



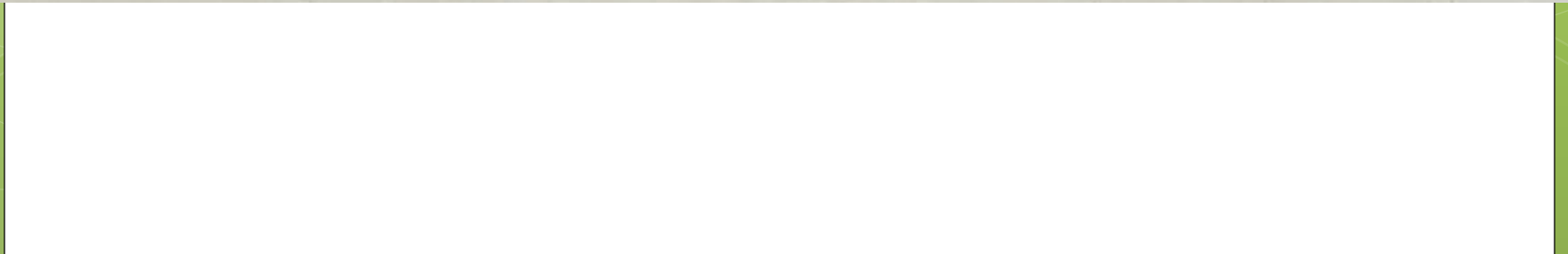
Population
Key Issue 1:
Where is the
World's
Population
Distributed?

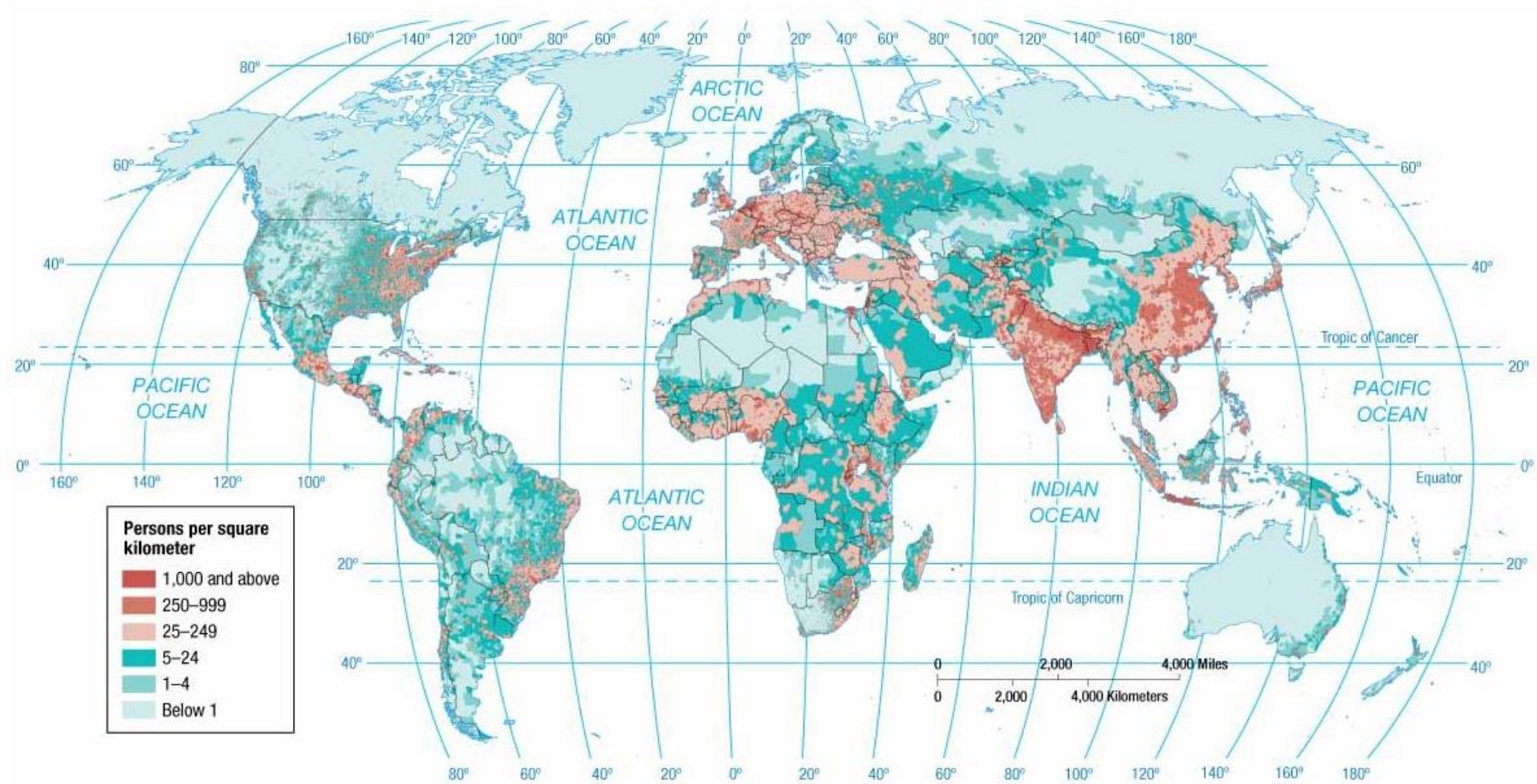
Which 3 countries do you believe have the highest populations?

1. China 1,344,692,576
2. India 1,236,344,631
3. U.S. 318,892,103



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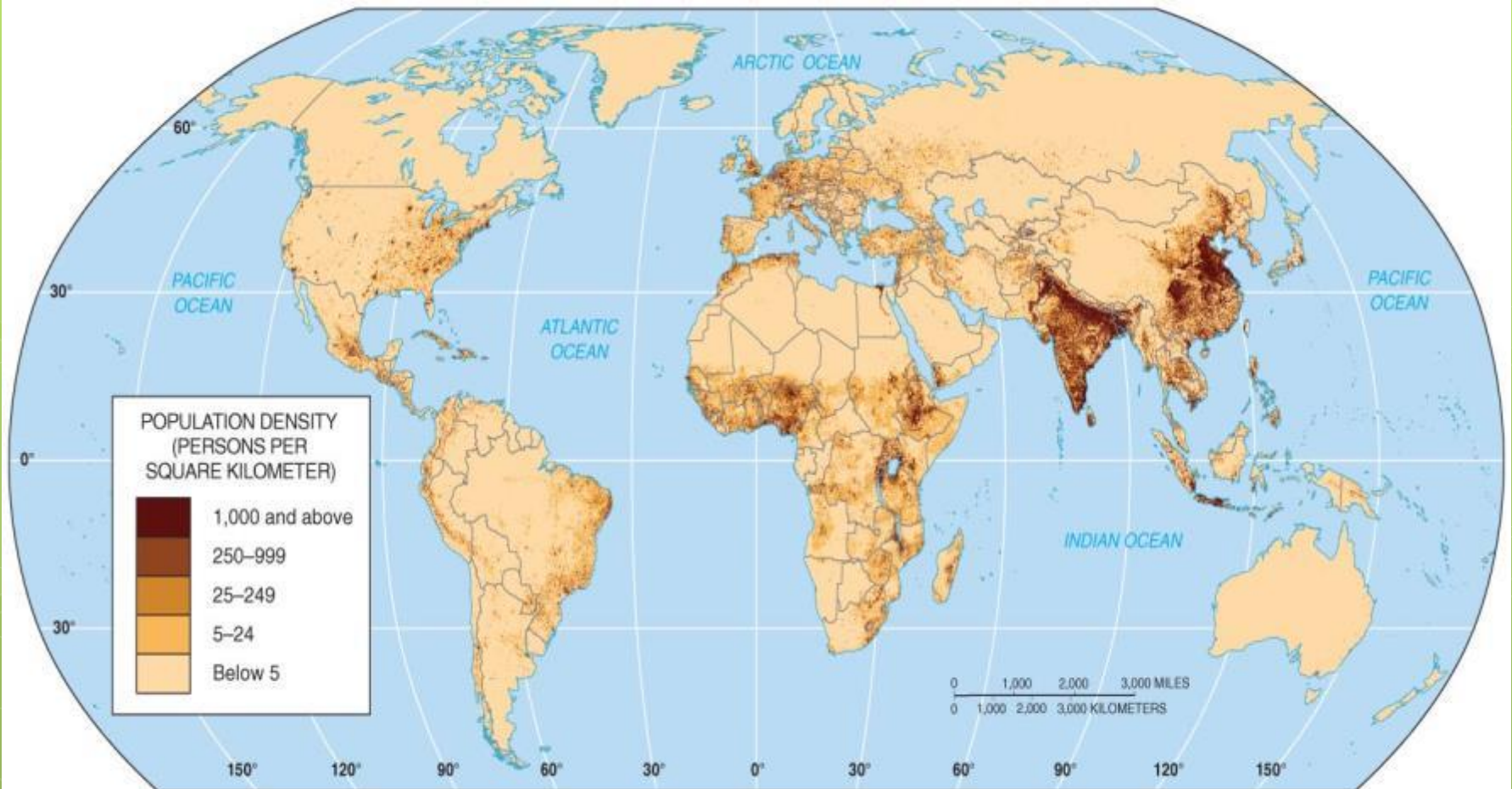




Where is the World's Population Distributed?

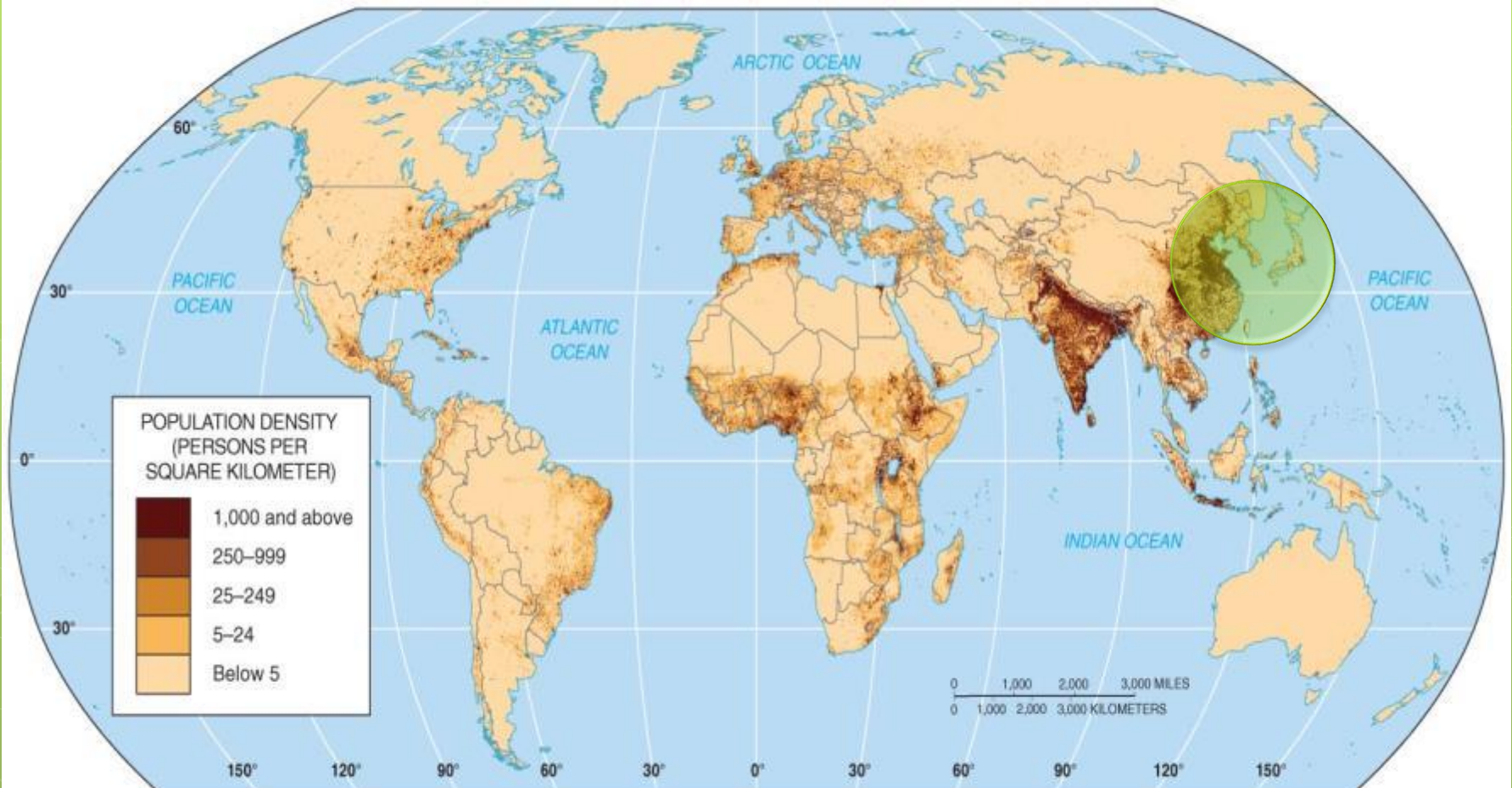
1. What? (title, key, images, data, words or phrases, dates and numbers)
2. Where? (patterns (or lack of) concentration, clustering)
3. Why there?
4. So what?

THE WORLD'S INHABITANTS ARE CLUSTED IN FOUR REGIONS.



