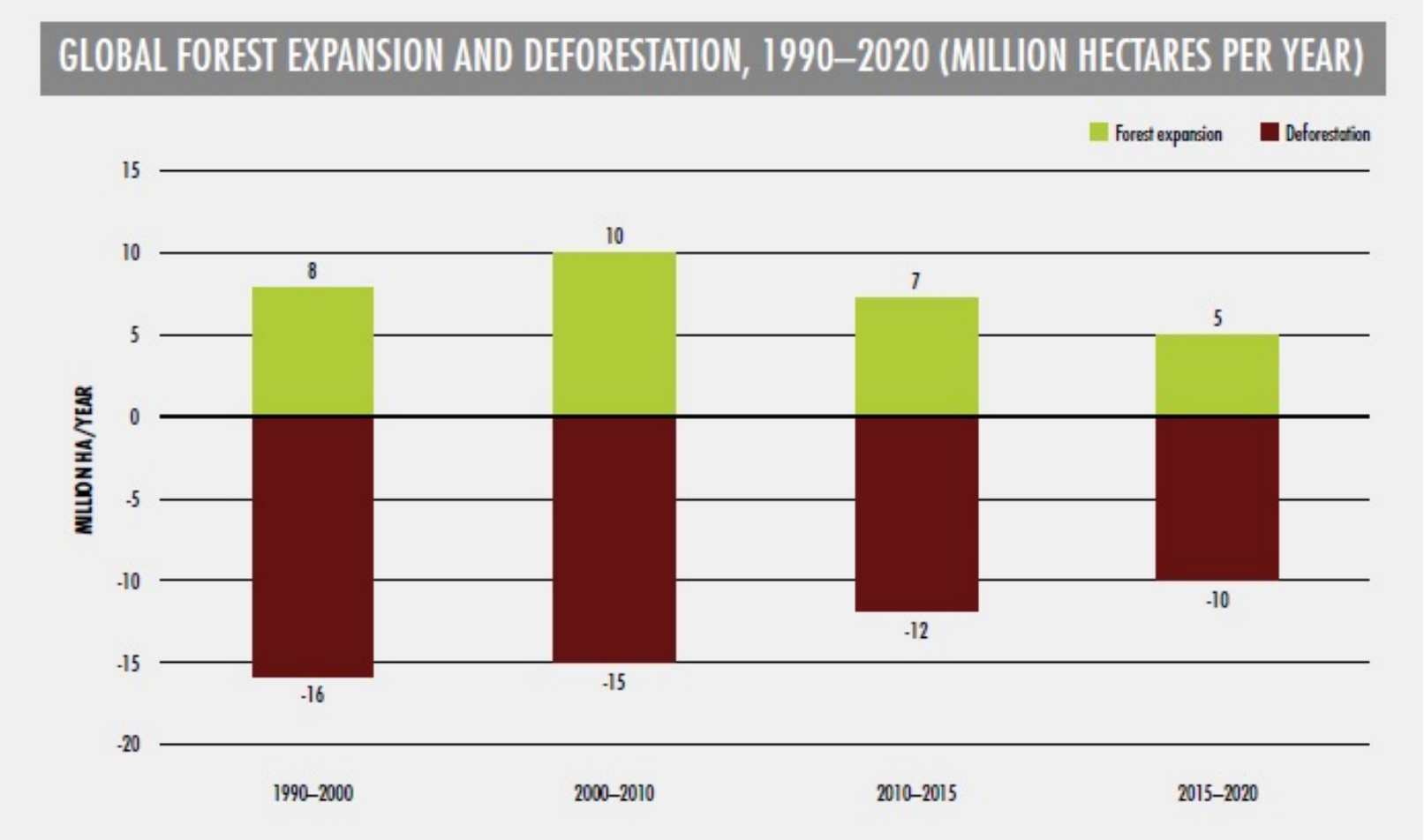
Period	Net change (million ha/year)	Net change rate (%/year)
1990–2000	–7.84	–0.19
2000–2010	–5.17	–0.13
2010–2020	–4.74	–0.12

