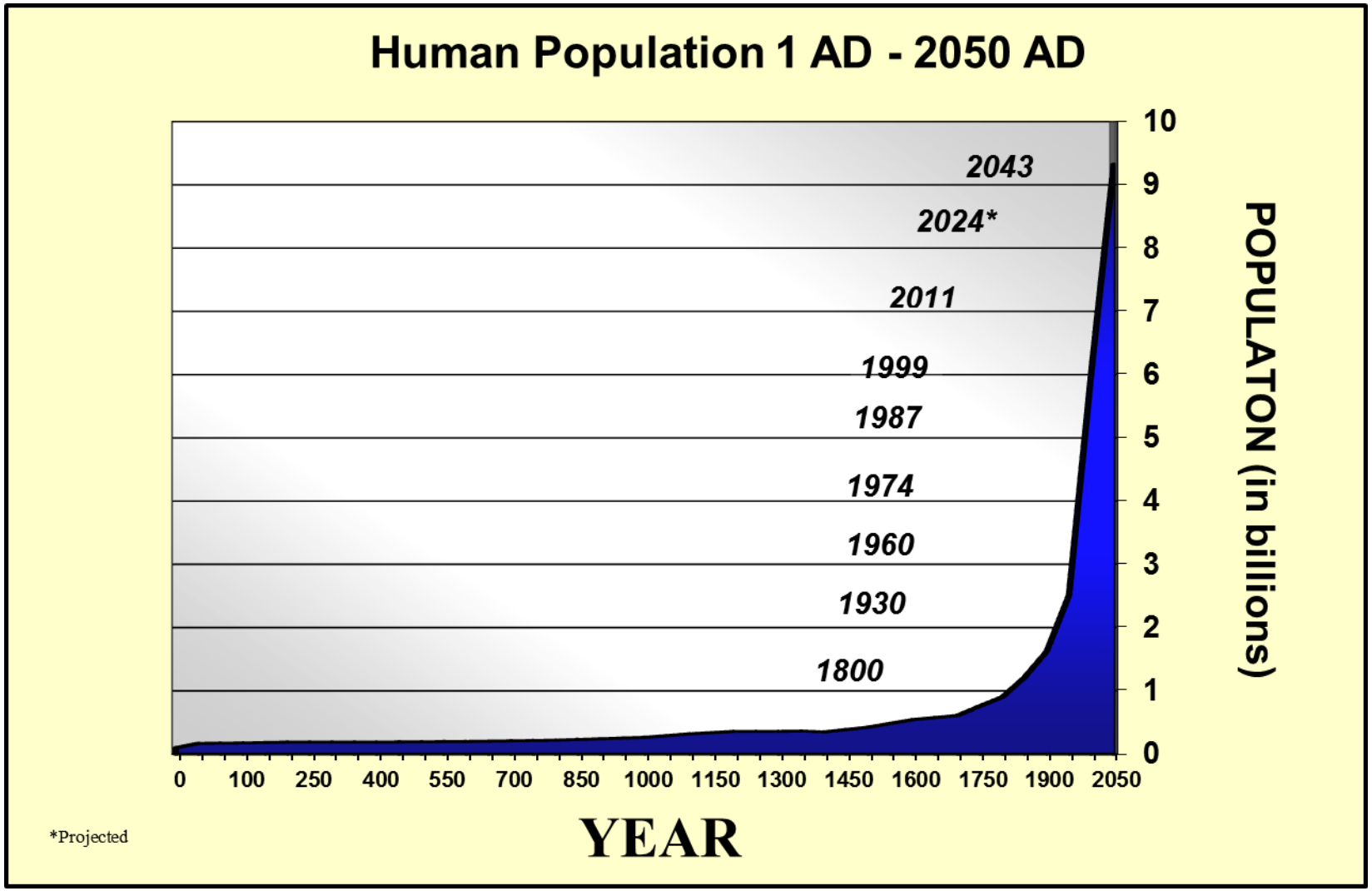
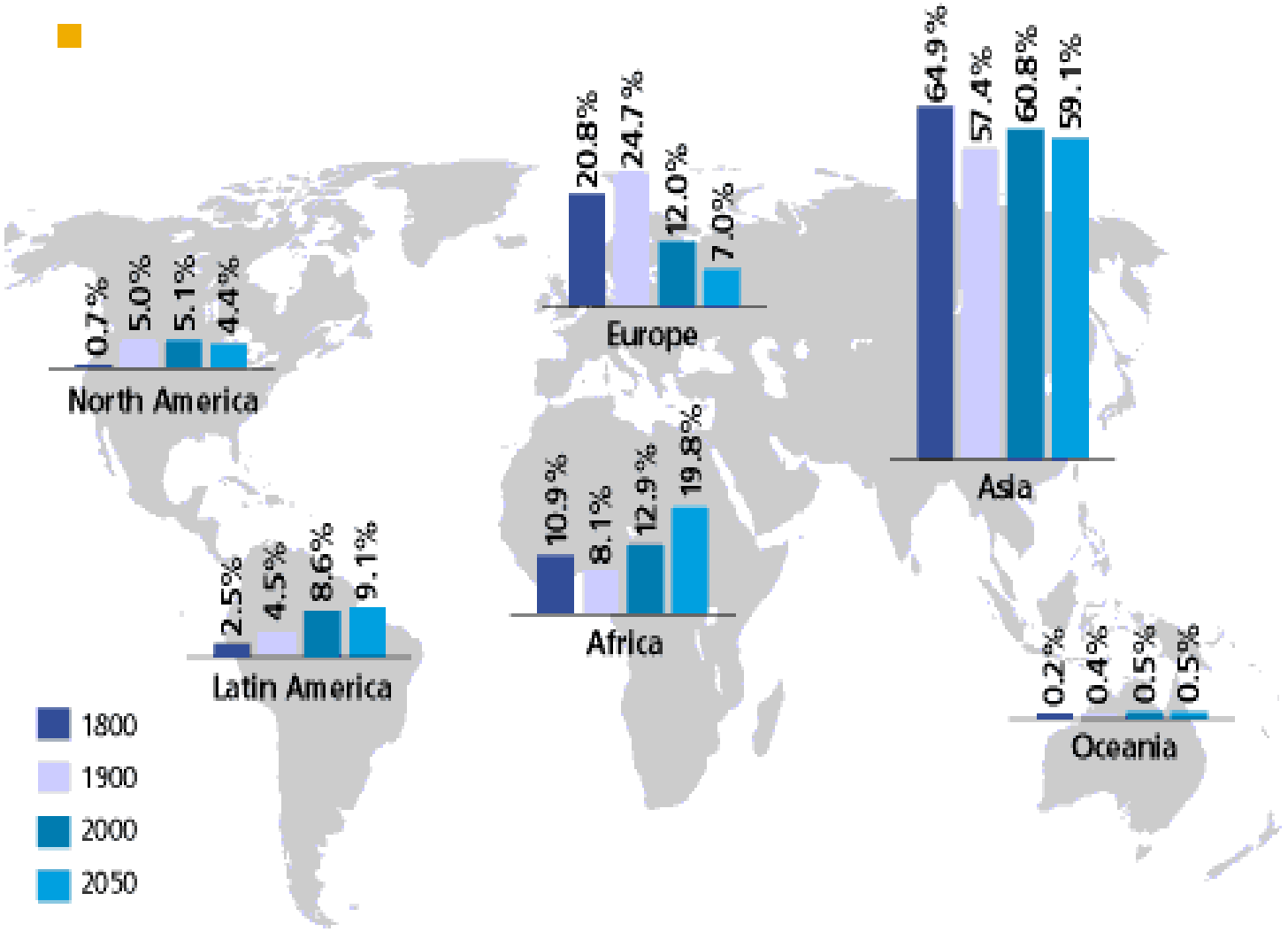
Unit 6: Population Distribution & Growth