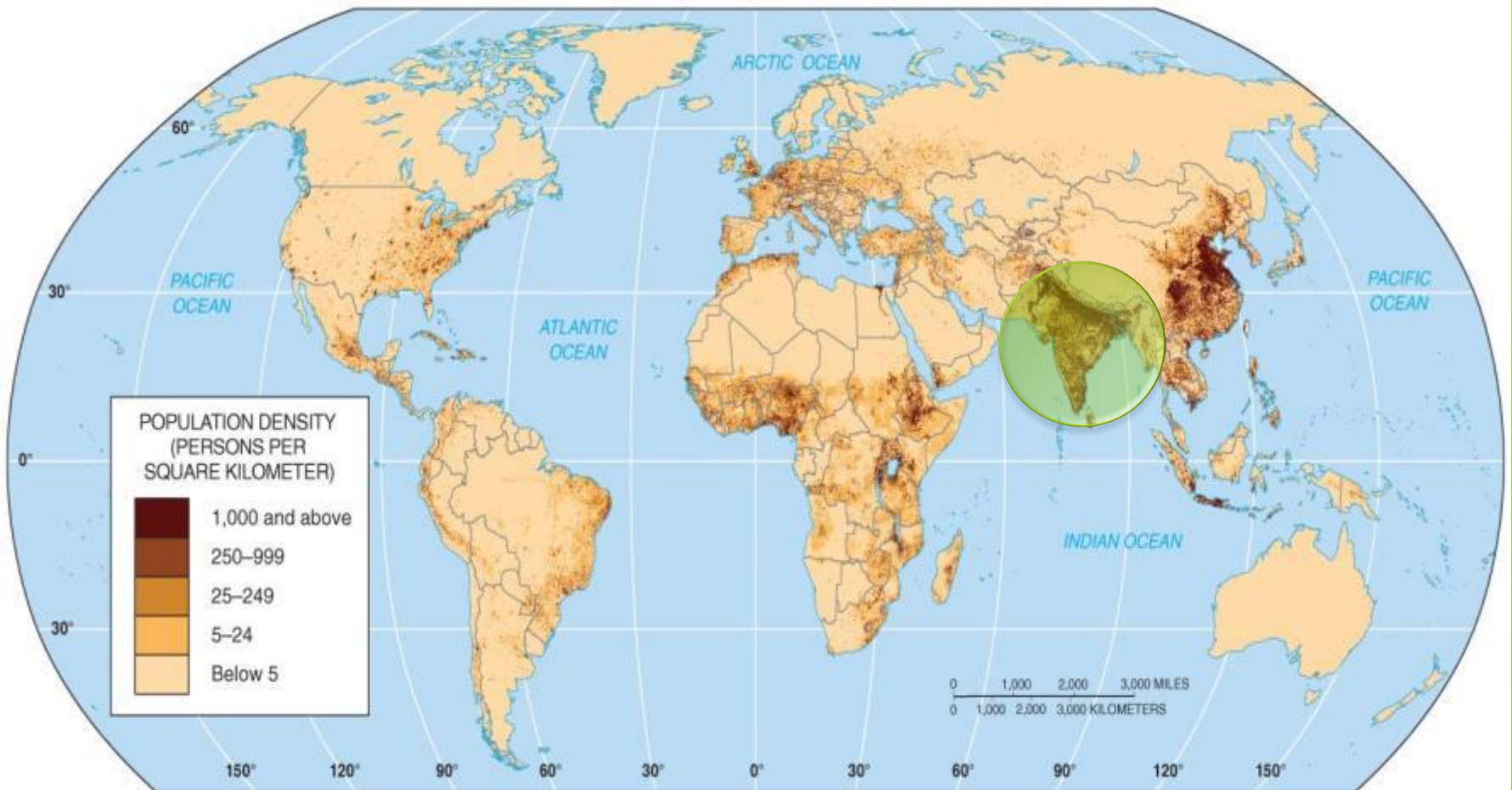
ARE CLUSTERED IN FOUR REGIONS.

EAST ASIA
China, Japan, Korean
Peninsula



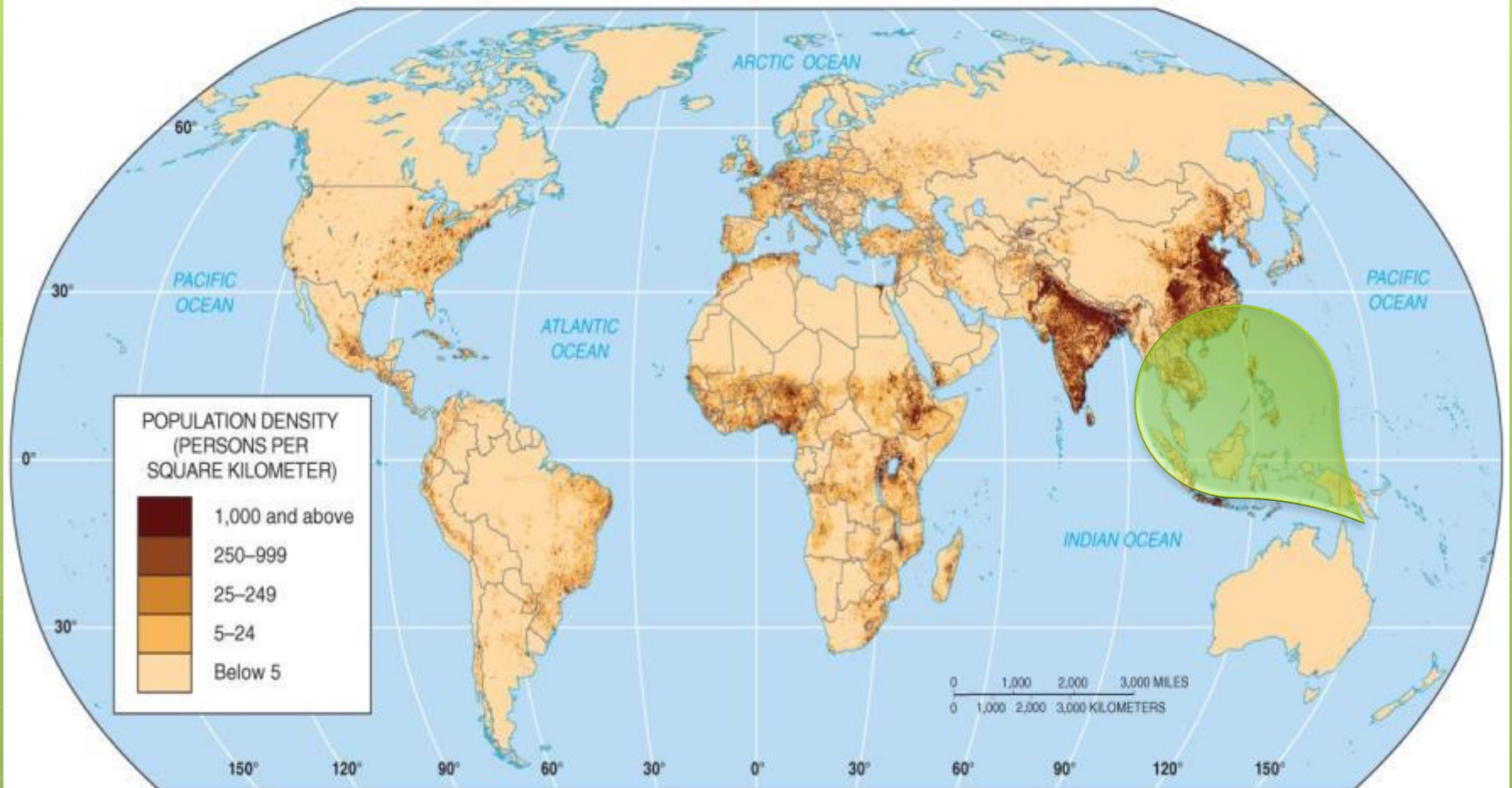
ARE CLUSTERED IN FOUR REGIONS.

South Asia
India, Bangladesh, Pakistan,
Sri Lanka



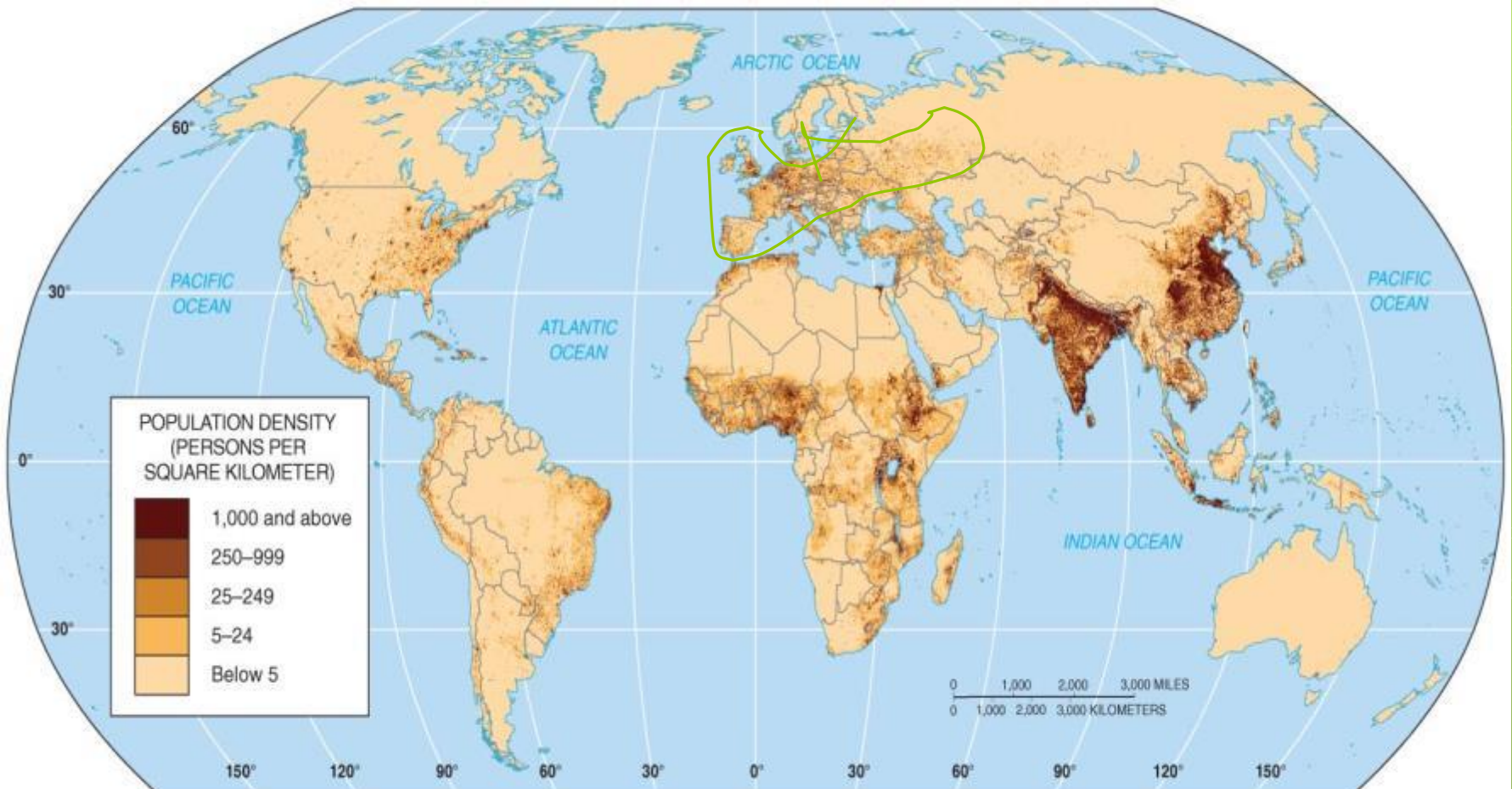
ARE CLUSTERED IN FOUR REGIONS.

SOUTHEAST ASIA: Indonesia (Java, Sumatra, Borneo) the Philippines, Papua New Guinea



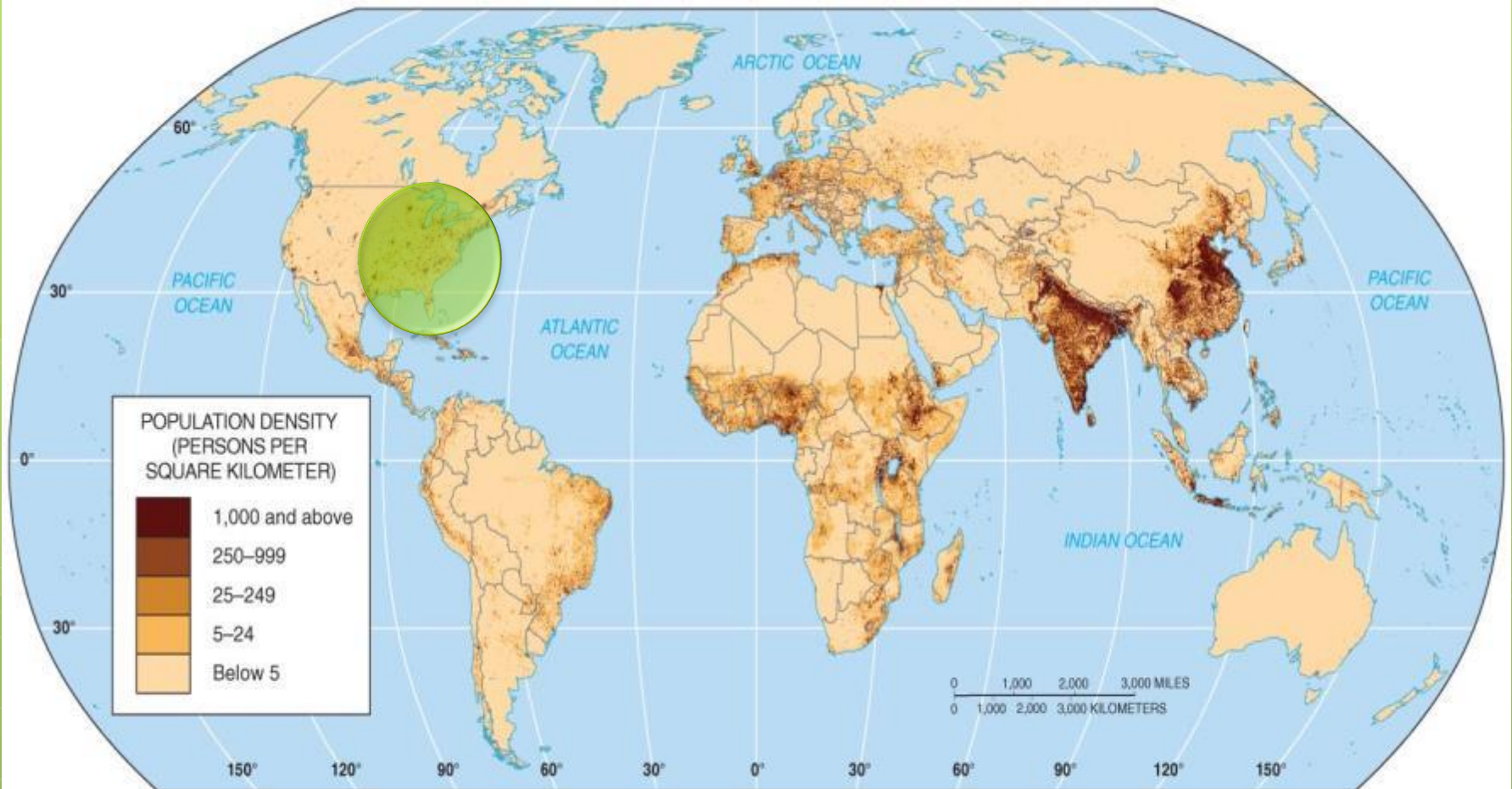
ARE CLUSTERED IN FOUR
REGIONS.