Source: FAO and UNEP, 2020: 11



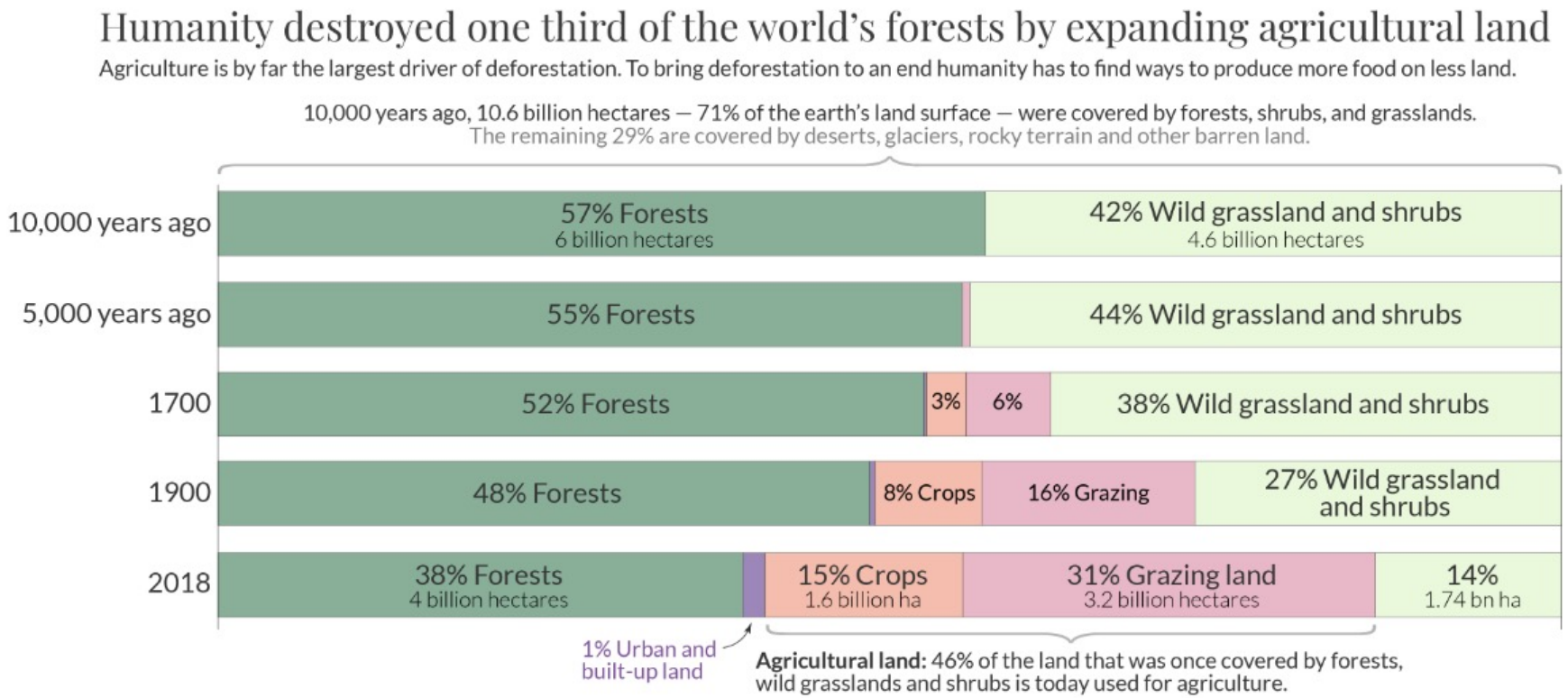
Source: https://ourworldindata.org/deforestation

Since 1990, an estimated 420 million hectares of forest have been lost due to deforestation, but the rate of deforestation has decreased significantly since 1990-2000.
FAO estimates that 10 million hectares of forest are cut down each year.

