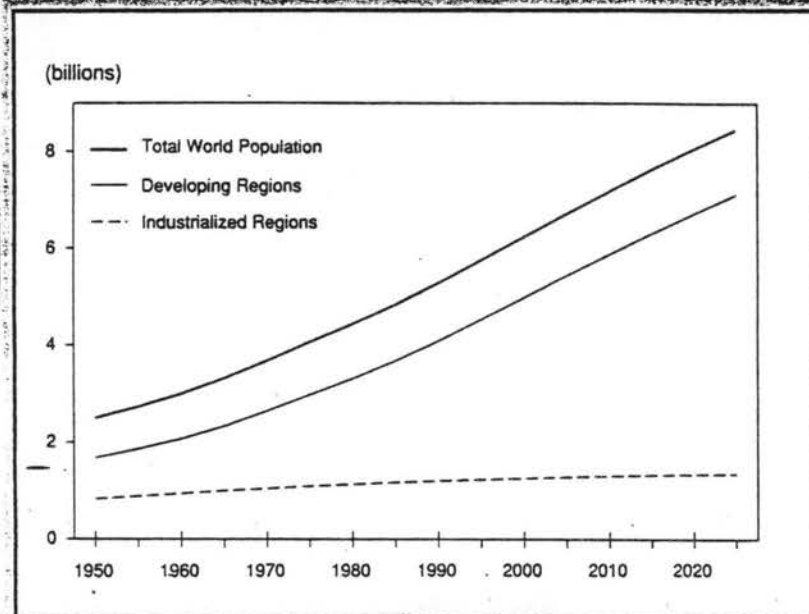


# Demographic Trends and Population Movements

**Figure 1.1 World Population Growth<sup>a</sup>**



Source: United Nations Population Division, *World Population Prospects 1988* (United Nations, New York, 1989).

Note: a. Based on United Nations medium variant projection, the middle projection of possible high, medium, and low projections.

What are the long-term consequences of projected global and regional population changes, and of population imbalances between industrialized and developing nations?

Are projections of flattening population growth in developing countries realistic?

What are the political/social consequences of large-scale population migration (e.g., across international borders or from rural to urban areas)?

How might population changes lead to political frictions and conflict?

What policies or technologies might be used to alleviate population pressures?

# Resource Trends

This topic includes a number of subtopics, including:

Water (Fresh and Sea)

Energy

Agriculture

Air

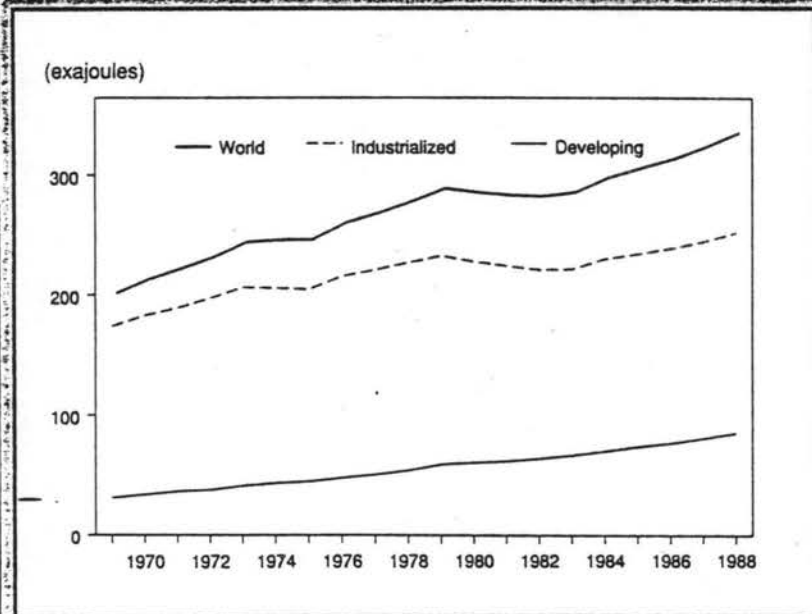
Environment

Strategic Materials

The following 3 pages introduce 3 of the topics, but all are open for discussion.

