

Sustainable Development

History – Assessing the principle

Roadmap

- Setting the stage – the debate
 - What defines the limits?
 - Sustainability, sustainable yield etc
 - Nine ways to achieve sustainability
- Sustainable development
 - Definitions
 - 3 dimensions
 - 3 approaches
 - Key issues to keep in mind

Roadmap

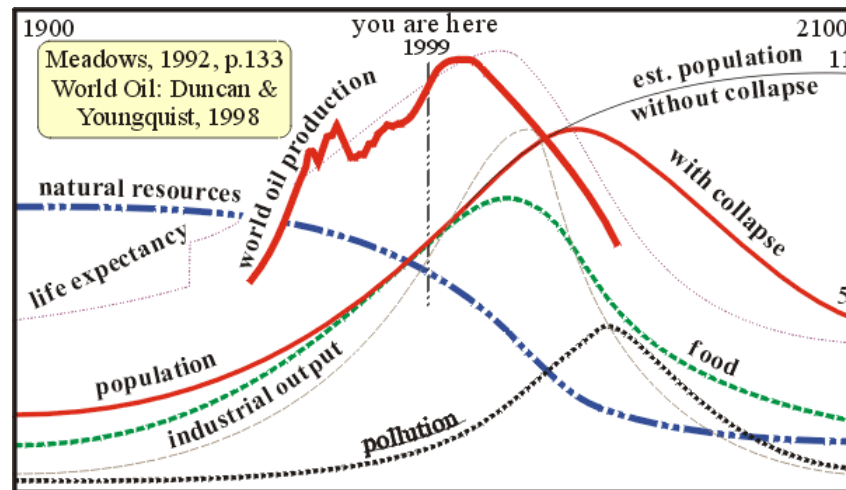
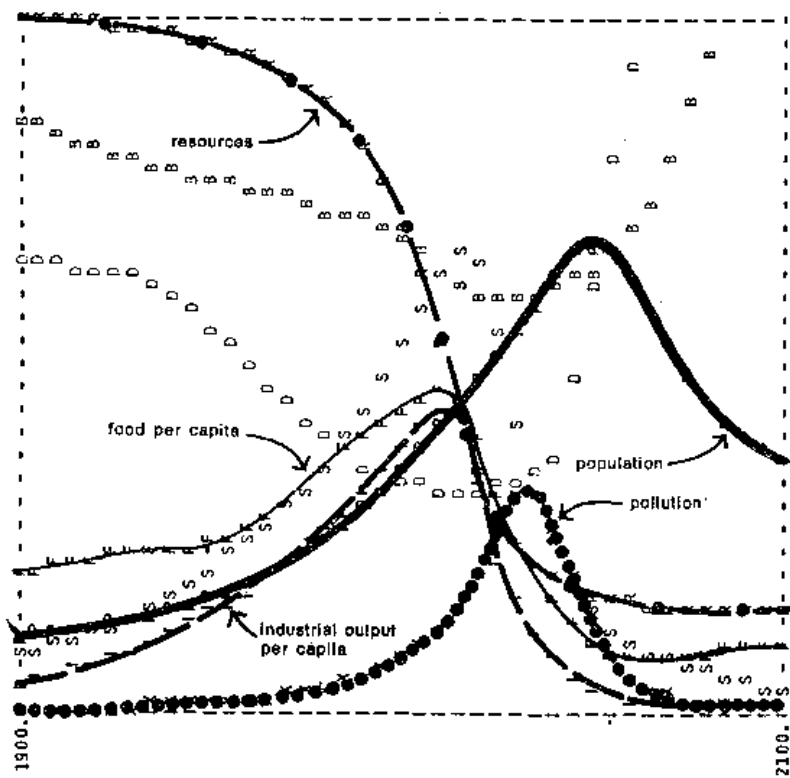
- History SD
 - The beginning
 - Stockholm
 - The road to Rio
 - Our common future
 - Agenda 21
 - CSD, CBD, UNFCCC
 - Rio plus 10
 - Johannesburg
 - Millennium development goals

Setting the stage

- Malthus – Principle of population
“Population when unchecked increased in a geometric ratio and subsistence for man in an arithmetical ratio”
- Renewed Malthusians
 - Club of Rome - Limits to growth – Donella Meadows et al
 - Lester Brown – Worldwatch Institute – warnings of immediate collapse
- Remind us that sooner or later unchecked consumption will get us in trouble

Limits to Growth

Figure 35 WORLD MODEL STANDARD RUN



Setting the stage

- Ester Boserup – believed “necessity is the mother of inventions” – increased population pressures act as an incentive to the development of new technology and food production
- Julian Simon, Wilfred Beckerman – limits only set by human ingenuity not resources
- Lomborg – assessing Simons claims
 - Who to believe?