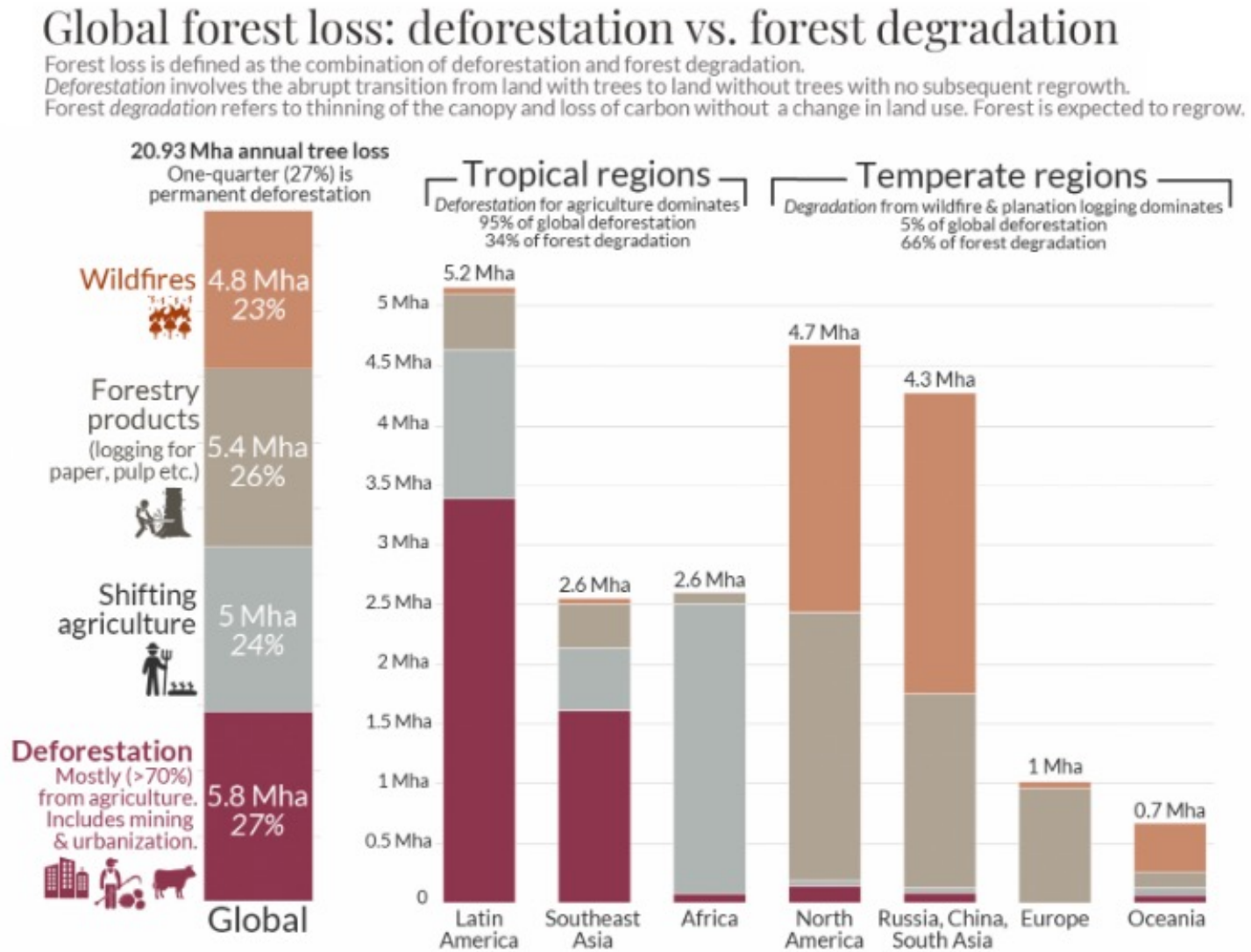


Source: FAO and UNEP, 2020: 19

During 2015–2020, the rate of deforestation was estimated at 10 million hectares per year, down from 16 million hectares per year in the 1990s.