# Resource Issues Energy

**Figure 1.5 Consumption of Primary Energy**



Source: British Petroleum (BP), *BP Statistical Review of World Energy* (BP, London, 1989).

What are the likely sources of energy over the next two or three decades?  
How will these vary regionally?

How probable are future conflicts over energy supplies?

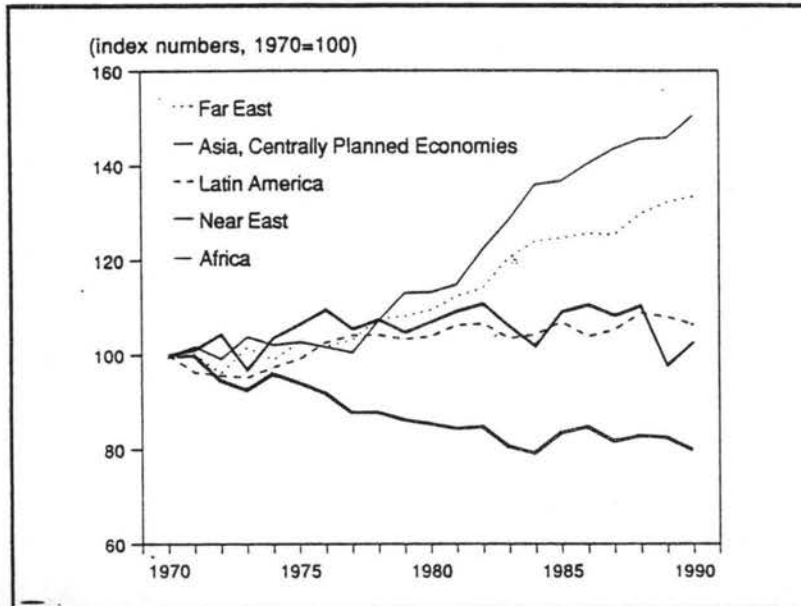
What role can technology or public policy play in solving regional and global energy problems?

What will be the environmental consequences of increased energy use in developing countries?

# Resource Issues

## Agriculture

**Figure 7.6** Index of Per Capita Food Production in Developing Regions, 1970–90



Source: Food and Agriculture Organization of the United Nations (FAO), unpublished data, March 1991.

**Notes:**

- Far East = Bangladesh, Bhutan, Brunei Darussalam, East Timor, Hong Kong, India, Indonesia, Republic of Korea, Lao People's Democratic Republic, Macao, Malaysia, Maldives, Myanmar, Nepal, Pakistan, Philippines, Singapore, Sri Lanka, Thailand.
- Asia, Centrally Planned Economies = Cambodia, China, Democratic People's Republic of Korea, Mongolia, Viet Nam.
- Near East = *Africa*: Egypt, Libyan Arab Jamahiriya, Sudan. *Asia*: Afghanistan, Bahrain, Cyprus, Gaza Strip (Palestine), Islamic Republic of Iran, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Kingdom of Saudi Arabia, Syrian Arab Republic, Turkey, United Arab Emirates, Yemen Arab Republic, Democratic Yemen.

Is another "Green Revolution" possible? What are the dangers of technology application to food production?