Global Population Distribution Over Time



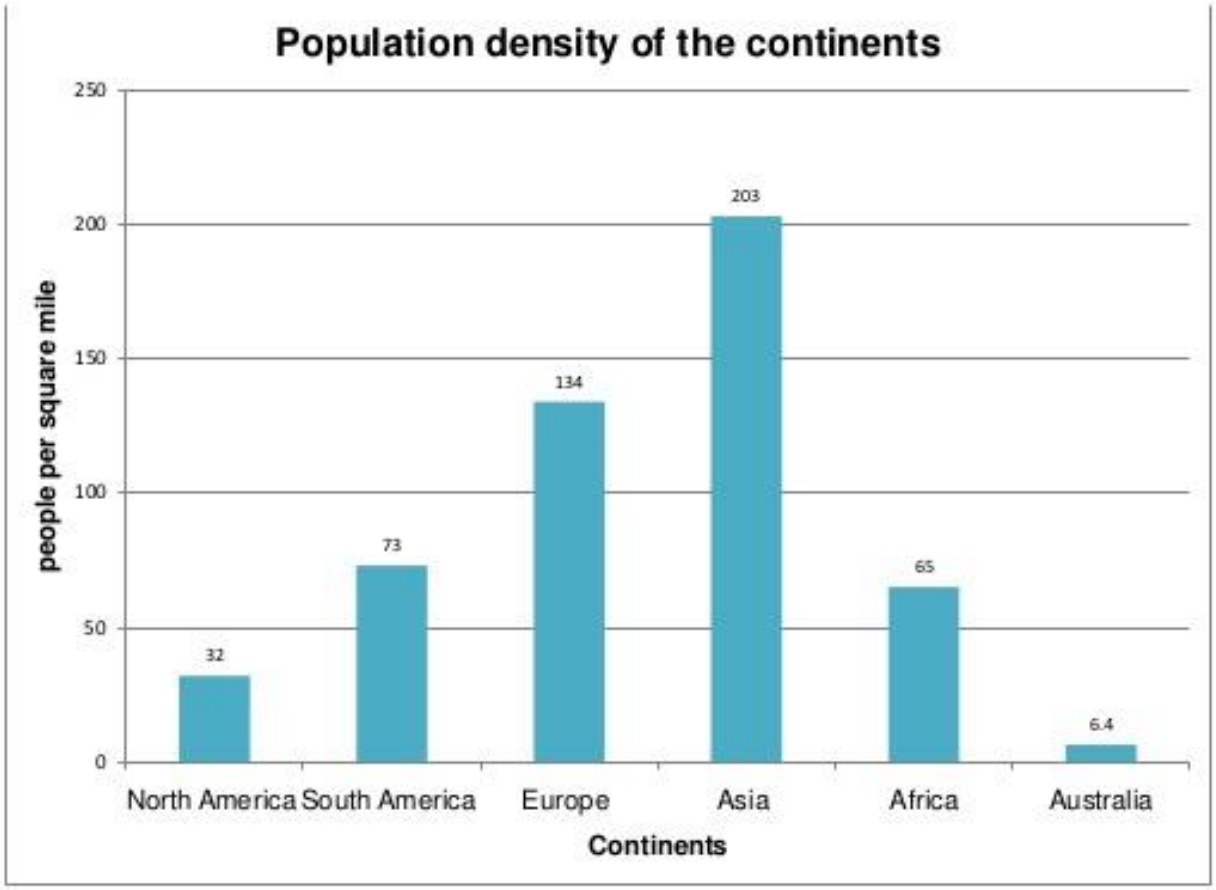
Population Density Terminology

- **Population density** is a measure of how crowded a population is. It looks at land area as well as population.

Expressing Population Density Mathematically

- **Population Density** = population per unit area

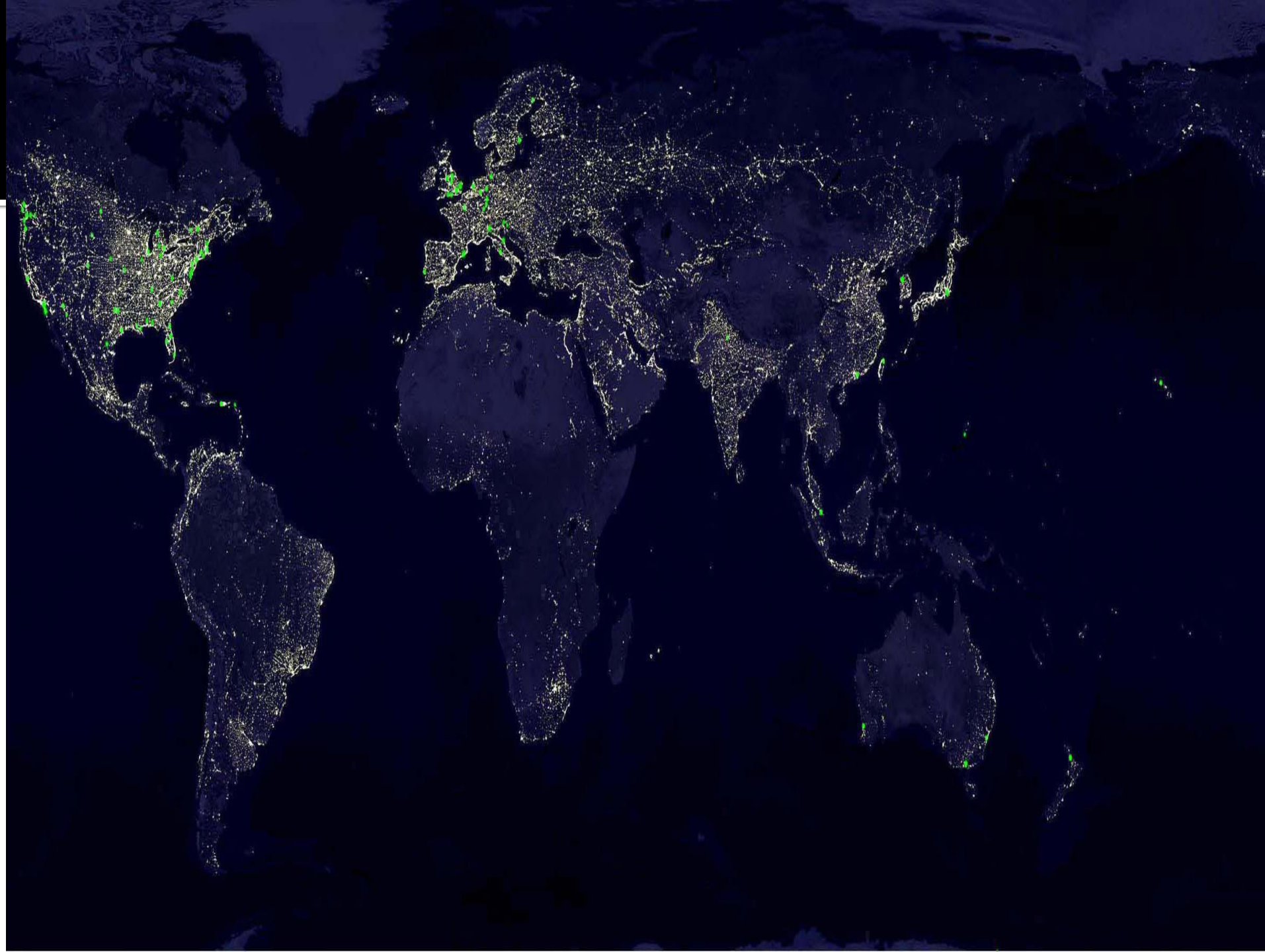
  (unit area is **usually measured in Km^2 or $miles^2$**)
- **Sparsely populated** = small number of people per unit area
  - (**less than 100 people / Km^2**)
- **Densely Populated** = high number of people per unit area
  - (**higher than 100 people / Km^2**)



- List of countries by population density
- http://en.wikipedia.org/wiki/List_of_countries_by_population_density

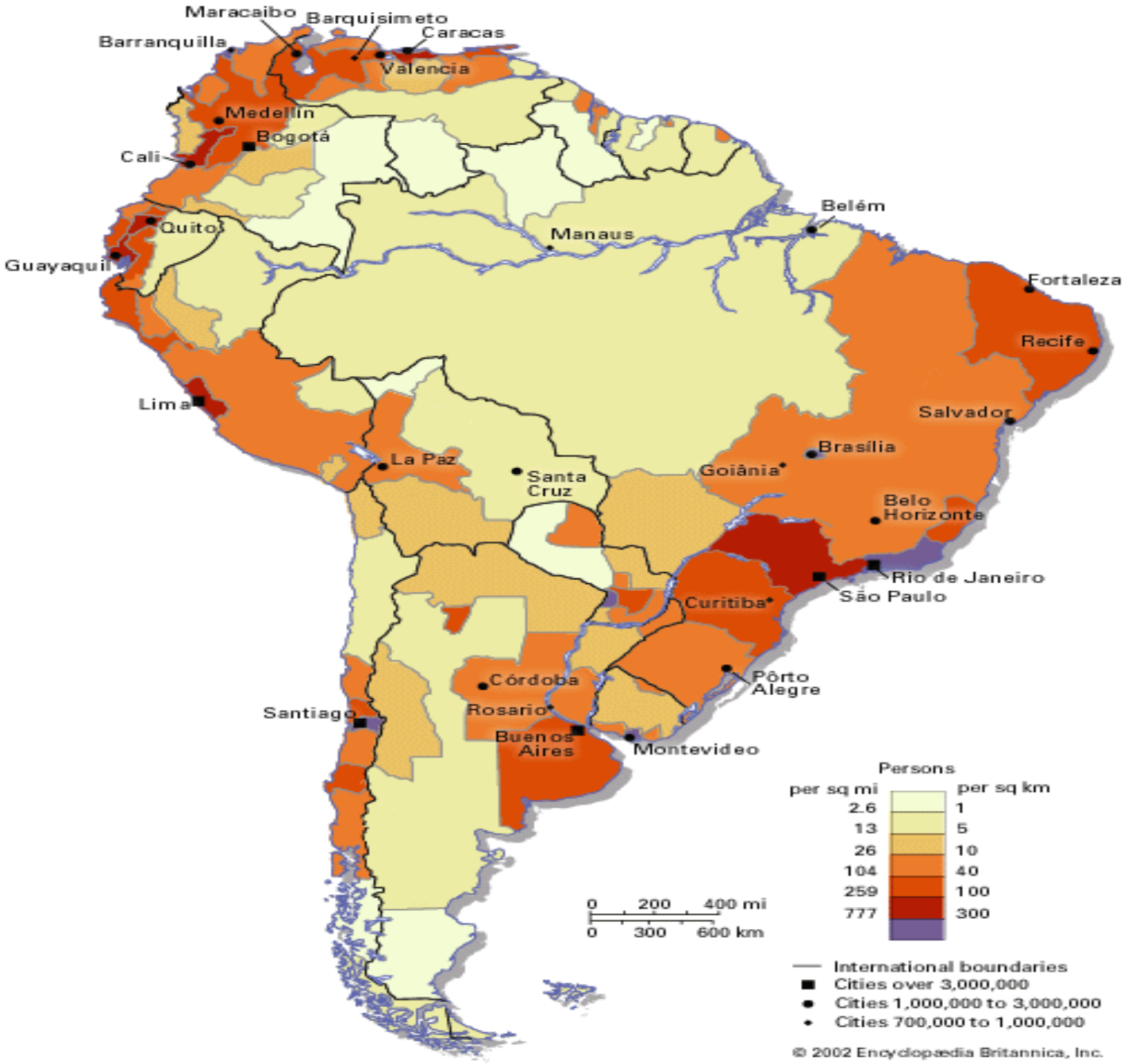
Global Patterns of Population Density

- North America:
  - Sparsely populated in north,
  - Densely populated along Northeastern U.S. and southwestern U.S.



