

THE SECOND WAVE:

*Two waves of Population Growth and Urbanization.
The greater challenges of the second wave*

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Population growth and urbanization have both had two major historical waves:

- The past in Europe-America
- The Current today in Asia, Africa and Latin America

The past transitions were relatively slow, occurring over more than two centuries and involved a few hundred millions of people.

The Current transitions are very rapid, coming in about half a century and they involve billions, not millions, of people.

The greater speed and magnitude of the current transitions pose special, and very difficult problems.

This is one of the most common graphs we see today; it depicts world population growth over the past 1000 years; it could go back 200,000 and not look much different.

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If we look at a larger picture, it is clear that population growth was accompanied by major changes in energy technology and in social organization, that is by the rise of urban industrial society.

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First consider SE Asia in the world context. A long period of very slow growth is followed by recent exponential growth. Europe led the way, SE Asia and the rest of the world follow. But the timing is most interesting. Why was Europe first, and what is implied by the followers?

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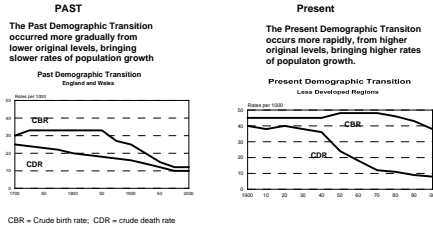
Now look at just the past 300 and next 50 years to see more clearly the different historical trajectories. Europe started much earlier, its population growth rate is now near zero and will soon turn negative. SE Asia is still growing rapidly and will continue to do so for the next half century and more.

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The explanation lies in the two demographic transitions: Europe was Past; Asia (and the rest of the "Third" world) is Present. This raises questions: why did death and birth rates fall? How? What are there differences between Past and Present?

Two Demographic Transitions

The Demographic Transition is the movement of a population from high to low birth and death rates
There have been TWO such transitions: one in the past and one taking place now.



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MORTALITY and FERTILITY DECLINES

PAST:

Mortality fell through a combination of trade, agricultural and industrial revolutions and a bit of global warming that slowly raised the general standard of living. (No major medical technological breakthroughs!)

Fertility declined through economic pressures on individuals and families brought by the above revolutions (Again, no major medical technological breakthroughs.)

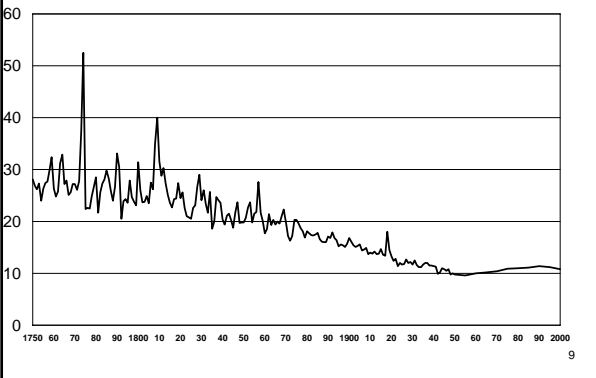
PRESENT

Mortality falls through the use of new chemical assaults on infectious diseases and their vectors. The assaults are carried out by new large scale organizations

Fertility falls through the use of modern non-coitally specific contraceptive technology, distributed by new large scale organizations operating under revolutionary new population policies.

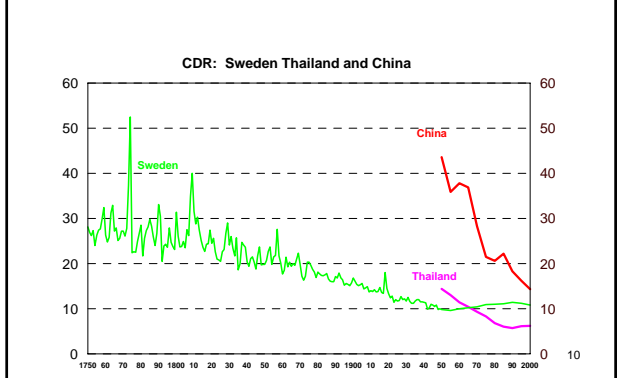
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The past "epidemiological transition" moved slowly from high, variable, death rates and infectious diseases to low, stable, death rates and degenerative diseases. Here is Sweden's crude death rate from 1750 to 2000