Long run vs short run

- Physical limits set by Nature – or what?
- In the long run we are limited without changes in technology
- In the short run rely on human ingenuity to keep us going

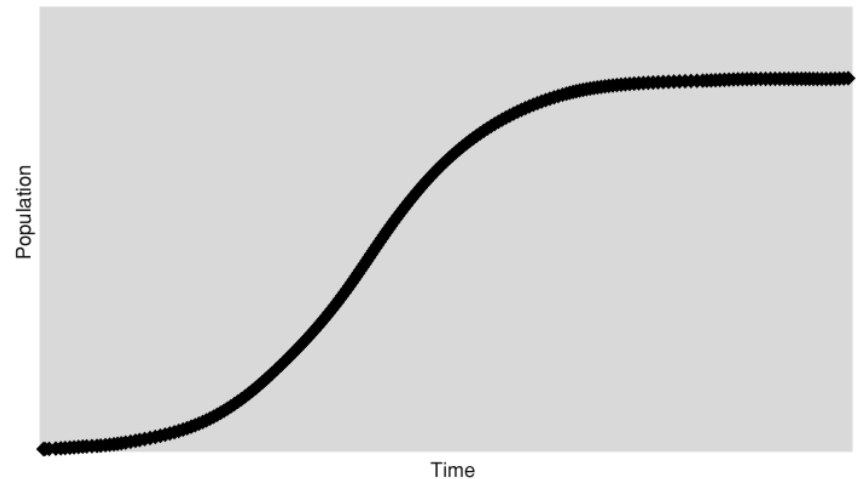
Sustainability

- Selected to bridge the gulf between development and environment
- Originally used in
 - Fisheries “maximum sustainable yield”
 - Forestry “maximum sustainable cut”
 - Hydrology “maximum sustainable pumping rate”

Renewable Resources

Population growth

- Logistic or density dependent growth
- Upper limit to the ultimate size
- Determined by carrying capacity
 - What defines CC?
- Growth curve u-shaped



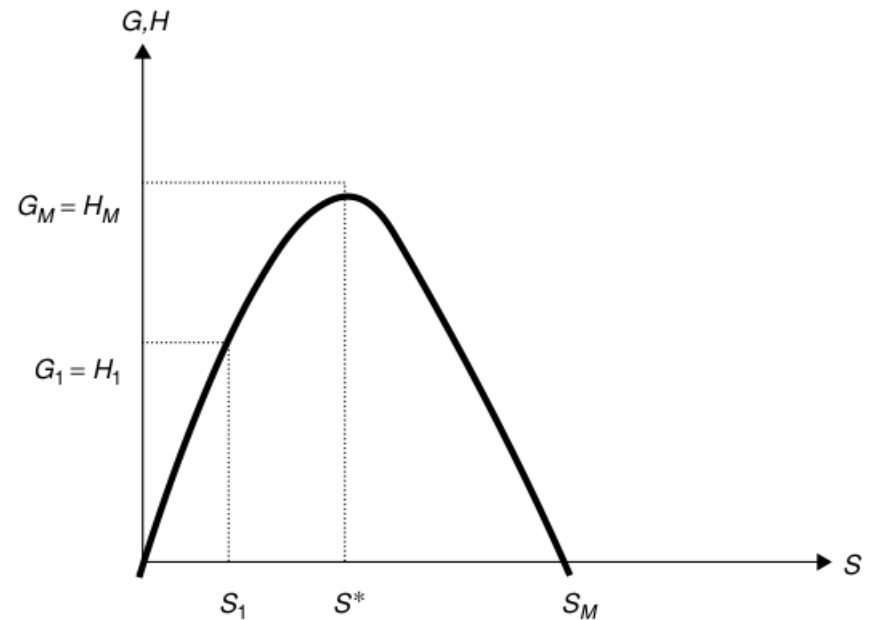
Growth determined by:

$$P_t = P_{t-1} + r^*(CC - P_{t-1})/CC$$

MSY

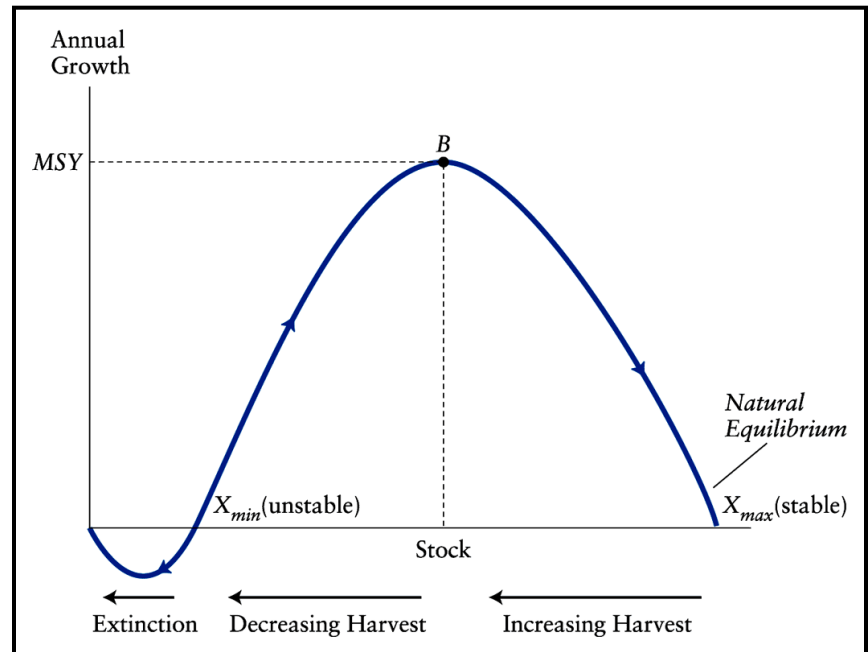
Original Equation

- $S_t = S_{t-1} + G_t - E_t$
- Extraction affects stock size.
- Sustainable yield: extraction equal to growth
- $G=E$



Renewable resources

- Maximum sustainable yield (MSY)
- Complex dynamics - stock possibly grows drastically with decreased harvest



Sustainability?

- What is a sustainable fishery?
- How would you define it?

Nine ways to achieve sustainability

1. Leave everything in pristine state, or return it to pristine state
2. Develop so as to not overwhelm carrying capacity of the system
3. Sustainability will take care of itself as economic growth proceeds (Kuznets)
4. Polluter and victim can arrive at an efficient solution by themselves (Coase)
5. Let the market take care of it!

Nine ways to achieve sustainability?

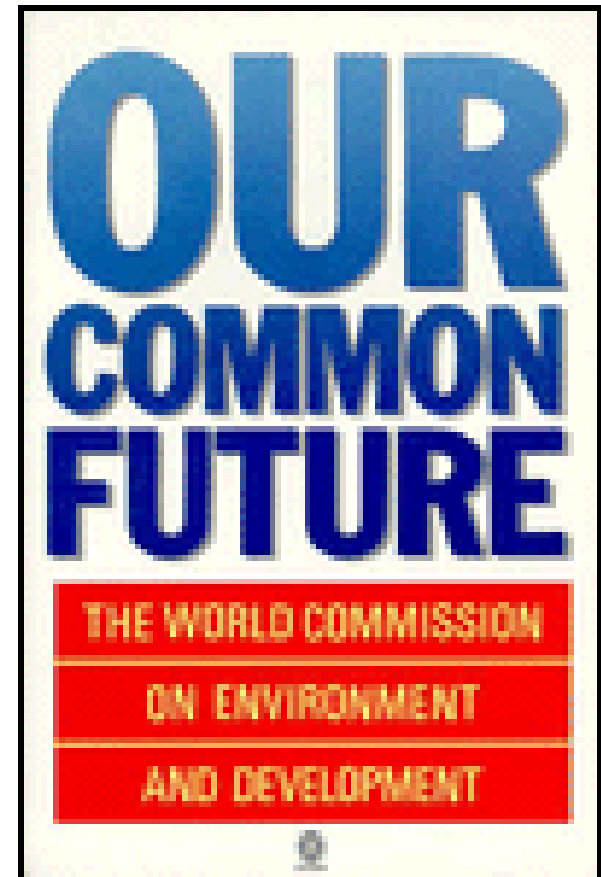
6. Internalize externalities
7. Reinvest rents for nonrenewable resources
8. Let the national economic accounting systems reflect defensive expenditures
9. Leave for future generations the options or the capacity to be as well off as we are