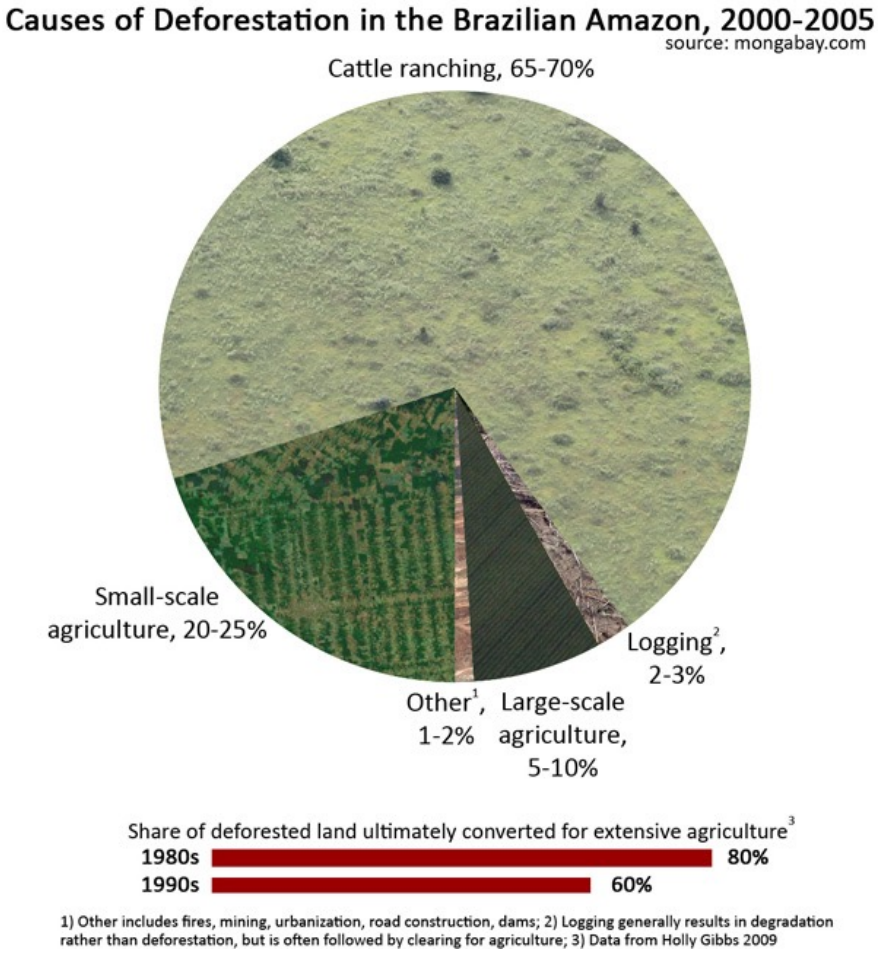
Source: https://ourworldindata.org/deforestation



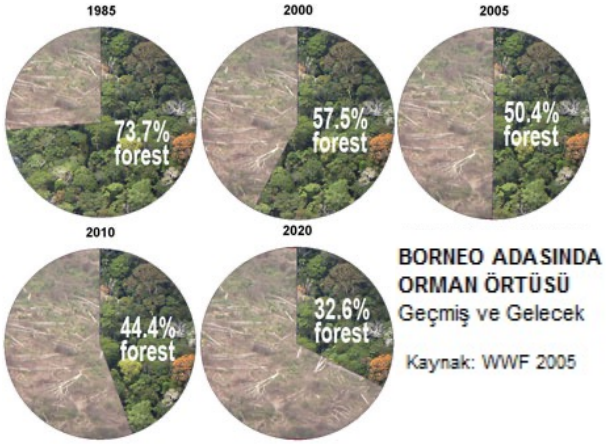
Source: https://ourworldindata.org/deforestation

Deforestation

- The main destruction is experienced in **tropical rainforests**.
- On the **Pacific island** of Borneo in 1950, almost the entire island was covered with forests; The proportion of forest areas decreased to approximately 74% in 1985, 57.5% in 2000 and 44.4% in 2010. Estimates predict that forest areas will decline to 32.6% by 2020.
- A similar situation is observed in the **Amazon** (**Brazil**) forests.
- More than 600,000 km² of the Amazon rainforest has been destroyed since 1970, and between 2000 and 2006 about 150,000 km² (an area larger than the area of Greece).

