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SUSTAINABLE DEVELOPMENT: THEORETICAL APPROACHES AND MEASUREMENT METHODS

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FONDAZIONE ENI ENRICO MATTEI

LECTURE I

SUSTAINABLE DEVELOPMENT: THEORETICAL APPROACHES AND MEASUREMENT METHODS

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Trieste, 2nd October 2012

OUTLINE

Sustainable Development:

- ***Historical Background***
- ***Definition and Main Issues***
- ***Economy vs Environment***
- ***Measuring Sustainability***

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HYSTORICAL BACKGROUND: THE ROOTS

- 1972 = United Nations Conference on the Human Environment held in Stockholm

✓ (simultaneously => Limits to Growth)

- 1983 = creation of the World Commission on Environment and Development (WCED). Mission: to formulate 'A global agenda for change'

- 1987 = Our Common Future => global interdependence and strong relationship between social, economic, cultural and environmental issues and global solutions. "The environment does not exist as a sphere separate from human actions, ambitions and needs, and therefore it should not be considered in isolation from human concerns"

RIO 1992: AGENDA 21

- 1992 = first UN Conference on Environment and Development (UNCED) held in Rio de Janeiro. Adopted an agenda for environment and development in the 21st Century (***Agenda 21***). Each nation's right to pursue social and economic progress and responsibility of adopting a model of sustainable development => "Human beings are at the center of concerns for sustainable development. They are entitled to a healthy and productive life in **harmony with nature**"

➢ Main items:

- ✓ Convention on Biological Diversity Conservation
- ✓ Climate Change (UNFCCC)
- ✓ Forest Management
- ✓ UNCED (Agenda 21; Rio Declaration)

FROM RIO TO … RIO!

- 2002 = a follow-up conference, the World Summit on Sustainable Development (WSSD) was convened in Johannesburg to renew the global commitment to sustainable development (***from what to how***)

- 2012 = RIO + 20 => 2 main objectives

✓ integration of sustainable development at all levels of institutional governance

✓ green economy (make more concrete the concept of sustainable development?)

Focus areas for priority attention
1. Green jobs, youth employment and social inclusion
2. Energy access, efficiency, sustainability
3. Food security and sustainable agriculture
4. Water
5. Sustainable cities
6. Management of the oceans, fisheries and other marine resources
7. Improved resilience and disaster preparedness

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SUSTAINABLE DEVELOPMENT: Definition

Brundtland Report (WCED, 1987 – Our Common Future):

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

It contains within it two key concepts:

*the concept of **needs**, in particular the essential needs of the world's poor, to which overriding priority should be given; and*

*the idea of **limitations** imposed by the state of technology and social organization on the environment's ability to meet present and future needs."*

MAIN ISSUES

Trade-off between sustainability spheres:

- Economy
- Society
- Environment

- Economic growth different by wellbeing increase

- Intra-generational equity (weighting)
- Inter-generational equity (discounting)

STRONG vs WEAK SUSTAINABILITY

Economy/Environment substitutability (manufactured vs natural capital)

Common point => non-decreasing welfare/utility (or easier, consumption/GDP) over time

But ….

Strong => leave to future generations the same amount of natural resources and environmental quality (non-decreasing **natural** capital) => precautionary principle

Weak => find substitutes for exhausting natural capital (such that non-decreasing **total** capital: natural + physical + human + social)