Sustainable Development

“Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs”

Brundtland Commission

“Our common future” 1987



Dissecting

“meeting the needs”,

“the present”

“compromise”

“ability of future generations”

“meet their own needs”

Different views

- Robert Repetto

“The core idea of sustainability is that current decisions should not impair the prospects for maintaining or improving future living standards. This implies that our economic system should be managed so we can live off the dividends of our resources”.
- Resources – all resources

Mohan Munasinghe

- SD is an approach that will permit continuing improvements in the quality of life with a lower intensity of resource use, thereby leaving behind for future generations an undiminished or even enhanced stock of natural resources and other assets.

Different views

- Mohan Munasinghe – three approaches
- **Economic:** Maximize income while maintaining a constant or increasing stock of capital
- **Ecological:** Maintaining resilience and robustness of biological and physical systems
- **Socio-cultural:** Maintaining the stability of social and cultural systems

- **Triple bottom line**

3 Dimensions

Economic dimension

Capital: produces a stream of goods and services into the future

- Financial capital
- Manufactured capital; durable capital
- Human capital; stocks of learned skills
- Intellectual capital; accumulation of knowledge and skills not embodied in individuals
- Social capital; Set of institutions and customs
- Natural capital; renewable and nonrenewable

Weak vs Strong sustainability

- **Weak sustainability;** man made and natural capital substitutable. Sum must be non-declining
 - Implications?
- **Strong sustainability;** man made and natural capital with limited substitutability, each stock must be non-declining separately
 - Implications?

Strong or weak?

Robert Repetto – Economic Approach

“The core idea of sustainability is that current decisions should not impair the prospects for maintaining or improving future living standards. This implies that our economic system should be managed so we can live off the dividends of our resources”.

- Resources – all resources

Economic dimension

Jonathan Harris Tufts U

- An economically sustainable system must be able to produce goods and services on a continuing basis, to maintain manageable size of government and external debt and to avoid sectoral imbalances (maintain diversity)

Environmental dimension

D. Pearce

- Sustainable development is (1) development subject to a set of constraints which set resource harvest rates at levels not higher than managed natural regeneration rates and (2) use of the environment as a waste sink on the basis that waste disposal rates should not exceed rates of managed or natural assimilative capacity of the ecosystem

Quantifiable

- Managed or natural regeneration rate
 - Forest resource
 - X_1 biomass removed/unit time
 - X_2 biomass regenerated/unit time
 - $X_1 \leq X_2$
- Managed or natural waste assimilative capacity
 - Wastewater effluent
 - Y_1 = PPM discharged BOD/unit time
 - Y_2 = PPM BOD capacity /unit time
 - $Y_1 \leq Y_2$

Environmental dimension

Jonathan Harris Tufts U

- A stable resource base, do not overwhelm the waste assimilative ability of the environment nor the regenerative services of the environment, deplete non-renewables only to the extent we invest in renewable substitutes.

Social Dimension

Jonathan Harris Tufts U

- Achieve distributional equity, adequate provision of social services including health and education, gender equity and political accountability and participation

3 Approaches

Economic Approach to SD

- Robert Repetto
“The core idea of sustainability is that current decisions should not impair the prospects for maintaining or improving future living standards. This implies that our economic system should be managed so we can live off the dividends of our resources”.
- Resources – all resources

Ecological approach to SD

IUCN

- SD is about maintenance of essential ecological processes and life support systems, the preservation of genetic diversity and the sustainable utilization of species and ecosystems

Social Approach to SD

Ed Barbier

- SD is directly concerned with increasing the standard of living of the poor, which can be measured in terms of increased food, real income, education, health care, water supply, sanitation and only indirectly concerned with economic growth at the aggregate.

The principle

- Protect the environment and at the same time fulfill economic and social objectives
- Operational criteria:
 - Economic objectives should not be maximized without satisfying environmental and social constraints
 - Environmental benefits should not be maximized without satisfying economic and social constraints
 - Social benefits should not be maximized without satisfying economic and environmental constraints

The principle – meant to deliver

1. Economic growth and equity; not leaving any region behind
2. Conserving natural resources and the environment; for us and future generations
3. Social development; Ensure rich fabric of social and cultural diversity, ensure rights of workers, empowerment and at the same time ensure jobs, education, food, health care, energy etc.