EUROPE: England, Germany,
Belgium



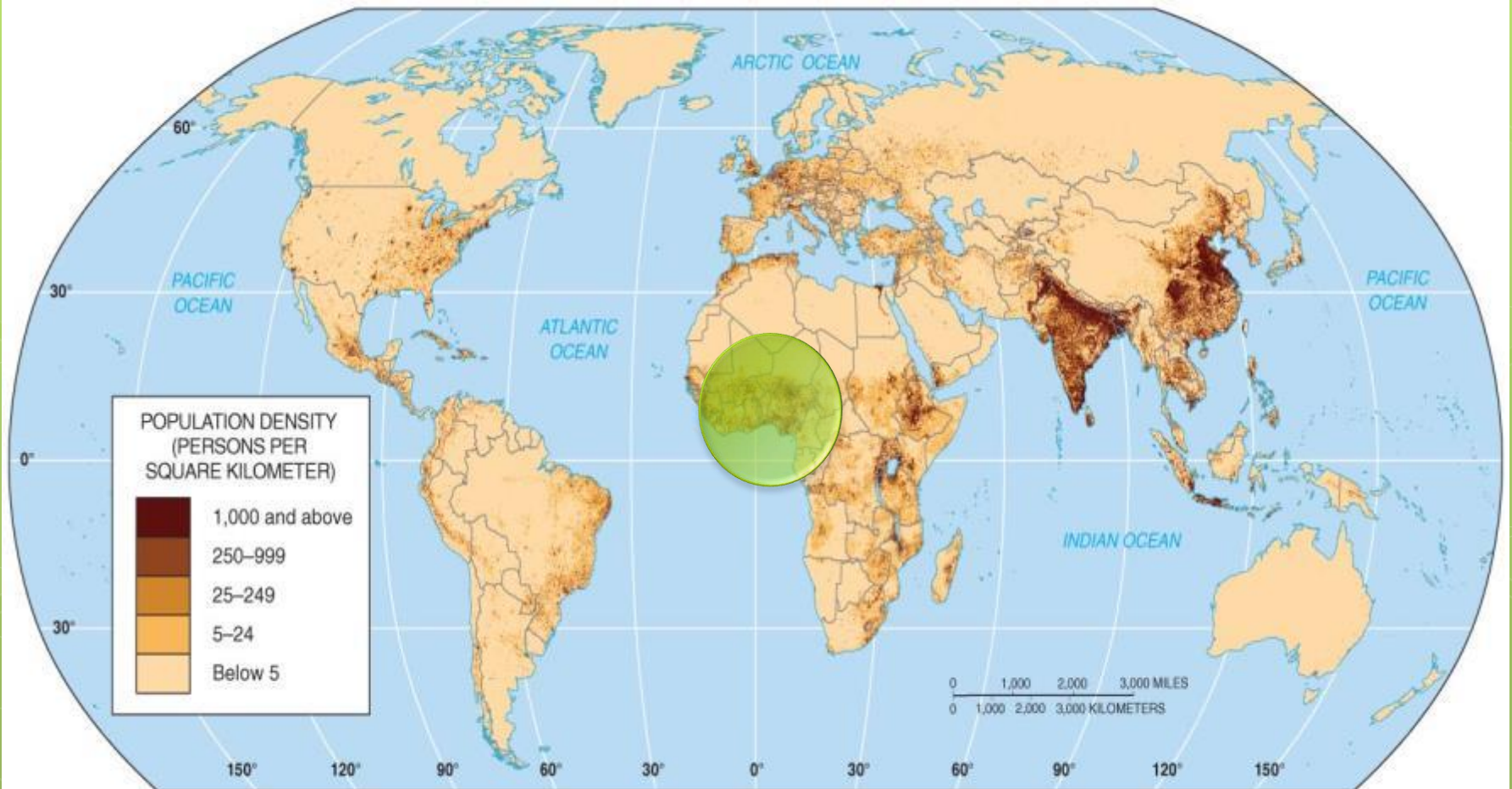
TWO ADDITIONAL CLUSTERS

Northeastern US / SE Canada:
Boston to New Port News, VA,
to the Great Lakes and
Chicago



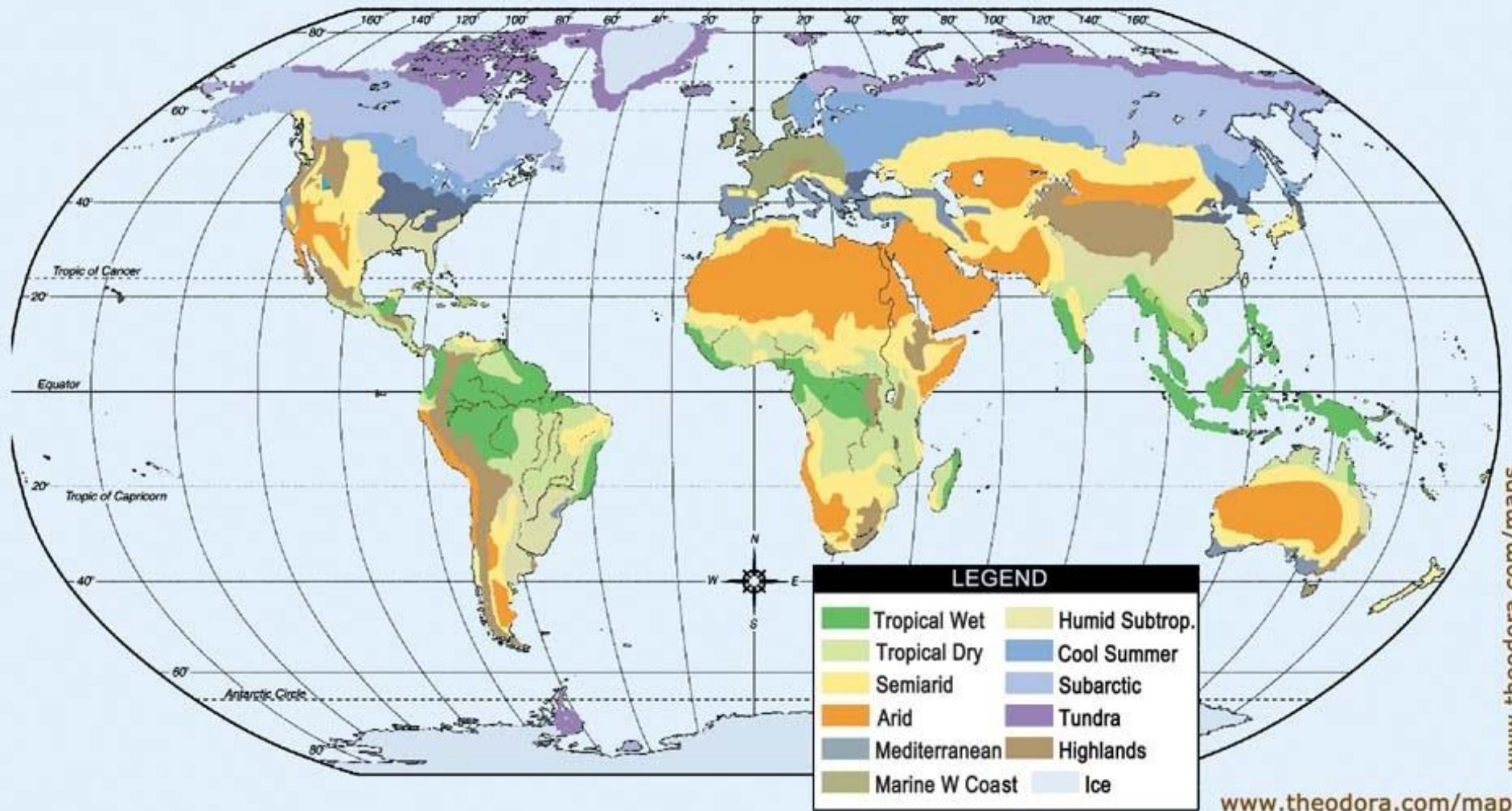
TWO ADDITIONAL CLUSTERS

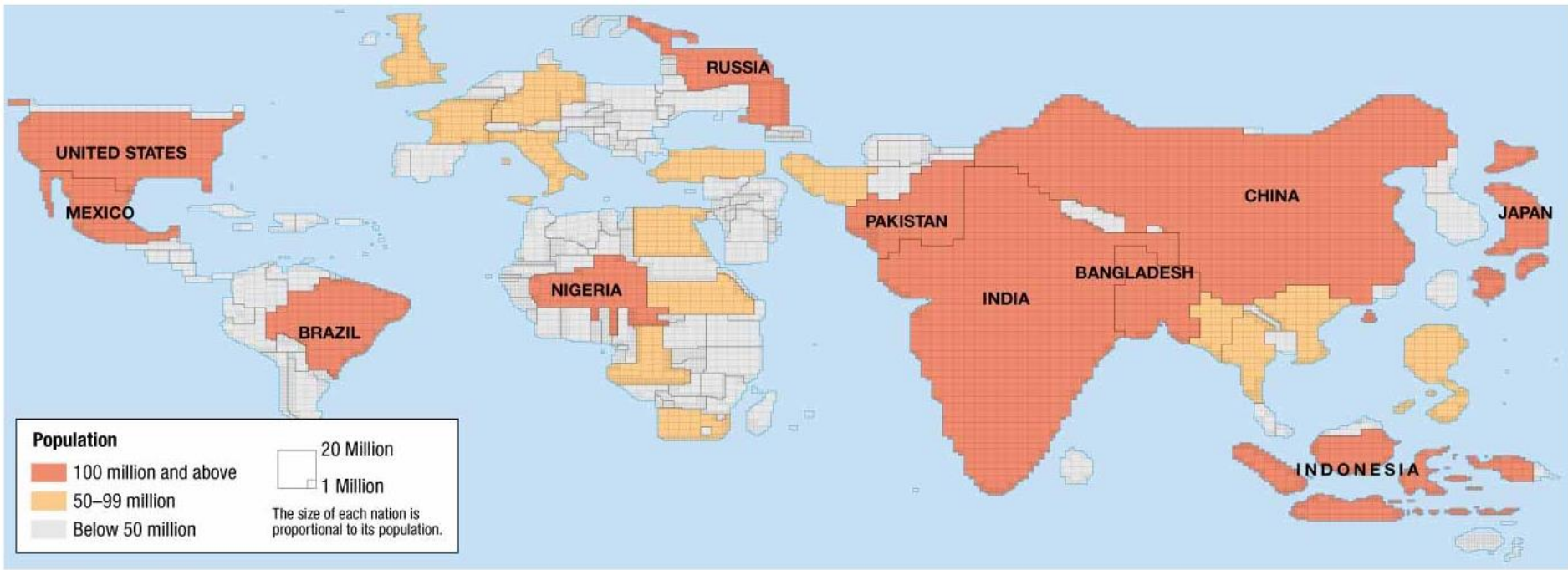
Western Africa: Nigeria, Togo, Benin, Ghana



Why is it important to know where areas of large population density are located?



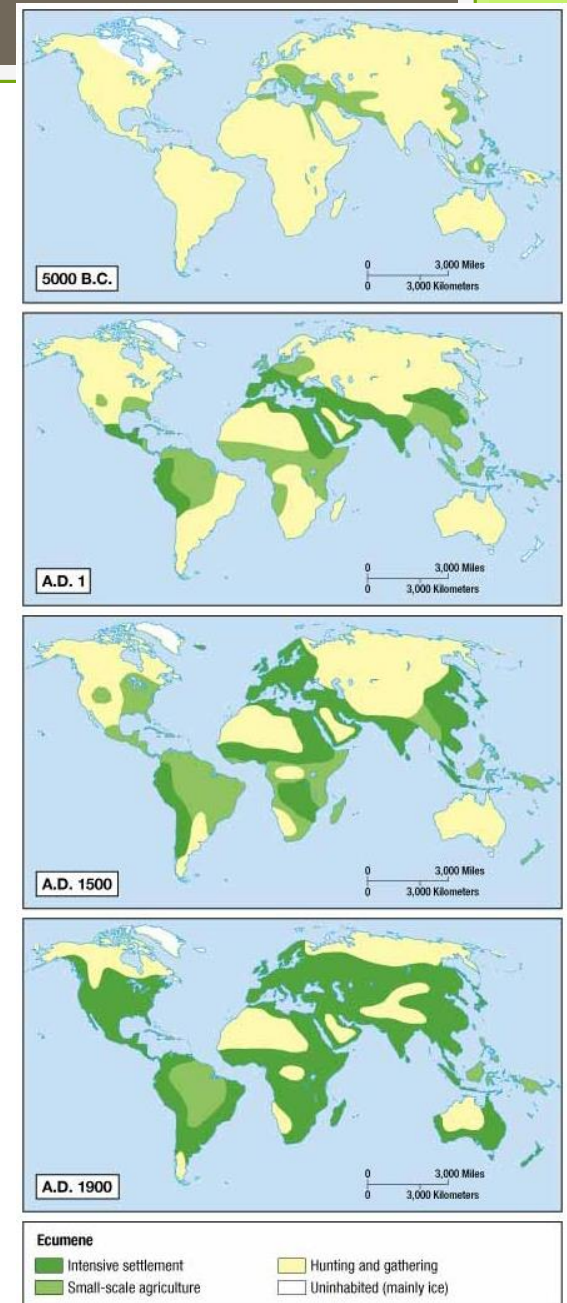






Ecumene

- Places of Permanent Human settlement
- Places considered too harsh for occupancy have diminished over time
 - Why?
- Still, about $\frac{3}{4}$ of the world's population live on only 5% of the Earth's surface