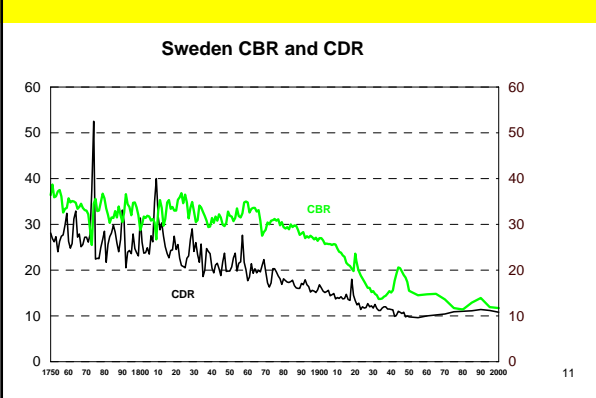


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Today, death rates can be reduced more rapidly. China's CDR fell more in 40 years than Sweden's did in 200 years. The Thai death rate had already fallen by 1950.

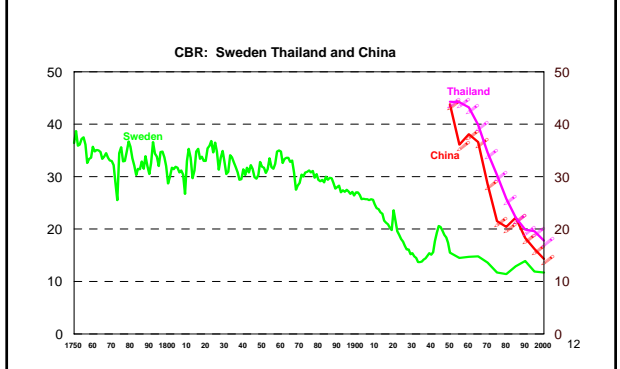


Let me remind you of Sweden's Birth and Death Rates, its demographic transition.

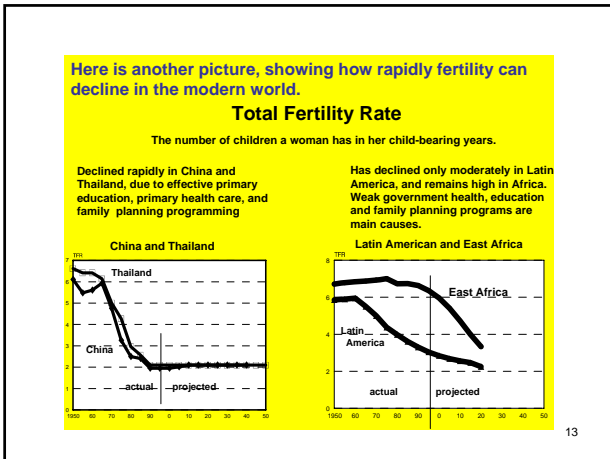


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Birth rates fell in China and Thailand as much in 40 years as Sweden's fell in 200 years.