Confusion

- Sustainable development
- vs.
- Sustainable production
 - Sustainable extraction
 - Sustainable use
 - Sustainable yield

To consider

- Define sustainable development of the Icelandic Geothermal system

History of SD

1. The Beginning

- 1962; “Silent spring” – Rachel Carson
- 1963 International biological programme initiated
- 1967 Environment defense fund pursues legal options to protect environment
- 1968 Paul Ehrlich “The population bomb”
- 1968 Club of Rome

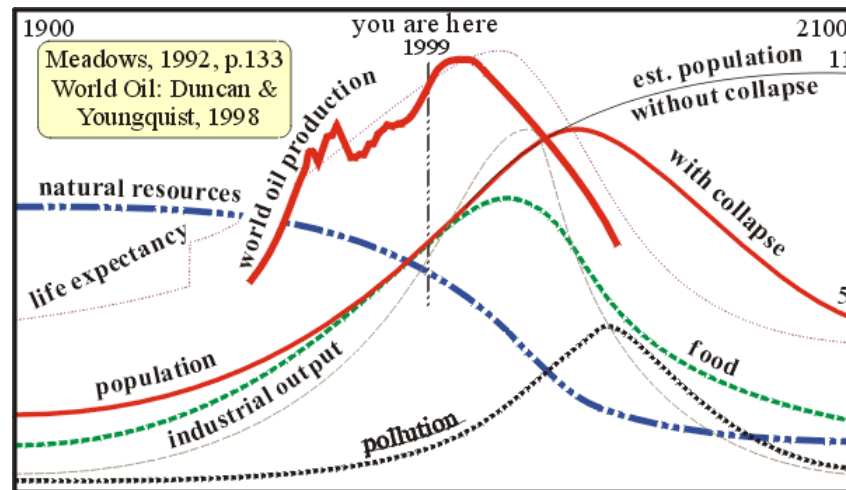
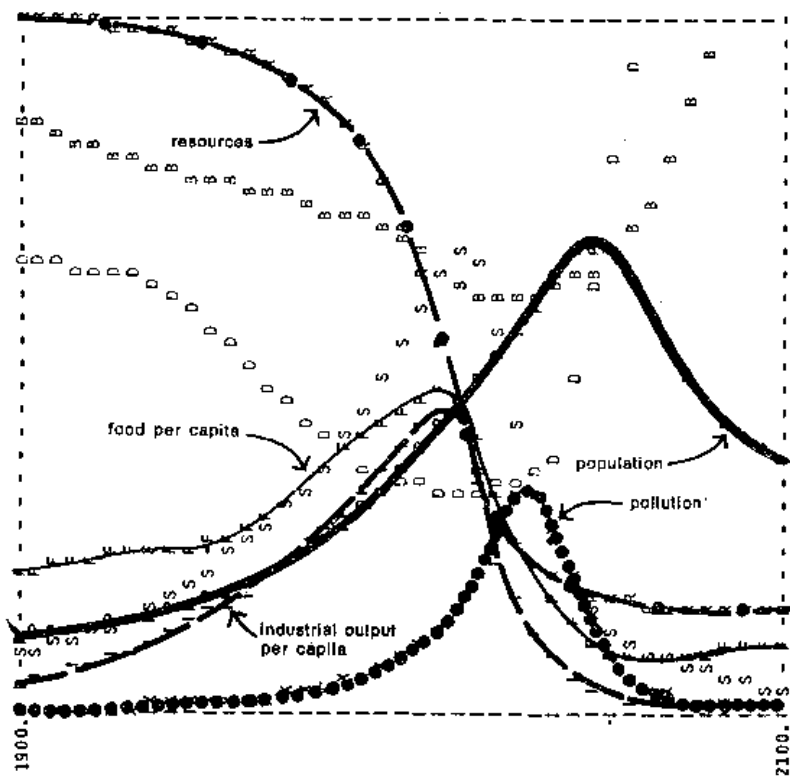
History

1. The Beginning

- 1968; Intergovernmental conference for rational use and conservation of the biosphere
- UN GA authorizes the Human Environment conference in Stockholm
- 1969 NEPA formed – EPA established
- 1970 - 71 Natural Resources Defense Council formed, earth day, Greenpeace established, IIED
- 1971 Founex Report
- 1972 Club of Rome report published “Limits to Growth”

Limits to Growth

Figure 35 WORLD MODEL STANDARD RUN



First Conference – first milestone

- 1972 Stockholm, United Nations Conference on Human Environment
 - First international recognition of environmental problems and the link between human behavior and environmental issues
 - Focus on environment vs development
 - Concept Sustainable development argued as the solution to this dilemma
 - Led to creation of UNEP

First Conference 1972

- Conference themes
 - the interdependence of human beings and the natural environment;
 - the links between economic and social development and environmental protection;
and
 - the need for a global vision and common principles.