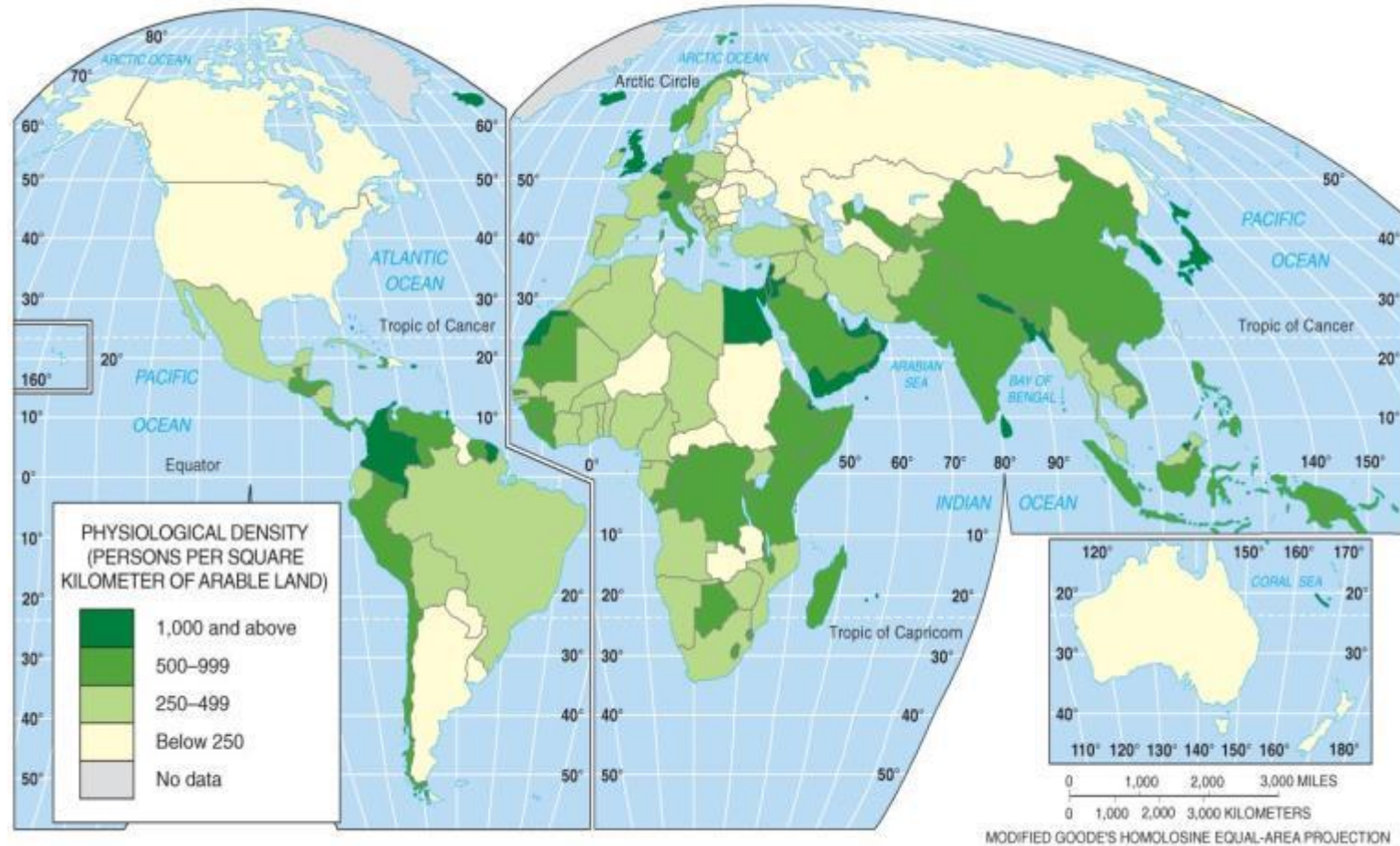
Where Is the World's Population Distributed?

- Population Density can be computed in up to three ways for a place.
 - 1. Arithmetic Density**
 - Total number of objects in an area
 - Computation: Divide the population by the land area
 - 2. Physiological Density**
 - Number of people supported by a unit area of arable land
 - Computation: Divide the population by the arable land area
 - 3. Agricultural Density**
 - Ratio of the number of farmers to amount of arable land
 - Computation: Divide the population of farmers by the arable land area

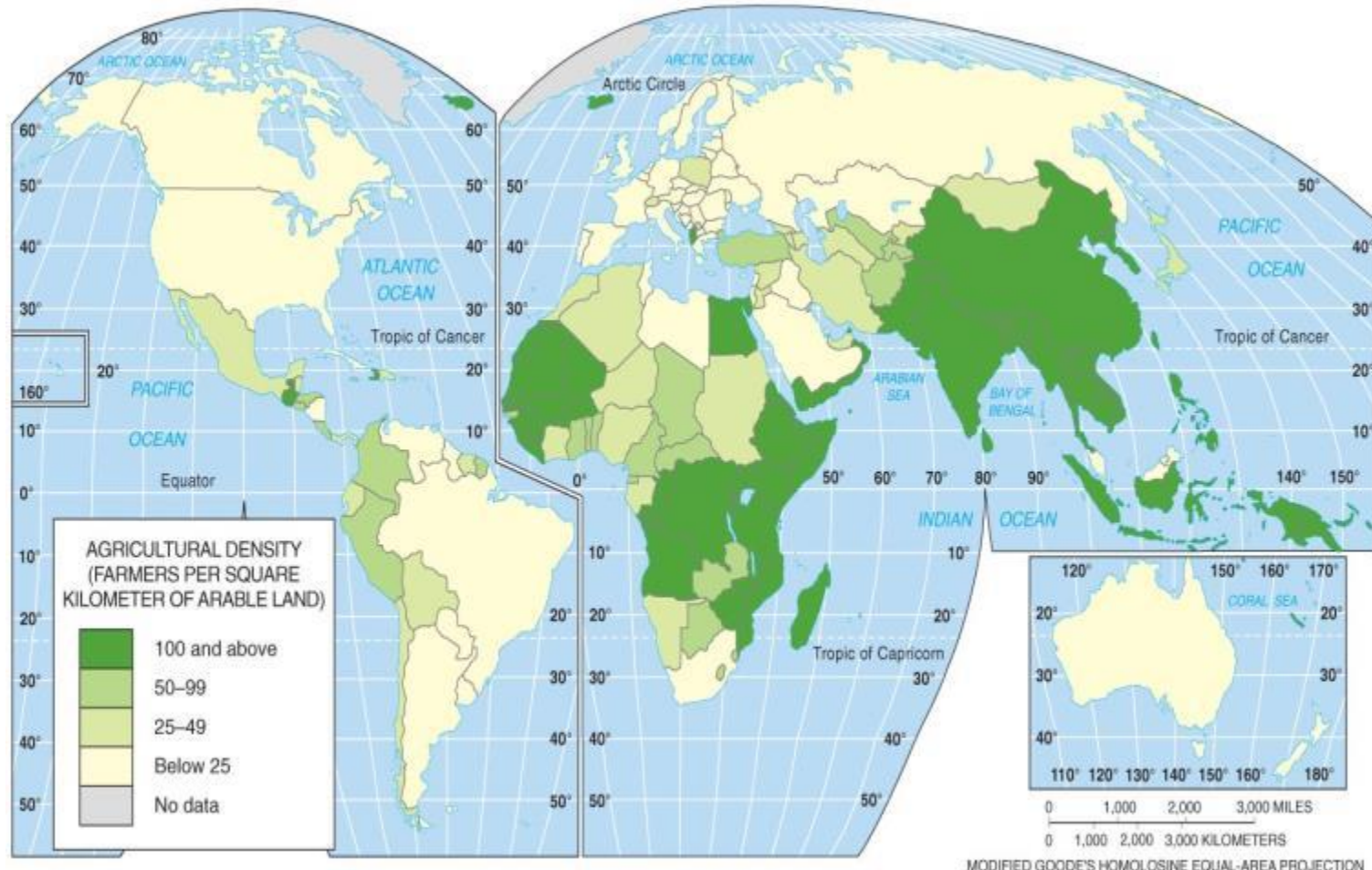
ARITHMETIC DENSITY – (Pop density) Misleading measure of distribution of people because the total number of people divided by the total land area See Egypt example 75 people per square km, but most people live by the Nile.



PHYSIOLOGICAL DENSITY – More useful measure because it is the number of people supported by a unit of area of arable land. Physiological density of Egypt is 2,580 people per square km. This shows pressure on the agricultural land.

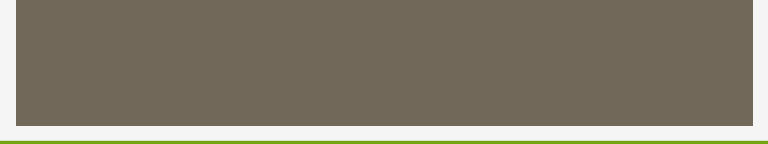
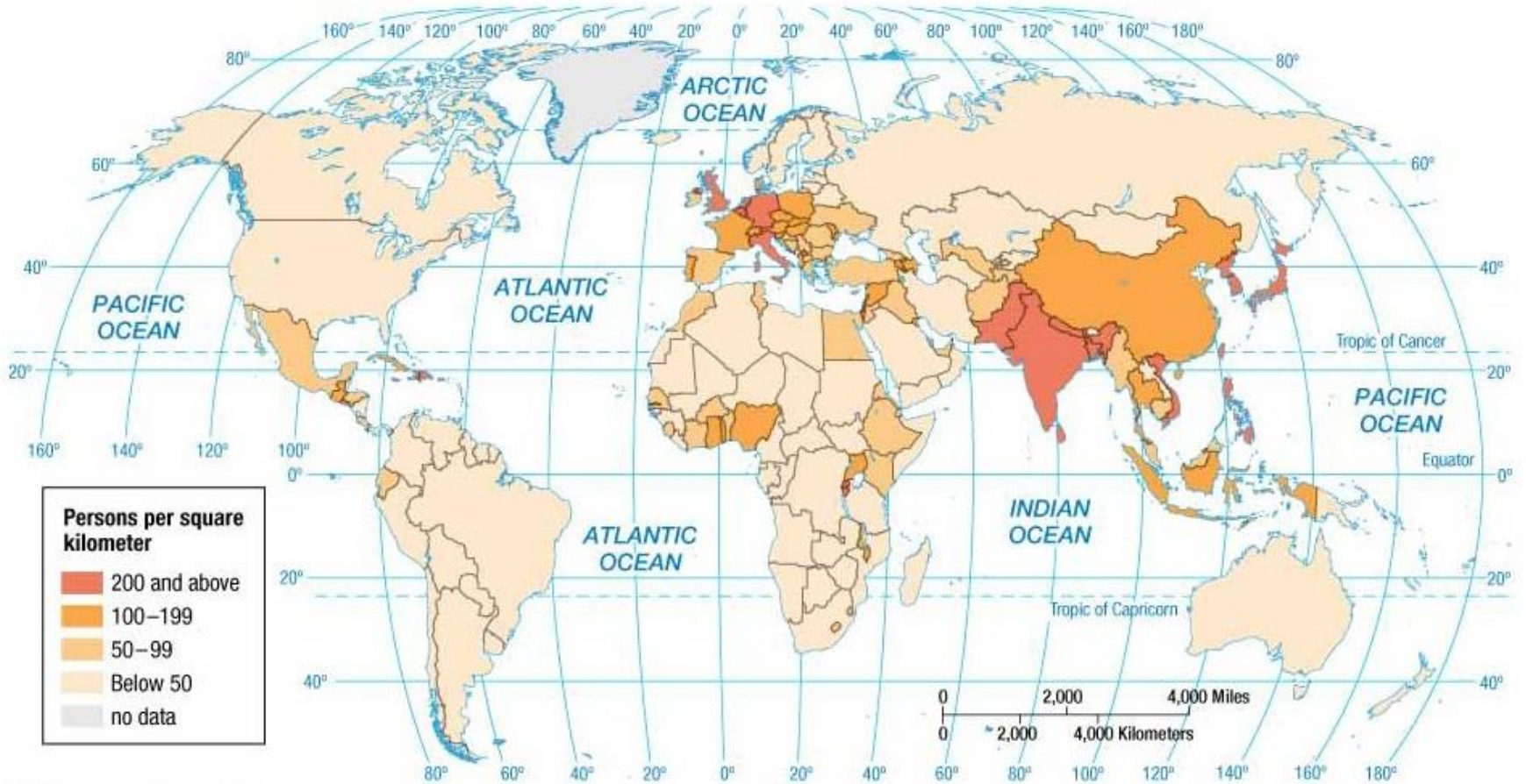


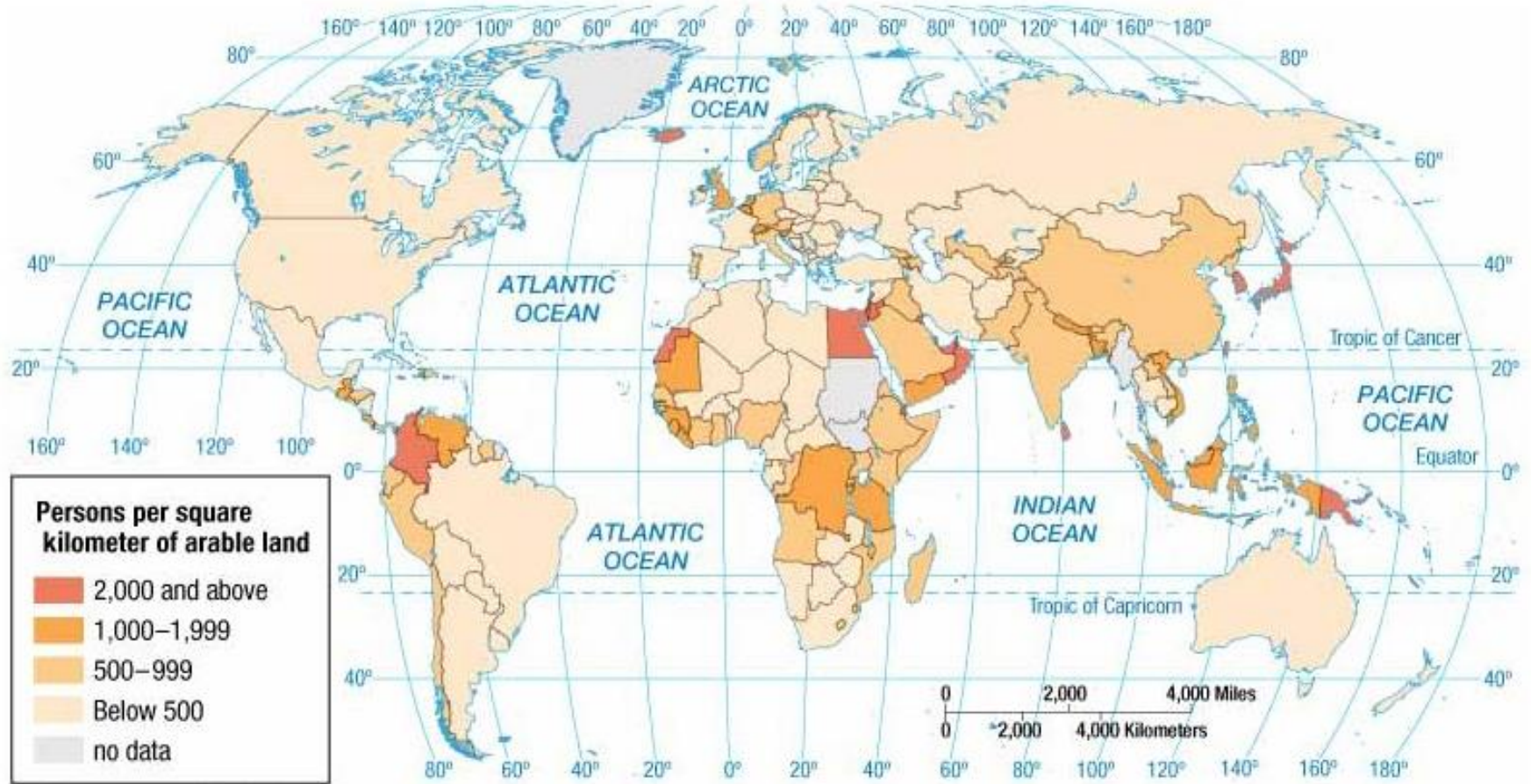
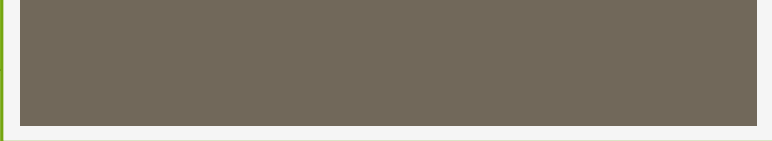
AGRICULTURAL DENSITY – Ratio of the number of farmers to the amount of agricultural land. Countries like the US and Canada have a much lower agricultural density than an LDC like India or Bangladesh