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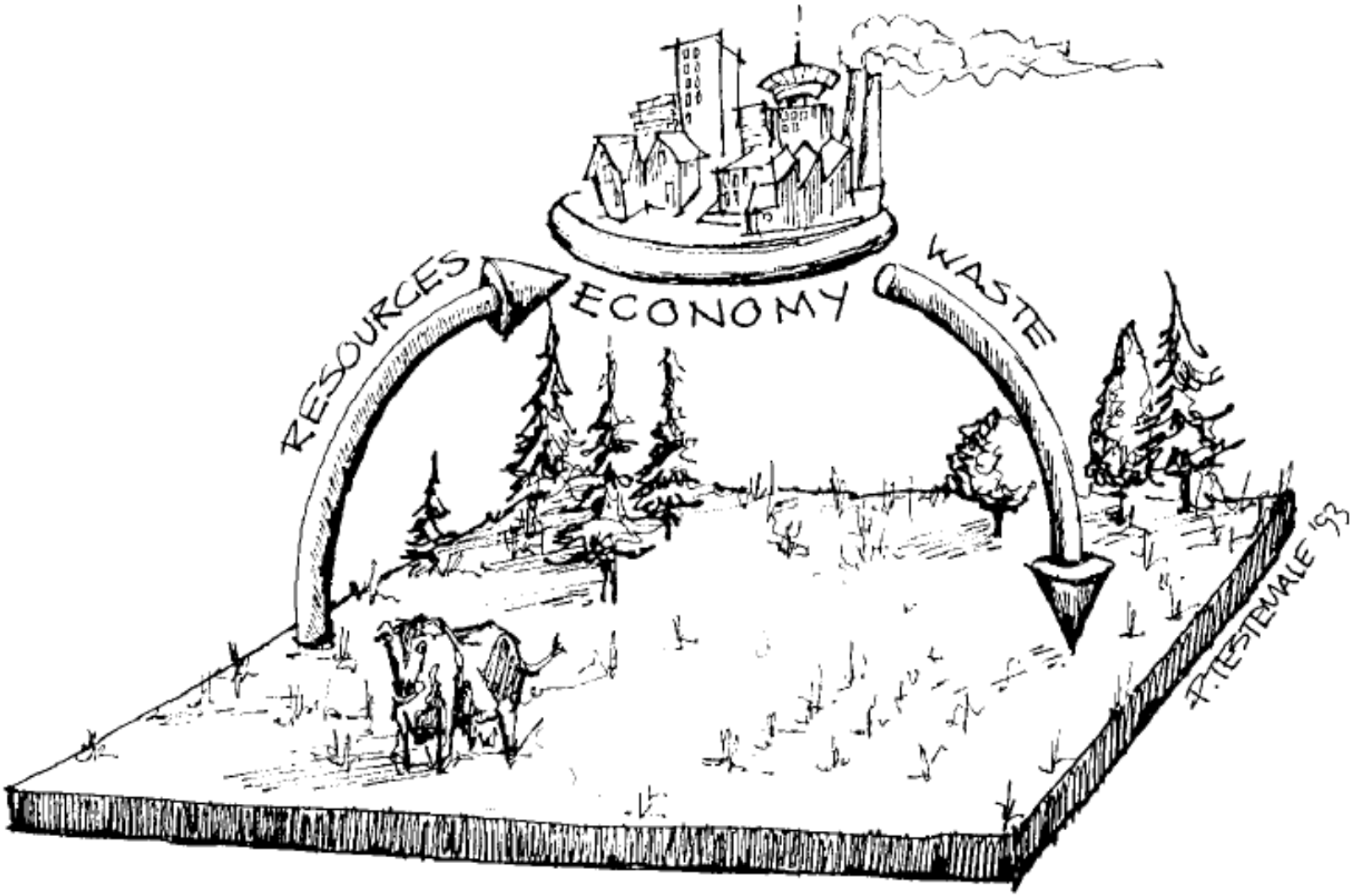
ECONOMIC GROWTH vs ENVIRONMENT

- Not only environmental concerns …. but everlasting ***trade-offs between economic growth and environmental deterioration***

➢ Kenneth Boulding => The Economics of the Coming Spaceship Earth (1966)