The Road to Rio

2. Towards Rio

- 1972 Oil Crisis
 - Evidence mounts for increasing scarcity
- 1980 World Conservation strategy released (IUCN)
 - Towards Sustainable development
 - Poverty, population pressure, inequity, trade
- Global 2000 commissioned
- 1983 World Commission on Environment and Development formed
 - Gro Harlem Brundtland (chair)

World Commission on Environment and Development

Mandate to work for 3 years to:

- To propose long-term environmental strategies for achieving sustainable development to the year 2000 and beyond;
- To recommend ways in which concern for the environment may be translated into greater co-operation among developing countries and between countries at different stages of economic and social development
- To consider ways and means by which the international community can deal more effectively with environmental concerns, in the light of the other recommendations in its report;
- To help to define shared perceptions of long-term environmental issues

2. The Road to Rio

- 1984 Worldwatch publishes the first State of the World Report
- 1985 Antarctic ozone hole found
- 1985 Villach Austria, climate change predicted
- 1986 IUCN Conference on Environment and Development
- 1987 Our Common Future Published
 - Prompts the Earth Summit in Rio

Our Common Future – second Milestone

- Argue for a new era of economic growth, growth that is forceful, and at the same time environmentally and socially sustainable.
- Three dimensions of SD
 - Environment
 - Economics
 - Social
- Not clear on specifics

The Earth Summit – third milestone

- 1992, The United Nations Conference on Environment and Development
 - Rio 1992
 - 178 nations
 - 2400 NGO's
 - 17000 participants

Unparalleled emphasis and interest in the environment
– and how to achieve balanced solutions

The Earth Summit

Outcomes

- Rio Declaration on Environment and Development
- Agenda 21
- Convention on Biological Diversity
- Forest Principles
- Framework Convention on Climate Change
- Establishing the CSD – began operating in 1993

Rio Declaration

- Non-binding
- Consists of 27 Principles intended to guide future sustainable development around the world
- <http://www.un.org/documents/ga/conf151/aconf15126-1annex1.htm>

Rio Declaration – Key highlights

- Humans at the center
- States have the right to use their own resources as they see fit
- Must integrate the environment into development plans
- Should facilitate increased public participation
- States should enact environmental legislation and should cooperate where needed
- Should actively discourage or prevent relocation of activities or substances harmful to the environment or human health
- Apply the **Precautionary approach**
- Internalize environmental costs and use economic instruments
- EIA should be undertaken for proposed activities
- Peace, development and environmental protection are interdependent and indivisible

Agenda 21

- A comprehensive blueprint of action to be taken globally, nationally and locally by organizations of the UN, governments, and major groups in every area in which humans influence the environment.
- The task is to balance economic development with social and environmental objectives
- 21?
- 40 Chapters, 4 sections, 100 programme areas
- Non-binding

The 4 sections

Section I: Social and Economic Dimensions

- Including combating poverty, changing consumption patterns, population and demographic dynamics, promoting health, promoting sustainable settlement patterns and integrating environment and development into decision-making.

Section II: Conservation and Management of Resources for Development

- including atmospheric protection, combating deforestation, protecting fragile environments, conservation of biological diversity (biodiversity), and control of pollution.

Section III: Strengthening the Role of Major Groups

- Including the roles of children and youth, women, NGOs, local authorities, business and workers.

Section IV: Means of Implementation

- Including science, technology transfer, education, international institutions and mechanisms and financial mechanisms.

Local Agenda 21

- Agenda 21 involves action at international, national, regional and local levels.
- Some national and state governments have legislated or advised that local authorities take steps to implement the plan locally (Chapter 28)
- Such programmes are often known as 'Local Agenda 21' or 'LA21'.