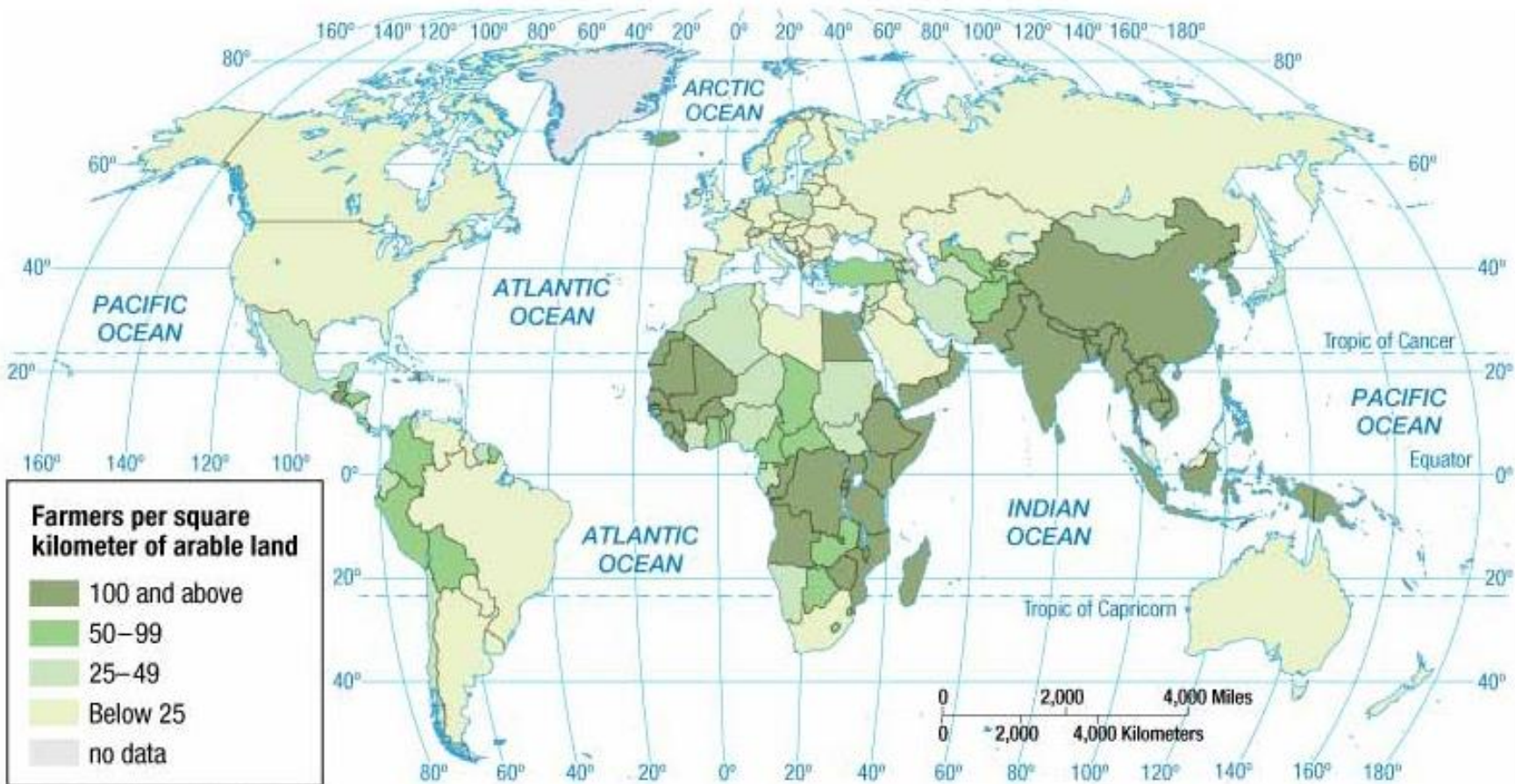




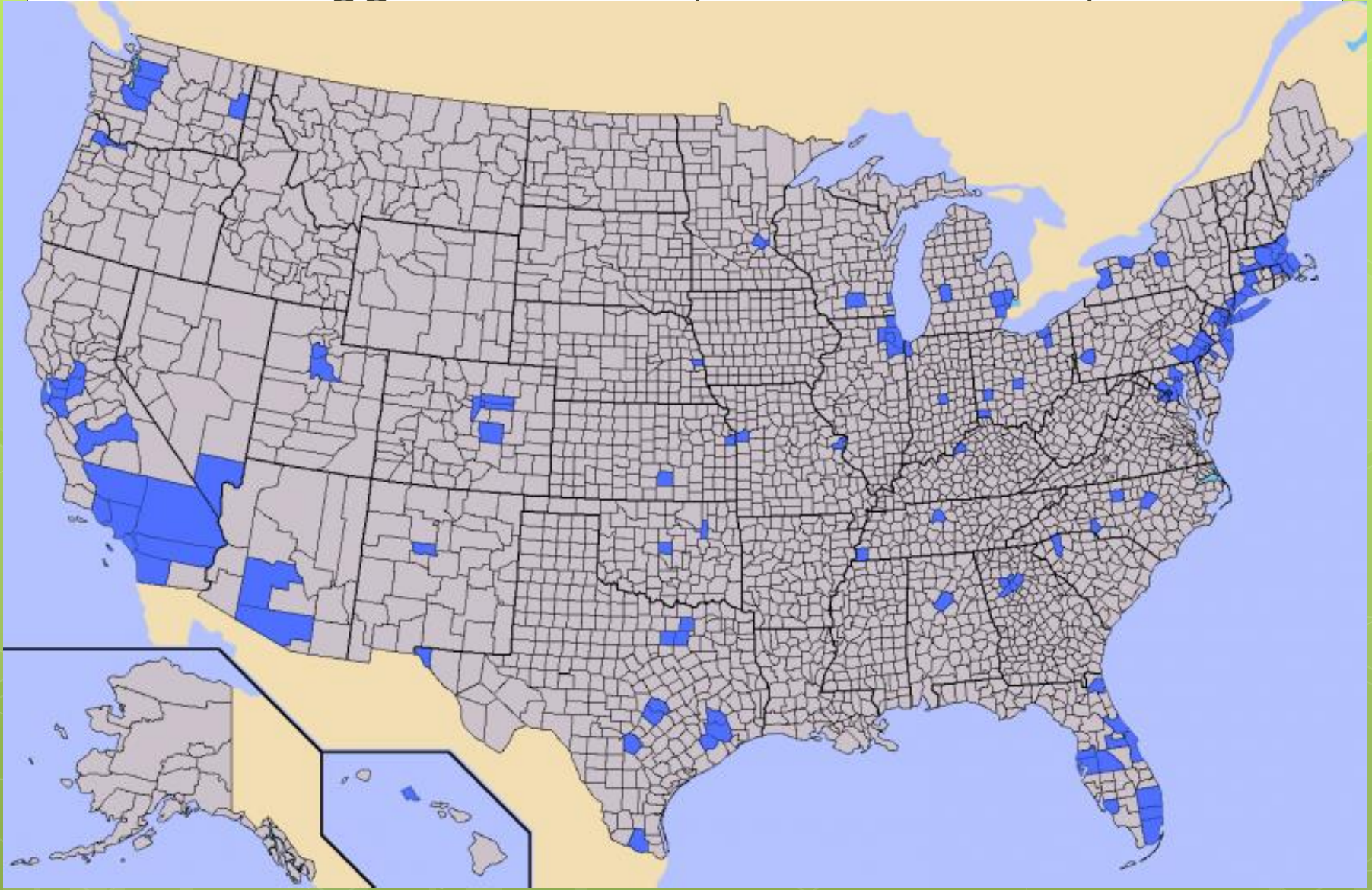
Which country do you believe has a higher population density, China or India? Why?







- ½ of U.S. population is clustered in just the 146 biggest counties (out of over 3000)



- LA County #1
- San Diego County #5
- Orange County #6
- Riverside County #11
- San Bernardino County #12

Source: <http://www.businessinsider.com/half-of-the-united-states-lives-in-these-counties-2013-9>



Key Issue 2
Why is Global
Population
Increasing?

Why Is Global Population Increasing?

- Components of Population Growth

- Geographers measure population change in a country or the world as a whole by using three measures:

- **Crude Birth Rate (CBR)** – total number of live birth in a year for every 1,000 people alive in society.

- **Crude Death Rate (CDR)** – total number of deaths in a year for every 1,000 people alive in society.

- **Natural Increase Rate (NIR)** – *percentage* by which a population grows in a year.

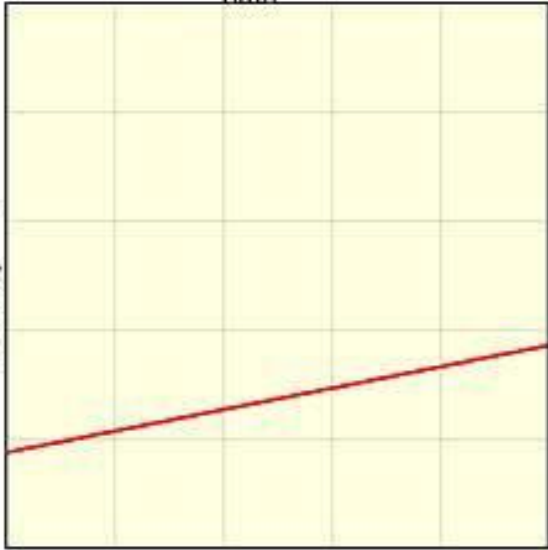
- Computation: $CBR - CDR = NIR$

- Remember NIR is a percentage (*n* per 100, while CBR and CDR are expressed as *n* per 1,000)