Global Patterns of Population Density

- South America:
  - Sparsely populated in Center,
  - Densely populated along Western Coast but most dense in southeastern Brazil


Maracaibo
Barquisimeto
Caracas
Barranquilla
Valencia
Medellín
Bogotá
Cali
Quito
Guayaquil
Manaus
Belém
Fortaleza
Recife
Lima
Salvador
Brasília
La Paz
Santa Cruz
Goiânia
Belo Horizonte
Rio de Janeiro
São Paulo
Curitiba
Córdoba
Pôrto Alegre
Santiago
Rosario
Buenos Aires
Montevideo
Persons
per sq mi
per sq km
2.6
1
13
5
26
10
104
40
259
100
777
300
0 200 400 mi
0 300 600 km
International boundaries
Cities over 3,000,000
Cities 1,000,000 to 3,000,000
Cities 700,000 to 1,000,000
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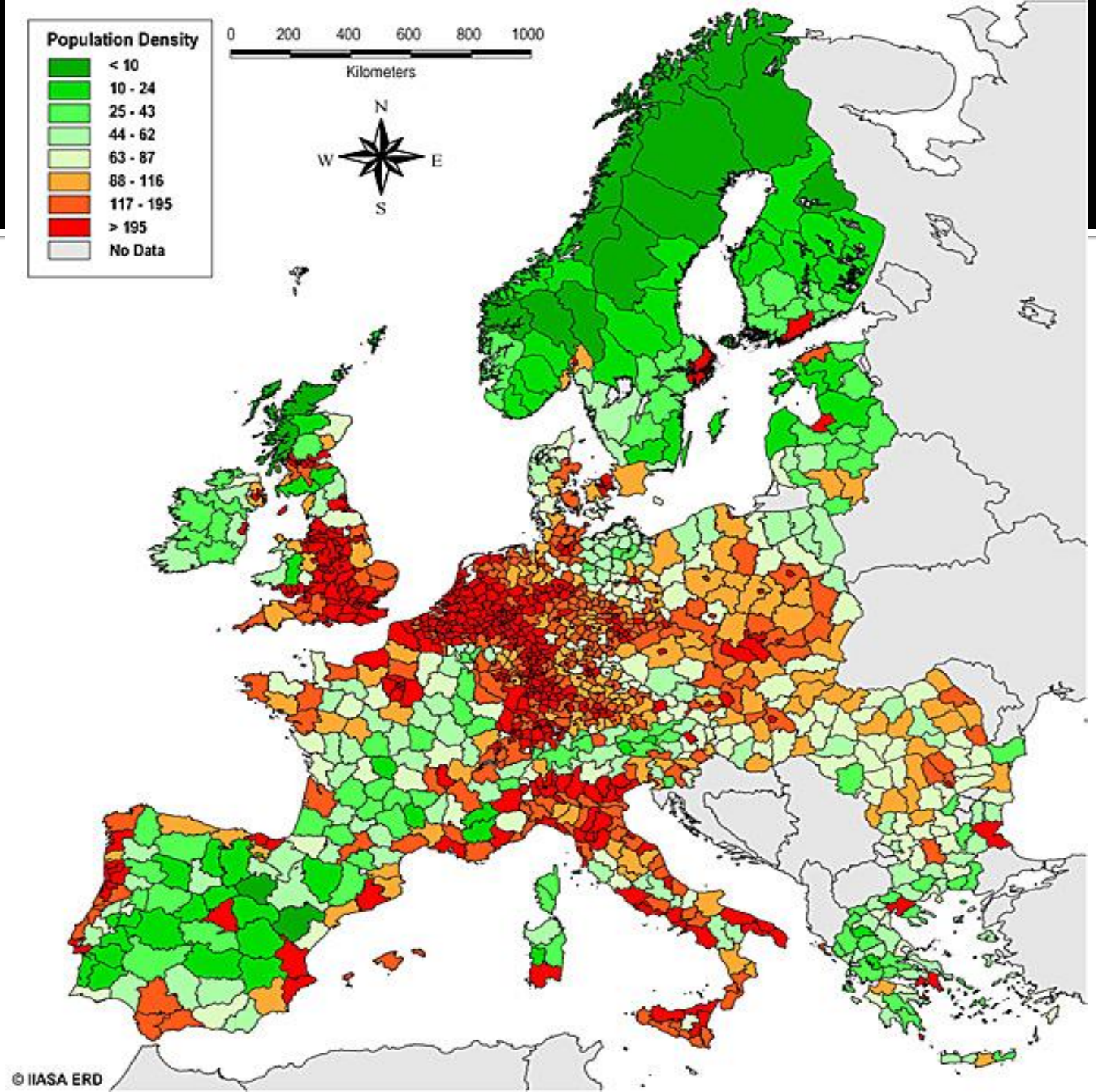
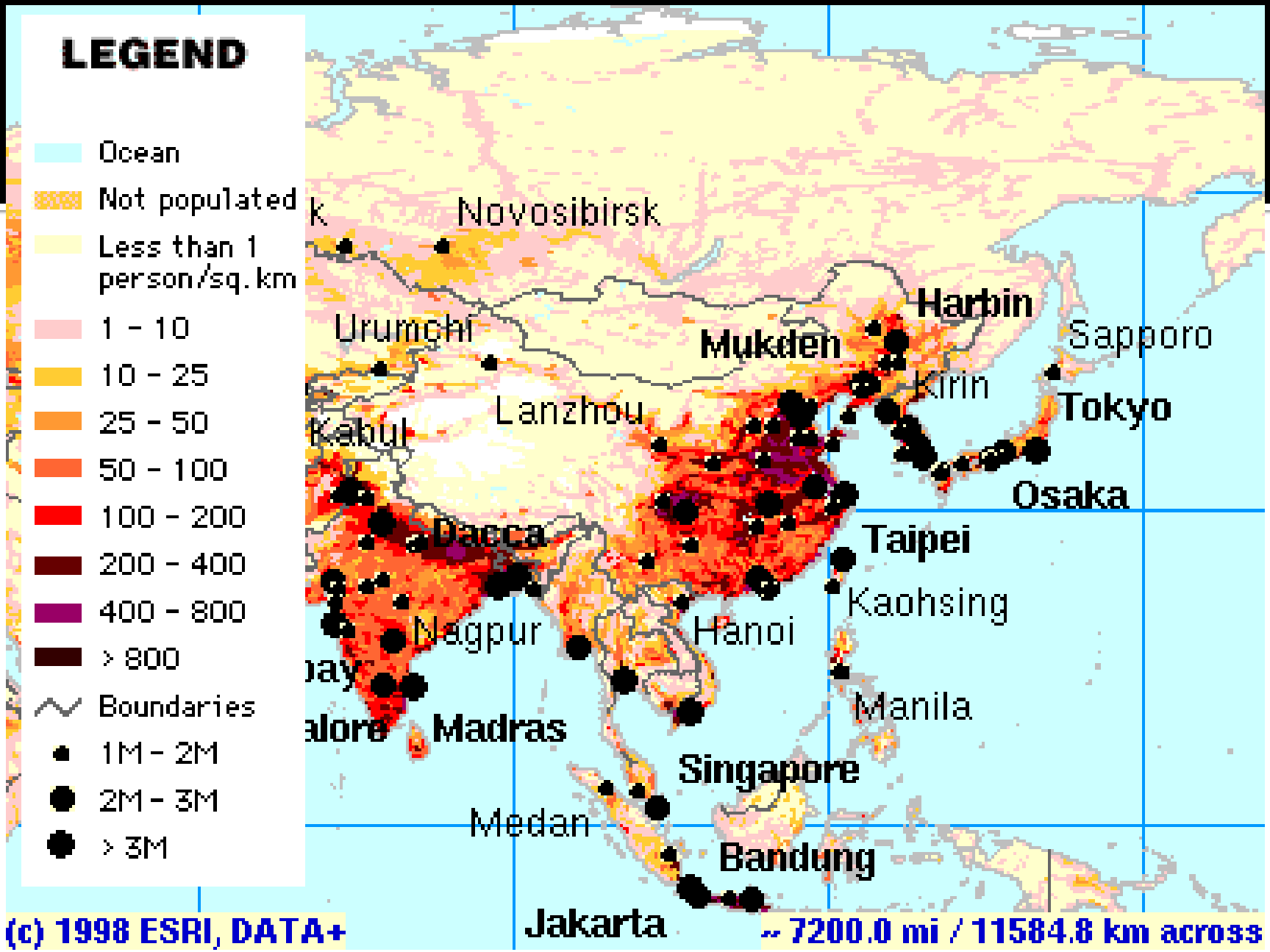
Global Patterns of Population Density

- *Europe:*
  - *Sparsely populated in Extreme North,*
  - *Densely populated throughout remainder*


