

## 1 ☐ Human Population Issues

EVPP 111 Lecture

Spring 2004

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## 2 ☐ Human Population Issues

- ✓ importance
- ✓ history
- ✓ current trends
- ✓ growth
- ✓ impacts on resources
- ✓ urbanization
- ✓ economic development

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## 4 ☐

## 5 ☐ Human population issues - importance

### ✓ Importance

- Many human problems exacerbated by rapid increase in population, including
  - hunger
  - resource depletion
  - environmental degradation
  - underdevelopment
  - poverty
  - urban problems

## 6 ☐ Human population issues - importance

### ✓ Importance

- Human population growth is contributing factor in nearly every environmental problem
  - including
    - air pollution
    - water pollution
    - waste management and disposal
    - environmental degradation
    - extinction of species
    - climate change

## 7 Human Population Issues

- ✓ importance
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- ✓ urbanization
- ✓ economic development

## 8 Human population issues - history

- ✓ **history**
  - human population
    - has increased over time
    - rate of increase has increased with time
    - been growing rapidly for centuries
    - grown explosively over last 300 years

## 9 Human population issues - history

- ✓ **history**
  - human population
    - less time between doubling time
      - 1 A.D. = ~ 130 million
      - 1000 A.D. = ~ 260 million
      - 1650 A.D. = ~ 500 million
      - 2000 A.D. = ~6,000 million (~6 billion)

## 10 Fig. 7.9

## 11 Human population issues - history

- ✓ **history**
  - exponential growth in human population
    - as human history progressed
      - humans gained greater control over factors that influence growth rate
        - » through knowledge and technology

## 12 Human population issues - history

- ✓ **history**
  - exponential growth in human population
    - advances in knowledge and technology
      - improved control over
        - » food supply through agriculture
        - » development of weapons to ward off predators
        - » development of medicines to treat diseases

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14  Human population issues - history

✓ **history**

- exponential growth in human population
  - advances in knowledge and technology
    - enabled humans to expand the carrying capacity of their habitats
      - » escape confines of logistic growth
      - » re-enter exponential portion of sigmoid growth curve

15  Human Population Issues

- ✓ importance
- ✓ history
- ✓ current trends
- ✓ growth
- ✓ impacts on resources
- ✓ urbanization
- ✓ economic development

16  Human population issues - current trends

✓ **current trends**

- human population growth
  - continues, is rapid
    - even though growth rate has declined
  - not uniform over planet

17  Global Population Continues to Rise

18  Human population issues - current trends

✓ **current trends**

- between 1963 - 2001
  - growth rate has decreased 39%
    - from 2.2% to 1.33%
  - population based increased 91%
    - from 3.2 billion to 6.1 billion

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21  Human population issues - current trends

✓ **current trends**

- growth not uniform over planet
  - some countries = stable populations
    - birth dates  $\approx$  death rates
      - » example; Sweden

- some countries = burgeoning populations
  - birth rates greatly exceed death rates
    - » example; many developing nations

## 22 Human population issues - current trends

### ✓ current trends

- world
  - current population
    - ~6.3 billion
      - » 6 billion mark reached in October 1999
  - natural rate of increase
    - ~1.3%
  - projected change
    - 46% by 2050

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## 25 Human population issues - current trends

### ✓ current trends

- world
  - doubling time
    - concept in understanding impact of “small” rates of increase on overall population size
    - can be calculated
      - »  $70/\text{rate of increase}$

## 26 Human population issues - current trends

### ✓ current trends

- world
  - doubling time
    - = 70 years at rate of increase of 1%
    - = 35 years at rate of increase of 2%
    - = 54 years at rate of increase of 1.3 %
      - » current world rate of increase

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## 28 Human population issues - current trends

### ✓ current trends

- US
  - current population
    - ~287 million
  - natural rate of increase
    - ~0.6%
  - projected change

– +44% by 2050

29  Fig. 8.8

30  Human population issues - current trends

✓ **current trends**

- population growth in various regions of world
  - see textbook, figure 8.1: population growth in the world (2002)
- population characteristics of most populous countries
  - see textbook, table 8.1: population characteristics of 20 most populous countries (2002)