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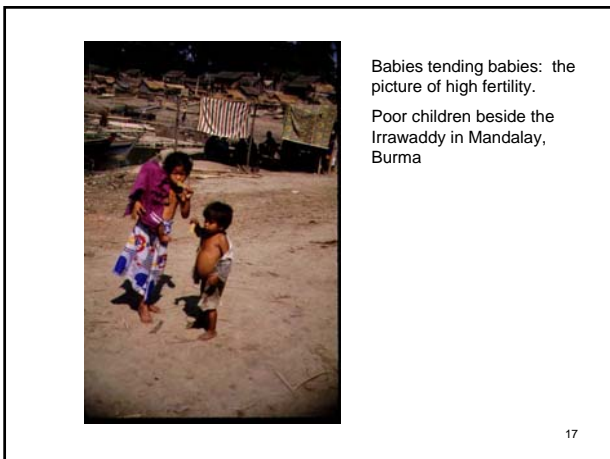
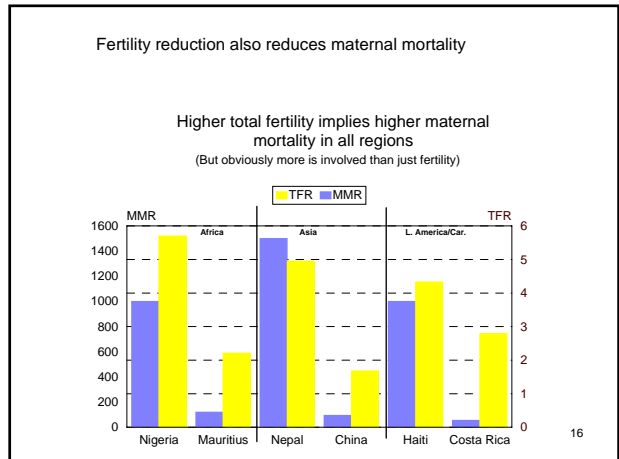
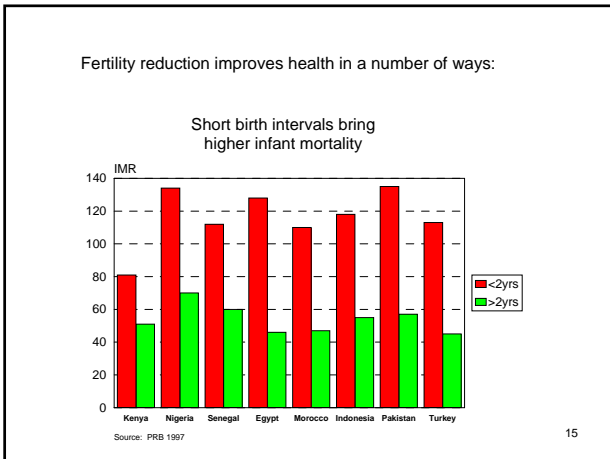
Again the reason for the greater speed of change lies in a new medical technology: the vast array of modern contraceptives available since about 1965.

There was also a major policy change: the **ANTINATALIST POLICY REVOLUTION**, led by India, starting in 1952. Good family planning programs speed the transition and improve health.

In addition, the United Nations, especially the Population Fund, helped move that new technology throughout the world rapidly. UNFPA has supported family planning programs throughout the world

The result has been a vast improvement in reproductive health, especially in the health of poor women and children

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Rapid population growth:

reduces health and welfare

AND

produces a rapidly growing young population.

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Young males (15-19 years old) are a highly energetic, inexperienced, and volatile population.

They can be led to acts of heroism, making them attractive to infantry sergeants;

They can be led to acts of great altruism;

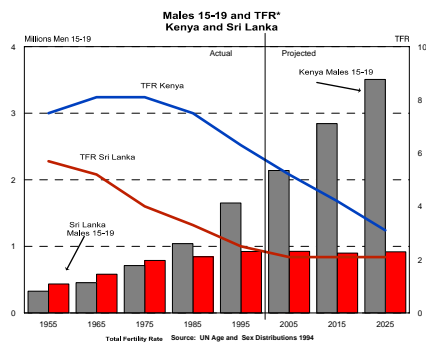
And they can also be led to acts of terrible violence, as we saw, for example, in the Tutsi-Hutu genocide

Much depends on the leadership and social infrastructure that gives them some hope for the future.

But demographics also show their numbers will increase rapidly.

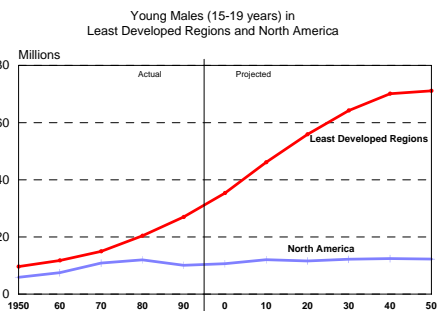
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One example: reduced fertility means fewer young males



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The growth of young males will be greatest in those regions least able to provide them with schools, jobs, or hope.