UNFCCC

- Binding
- Signed initially by 153 nations – now been ratified by enough nations to be implemented
- Described commitments to reduce emissions of GHG

CBD

- Binding
- Signed by 156 nations initially
- Deals with:
 - Economic exploitation of genetic material and biodiversity conservation
 - Creating protective areas and draw up national plans for conservation

Convention on forest management

- Non-binding
- Short statement on principles for a global consensus on forest management

Commission for SD

- Was established by the General Assembly to monitor and facilitate efforts to implement the diverse goals of the earth summit – in particular agenda 21.
- Supposed to promote dialog and encourage partnerships among governments, UN agencies and the NGO community.
- Lacks both power to make binding resolutions and its own financial resources to fund programs.
- Reports directly to ECOSOC

CSD - functions

1. Provides a forum for the discussion of a wide range of subjects related to SD. Supposed to strengthen the participation of groups such as NGO's indigenous peoples, local governments, workers women and the young.
2. Monitors progress made by industrial and developing countries towards SD and implementing Agenda 21. Protocol for reporting has been agreed upon – and at least..
 - 137 countries have submitted reports.
3. Have encouraging organizational developments but little has been done to implement key provisions agreed upon at the Earth Summit => But keep in mind – the CSD lacks powers to do anything about it.

History – After Rio

3. After Rio

- 1993 First meeting of the CSD
- 1995 World Summit for Social development
- 1996 The Summit of the Americas on SD
- 1997 UN GA review of the Earth Summit progress
- 2000 UN Millennium Summit – declaration of the Millennium Goals
- 2001 EU sustainable development strategy
- 2002 Rio plus 10 - Johannesburg

Millennium Declaration

- <http://www.un.org/millenniumgoals/>
- The eight Millennium Development Goals (MDGs) form a blueprint agreed to by all the world's countries and all the world's leading development institutions.
- The goals.....

The Millennium Goals

1. Eradicate extreme poverty and hunger
2. Achieve universal primary education
3. Achieve gender equality and empower women
4. Reduce child mortality
5. Improve maternal health
6. Combat HIV/AIDS, malaria
7. Ensure environmental sustainability
 - Integrate the principles of sustainable development into country policies and programs
 - reverse loss of environmental resources
 - Reduce by half the proportion of people without sustainable access to safe drinking water
8. Develop a global partnership for sustainability

The Millennium Goals

- <http://www.un.org/millenniumgoals/>
- Take a look at the indicators and the most recent report

3) Rio plus 10. Johannesburg

World Summit on Sustainable Development (WSSD)

2002 Johannesburg

- Established to assess progress on implementation of the results of the Rio summit – in particular Agenda 21.
- The Johannesburg Plan of Implementation, agreed at the World Summit on Sustainable Development (Earth Summit 2002) affirmed UN commitment to 'full implementation' of Agenda 21, alongside achievement of the Millennium Development Goals and other international agreements.
- Non-binding
- No new conventions

Johannesburg

- Johannesburg Declaration
 - Targets set for economic factors and poverty reduction – e.g.
 - Halve by 2015 the population living on less than 1\$ a day
 - Ensure by 2015 all children complete primary education
 - Non-quantitative targets for environment
 - Substantially increase global share of renewable energy sources
 - Achieve by 2010 a significant reduction in the current rate of loss of biodiversity

Johannesburg

- Focus:
 - Social pillar of SD
 - Fight poverty
 - Mutually enhancing poverty and environmental degradation is one of the factors preventing SD
 - Address equitable access to resources
 - Debt relief programs
 - Increasing ODA

The three dimensions

- The three conferences defined the three dimensions
 - Stockholm (Environment)
 - Rio (Economics)
 - Johannesburg (Social)

Move towards fostering synergy

- International community seems to agree on the general goals of SD
- Efforts remain fragmented – e.g. little link between various environmental agreements
- Increased cooperation required between various agreements (e.g. CBD and UNFCCC) – and there seems to be willingness to do this.

The Precautionary Principle

- Where environmental consequences of regulatory inaction are (1) in some way uncertain (2) **but non-trivial**, we must act
- In essence minimizing risk – setting minimum acceptable risk
- Already implemented into EU legislation and USA legislation

How can we get towards SD?