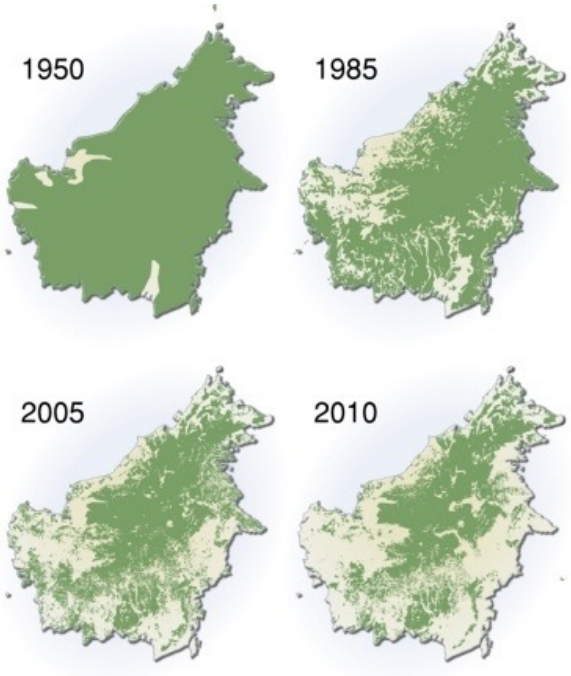


Deforestation



BORNEO ADASINDA ORMAN ÖRTÜSÜ
Geçmiş ve Gelecek

Kaynak: WWF 2005



Photograph by Mattias Klum

Raw scribblings of access roads and terraced fields erase the lush diversity of Sarawak's rolling lowlands in favor of a single tree: the oil palm. The profitability of palm oil has sent the crop sprawling across some eight million acres of Borneo—an area roughly the size

Photograph by Mattias Klum

To make way for an oil palm plantation, land in Sarawak, in Malaysian Borneo, is stripped of trees, then burned. Palm oil is a prime export for Malaysia and Indonesia, and global demand is growing.

Decreased Biodiversity

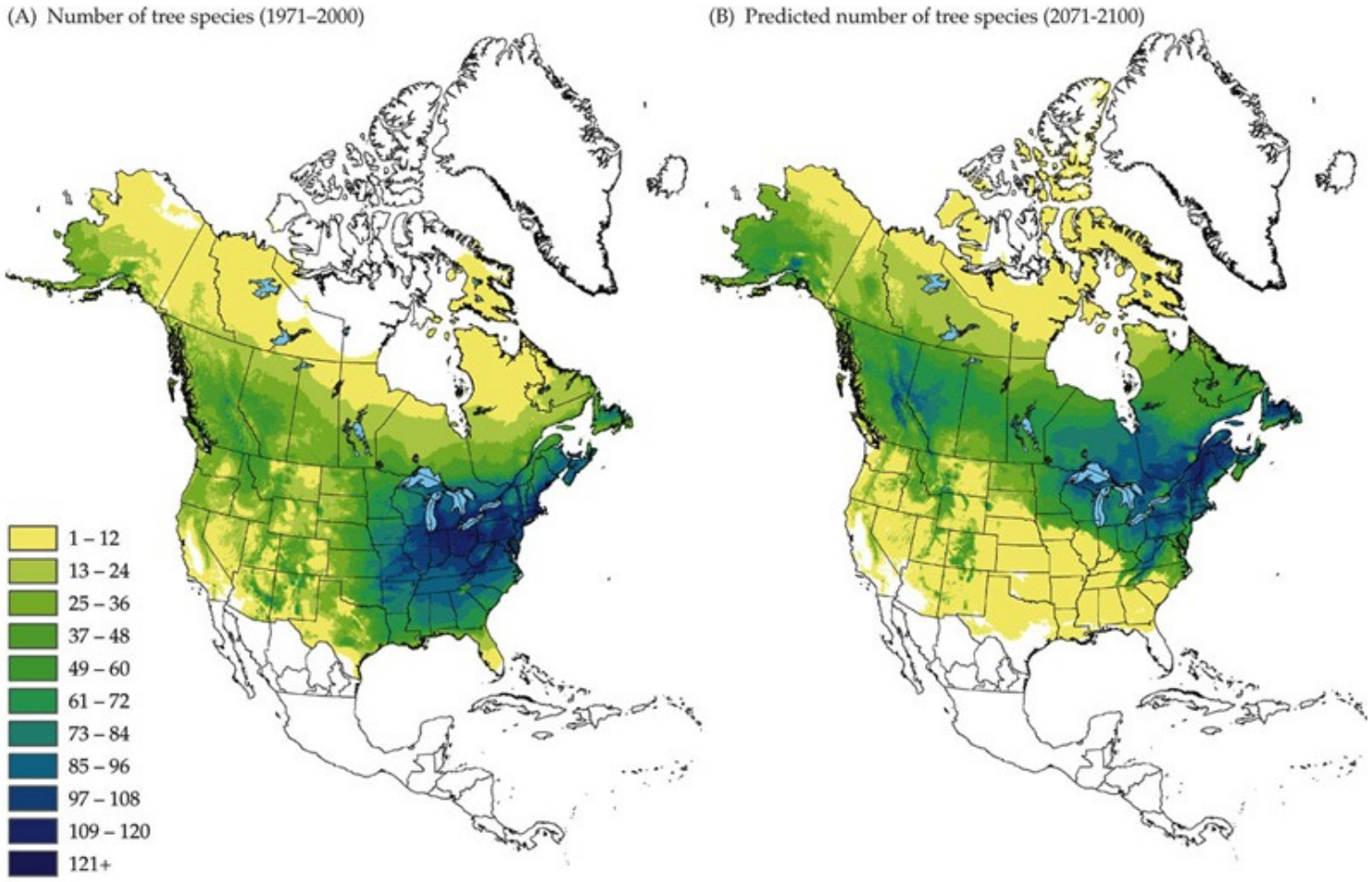
- Biodiversity is the differentiation between living organisms from all sources, including terrestrial, marine and other aquatic ecosystems and the ecological structures that are part of these ecosystems.