*"I am tempted to call the open economy the "**cowboy economy**," the cowboy being symbolic of the illimitable plains and also associated with reckless, exploitative, romantic, and violent behavior, which is characteristic of open societies. The closed economy of the future might similarly be called the "**spaceman**" economy, in which the earth has become a single spaceship, without unlimited reservoirs of anything, either for extraction or for pollution, and in which, therefore, man must find his place in a cyclical ecological system which is capable of continuous reproduction of material form even though it cannot escape having inputs of energy."*

ECONOMIC GROWTH vs ENVIRONMENT

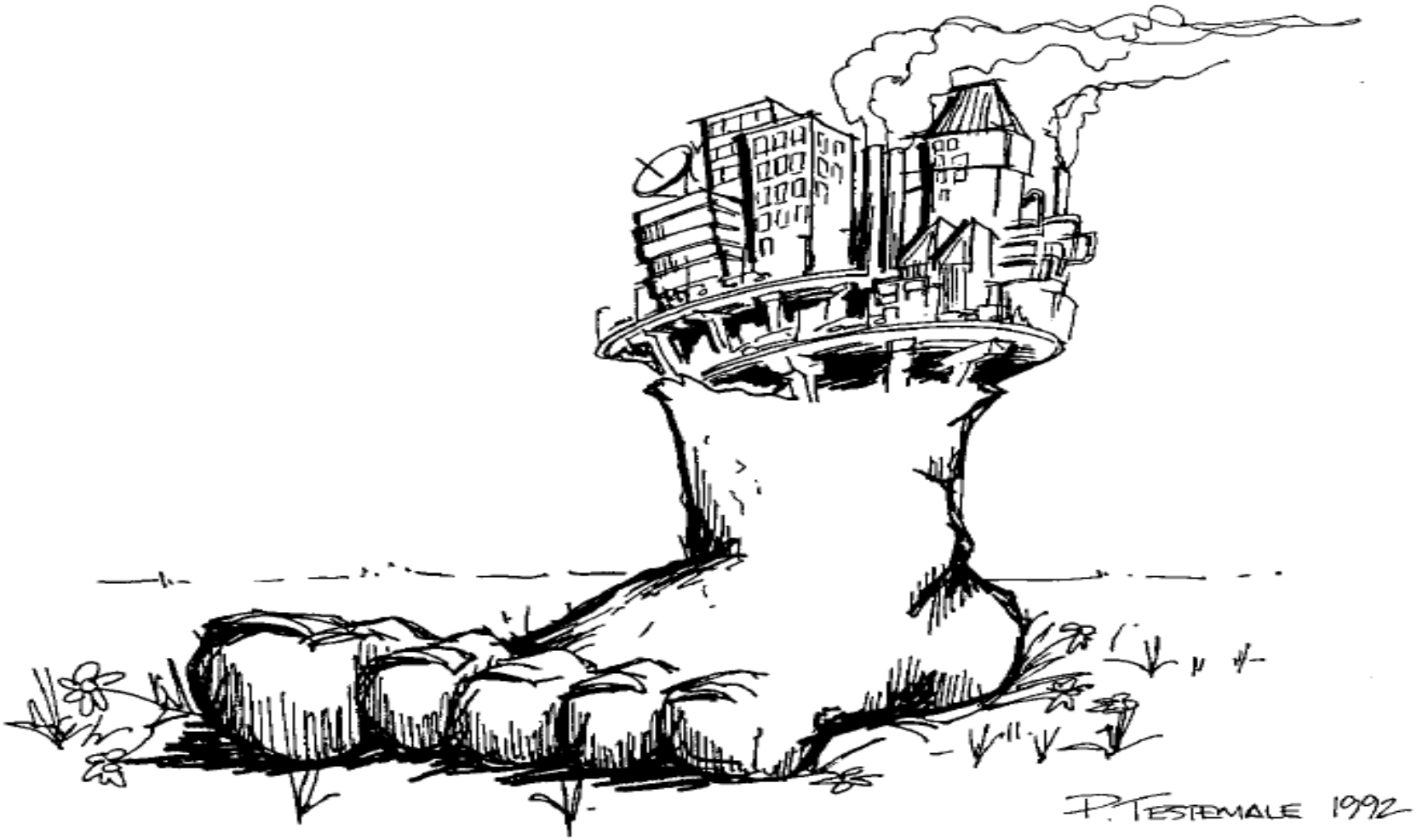


MARKET FAILURES: EXTERNALITIES

=> long-term sustainable trends?