Population Density
< 10
10 - 24
25 - 43
44 - 62
63 - 87
88 - 116
117 - 195
> 195
No Data
0 200 400 600 800 1000
Kilometers
N
W
E
S
© IIASA ERD

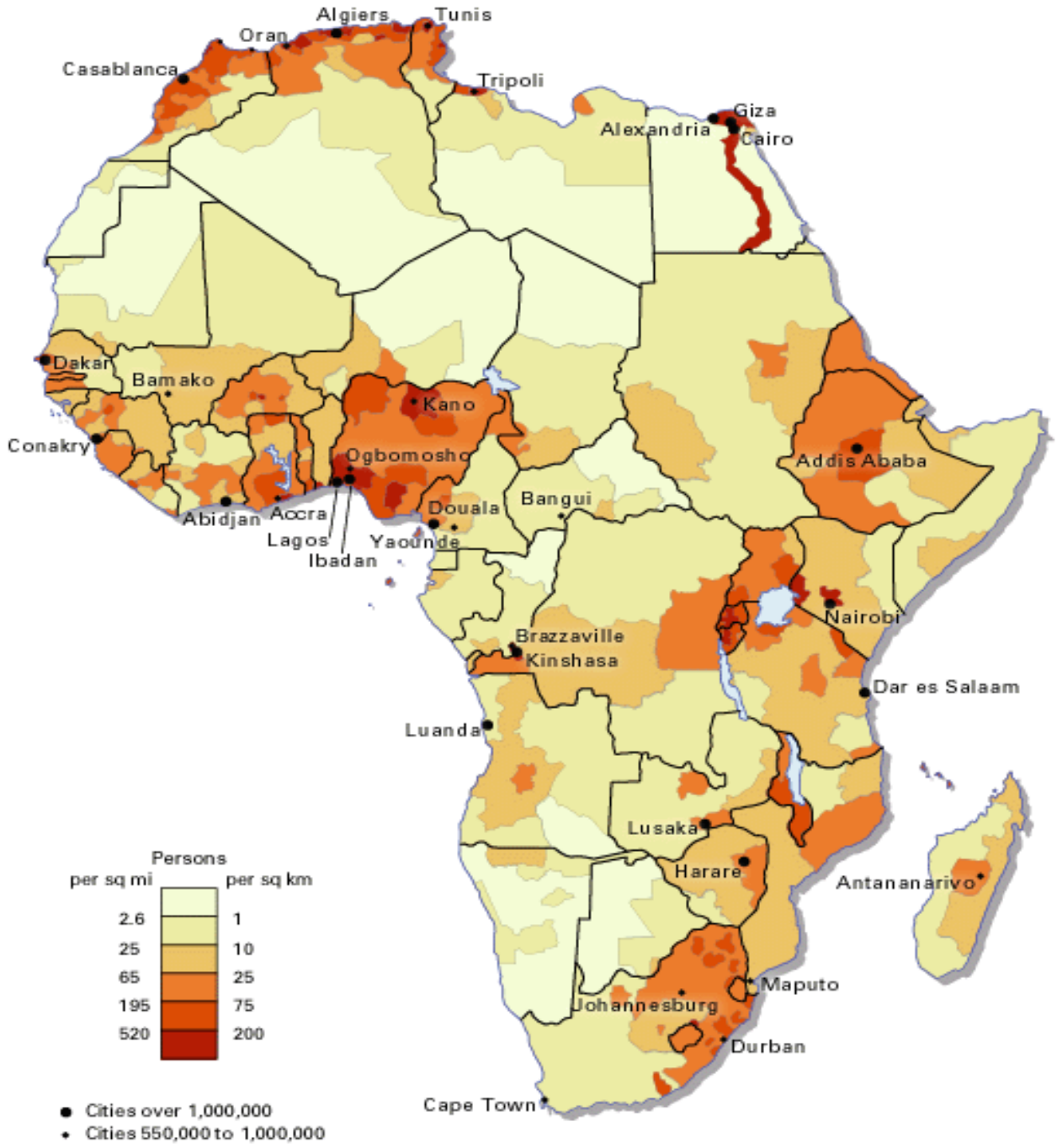
Global Patterns of Population Density

- Asia:
  - Sparsely populated in North & center,
  - Densely populated in South East


LEGEND
Ocean
Not populated
Less than 1 person/sq.km
1 - 10
10 - 25
25 - 50
50 - 100
100 - 200
200 - 400
400 - 800
> 800
Boundaries
1M - 2M
2M - 3M
> 3M
Novosibirsk
Urumchi
Lanzhou
Kabul
Harbin
Mukden
Kirin
Sapporo
Tokyo
Osaka
Taipei
Kaohsing
Manila
Dacca
Nagpur
Hanoi
Madras
Singapore
Medan
Bandung
Jakarta
(c) 1998 ESRI, DATA+
~ 7200.0 mi / 11584.8 km across

Global Patterns of Population Density

- Africa:
  - Sparsely populated in Sahara,
  - Densely populated in North & Sub Sahara


Algiers
Tunis
Oran
Casablanca
Tripoli
Giza
Alexandria
Cairo
Dakar
Bamako
Kano
Conakry
Ogbomosho
Addis Ababa
Bangui
Douala
Abidjan
Accra
Lagos
Yaounde
Ibadan
Nairobi
Brazzaville
Kinshasa
Dar es Salaam
Luanda
Lusaka
Harare
Antananarivo
Maputo
Johannesburg
Durban
Cape Town
Persons
per sq mi
per sq km
2.6
1
25
10
65
25
195
75
520
200
Cities over 1,000,000
Cities 550,000 to 1,000,000
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Factors Affecting Population Density

- There are a range of **human** and **natural** factors that affect population density.
  - Human Factors
    - Political
    - Social
    - Economic
  - Natural Factors (**Physical Factors**)
    - Relief (shape and height of land)
    - Resources
    - Climate

Human Factors

- Political
  - Countries with stable governments tend to have a high population density (e.g. Singapore)
  - Unstable countries tend to have lower population densities as people migrate (e.g. Afghanistan)

Human Factors

- Social
  - Groups of people want to live close to each other for security (e.g. USA…High density)
  - Other groups of people prefer to be isolated (e.g. Scandinavians…Low density)

Human Factors

- Economic
  - Good job opportunities encourage high population densities.
  - Limited job opportunities cause some areas to be sparsely populated (e.g. Amazon Rainforest)

Natural Factors (Physical Factors)

- Climate
  - Warmer, comfortable climates attract people. Areas with temperate climates tend to be densely populated as there is enough rain and heat to grow crops (e.g. UK)
  - Areas with extreme climates of hot and cold tend to be sparsely populated (e.g. the Sahara Desert)

Natural Factors (Physical Factors)

- **Resources**
  - Areas rich in resources (e.g. coal, oil, wood, fishing etc.) tend to densely populated (e.g. Western Europe)
  - Areas with few resources tend to be sparsely populated (e.g. The Sahel region of central Africa)

Natural Factors (Physical Factors)

- **Relief (shape and height of land)**
  - Low land which is flat (e.g. Ganges Valley in India…High density)
  - High land that is mountainous (e.g. Himalayas…Low density)

Transportation

- Coastal regions attracted business and people because of ocean transportation.
- It was true for initial settlement and is still true today.
- Most major cities are located on the coast.

Population Growth Rate

- Generally it is a measure of "how fast is the population growing?"
  - It is measured as the percentage increase in a population over a period of time.
- The calculation used to provide a measure is known as the **Annual Growth Rate (AGR)**
  - The formula is :
- AGR = $\frac{\text{pop. change}}{\text{pop. original}}$ x 100% ÷ years for change

Sample calculation of AGR

- **Example: Mexico**
  - Mexico's population changed from 49 million to 72 million between the years 1971 & 1981
  - AGR = $\frac{\text{pop. change}}{\text{pop. Original}}$ x100% ÷ years for change
  - AGR = $\frac{72 - 49}{49}$ x100% ÷ 10 = 4.7% **(very high)**

Sample calculation of AGR

- **Example: Sweden**
  - Sweden's population changed from 7.9 million to 8.3 million between the years 1971 & 1981
  - AGR = $\frac{\text{pop. change}}{\text{pop. Original}}$ x100% ÷ years for change
  - AGR = $\frac{8.3 - 7.9}{7.9}$ x100% ÷ 10 = 0.5% **(very low)**

How fast is population growing?

- **Fast growing: AGR > 2%**
  - For example Mexico, between 1971 & 1981, had a fast growing population with an AGR of 4.7%
- **Moderately growing:**
  - **AGR approximately = 2%**
- **Slow growing: AGR < 2%**
  - For example Sweden, between 1971 & 1981, had a slow growing population with an AGR of 0.5%

Trends in population growth rates

- **Most countries population growth rates are declining,** especially developed nations.
  - Generally speaking, the more developed the nation the more stable the population.

- This trend towards lower growth rates should not be confused with decreasing populations. The world's population is still growing at a phenomenal rate.
- Note: developed nations have lower AGR
- population clock

Controlling Population Growth

- **Demographic Transitions Model**
  - "Demographic Transition" is a model that describes population change over time.

STAGE ONE is associated with pre Modern times, and is characterized by a balance between birth rates and death rates.

STAGE TWO sees a rise in population caused by a decline in the death rate while the birth rate remains high, or perhaps even rises slightly.

- ***STAGE THREE*** moves the population towards stability through a decline in the birth rate.
  - This would be the case in developing countries and those that have recently become developed nations.