31  Fig. 8.1

32  Table 8.1

33  Human Population Issues

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- ✓ economic development

34  Human Population Issues - Growth

- ✓ growth rate
- ✓ factors that affect growth rate

35  Human Population Issues - Growth

✓ **Growth rate**

- populations grow (+) or decline (-)
  - based on interplay of four factors
    - births
    - deaths
    - immigration
    - emigration

36  Human Population Issues - Growth

✓ **Growth rate**

- population change=
  - (births + immigration) - (deaths + emigration)
  - zero
    - when factors balance out
    - a condition known as
      - » **zero population growth (ZPG)**

37  Fig. 7.1

38  Human Population Issues - Growth

✓ **Growth rate**

- based on
  - birth rate=
    - number of live births per 1000 people
  - death rate
    - number of deaths per 1000 people

39  Global Per. P.167

40  Human Population Issues - Growth

✓ **Growth rate**

- demographers use
  - **natural rate of increase** =
    - $((\text{birth rate} - \text{death rate}) / 1000) \times 100$

41  Global Per. P.167

42  Human Population Issues - Growth

✓ **Growth rate**

- birth rate
  - affected by fertility
    - **total fertility rate (TFR)**
      - » # children per woman in her lifetime
    - **replacement fertility rate**
      - » 2.1

43  Global Per. P.167

44  CO7

45  Human Population Issues - Growth

✓ **Growth rate**

- influenced by
  - **Age structure** of a population
    - proportion of individuals in different age groups
    - can help predict future growth of population

46  Human Population Issues - Growth

✓ **Age structure** of a population

- illustrated graphically in a
  - **population pyramid**

- bar graph, displays number of people in each age category by sex
- can predict demographic trends by “steepness” of pyramid

#### 47 Human Population Issues - Growth

##### ✓ population pyramid

- bar graph
  - displays number of people in each age category by sex
    - » males to left, females to right of vertical axis
    - » usually uses percentage of population
    - » age categories can be; narrow, broad, tied to reproductive stages

#### 48 Figures : Age structure diagrams

#### 49 Human Population Issues - Growth

##### ✓ Age structure

- three kinds of age structure are characteristic of human populations
  - **expanding**
  - **stable**
  - **declining**

#### 50 Human Population Issues - Growth

##### ✓ Age structure

- **expanding**
  - broad-based pyramid
  - most of population is pre-reproductive
  - population will continue to grow for some time as individuals in pre-reproductive stages enter reproductive stages of life
  - example = Kenya


#### 51 Figures : Age structure diagrams

#### 52 Fig. 7.3

#### 53 Human Population Issues - Growth

##### ✓ Age structure

- **stable**
  - more uniform, rectangular in shape
    - sides roughly parallel
  - age groups are nearly balanced
  - will remain stable for some time since there will be little change in number of individuals in reproductive stages of life
  - examples = US, Canada, Australia

54  Figures : Age structure diagrams


55  Fig. 7.3

56  Human Population Issues - Growth

✓ **age structure**

– **declining**

- inverted pyramid
  - narrow base, broad top
- fewer pre- and reproductive individuals than post-reproductive older individuals
- population will continue to decline
  - no new ranks of individuals to replace reproductive individuals as they move into post-reproductive stage of life
- examples = Hungary, Germany

57  Figures : Age structure diagrams

58  Fig. 7.3

59 

60  Human Population Issues - Growth

✓ **Factors that affect growth rate**

– three general categories

- cultural
- socioeconomic
- political

61  Human Population Issues - Growth

✓ **Factors that affect growth rate**



- three general categories
  - cultural
  - socioeconomic
  - political

## 62 ☐ Human Population Issues - Growth

✓ Factors that affect population growth

- **cultural**
  - religious beliefs
  - traditions
  - cultural norms
  - attitudes about birth control
  - infant mortality rates
  - importance of children as part of labor force
  - average age at marriage