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The problems of the changing age distributions will be treated in other workshops.

But it is important to note here that the rapid growth of population in Asia is producing a large number of young males.

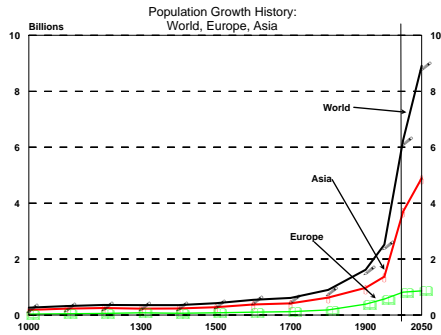
Young males are a highly volatile population.

Without schools, jobs and the prospect of marrying, the surging male population can spell considerable social unrest for a society.

Now let us go back to see more fully the differences between the slower and smaller transitions of the past

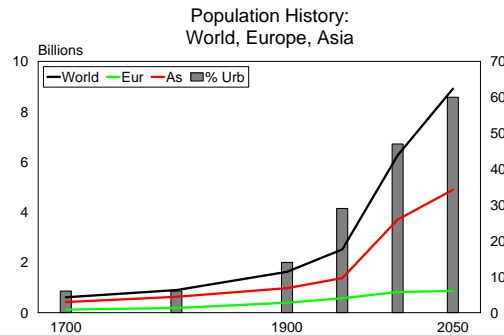
and the more rapid and much larger transitions that bring you so many challenges today.

Comparing Asia, the World and Europe, we see Asia's later surge and the far greater magnitude involved in that population surge



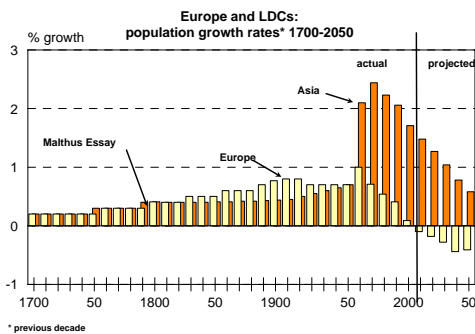
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Adding urbanization and examining just the past 350 years puts the great Asian population surge in better perspective.



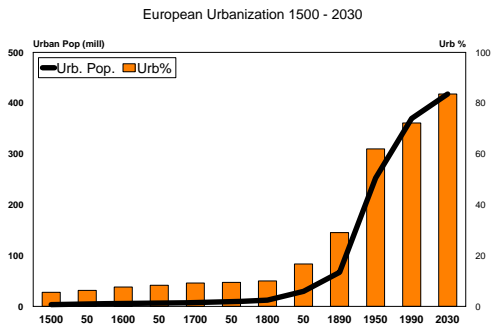
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Here the long term differences in rates of growth are clear.



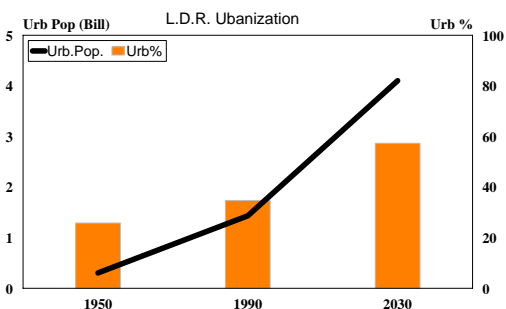
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The European urbanization surge took almost two centuries and brought an urban population of about 400 million.



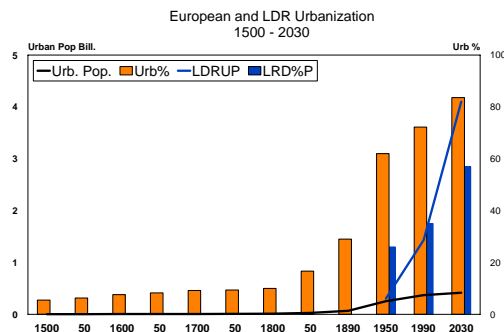
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The Asian surge taking place now will take less than a century and will give us urban population of over 4 billion.