A. LINEAR GROWTH

Time →

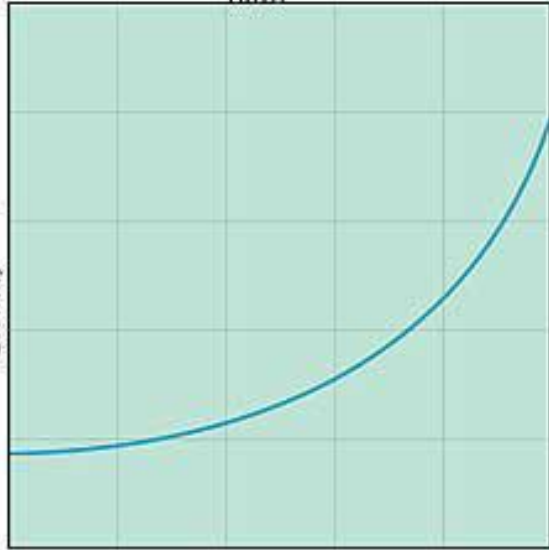
Quantity ↑



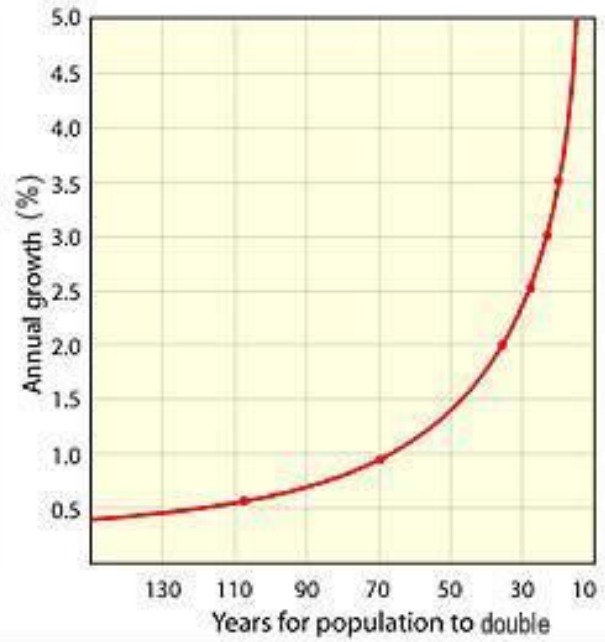
B. EXPONENTIAL GROWTH

Time →

Quantity ↑



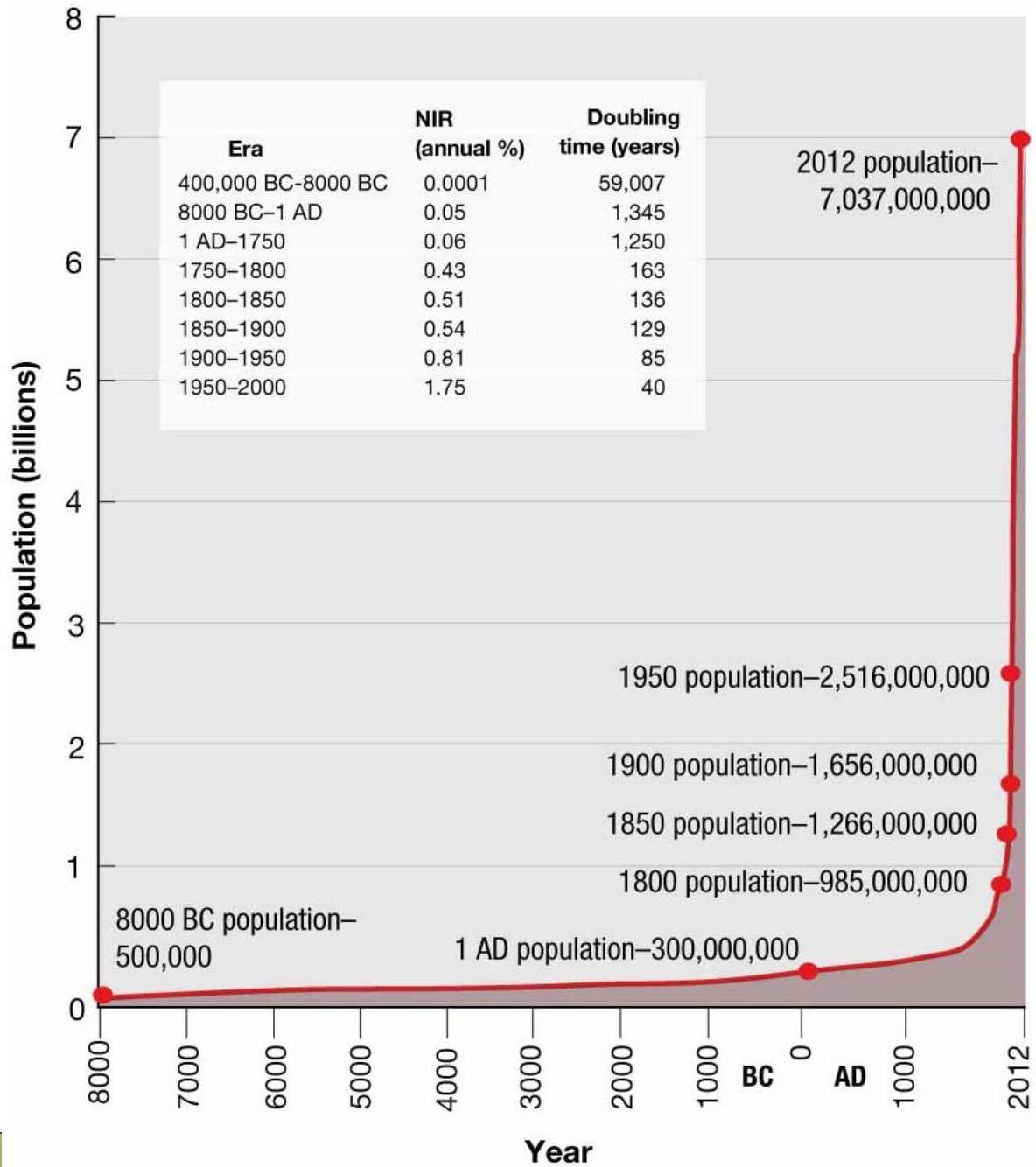
C. DOUBLING TIME



Doubling Time = 70 / Rate of Increase

Rate of Increase (%)	Doubling Time (yrs.)	Example (1998)
0.50	140	Ireland
0.60	120	United States
1.00	70	China
2.00	35	Costa Rica
3.50	20	Yemen

2000 yrs. ago – 250 million: doubling time 16 centuries (1650)
1650 – 500 million: doubling time 170 yrs. (1820) ...
2000 – doubling time reduced to 35 yrs. (>6 billion currently)

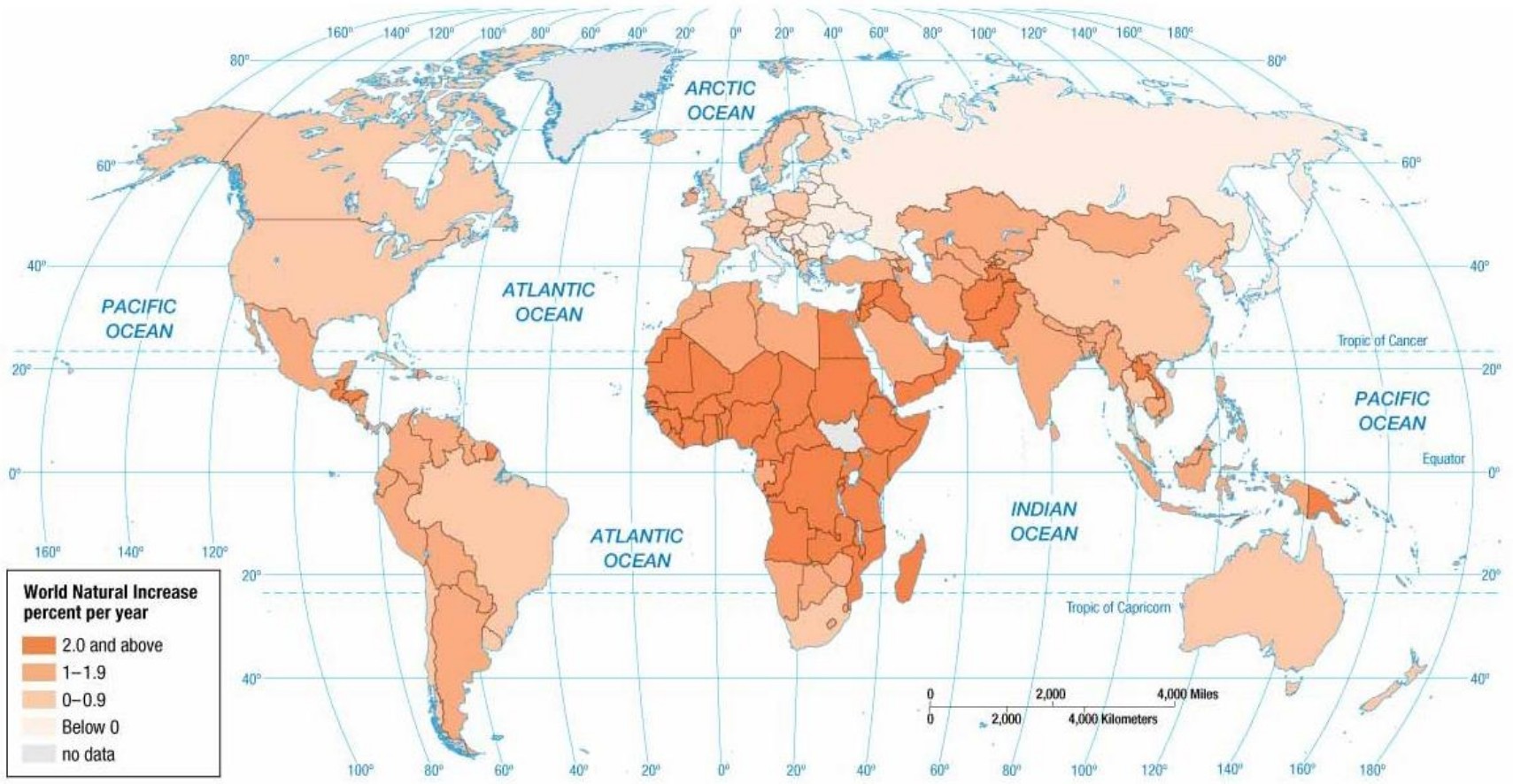
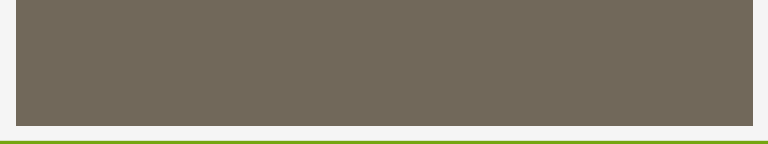


Why Is Global Population Increasing?

○ Components of Population Growth

○ Natural Increase

- About 82 million people are added to the population of the world annually.
- Rate of natural increase affects the *doubling time*— number of years needed to double the population, assuming a constant rate of natural increase.
- Twenty-First Century Rate (1.2 percent): 54 years
 - Global population in 2100 would reach 24 billion.
- 1963 (2.2): 35 years
 - Global population in 2010 would have been 10 billion instead of nearly 7 billion.
- More than 95 percent of the natural increase is clustered in developing countries.

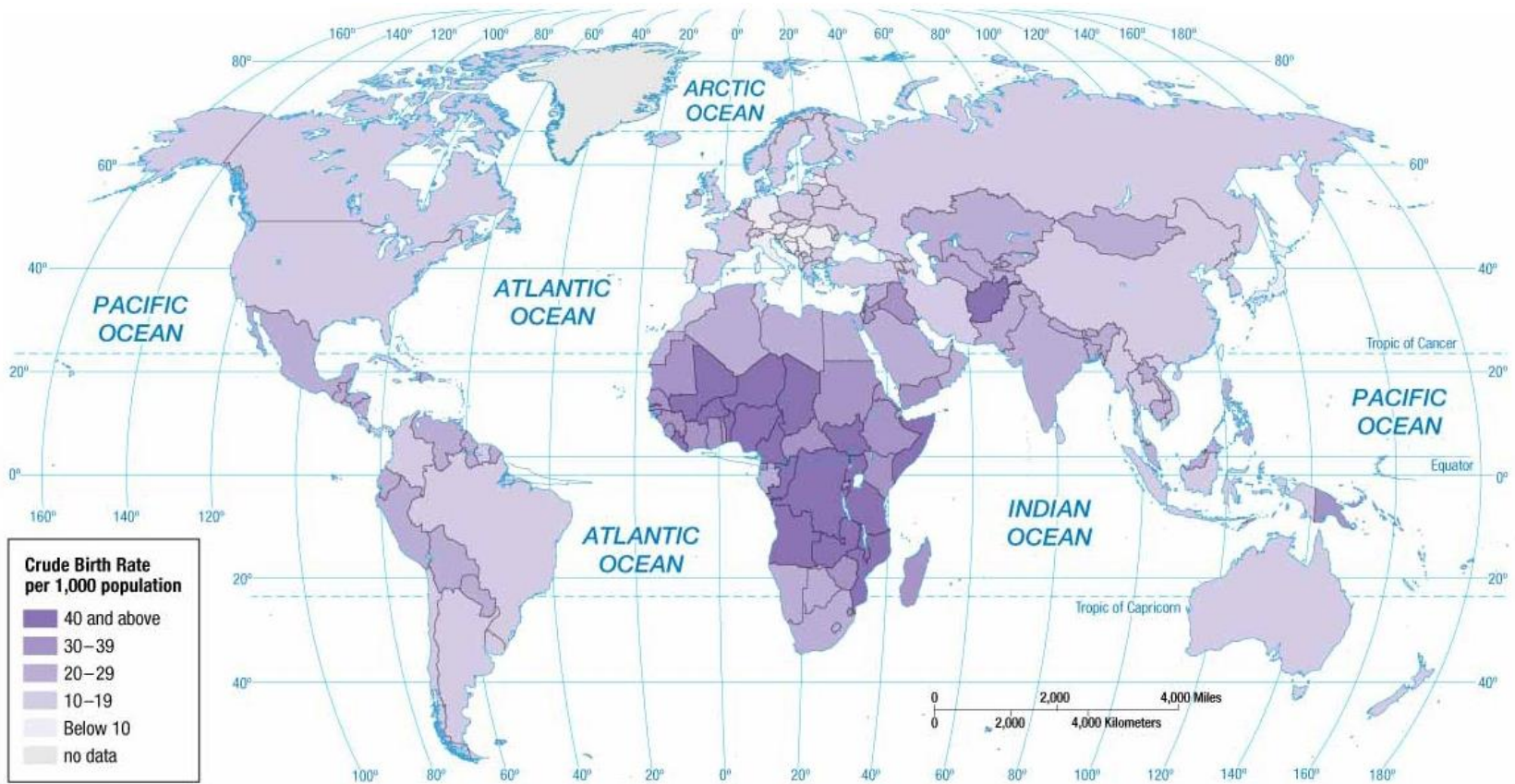


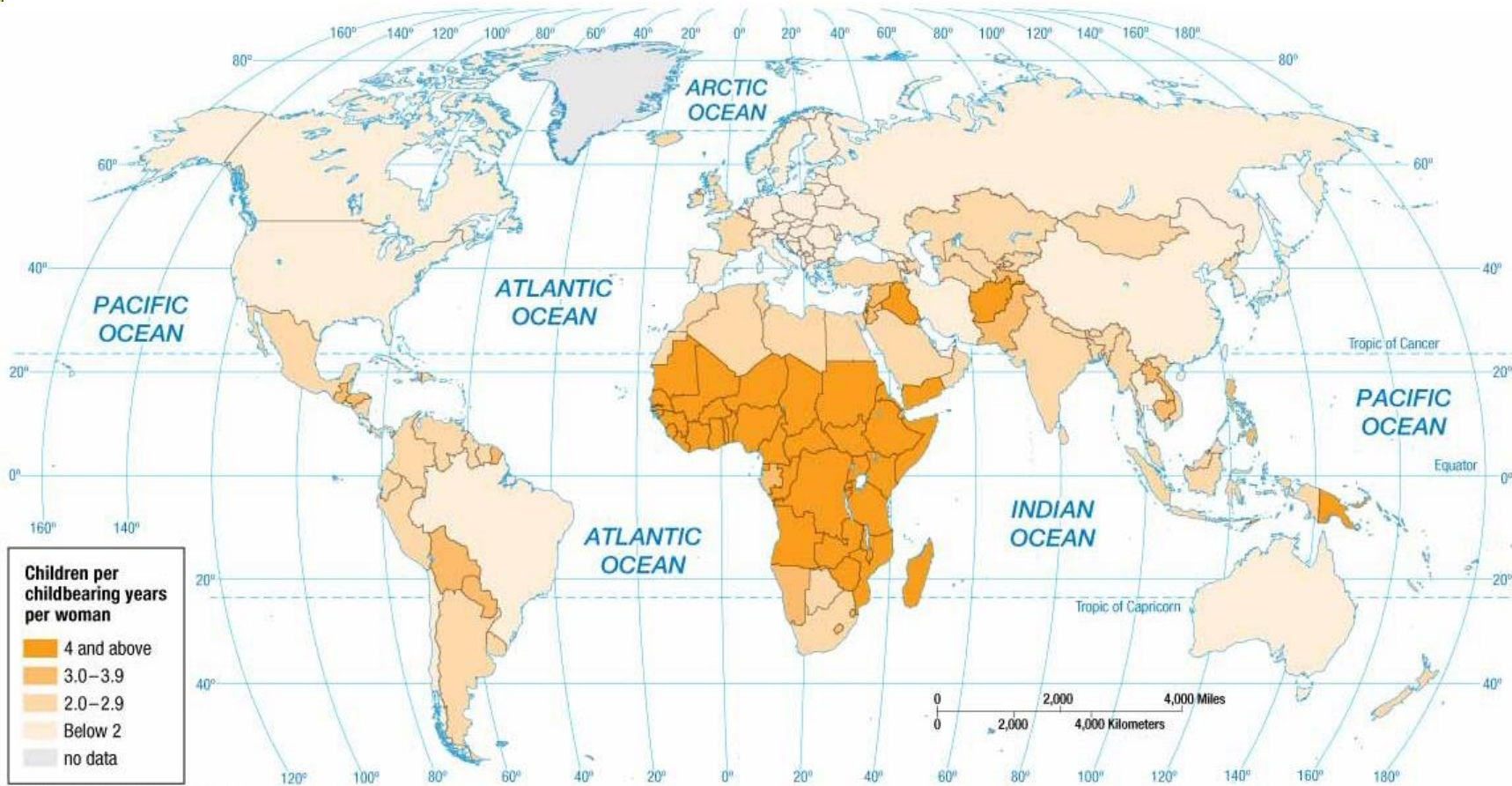
Why Is Global Population Increasing?