## 63 ☐ Human Population Issues - Growth

✓ Factors that affect population growth

- cultural
  - **religious beliefs, traditions, cultural norms, attitudes about birth control**
    - high TFRs traditional in many cultures
    - motivations for having many children vary from culture to culture
    - some cultures oppose use of birth control

## 64 ☐ Human Population Issues - Growth

✓ Factors that affect population growth

- cultural
  - **infant mortality rates**
    - major reason for high TFRs is to offset
      - » high infant and child mortality rates

## 65 ☐ Human Population Issues - Growth

✓ Factors that affect population growth

- cultural
  - **infant mortality rates**
    - to endure, a society must continue to produce enough children who survive to reproductive age
      - » if infant and child mortality rates are high
      - » total fertility rate must be high to compensate

## 66 ☐ Human Population Issues - Growth

✓ Factors that affect population growth

- cultural
  - **infant mortality rates**
    - though infant mortality rates have been decreasing worldwide

- there's a lag time for culturally-imbedded fertility levels to decline
- parents must have sufficient confidence that the children they already have will survive before they stop having additional children

## 67 Table 8.1

## 68 Human Population Issues - Growth

✓ Factors that affect population growth

– cultural

- **importance of children in labor force**

- in developing countries

- » high TFRs help ensure that there are children to work in family enterprises, such as farming, commerce

## 69 Human Population Issues - Growth

✓ Factors that affect population growth

– cultural

- **importance of children in labor force**

- in developed nations, by contrast

- » children have less value as a source of labor

- » because; they attend school, society is more mechanized, care of elderly shared by society

## 70 Human Population Issues - Growth

✓ Factors that affect population growth

– cultural

- **average age at marriage**

- affects total fertility rate

- is determined by laws and customs of society

- varies from culture to culture

## 71 Human Population Issues - Growth

✓ Factors that affect population growth

– cultural

- **average age at marriage**

- there is always a correlation between marriage age and total fertility rate

- the older the average age of marriage, the lower the TFR

- » it delays age at which first child is born

- » lowers the number of children a woman can have in her lifetime

## 72 Human Population Issues - Growth

✓ Factors that affect population growth

– cultural

- **average age at marriage**

- example; in Sri Lanka

- » average age of marriage is 25

- » average number of children per women is 2.1

» population doubling time is 60 years

### 73 ☐ Human Population Issues - Growth

✓ Factors that affect population growth

– cultural

- **average age at marriage**

– example; in Bangladesh

» average age of marriage is 17

» average number of children per woman is 3.3

» population doubling time is 38 years

### 74 ☐ Human Population Issues - Growth

✓ Factors that affect growth rate

– three general categories

- cultural

- socioeconomic

- political

### 75 ☐ Human Population Issues - Growth

✓ Factors that affect population growth

– **socioeconomic**

- socioeconomic status of women

– employment opportunities

– educational opportunities

– availability of family planning services

### 76 ☐ Human Population Issues - Growth

✓ Factors that affect population growth

– socioeconomic

- **socioeconomic status of women**

– in most societies, women do not have same rights, privileges or opportunities as men

– evidence is accumulating that

» single most important factor affecting high TFRs is low status of women in many societies

### 77 ☐ Human Population Issues - Growth

✓ Factors that affect population growth

– socioeconomic

- **employment opportunities**

– TFRs tend to be lower when women have access to paid employment outside the home

– employment opportunities brings

» financial independence

» tendency to marry later

» tendency to have fewer children

## 78 Human Population Issues - Growth

✓ Factors that affect population growth

– socioeconomic

- **educational opportunities**

- in nearly all societies, women with more education tend to marry later and have fewer children

- providing women with education opportunities delays first childbirth

- » thus reducing number of “active” childbearing years, increasing time between generations

## 79 Human Population Issues - Growth

✓ Factors that affect population growth

– socioeconomic

- **educational opportunities**

- education opens door to greater career opportunities which often further delays first childbirth

- it has been said that single most important activity needed to reduce world population is to educate women