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When we graph those two surges together, the European surge almost disappears beneath the far great magnitudes involved in Asia.



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Pollution: the Second Wave

There is also a second wave in pollution. The urban industrial revolution and population growth produce a great impact on the world's environment. Here we look at two pollutants:

carbon: produced everywhere from fossil fuel consumption, it is truly global pollutant; it goes everywhere

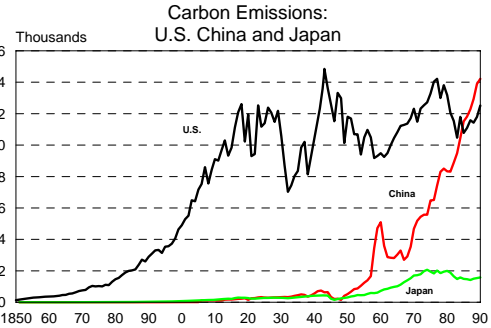
sulfur: is also produced from fossil fuels, but it is often more local in its distribution

Past industrialization raised levels of both. Current industrialization is raising those levels very rapidly.

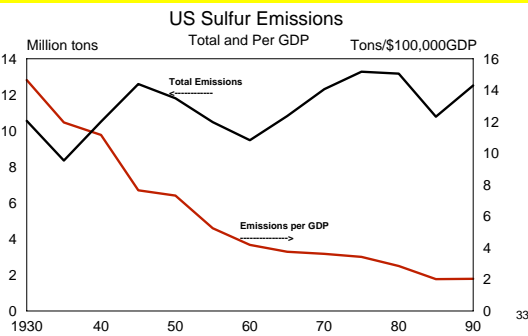
Begin with sulfur: a powerful local pollutant

U.S. sulfur emissions grew over the long period of its industrialization in the first wave. China's emissions have grown very rapidly in the second wave, overtaking the U.S.

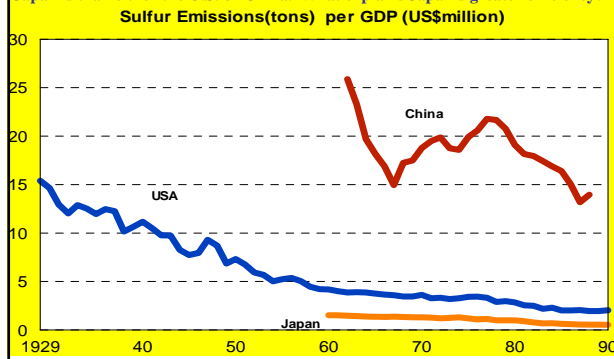
But note how much lower are Japan's emissions. Why?



The possible up-side is seen here. After 1910, U.S fossil fuel consumption became more efficient, reducing the sulfur emission per dollar of wealth even while economic development continued strongly!



Since about 1980 China has been following the U.S. trend toward greater efficiency, reducing emissions per dollar of wealth. But not how much lower Japan is than either the U.S. or China. What explains Japan's greater efficiency?



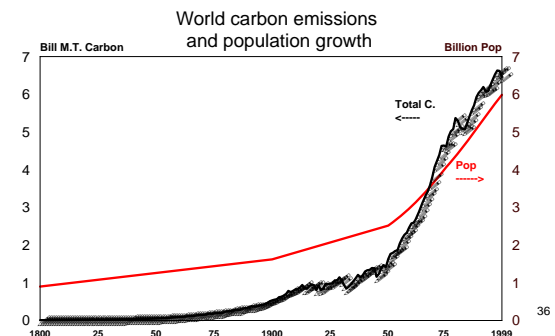
Sulfur emissions produce immediate health effects with increase in respiratory diseases, especially among children and the aged. This entails a high cost of pollution

Controlling sulfur pollution requires more advanced and more costly technology for coal burning. Installing the technology is difficult for poor countries.