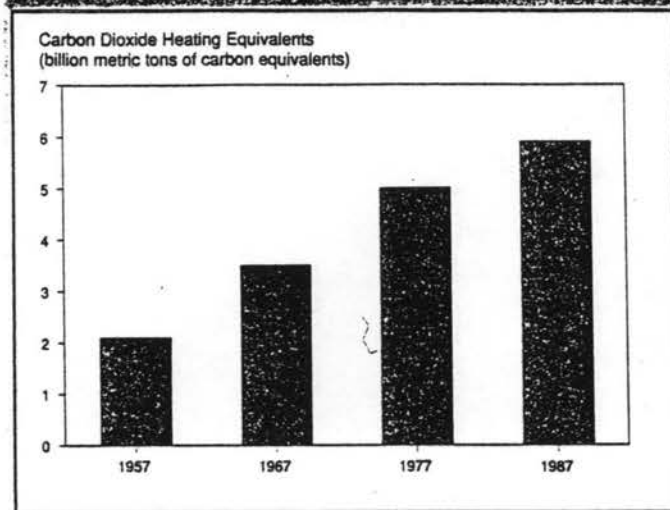
What is the relationship between food and conflict?

What is the interplay between population growth and per capita food production?

Is the decline in African food production due mainly to climate change, government policies, or conflict?

# Resource Issues Environment

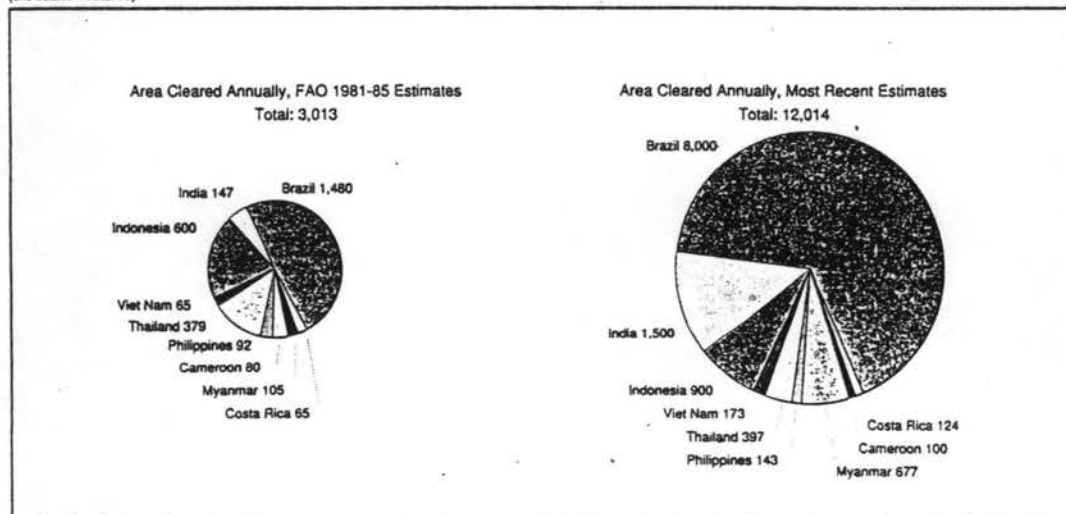
**Figure 1-3 Annual Additions of Three Major Greenhouse Gases to the Atmosphere 1957-87**



Source: World Resources Institute estimates.

## Area of Closed Forests Cleared Annually in Selected Tropical Countries, 1980s

(thousand hectares)



Source: Table 7.1.

Note: This figure shows the area lost to deforestation in nine tropical countries as calculated by the Food and Agriculture Organization of the United Nations (1981-85) and more recent estimates. Note that the country with the largest percentage loss (Costa Rica) in Figure 7.1 has the second smallest area lost.

What will be the major environment problems in the next 25 years?

What types of conflicts may result from opposing viewpoints on these problems or the problems themselves?