- ***STAGE FOUR*** is characterized by stability.
  - In this stage the population age structure has become older. For example Canada, Sweden and other developed nations would be in this stage of the model.

Economic Conditions That Affect a Country's AGR.

- Better economic conditions affect a number of things that have allowed developed nations to stabilize their populations.

Reasons for population control in developed nations:

1. Education rate of the masses:

- educated people are more aware of birth control
  - Statistics show that increased education is correlated with decreased number of children.

2. Education of females:

- it is assumed that the education of women has resulted in them taking on a greater variety of societal roles in developed nations.
  - Again statistics show that more educated women tend to have fewer children.

3. Employment for females:

- instances of females working outside the home are more common in developed nations. This goes hand in hand with increased education.
  - Statistics show that in developed nations women are having children later in life and are having fewer children as they put family on hold to develop a career.

4. Ability to access birth control:

- While a trip to the corner store for birth control is a simple task in a developed nation, in lesser developed nations the cost is prohibitive.

5. Service sector jobs & the move from agriculture to urbanization:

- People do not need large families to help on the farm if they work in the city where the jobs are predominantly in manufacturing and in the service sector.

6. Health care:

- Prenatal and family planning services are expensive and are predominantly found in more developed nations.
  - **We may not recognize the services we have available to us because we are so accustomed to them.**
  - **However our government collects millions of dollars in taxes that contribute to public health nurses, hospitals, family planning clinics, and family living courses in grade school**.

Population Control

- In developed nations family planning, pension plans, easy access to birth control, education and a changing standard of living have all led to a controlled, stable population.
- However, in lesser developed nations, education, family planning, birth control and pensions are all very difficult to obtain.

What plan would you support to help developing nations control their population?

- Legislation by government could make it illegal to have more than a certain number of babies.
  - Is that humane?
  - How do we ensure the correct number.
  - What is done with children over the limit?

- Some people have proposed that war and famine used to be our natural means of birth control.
  - However if we want to have a manageable plan to control the earth's population surely we cannot let people in famine go unaided or reduce peacekeeping missions. Clearly this is not an option.

- ***Increasing education of the masses is correlated with decreased births.***
  - ***Could we help to provide education in developing nations?***
  - ***Is that humane?***

- ***Pension plans & RRSP's allow us to be secure into our old age and we do not have to worry about having children to take care of us.***
  - ***Is this something we could promote in under-developed nations?***

- ***In some regions of the world the disparity between the education received by females and males is tremendous.***
  - ***We know that education of women is correlated with decreased births. Is the education of women something we could promote?***

- There is little doubt that birth control is the biggest factor limiting populations in developed nations.
  - Could we provide less expensive birth control for developing nations?

- Highly developed economies are associated with decreased birth rates.
  - Should we concentrate on supporting improvements to their economies as an ultimate route to controlling birth rates?

Natural Change

- Natural change in a population considers only births as a means of increasing the population.
  - **Two factors that can increase a population :**
    1. **Births**
    2. **Immigration**

Two factors that can decrease a population

1. Deaths
2. Emigration.

Natural change in a population considers only the deaths as a means of decreasing the population.

Natural Change

- Natural Change = difference in births & deaths
- **Natural Increase** occurs when there are more births than deaths
- **Natural Decrease** occurs when there are more deaths than births

Rate of Natural Change

- **Birth Rate** (BR) is measured as the number of births (in one year) per 1000 people.
  - The formula is $BR = \frac{\text{births}}{\text{population}} \times 1000$

Death Rate (DR) is measured as the number of deaths (in one year) per 1000 people.

- The formula is $DR = \frac{\text{deaths}}{\text{population}} \times 1000$

Rate of Natural Increase (RNI) is a measure of how fast the population is increasing due only to the births and deaths.

- The formula is $RNI = BR - DR$

Population Growth Rate & Standard of Living

- A stable population is characteristic of a high standard of living due to:

1. Low birth rate caused by good family planning, access to birth control, financial planning, education, etc.

2. Low death rate caused by good medical care, nutrition, education etc.

Population Growth Rate & Standard of Living

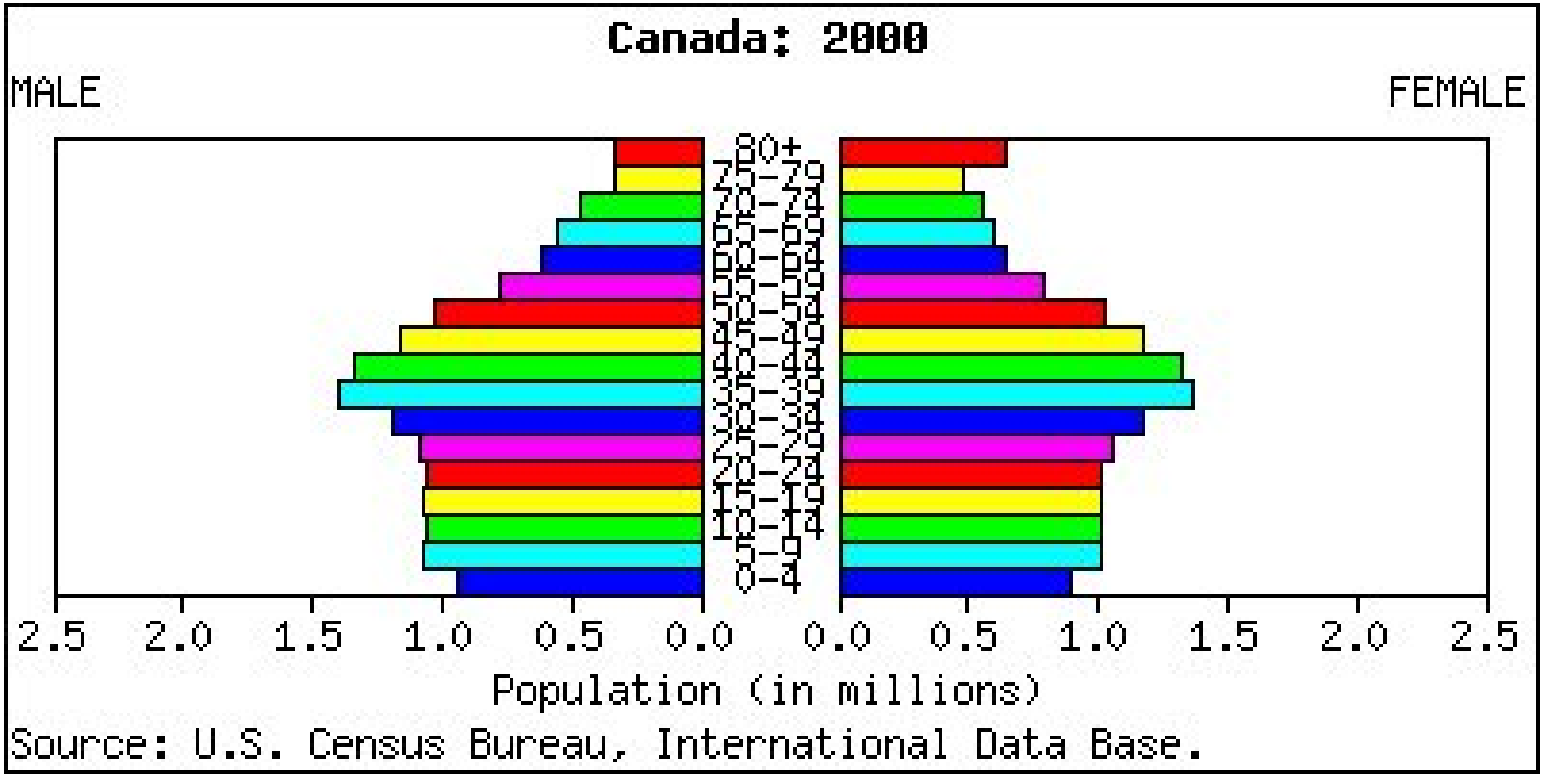
- Expanding population is characteristic of a lower standard of living:

1. high birth rate due to poor access to birth control, lack of education etc.;