## 80 Fig. 8.2

81 

## 82 Human Population Issues - Growth

✓ Factors that affect population growth

– socioeconomic

- **educational opportunities**

- example; in Botswana, women with

- » secondary education have an average of 3.1 children

- » primary education have an average of 5.1 children

- » no formal education have an average of 5.9 children

## 83 Fig. 8.4

## 84 Human Population Issues - Growth

✓ Factors that affect population growth

– socioeconomic

- **availability of family planning services**

- greater contraceptive use among married women of reproductive age correlates with a lower fertility rate

- socioeconomic conditions and status of women affect availability of family planning services

85 

86  Table 8.1

87  Human Population Issues - Growth

✓ Factors that affect growth rate

- three general categories
  - cultural
  - socioeconomic
  - political

88  Human Population Issues - Growth

✓ Factors that affect population growth

- **political**
  - **family planning policies**
    - governments in ~ 78 developing countries have established policies to help help limit population growth, including
      - » public education efforts
      - » economics rewards and penalties
      - » laws

89  Human Population Issues - Growth

✓ Factors that affect population growth

- **political**
  - **family planning policies**
  - China
    - first program began in 1955
    - launched *wan xi shao* campaign in 1971, meaning
      - » “later” marriages
      - » “longer” intervals between births
      - » “fewer” children

90  Human Population Issues - Growth

✓ Factors that affect population growth

- **political**
  - **family planning policies**
    - China
      - » TRF has been reduced to 1.8 (from 5.9 in 1965)
      - » ~80% of couples use contraception
      - » 87% of women are literate (1990)
      - » projected population change by 2050 = +9%

91  Human Population Issues - Growth

✓ Factors that affect population growth

- **political**
  - **family planning policies**
    - India
      - » has been less successful
      - » TRF has been reduced to 3.2 (from 5.8 in 1965)
      - » ~48% of couples use contraception
      - » 40% of women are literate (1990)
      - » projected population change by 2050 = +55%

92  Fig. 8.3

93  Human Population Issues

- ✓ importance
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94  Human population issues - impacts on resources

- ✓ discrepancy between individual resource demands in developing vs. developed nations
  - developing nations
    - individual resource demands are small
    - but rapidly increasing populations deplete natural resources
  - developed nations
    - individual resource demands are large
    - and this demand depletes natural resources

95  Human population issues - impacts on resources

- ✓ Effects of overpopulation on
  - **nonrenewable resources**
    - present in limited quantities, depleted by use
    - used/depleted faster than they can be replenished
      - slowing population growth would give more time to find substitutes for nonrenewable resources
    - people in US and other developed nations consume majority of world's nonrenewable resources

96  Human population issues - impacts on resources

- ✓ Effects of overpopulation on
  - **renewable resources**
    - replaced by nature, fairly “rapidly”
    - can be used forever as long as they are not exploited in short term
      - rapid population growth can cause renewable resources to be overexploited
        - » renewable resources must be used in sustainable way that gives them time to

replace or replenish themselves

97 ☐ Human population issues - impacts on resources

- ✓ Effects of population growth on natural resources
  - particularly critical in developing nations
  - economic growth of developing nations is often tied to exploitation of their natural resources
    - to provide for their expanding populations in short term

98 ☐ Human population issues - impacts on resources

- ✓ Effects of population growth on natural resources
  - resources issues are clearly related to population size
    - more people use more resources
  - **resource consumption**
    - more important issue
    - measure of human use of materials/ energy
    - people in developed nations are extravagant consumers
      - their use of resources is greatly out of proportion to their numbers

99 ☐ Human population issues - impacts on resources

- ✓ Effects of population growth on natural resources
  - people in developed nations are extravagant consumers
    - their use of resources is greatly out of proportion to their numbers
      - highly developed nations represent ~20% of world's population
      - yet they consume >50% of its resources

100 ☐ Human population issues - impacts on resources

- ✓ **Overpopulation**
  - a country is overpopulated if level of demand on its resource base results in damage to environment
  - a country can be overpopulated in two ways
    - people overpopulation
    - consumption overpopulation