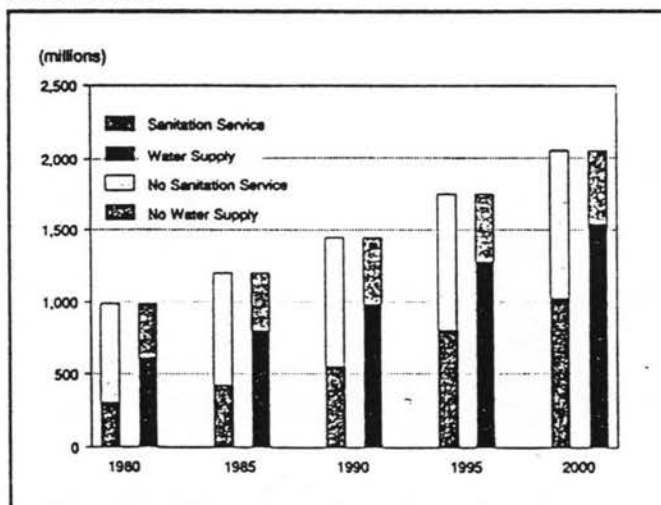
What policies or technologies might be pursued to solve these environmental problems?

# Medical Care

Table 28. Health and nutrition

	Population per				Births attended by health staff (percent) 1985	Babies with low birth weight (percent) 1985	Infant mortality rate (per 1,000 live births)		Daily calorie supply (per capita)	
	Physician		Nursing person				1965	1990	1965	1989
	1965	1984	1965	1984						
Low-income economies	9,640 w	5,800 w	5,980 w	2,150 w			124 w	69 w	1,975 w	2,406 w
China and India	2,930 w	1,650 w	4,420 w	1,650 w			114 w	56 w	1,966 w	2,464 w
Other low-income	26,500 w	14,160 w	9,760 w	3,540 w			145 w	92 w	1,994 w	2,298 w
Upper-middle-income	2,240 w	940 w	1,870 w	870 w			84 w	45 w	2,584 w	2,987 w
Low- and middle-income	8,170 w	4,980 w	5,010 w	1,850 w			117 w	63 w	2,108 w	2,523 w
Sub-Saharan Africa	33,310 w	26,670 w	5,420 w	2180 w			157 w	107 w	2,074 w	2,122 w
East Asia & Pacific	5,600 w	2,390 w	4,130 w	1,530 w			95 w	34 w	1,939 w	2,617 w
South Asia	6,220 w	3,460 w	8,380 w	2,650 w			147 w	93 w	1,992 w	2,215 w
Europe	1,260 w	700 w	510 w	480 w			71 w	30 w	3,069 w	3,433 w
Middle East & N. Africa	7,740 w	2,410 w	6,160 w	1,800 w			151 w	79 w	2,153 w	3,011 w
Latin America & Caribbean	2,380 w	1,220 w	2,100 w	1,010 w			94 w	48 w	2,445 w	2,721 w
Other economies	500 w	530 w	300 w	290 w			30 w	23 w	3,125 w	3,327 w
Severely indebted	3,140 w	1,250 w	2,220 w	920 w			93 w	50 w	2,569 w	2,883 w
High-income economies	890 w	470 w	440 w	150 w			24 w	8 w	3,091 w	3,409 w
OECD members	880 w	460 w	440 w	150 w			24 w	8 w	3,099 w	3,417 w
†Other	1,660 w	880 w	760 w	210 w			31 w	13 w	2,546 w	3,072 w
World	6,050 w	4,200 w	3,700 w	1,600 w			91 w	52 w	2,333 w	2,711 w
‡Fuel exporters, excl. former USSR	16,870 w	4,480 w	5,440 w	1,900 w			149 w	84 w	2,093 w	2,642 w

Actual and Projected Percentages of Urban Population in Developing Countries with Access to Water and Sanitation Services, 1980-2000