2. high death rate due to poor medical care & nutrition

Population Pyramids

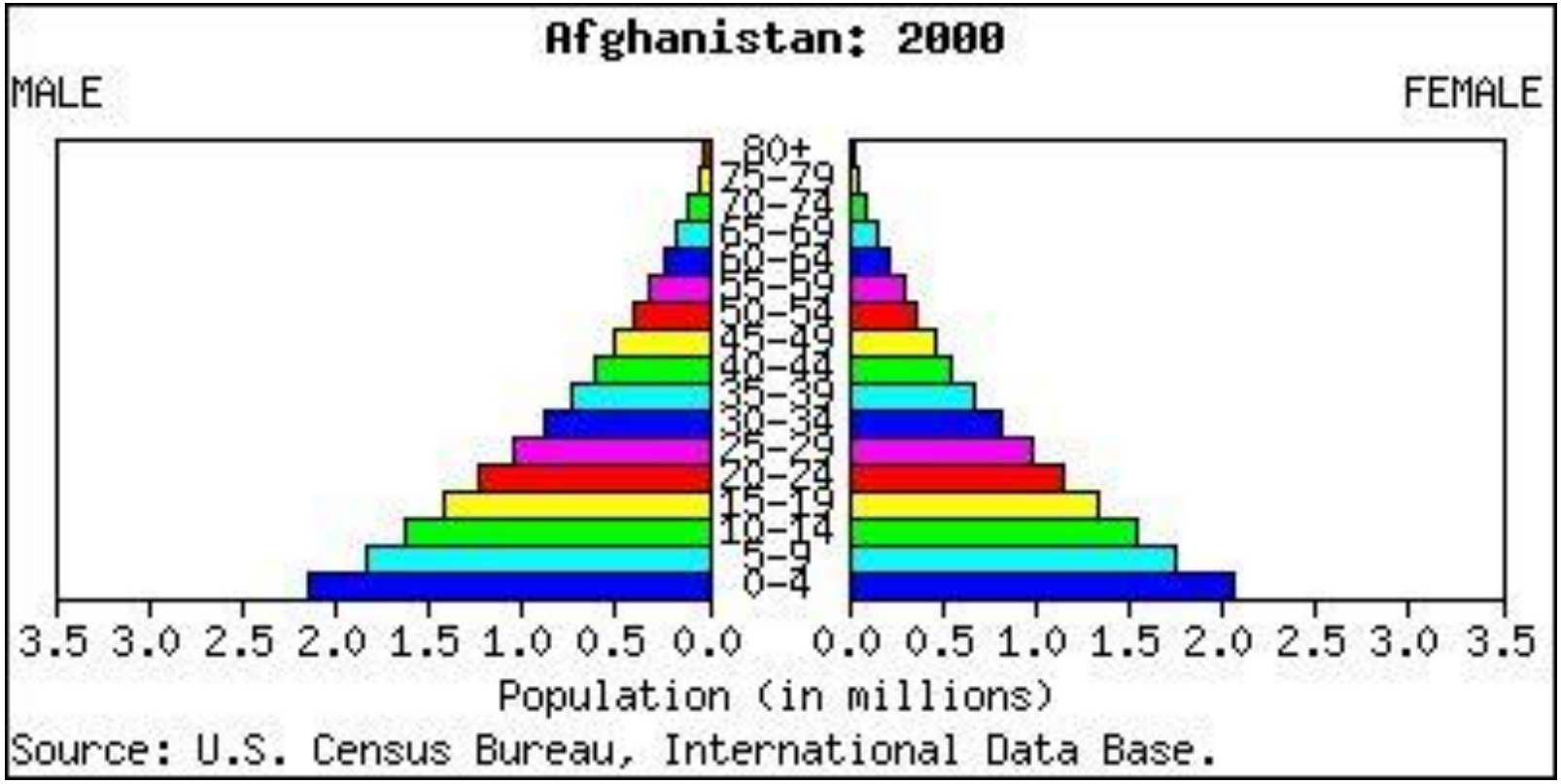
- Population pyramids are graphs that show the age structure of a population by age & gender.
  - Notice the following points about population pyramids:
    - normally Males are on the left and females are on the right;
    - age categories are in 5 year increasing intervals labelled up the center axis;
    - the horizontal axis is measured in millions.


Canada: 2000
MALE
FEMALE
80+
75-79
70-74
65-69
60-64
55-59
50-54
45-49
40-44
35-39
30-34
25-29
20-24
15-19
10-14
5-9
0-4
2.5 2.0 1.5 1.0 0.5 0.0 0.0 0.5 1.0 1.5 2.0 2.5
Population (in millions)
Source: U.S. Census Bureau, International Data Base.

Classifying Population Pyramids

1. **Expansive or expanding** population pyramids have this classic triangular/pyramid shape. The wide base of this population pyramid indicates a high birth rate & the narrow top indicates a high death rate.

Expansive or **expanding** population



- Expanding population is characteristic of a lower standard of living:

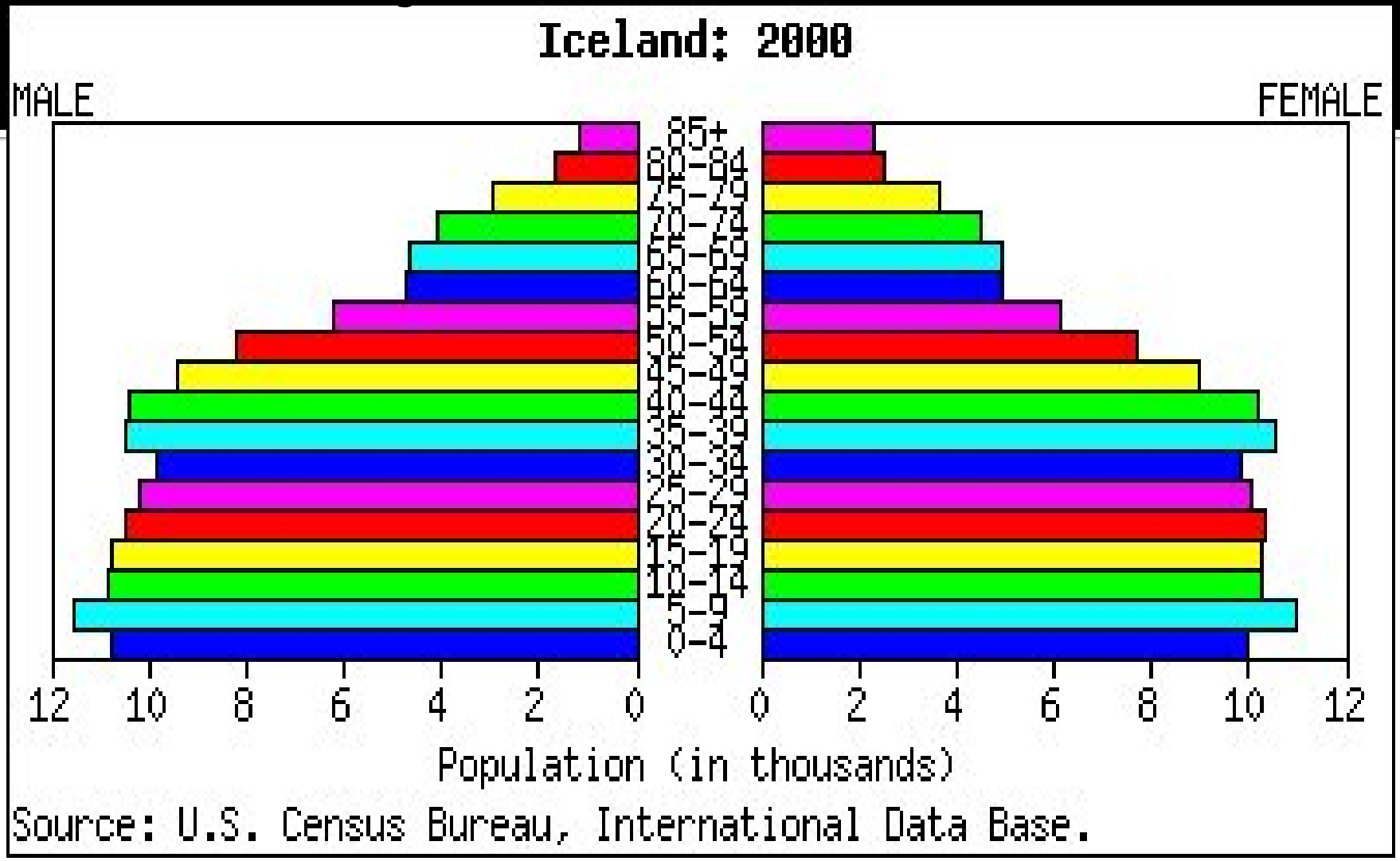
  - high birth rate due to poor access to birth control, lack of education etc.

  - high death rate due to poor medical care & nutrition.

Classifying Population Pyramids

2. Stationary or Stable population pyramids have a 1/2 elipse shape.

- The base of this population pyramid is similar in width to the population of the reproductive ages which indicates a stable population


Iceland: 2000
MALE
FEMALE
85+
80-84
75-79
70-74
65-69
60-64
55-59
50-54
45-49
40-44
35-39
30-34
25-29
20-24
15-19
10-14
5-9
0-4
12
10
8
6
4
2
0
0
2
4
6
8
10
12
Population (in thousands)
Source: U.S. Census Bureau, International Data Base.