- Many concerns: Coase (1960), Hardin (1968), Limits to Growth (1972), Wackernagel and Rees (1994, 1996)

MARKET FAILURES: EXTERNALITIES



MARKET FAILURES: EXTERNALITIES

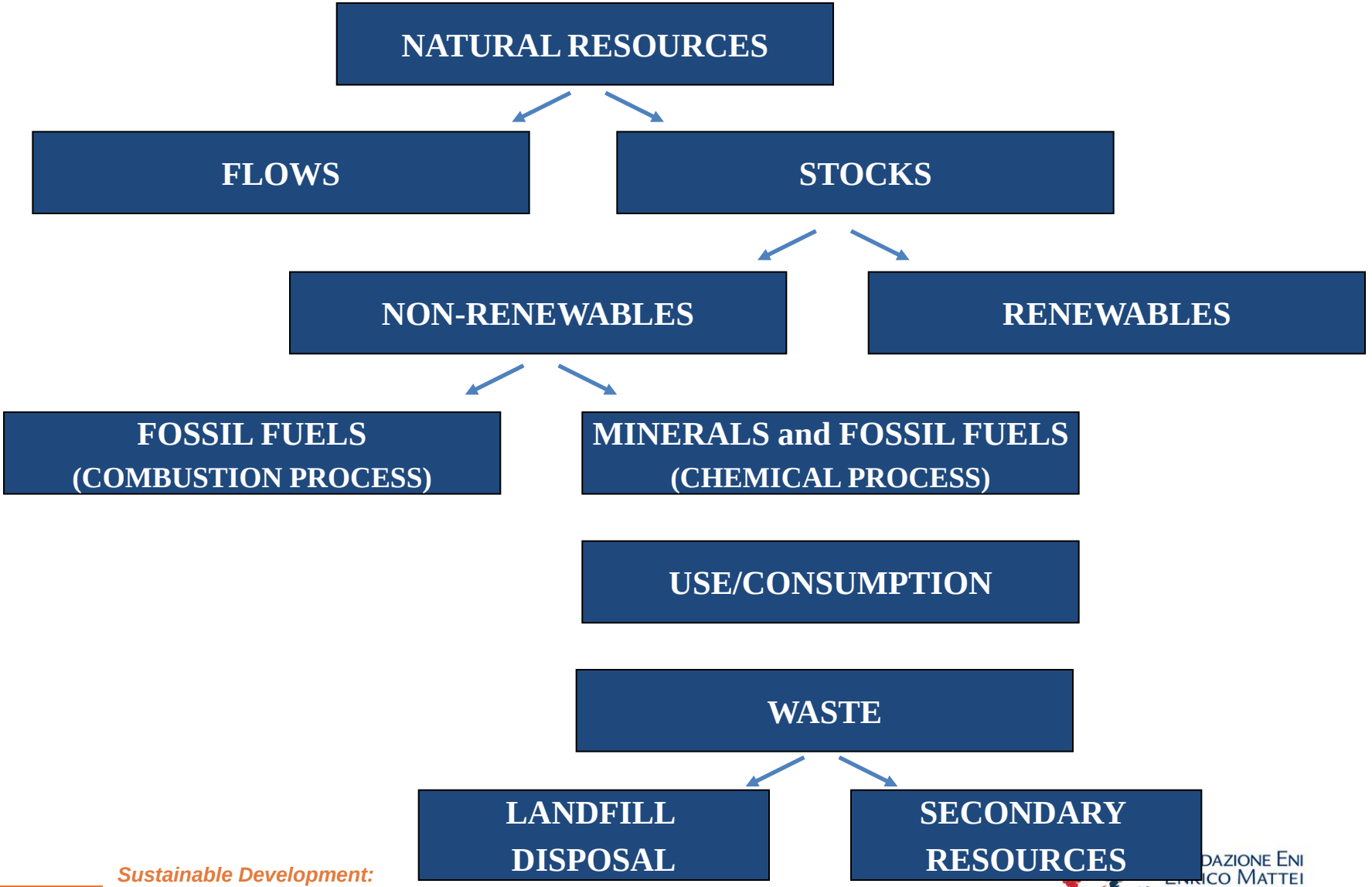
- Environment and Natural Resources => Inputs/constraints for economic systems?
- Upstream => Extraction of natural resources (extraction/harvest rate higher than growth/regeneration rate)
- Downstream => Pollution of environment receptors (pollution quality and quantity higher than assimilative/carrying capacity)
- An alternative Production Function