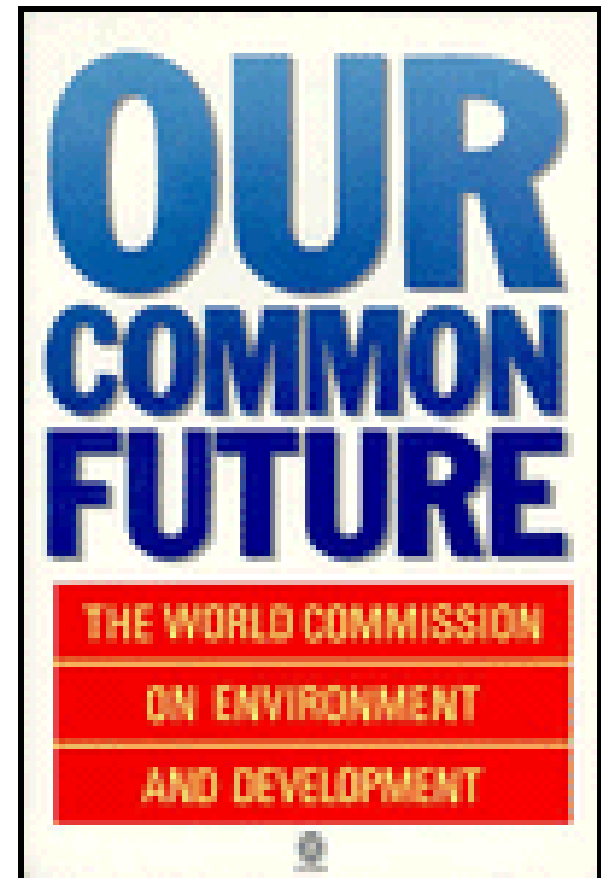
1. How do we define it?
 - What does it mean?
 - What is the objective?
 - What are the basic principles?
2. How do we know if we are moving there?
 - Indicators
3. How to move further?
 - From indicators to action

Sustainable Development

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Economic dimension

- An economically sustainable system must be able to produce goods and services on a continuing basis, to maintain manageable size of government and external debt and to avoid sectoral imbalances (maintain diversity)

Environmental dimension

- A stable resource base, do not overwhelm the waste assimilative ability of the environment nor the regenerative services of the environment, deplete non-renewables only to the extent we invest in renewable substitutes.

Social Dimension

- Achieve distributional equity, adequate provision of social services including health and education, gender equity and political accountability and participation

The principle

- Protect the environment and at the same time fulfill economic and social objectives

The three core drivers of un-sustainability

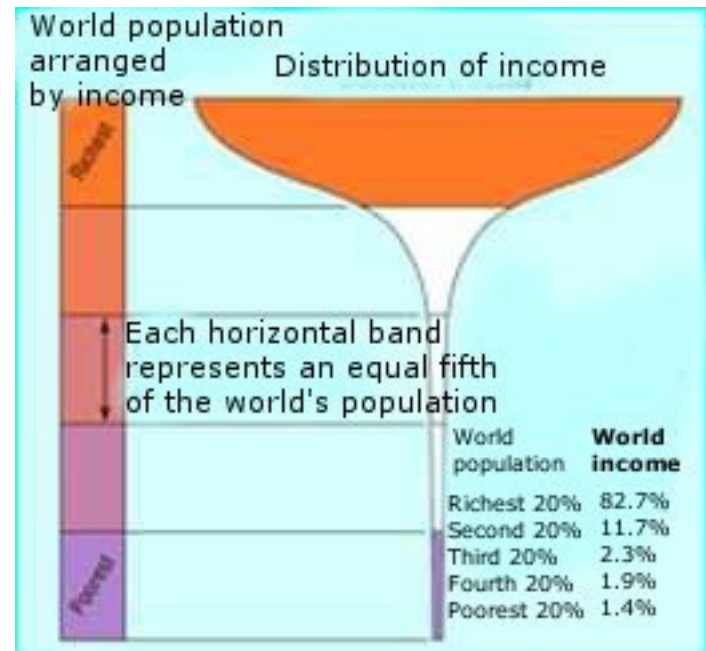
- Consumption
 - Use of resources beyond the reasonable limits set by nature
- Production
 - Gross inefficiencies in production.
- Distribution
 - Inequitable distribution e.g. distribution of global income between rich and poor

Distribution

Myths

- Most environmental degradation is done by the poor
- Poverty reduction leads to environmental degradation
- Population growth necessarily leads to env. degradation
- The poor are too poor to invest in env.
- Poor people lack technical knowledge for resource management

The champagne glass



Conclusion

- Is a long journey towards SD
- End-point not definable
- Each country/region has different goals, based on economic circumstances, population size, stage of development, resource endowment etc....
- General vague principle agreed upon