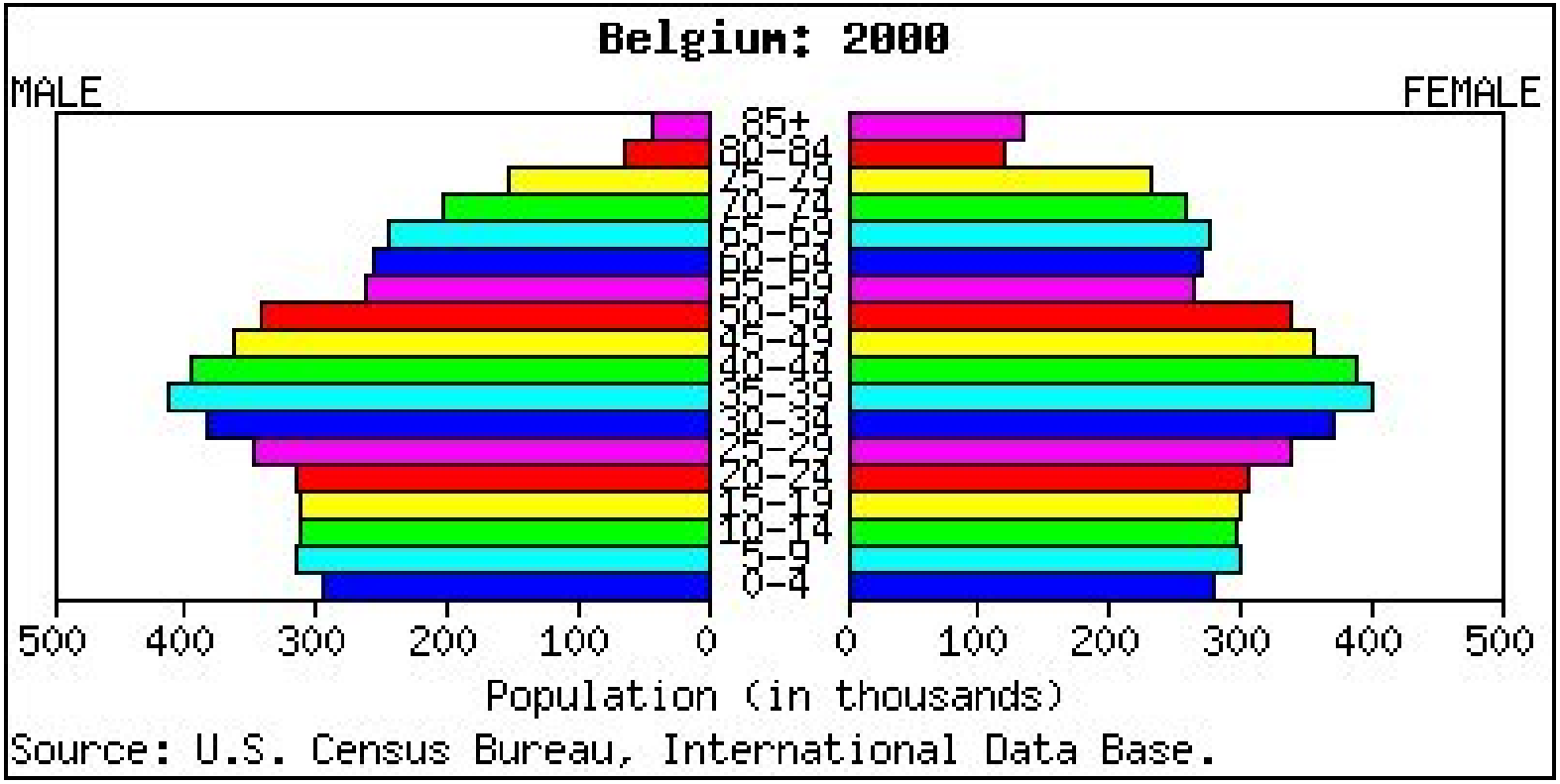
Stable populations are characteristic of a high standard of living due to:

- low birth rate due to good family planning, access to birth control, financial planning, education, etc.;
- low death rate due to good medical care, nutrition, education etc.

Classifying Population Pyramids

3. **Contractive or contracting** population pyramids have a narrower base than the reproductive age population. This indicates a decreasing population trend. The low birth rate is indicative of a well developed country.

Contractive or contracting population



Reading Population Pyramids

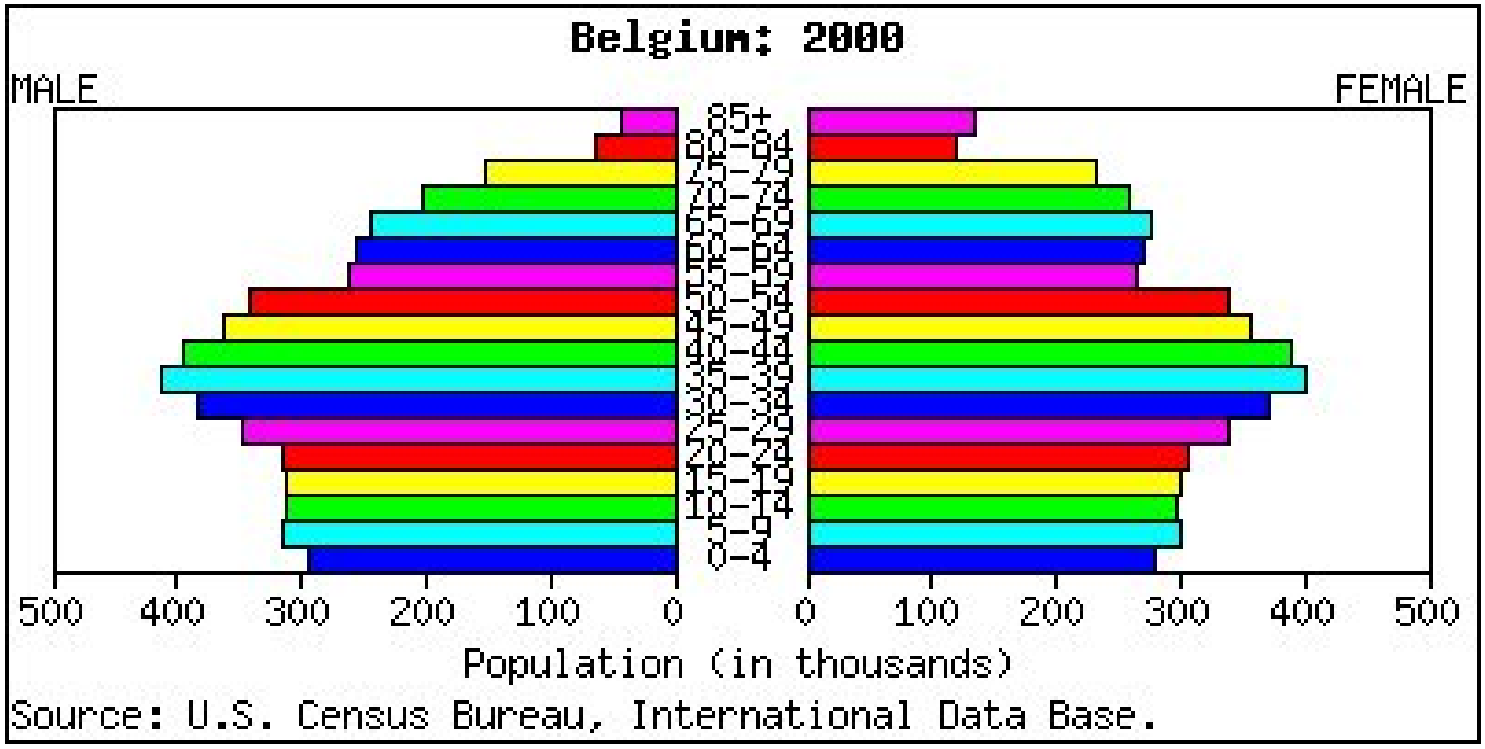
- **Width of the base:**
  - Birth rate varies with the width of the base.
    - A wide base indicates a high birth rate
    - A narrow base indicates a low birth rate.

Reading Population Pyramids

- **Symmetry:** pyramids should be relatively symmetrical.
- **Asymmetry** indicates a difference in the male and female population.
  - The following pyramid shows more females at the 85+ age range which indicates that women are living to older ages than males.

Asymmetry Pyramids

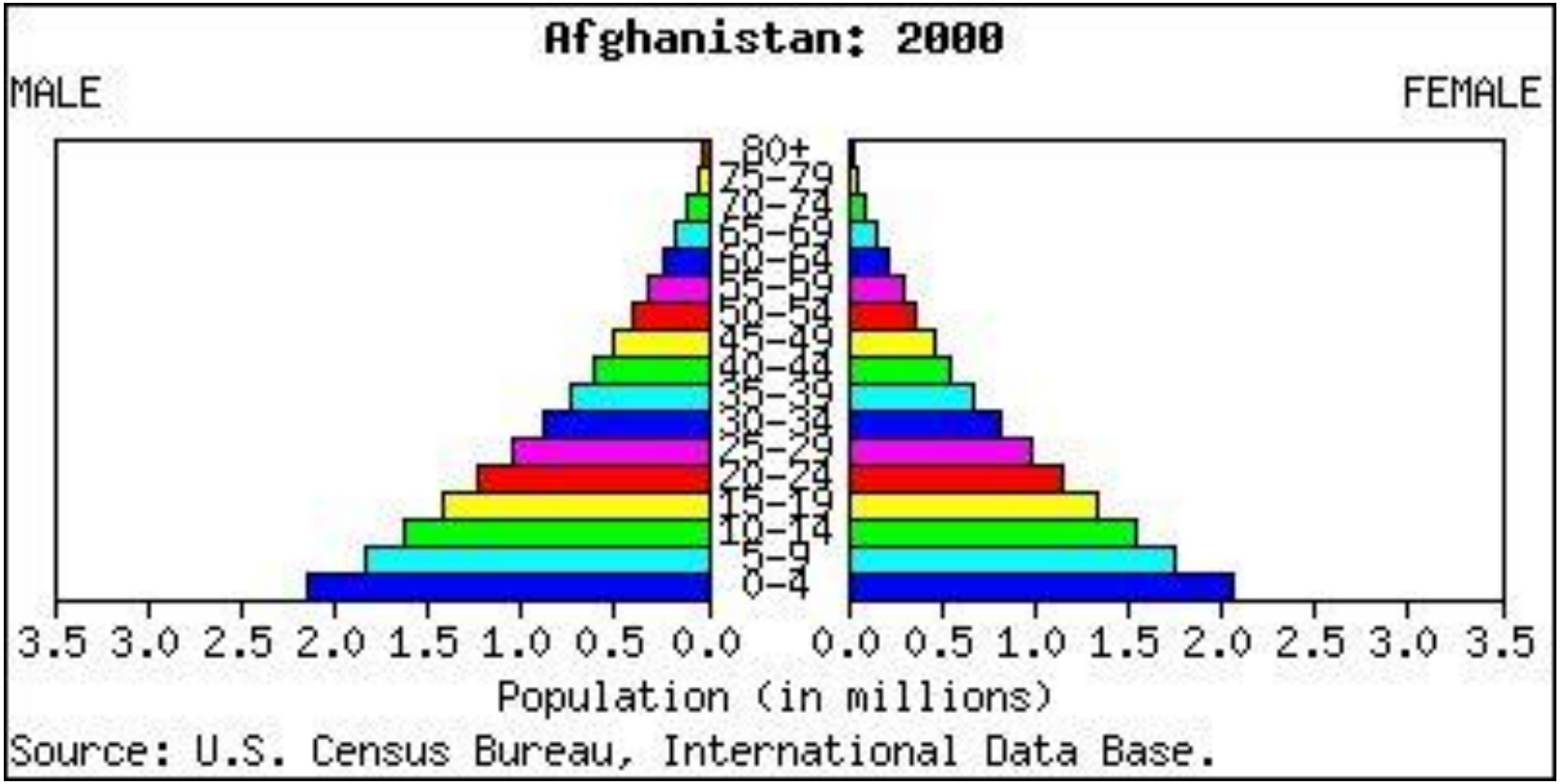
Why do you think the 80-84 and 85+ age groups have many more women than men?