- **Biological diversity, the differences in the living environments of species in terms of various biotic and abiotic factors, the living things living in ecosystems among themselves; between the living and the inanimate; It refers to genes, species, ecosystems and all functions with differences that vary according to place and time.**

- The basis of living resources, which has an indispensable place in meeting the basic needs of people, especially food, is biological diversity.

Decreased Biodiversity

- McKenney et al. (2011) predicted that various tree species in different parts of North America will change as a result of climate change.
- Maps show the decline of tree species over time across the North America.



Source: http://sites.sinauer.com/ecology2e/ccc23.1.html

Decreased Biodiversity

- With the acceleration of processes such as industrialization and urbanization that increase pressures on biological diversity in the world, the Convention on Biological Diversity was prepared by the United Nations Environment Program (UNEP) in 1992.
- The three main objectives of the Convention on Biological Diversity are;

1. ***Conservation of biodiversity,***
2. ***Sustainable use of biological resources;***
3. ***It is the fair and equitable sharing of the benefits resulting from the use of genetic resources.***

Overgrazing

- **Excessive (animal) grazing is also a population growth problem.**
- An increase in the human population means an increase in the demand for livestock, especially in poor countries. Farm animals serve people as food, security, treasure of family well-being, attraction of agricultural implements.

- The increase in livestock and cattle can initiate a process that can quickly bare natural grazing lands. Due to scavenging (denudation), the flow of surface waters increases and eventually soil erosion accelerates and siltation increases.
- Many historical examples of overgrazing can be cited.
- Although North Africa was known as the granary of the Roman period, today it has turned into a largely unproductive area. The Euphrates and Tigris valleys, known as the Fertile Crescent, feed less people today than before pre-Christianity.