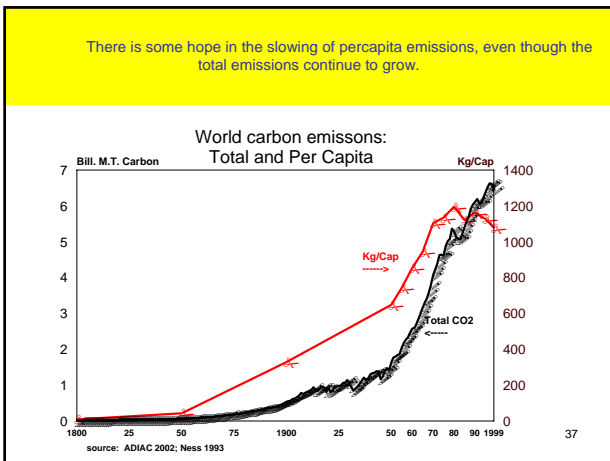
Carbon or carbon dioxide pollution follows the same patterns, but carbon is a more global pollutant is that is circles throughout the atmosphere, remaining there for decades or centuries. It is a major greenhouse gas, associated with global warming;

Global warming will raise sea levels, change world agricultural patterns and disease distributions in ways yet unknown

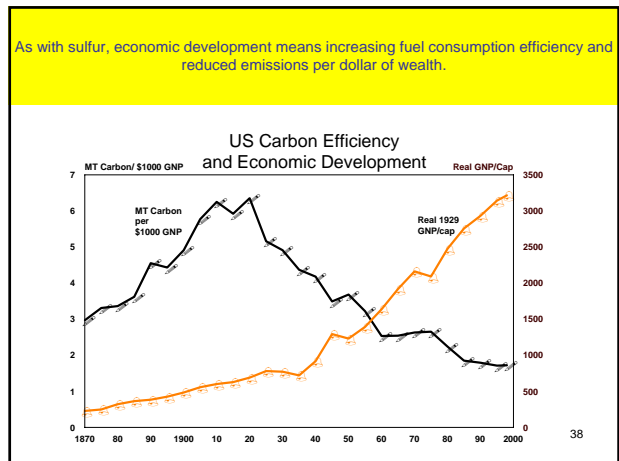
World Carbon Emissions and population have grown rapidly together in our modern era



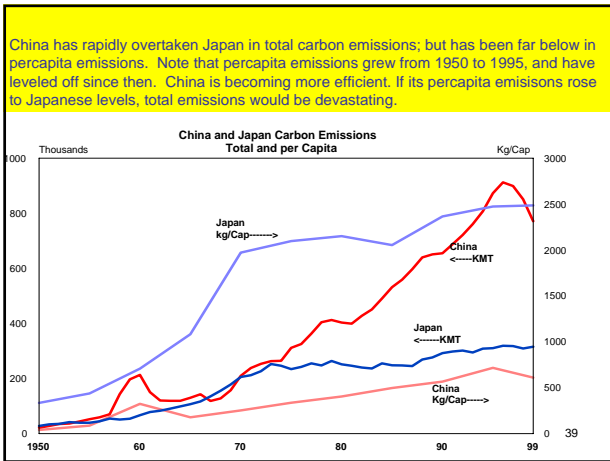
There is some hope in the slowing of percapita emissions, even though the total emissions continue to grow.



As with sulfur, economic development means increasing fuel consumption efficiency and reduced emissions per dollar of wealth.



China has rapidly overtaken Japan in total carbon emissions; but has been far below in percapita emissions. Note that percapita emissions grew from 1950 to 1995, and have leveled off since then. China is becoming more efficient. If its percapita emissions rose to Japanese levels, total emissions would be devastating.



Summary

Population growth, urbanization and environmental impacts have come in two major historical waves:

The First in Europe and America

The Second in Asia, Africa and Latin America

Past transitions were slow and involved relatively few people

Present transitions are faster and involve many more people.

Technological advances have made it possible to:

Reduce mortality and disease;

Reduce fertility and increase reproductive health;

Reduce environmental degradation

Our task at global and local levels is to develop policies that can use the best technologies to improve human welfare.