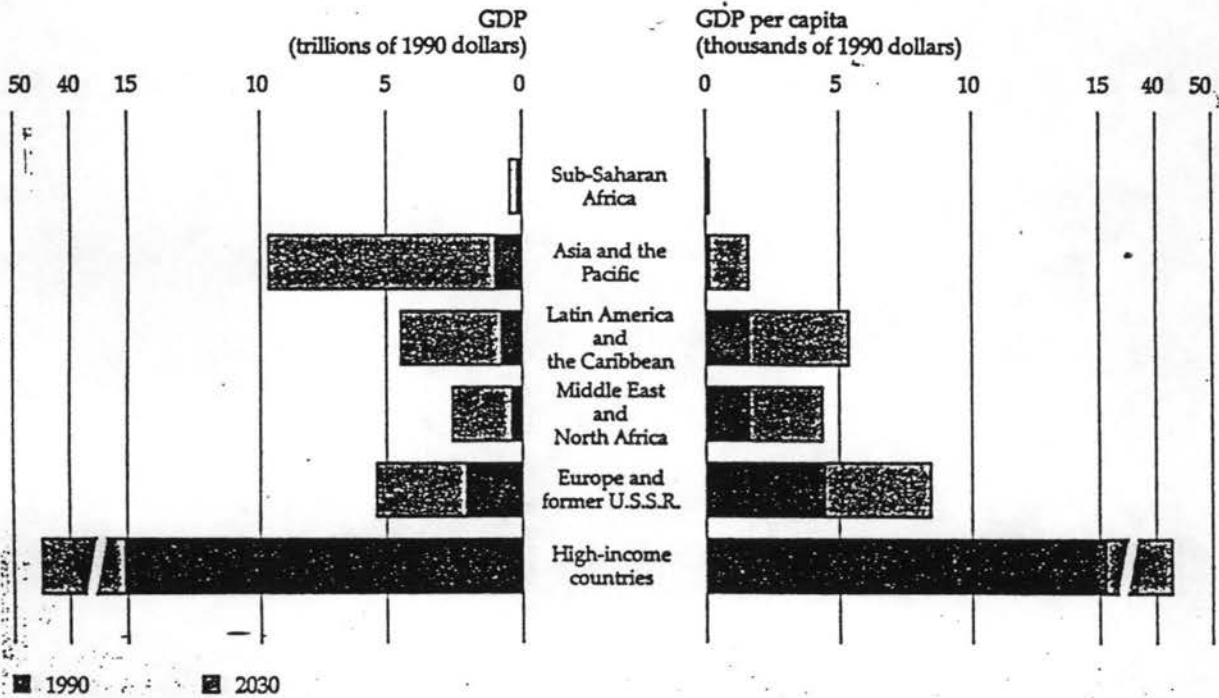
Source: Policy, Planning, and Research Staff, The World Bank, *FY88 Annual Sector Review: Water Supply and Sanitation* (The World Bank, Washington, D.C., November 1988), Figure 2, p. 2.

What are the major health problems facing the world?

What role can technology and public policy play in meeting these problems?

# Economic Trends Interdependence and Poverty

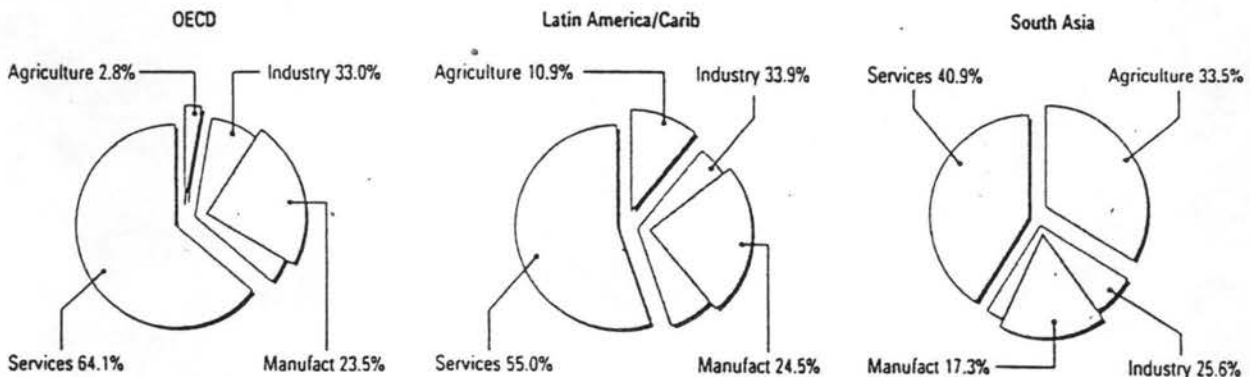
GDP and GDP per capita in developing regions and high-income countries,  
1990 and 2030



Note: Data for 2030 are projections.  
Source: World Bank data.