Overgrazing

References

- Çevre ve Orman Bakanlığı (2008). Ulusal Biyolojik Çeşitlilik Stratejisi ve Eylem Planı. Ankara. http://www.milliparklar.gov.tr/dkmp/oldversion/bolumler/dkoruma/UBSEP.pdf, 03.05.2012
- Davis, K. (1991). Population and Resources: Fact and Interpretation. (Eds.) K. Davis ve M.S. Bernstam, *Resources, Environment and Populatio*n içinde (s.1-25), New York: Oxford University Press.
- Dawson, T. P., Jackson, S. T. ,House, J. I. Prentice, I. C., Mace, G. M. (2011). Beyond predictions: Biodiversity conservation in a changing climate. *Science* 332, 53–58.
- Demirayak, F. (2002). Biyolojik Çeşitlilik-Doğa Koruma ve Sürdürülebilir Kalkınma. http://www.tubitak.gov.tr/tubitak_content_files/vizyon2023/csk/EK-14.pdf
- de Sherbinin, A.; Carr, D.; Cassels, S.; Jiang, L. (2007) "Population and environment", *Annual Review of Environment and Resources,* 32, 345-373.
- Dinda, S. (2004) "Environmental Kuznets Curve Hypothesis: A survey", Ecological Economics, 49(4), 431-455.
- Ewing, B.; Goldfinger, S.; Oursler, A.; Reed, A.; Moore, D.; Wackernagel, M. (2009) The Ecological Footprint Atlas 2009, Global Footprint Network, Oakland
- FAO and UNEP. 2020. The State of the World's Forests 2020. Forests, biodiversity and people. Rome. https://doi.org/10.4060/ca8642en
- Hern, W.M. (1990). Why are there so many of us? Description and diagnosis of a planetary ecopathological process. Population and Development 12(1), 9-40.
- Hunter, L.M. (2000) The Environmental Implications of Population Dynamics, RAND, Santa Monica-California.
- Kadıoğlu, M. (2008). Günümüzden 2100 Yılına Küresel İklim Değişimi. *TMMOB İklim Değişimi Sempozyumu - Küresel İklim Değişimi ve Türkiye*, 13-14 Mart 2008, Ankara.

References

- Marcoux, A. (2000). Population and deforestation. Sustainable Development Dimensions, FAO, http://www.fao.org/sd/wpdirect/WPan0050.htm (04.03.2012)
- McKenney, D. W.; Pedlar, J. H.; Rood R. B. ve Price D. (2011). Revisiting projected shifts in the climate envelopes of North American trees using updated general circulation models. *Global Change Biology,* 17(8), 2720-2730.
- Newbold, K. B. (2010). *Population Geography, Tools and Issues*. Plymounth UK: Rowman and Littlefield Publishers.
- Parmesan, C. (2006). Ecological and evolutionary responses to recent climate change. *Annual Review of Ecology, Evolution and Systematics* 37, 637–669.
- Pereira, H. M. and 22 others. (2010). Scenarios for global biodiversity in the 21st century. *Science* 330, 1496–1501.
- Peters, G. L., Larkin, R.P., (2005). *Population Geography, Problems, Concepts, And Prospect*, Eighth Edition, , Dubuque: Kendal/Hunt Publishing Company.
- Population Reference Bureau (2009). CO2 Emissions per Capita, 2006 (metric tons). http://www.prb.org/DataFinder/Topic/Rankings.aspx?ind=29
- Toros, A., Ulusoy, M., Ergöçmen, B. (1997). *Nüfus ve Çevre*. Ulusal Çevre Eylem Planı, Ankara: Devlet Planlama Teşkilatı.
- Türkeş, M. (2001). Hava, iklim, şiddetli hava olayları ve küresel ısınma. Devlet Meteoroloji İşleri Genel Müdürlüğü 2000 Yılı Seminerleri, *Teknik Sunumlar, Seminerler Dizisi 1* içinde, (s.187-205), Ankara .
- United Nations (2018). World Urbanization Prospects: The 2018 Revision, Key Facts. New York: UN
- United Nations Environment Programme-UNEP (1997) Global Environmental Outlook, New York: Oxford University Press. (http://www.unep.org/geo/geo1/fig/fig0_2.htm., 10.6.2016). UNFPA (1991). *Population, Resources and the Environment, The Critical Challenges*. New York: United Nations Population Fund.
- WWF (2016). Yaşayan Gezegen Raporu 2016.