101 ☐ Human population issues - impacts on resources

- ✓ **people overpopulation**
  - occurs when environment is degraded from too many people
    - even if those people consume few resources per person
- ✓ **consumption overpopulation**
  - occurs when each individual in a population consumes too large a share of resources
- ✓ effects of both are same
  - pollution and degradation of environment

102 ☐ Human population issues - impacts on resources

- ✓ **model of human impacts on the environment**

- three factors most important in determining environmental impact (I)
  - number of people (P)
  - affluence per person (A)
    - measure of consumption or amount of resources used per person
  - environmental effects of technologies (T) used to obtain and consume the resources
- $I = P \times A \times T$

### 103 Human population issues - impacts on resources

- ✓ model of human impacts on the environment
  - $I = P \times A \times T$ 
    - model expressed by this equation can be useful
      - but must be interpreted with care
        - » because we often do not understand all the environmental impacts of certain actions of processes

### 104 Human Population Issues

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### 105 Human population issues - urbanization

- ✓ Geographical distribution of people affects impact of population growth
  - throughout recent history, people have increasingly migrated to cities
  - **urbanization**
    - process in which people increasingly move from rural areas to densely populated cities
    - involves transformation of rural areas into urban areas

### 106 Human population issues - urbanization

- ✓ Geographical distribution of people affects impact of population growth
  - distinction between rural and urban areas
    - not just how many people live in area
    - but how people make their living
      - rural areas
        - » most people have occupations that involve harvesting natural resources
      - urban areas
        - » most people have occupations that are not directly connected with natural resources

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### 109 Human Population Issues

- ✓ importance
- ✓ history



- ✓ current trends
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110  Human population issues - economic development

✓ **Demographic transition**

- hypothesis of population change
- concept grew out of relationship between standard of living and population growth rate
  - countries with
    - highest standard of living have lowest growth rates
    - lowest standard of living have highest growth rates

111  Fig. 8.2

112  Human population issues - economic development

✓ **Demographic transition**

- based on examination of birth and death rates of North America and western European countries that industrialized during 19th century
- states that
  - as countries become industrialized
    - first their death rates and then their birth rates decline

113  Human population issues - economic development

✓ **Demographic transition**

- takes place in four distinct stages
  - pre-industrial stage
  - transitional stage
  - industrial stage
  - postindustrial stage

114  Human population issues - economic development

✓ Demographic transition

- **pre-industrial stage**
  - little population growth
  - harsh living conditions lead to both
    - high birth rates
      - » to compensate for high infant mortality rates
    - high death rates

115  **Demographic Transition**

116  Human population issues - economic development

✓ Demographic transition

- **transitional stage**
  - population grows rapidly
  - because with advent of industrialization
    - food production increases
    - health care improves
    - death rate decreases
    - birth rate remains unchanged
      - » culturally imbedded

117  **Demographic Transition**

118  **Human population issues - economic development**

- ✓ Demographic transition
  - **industrial stage**
    - population growth continues
      - but at slower and more fluctuating rate depending on economic conditions
      - birth rate drops and approaches death rate
        - » as industrialization and modernization become more widespread
      - most developed nations are in this stage

119  **Demographic Transition**

120  **Human population issues - economic development**

- ✓ Demographic transition
  - **post-industrial stage**
    - total population size decreases slowly
      - birth rate declines below death rate
    - 35 countries, most in Europe, containing about 13% of world's population have entered this stage

121  **Demographic Transition**

122 

123  **Human population issues - economic development**

- ✓ **Demographic transition**
  - will it be experienced by today's less-developed nations?
    - when today's developed nations passed through transition, conditions included
      - world population was lower
      - energy, natural resources were still abundant
      - access to large expanses of of unexploited lands
      - industrialization occurred fast enough to impact population growth

124  **Human population issues - economic development**

- ✓ **Demographic transition**
  - will it be experienced by today's less-developed nations?
    - necessary conditions for demographic transition to occur may not be available to today's

developing nations

125  The End.