- Components of Population Growth
 - Fertility
 - *Total Fertility Rate (TFR)*
 - Measure also used by geographers to measure number of births in a society.
 - Defined as the average number of children a woman will have throughout her childbearing years (15–49)
 - TFR for world is 2.5.
 - TFR exceeds 5 in sub-Saharan Africa, while 2 or less in nearly all European countries.

Why Is Global Population Increasing?

- Components of Population Growth
 - Mortality
 - *Infant Mortality Rate (IMR)*
 - Measure used by geographers to better understand death rates in a society
 - Defined as the annual number of deaths of infants under one year of age, compared with total live births
 - Usually expressed per 1,000 births rather than a percentage
 - IMR is 5 in developed countries and 80 in sub-Saharan Africa.





Why Is Global Population Increasing?

- Summary of Spatial Patterns

- Developed Countries

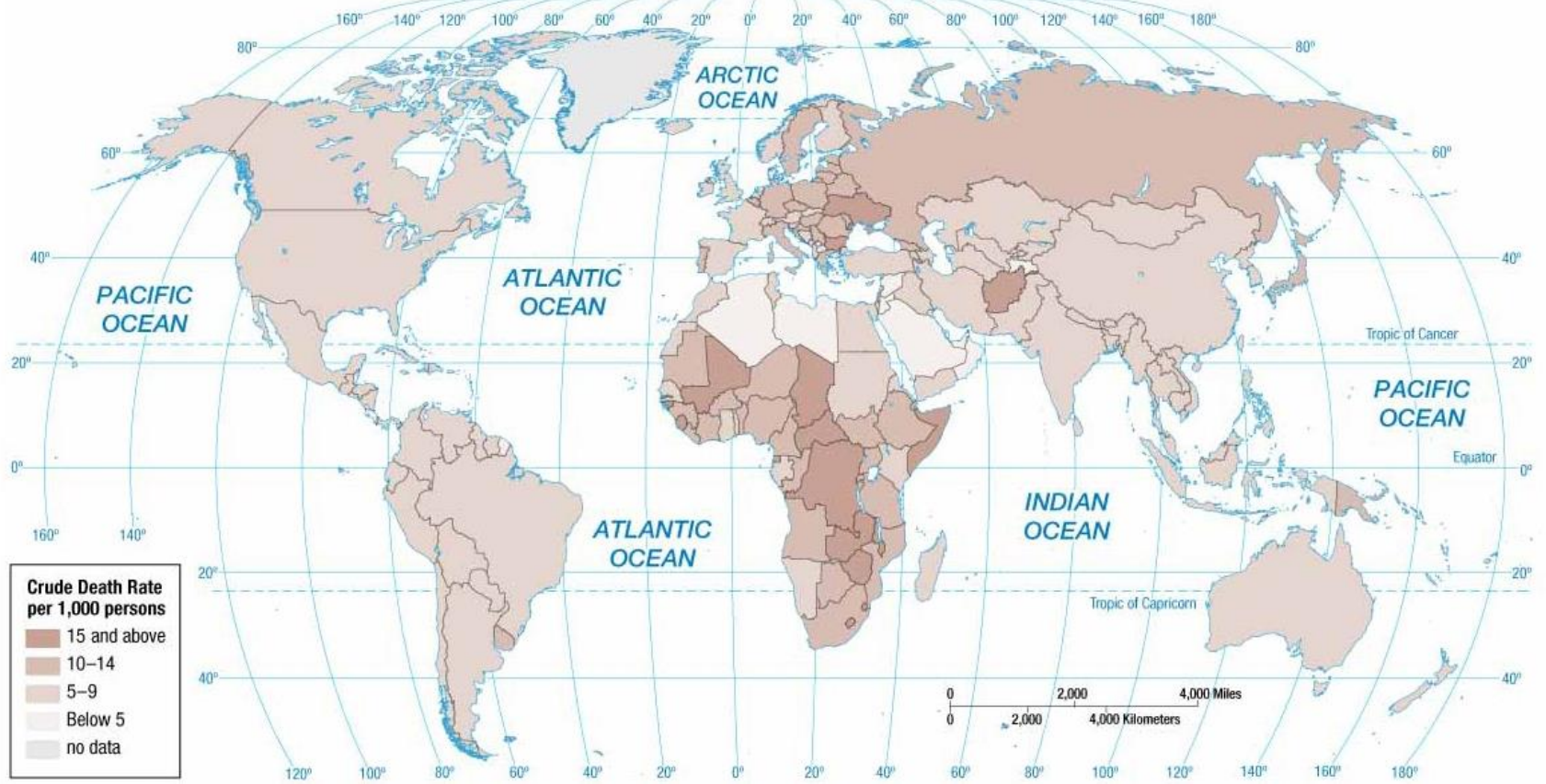
- **Lower** rates of...

- Natural increase
 - Crude birth
 - Total fertility
 - Infant mortality

- Developing Countries

- **Higher** rates of...

- Natural increase
 - Crude birth
 - Total fertility
 - Infant mortality



Populations Perils

Why Understanding
Population is Necessary

Explosion?



Or Implosion?



- From an elderly world, to possible extinction.

Basic Global Demographics

7.1 billion on earth today!

- 255 births per minute
- 15,300 an hour
- 367,200 births a day

Over 134 million births
a year

2014 estimates

- 107 people die
per minute
- 6,420 an hour die
- 154,080 a day die

About 56 million
deaths per year

A net global
population gain of
78 million annually

Are we overpopulated?

What is overpopulation?

Overpopulation is essentially, too many people for the available resources.

Where are we overpopulated?

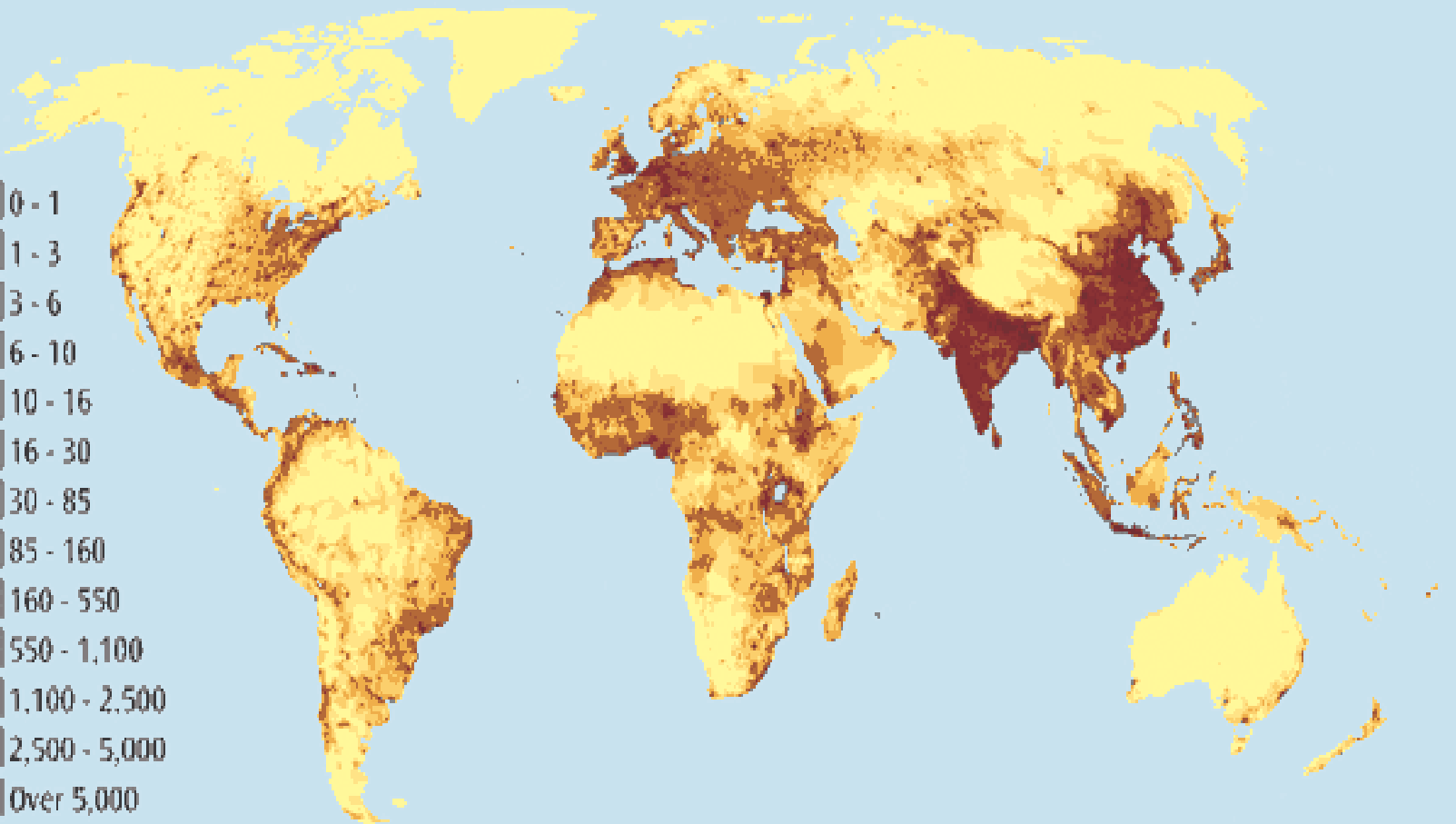
- LDC's have difficulty overcoming the effects of too many people.
- MDC's are guilty of over-consumption of the world's resources.

Carrying Capacity

- *Carrying capacity* is the world's ability to support and sustain life.
“sustainability”
- Is this a global, regional, or local scale question?
 - It's all three
- How long can we sustain?

What carrying capacity issues are at stake?



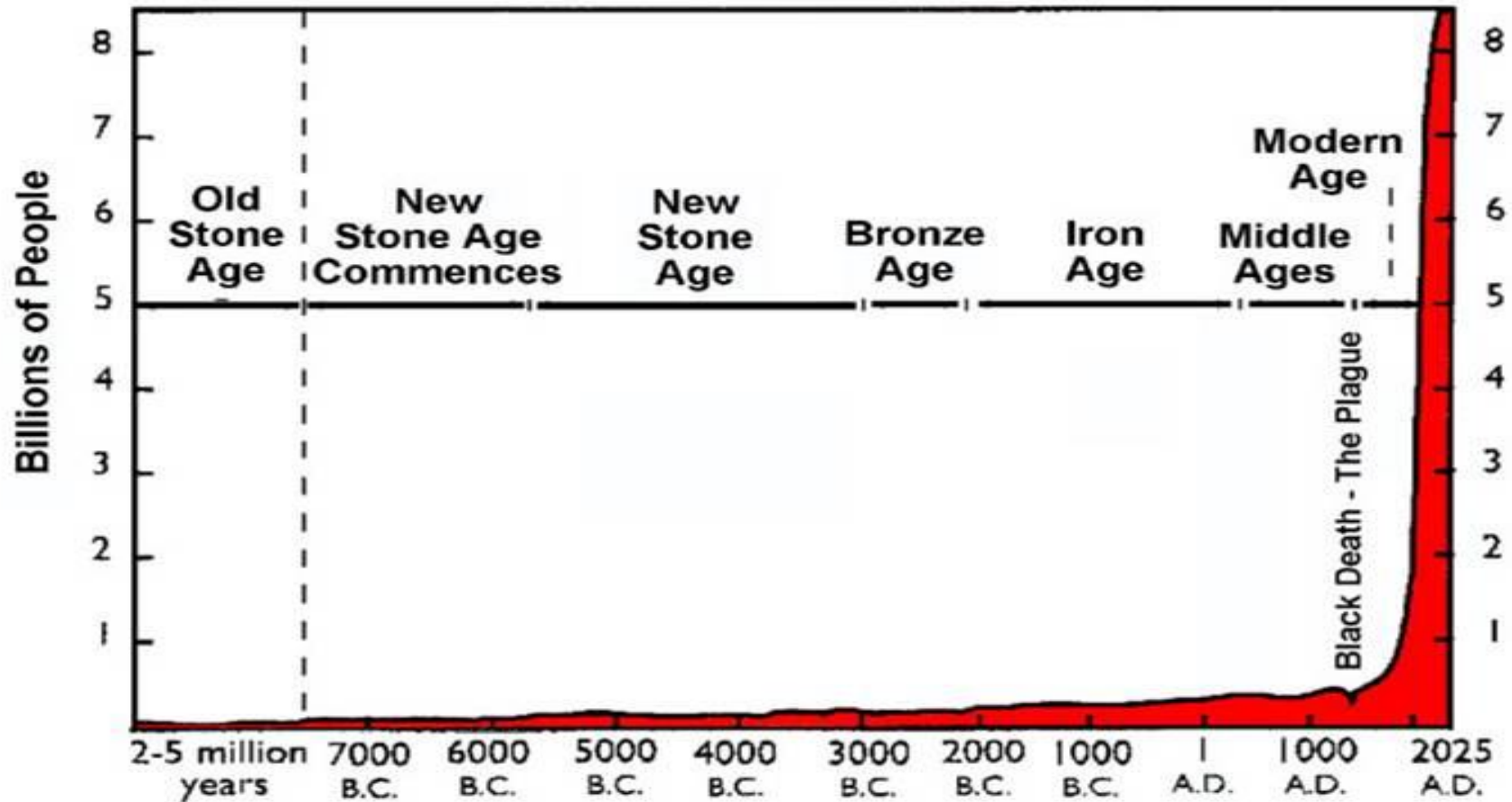


Cartogram – showing uneven



The J curve

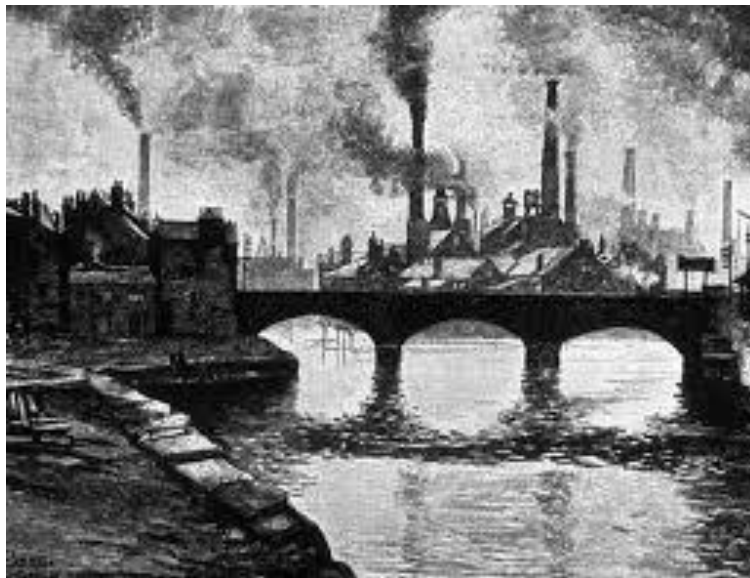
World Population Growth Through History



From "World Population: Toward the Next Century," copyright 1994 by the Population Reference Bureau

Industrial Revolution

- Late 1700's to early 1800's in England.
- Inventions and innovations led to machinery.
- This led to factories being built using iron and coal.
- Textiles (clothes) industry became mechanized.