## GDP by industry, % of total (1988)

*The Economist*



Which current global economic trends have the greatest potential for causing future political friction? North-North competition, North-South competition, or South-South competition?

What economic role will international economic and trade groups (EEC, NAFTA, APEC, OPEC) play in the future?

How will global industrialization and the diffusion of manufacturing affect the potential capabilities (e.g., military) of nations?

# Ideological Trends

Group Identifications	Examples	Negative Trend?
Race	Negroid, Caucasoid, Mongoloid	Racism
Ethnic Group or Tribe	Kurdish, Bantu, Serbian	Ethnic friction
Language Group	Turkic, Spanish, English	Pan-nationalism
Religion	Christian, Moslem, humanist	Fundamentalism, messianism
Nation	Japanese, Guatamalan, French	Nationalism
Political Philosophy	Monarchist, liberal, totalitarian	Hegemonism, expansionism, colonialism
Economic Philosophy	Capitalist, autarch, socialist, communist	economic imperialism, colonialism

**With the end of the Cold War, has the world entered a new era where the major ideological struggles have been decided or is this view too simplistic?**

**How are ideological issues linked to political conflict?**

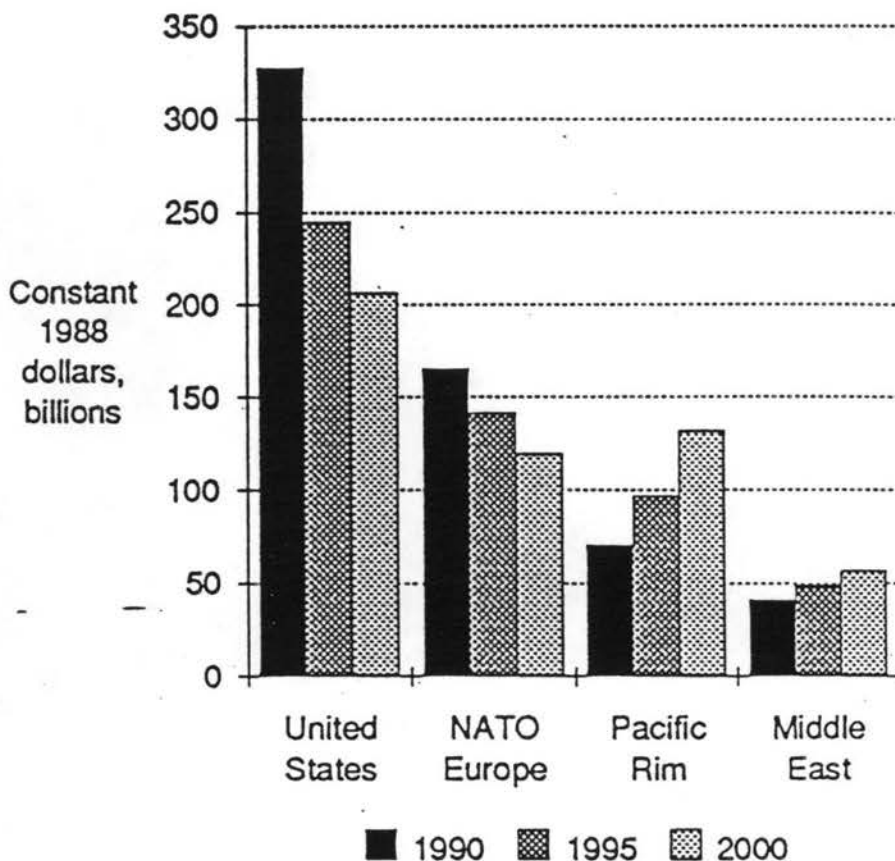
**In what regions of the world will ideological frictions be of greatest concern?**

**What can be done to relieve these frictions?**



# Domestic Security, Military Security and Terrorism

## Industry Projection of Worldwide Defense Spending, 1990-2000



Source: Major U.S. defense company's projection.