Reading Population Pyramids

- **Shape of sides:**
  - Concave sides indicate a high death rate
  - Convex sides indicate a low death rate.
    - The following population pyramid exhibits concave sides indicating a high death rate.

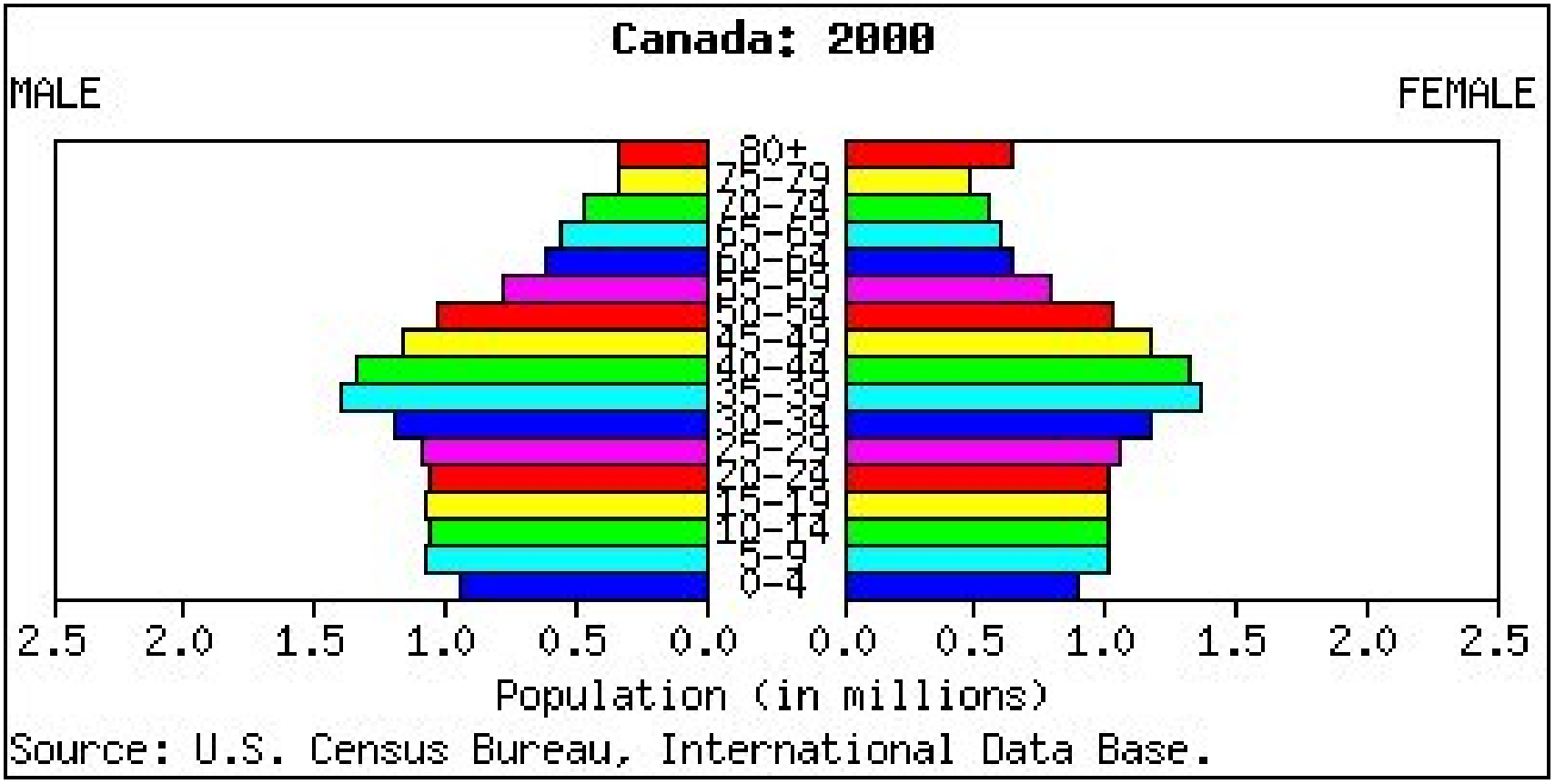
Concave sides indicating a high death rate.



Reading Population Pyramids

- **Bumps in the sides**:
  - Irregularities in the sides indicate a demographic anomaly.
  - The 30 -50 age group in this population pyramid represents the baby boom.
  - This bump will travel upward as the baby boomers age.

Bumps in the sides



Dependency Ratio

- The working age of people varies.
- Traditionally people worked until they were 65 years old.
- The common trend now is for people to retire closer to 55 years of age.
- However, for statistic purposes we recognize people between 15 and 65 as the workers of a society.
- People under 15 and over 65 are considered dependant upon the working population.
- The dependency ratio (DR) of a population indicates how many people are dependant upon every 100 workers.

Dependency Ratio

- The formula is
- $$DR = \frac{(\text{pop. } 0\text{-}14) + (\text{pop. } 65+)}{(\text{pop. } 15\text{-}64)} \times 100$$

Actual Population Change

- **Migration Terminology**
  - The term refers to the movement of people from one region to another.
    - **Immigration**
    - **Emigration**
    - **Net Migration**
    - **Internal Migration**

Actual Population Change

- **Immigration** refers to the migration of people into the country, province or region. This is less familiar to Newfoundlanders and Labradoreans.
- **Emigration** refers to the migration of people out of the country, province or region. This is the type of migration we are familiar with.

Actual Population Change

- **Net Migration** refers to the difference between immigration and emigration.
  - It would certainly seem the Newfoundland and Labrador as a whole has a negative net migration
  - Alberta, and Toronto likely have a positive net migration.
    - As we will see in section 2 this is an indication of how desirable living condition are in a place.

Actual Population Change

- **Internal Migration** refers to the migration of people within a country province or region.
  - Newfoundland and Labrador experiences a fair degree of internal migration as people move from smaller out ports to St. John's.

Actual Population Change

Actual change recognizes all the factors that can change a population. While natural change only deals with births and deaths, actual change deals with births, deaths, immigration and emigration.

- The formula is **AC = (B + I) – (D + E)**
- Where:
- **AC** (Actual Change) **= (B** (Births) **+ I** (Immigration)**) – (D** (Deaths) **+ E** (Emigration)**)**

Interesting Aspects of Actual Change

- A population can have a natural increase but an actual decrease! HOW?
  - If the net migration is negative and greater in magnitude than the natural increase there will be an actual decrease in the population.
- If the relative size of the symbols in the formula can represent the concept:
    - AC = (**B** + I) – (D + **E**)

Interesting Aspects of Actual Change

- A population can have a natural decrease but an actual increase! How?
  - If the net migration is positive and larger in magnitude that the natural decrease there will be an actual increase in the population.
  - If the relative size of the symbols in the formula can represent the concept:
    - **AC = (B + I) – (D + E)**

Push & Pull Factors

- **Why do People Migrate?**
  - People either want to **get away** from their place of origin or they want to **go to** a particular place.
  - Instead of using the term *get away factors* we use "**push factors**" and instead of using the term *go to factors* we use **"pull factors".**

Intervening obstacles

- *Obstacles to migration.*
  - *culture,*
  - *lack of money to move,*
  - *emigration/immigration laws,*
  - *family connections and*
  - *the feeling of home.*

- **Push forces** refer to disadvantageous factors in the home country that make people want to leave.
- **Pull Forces**: advantageous factors in the drawing country that attract people.
- **Intervening Obstacles** : those forces that prevent or inhibit people from moving such as lack of money, family connections and immigration laws.

Newfoundland Push Factors

- lack of high-skilled jobs in the IT sector;
- lack of high-paying jobs;
- lack of amenities attainable in larger centers.

Newfoundland Pull Factors

- friendly people and violence-free atmosphere;
- lack of hustle and bustle; peaceful life style.

- Some people might report that they would leave Newfoundland and Labrador except for **obstacles** such as:
  - they love the salt water;
  - parents are aging and need help & company;
  - they can not afford the trip away let alone the cost of setting up and trying to find a job.

Census Data

- A census is the process of obtaining information about every member of a population (age, location, spending habits, and much more).

- A government will use the info it gets from a census to make decisions about how tax money gets spent.