Industrial Revolution

- This would lead to more people moving to the cities.
- Better healthcare, sanitation, leads to longer life-expectancy.
- People continued to have large families.
 - What's the result?
 - **EXPONENTIAL GROWTH**

Thomas Malthus



- 1766-1834. British Economist & minister
- Wrote 'An essay in the First Principle of population' first published in 1798
- Predicted a population explosion
 - Debatable whether the principles of Malthus two hundred years ago (*that were very revolutionary and controversial*) have any relevance to the modern world.
 - The world population in 1798 was at nine million people. We have now passed the seven billion mark.

The Core Principles of Malthus:

- Food is necessary for human existence
- Human population tends to grow faster than the power in the earth to produce subsistence
- The effects of these two unequal powers must be kept equal
- Since humans tend not to limit their population size voluntarily - “preventive checks” in Malthus’ terminology.

Malthus recognised that population if unchecked, grows at a geometric

Rate:

1 2 4 8 16 32

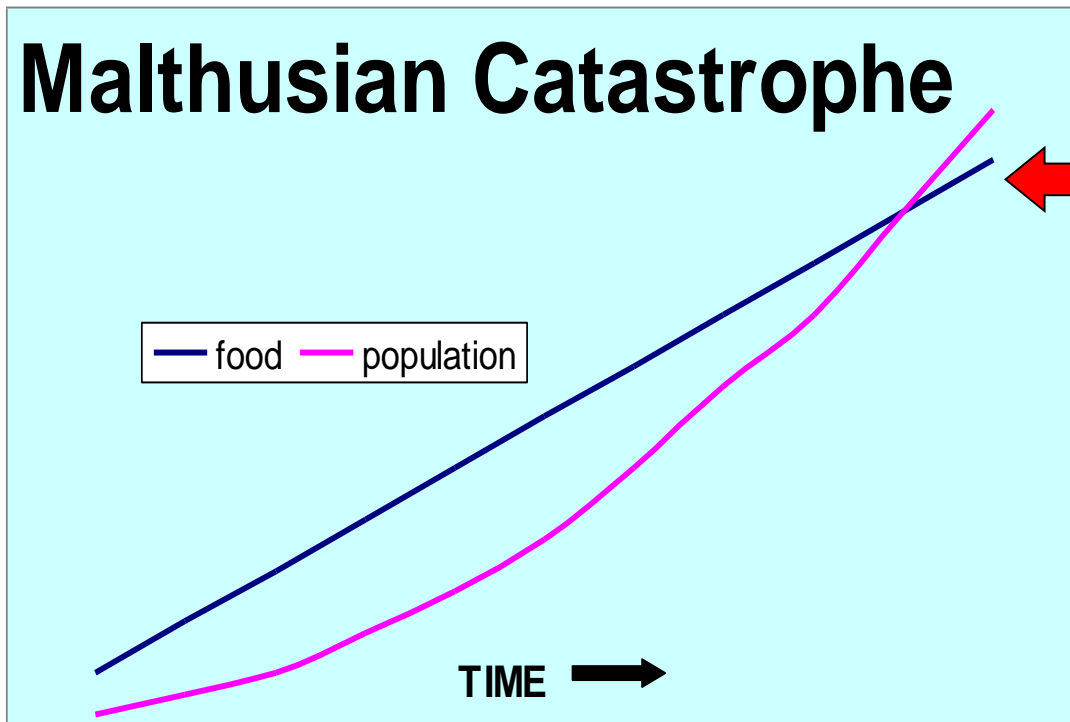
However, food only increases at an arithmetic rate, as land is finite.

1 2 3 4 5 6

Thomas Malthus' Prediction

- Food will continue to increase arithmetically while population will increase exponentially.
- Food $1+1+1+1=4$
- Population $1+1=2 \times 2=4 \times 2=8$

and therefore he said....

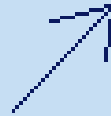


**War,
famine,
disease.**

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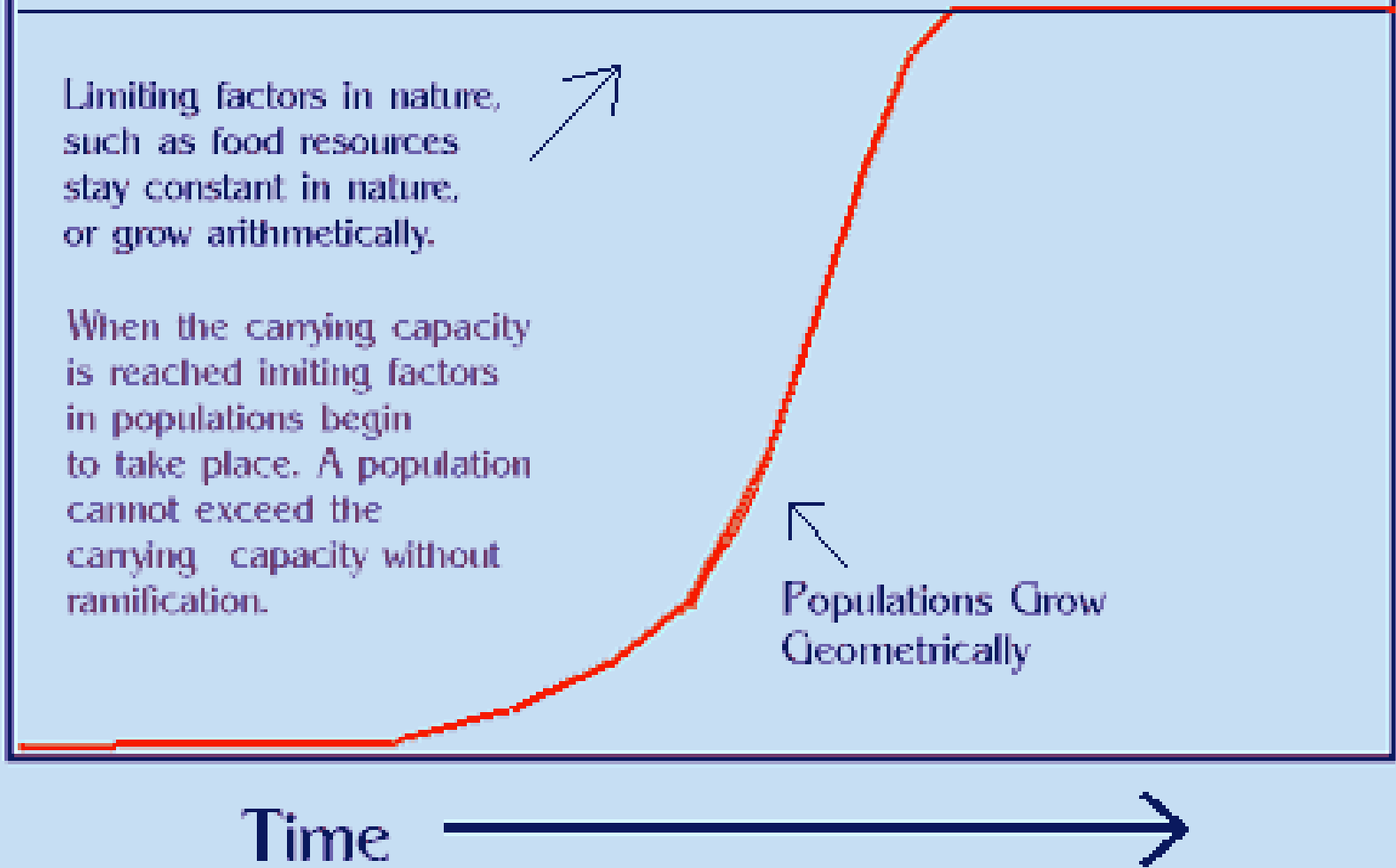
Carrying Capacity

Limiting factors in nature, such as food resources stay constant in nature, or grow arithmetically.



When the carrying capacity is reached limiting factors in populations begin to take place. A population cannot exceed the carrying capacity without ramification.

Populations Grow Geometrically



Malthusian Population Growth

CHECKS

- Malthus suggested that once this ceiling (catastrophe) had been reached, further growth in population would be prevented by negative and positive checks. He saw the checks as a natural method of population control. They can be split up into 3 groups....

Negative checks (decreased birth rate)....

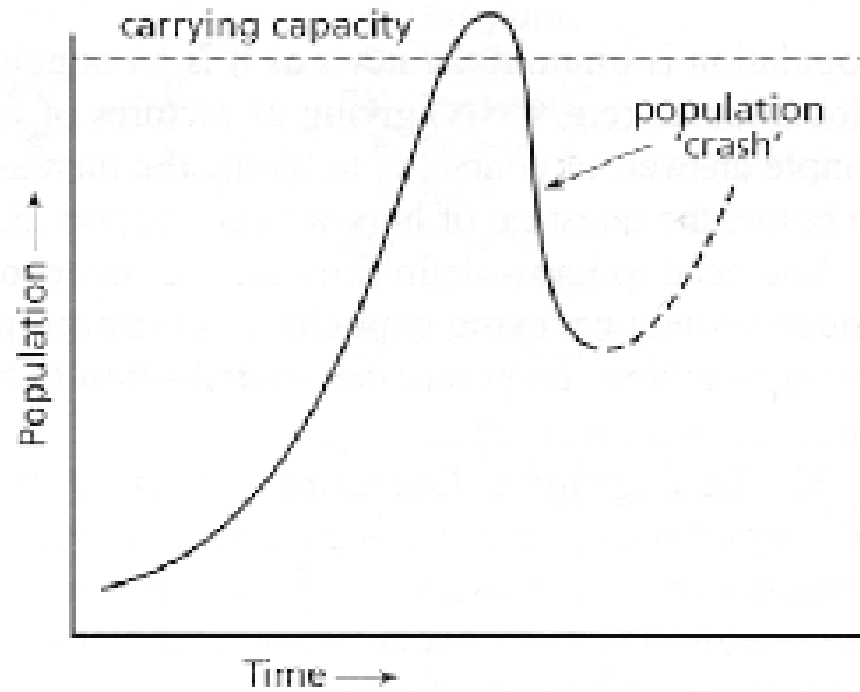
Negative Checks were used to limit the population growth. It included abstinence/ postponement of marriage which lowered the fertility rate.

- Malthus favoured moral restraint (including late marriage and sexual abstinence) as a check on population growth. However, it is worth noting that Malthus proposed this only for the working and poor classes!

Positive checks (increased death rate)

- **Positive Checks** were ways to reduce population size by events such as famine, disease, war - increasing the mortality rate and reducing life expectancy.

'J' Curve - Population Crash Model



Was Malthus right?

- There has been a population explosion
- Africa – repeated famines, wars, food crisis, environmental degradation, soil erosion, crop failure and disastrous floods – so was he right?

But.....

- Technological improvements which he could not have foreseen
- The increased amount of cropland due to irrigation
- Reduced population growth as countries move through the DTM

Esther Boserup 1965

- Boserup identified the theory that, as population increases, people and cultures are compelled to develop and expand their agricultural intensification in order to feed the increasing population.
- Boserup believed that people have the resources of knowledge and technology to increase food supplies.
- Opposite to Malthus – she suggested that population growth has enabled agricultural development to occur
- Assumes people knew of the techniques required by more intensive systems and used them when the population grew.

i.e.....

- Demographic pressure (population density) promotes innovation and higher productivity in use of land (irrigation, weeding, crop intensification, better seeds) and labour (tools, better techniques).

But....

- Boserup admits overpopulation can lead to unsuitable farming practices which may degrade the land
- e.g. population pressure as one of the reasons for desertification in the Sahal region (so fragile environments at risk)
- Boserup's theory based on assumption of 'closed' society -not the case in reality (migration)

IMPLOSION – deaths exceeding births!

- Will modernization spell the doom of some societies?
- Many of the world's countries are seeing below replacement levels (2.1 children per female) of population.

Who is faced with implosive demographics today?

Russia -0.6% NIR

- 142 mill. 2006 to 130 mill. In 2025

Germany -0.2% NIR

- 82.4 mill. 2006 to 82 mill. In 2025

Italy 0.0% NIR

- 59 mill. 2006 to 58.7 mill. In 2025

Japan -0.1% NIR

- 127.8 mill. 2006 to 121.1 mill. In 2025

What are the risks of implosion?

- The “graying” of the population.
- A shrinking taxpayer base. Why?
- How does migration and mobility effect the graying problem?

The Future??

- Conservative view is that the world's population will see 9.4 billion by the year 2050.
- We may then see a gradual leveling off.
- 10% of the world will be over 65 years old!