With the end of the Cold War, will security alliances and multilateral actions become more or less prevalent? Where?

What will be the role of international organizations and disarmament treaties?

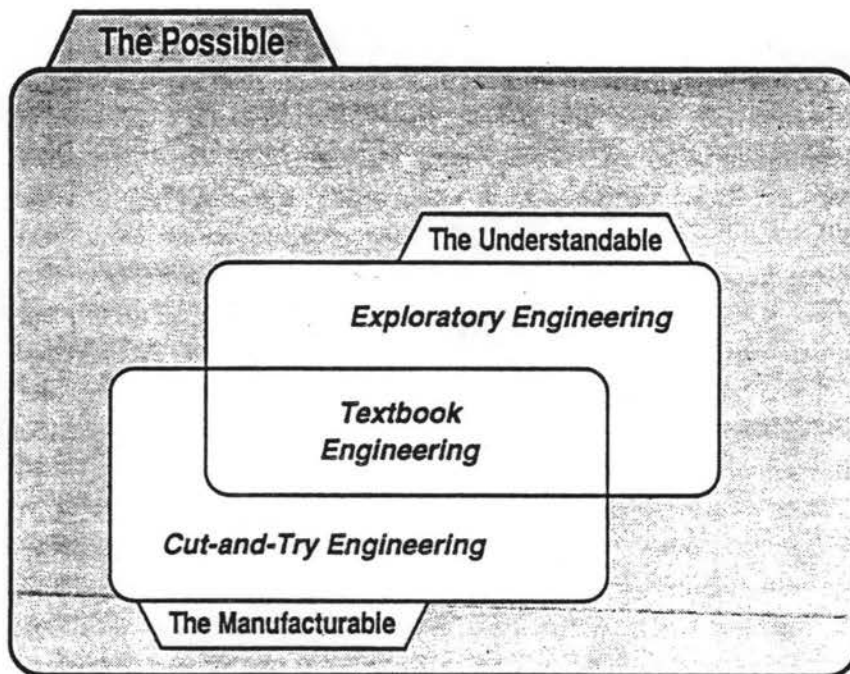
What trends do you see in weapons proliferation through sales, technology transfer, and production licensing?

Will terrorism expand or change its character in the future?

When do domestic security problems (e.g., crime, drugs, riots) become international concerns? When should "instability" be favored over the "status quo"?

What new technologies (military, police, intelligence) or policies will have a beneficial or detrimental effect on identified trends?

# Technology and Other Future Trends



EXPLORATORY ENGINEERING VENN DIAGRAM K. ERIC DREXLER

*The outer tagged rectangle represents the set of all technologies permitted by the laws of nature, whether they exist or not, whether they have been imagined or not. Within this set are those technologies that are manufacturable with today's technology, and those that are understandable with today's science. Textbooks teach what is understandable (hence teachable) and manufacturable (hence immediately practical). Practical engineers achieve many successes by cut-and-try methods and put them into production. Exploratory engineers study what will become practical as manufacturing abilities expand to embrace more of the possible.*

Source: K. Eric Drexler et al., *Unbounding the Future: The Nanotechnology Revolution* (New York, NY: William Morrow, 1991), p.42.

What emerging technologies and technology issues have not been sufficiently addressed during the workshop?

How do policymakers separate the probable from the possible from the fantastical when examining future trends?

What other important future trends or events need to be discussed?