Q = f (L,K) → **Q = f (L,K,R,-E)**

ENVIRONMENTAL ACCOUNTING

- Satellite System for Integrated Environmental and Economic Account (SEEA)
- Valuation of environmental capital
- Valuation of natural resources depreciation
- Defensive environmental expenditures

MATERIALS BALANCE



FLOWS, STOCKS, RENEWABLES

- Flows = (in principle) current use does not affect future availability (ex. solar radiation)
- Stocks = current use reduces future availability

- Renewables = growth rate is greater than or equal as harvest rate
- Non-Renewables = growth rate (requiring geological periods) is lower than harvest rate (ex. fossil fuels, long-term forestry)

KAYA IDENTITY

- It decomposes carbon emissions into its major determinants

- For a given level of GDP, CO_2 reduction can come from reduction in:
  - Energy consumption
  - Energy use per unit of output (energy intensity)
  - CO_2 emissions per unit of energy (carbon intensity)

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RIO + 20 STATEMENTS

- ***250 "RIO + 20" principle*** *=> We recognize that progress towards the achievement of the goals needs to be assessed and accompanied by targets and indicators, while taking into account different national circumstances, capacities and levels of development.*
- ***RIO 2012 Issues Briefs n. 6*** *=> Sustainable development indicators and composite indicators are considered to be a good vehicle in helping to measure sustainable development and progress achieved in it … They can help to share policy on the basis of information which is transparent and evidence-based.*
- ***Sustainable development indicators****: A statistical measure that gives an indication on the sustainability of social, environmental and economic development.*
- ***Composite indicators****: the compilation of individual indicators into a single index, on the basis of an underlying model of the multi-dimensional concept that is being measured.*

SUSTAINABLE DEVELOPMENT GOALS

The Governments of Colombia and Guatemala	CSOs
Combating Poverty	SDG1 Sustainable Consumption and Production
Changing Consumption Patterns	SDG2 Sustainable livelihoods, youth & education
Promoting Sustainable Human Settlement Development	SDG3 Climate sustainability
Biodiversity and Forests	SDG4 Clean energy
Oceans	SDG5 Biodiversity
Water Resources	SDG6 Water
Advancing Food Security	SDG7 Healthy seas and oceans
Energy, including from renewable sources	SDG8 Healthy forests
	SDG9 Sustainable agriculture
	SDG10 Green cities
	SDG11 Subsidies and investment
	SDG12 New Indicators of progress
	SDG13 Access to information
	SDG14 Public participation
	SDG15 Access to redress and remedy
	SDG16 Environmental justice for the poor and marginalized
	SDG17 Basic health

SUSTAINABLE DEVELOPMENT GOALS

Goal 1
Eradicate Extreme Hunger and Poverty

Goal 2
Achieve Universal Primary Education

Goal 3
Promote Gender Equality and Empower Women

Goal 4
Reduce Child Mortality

Goal 5
Improve Maternal Health

Goal 6
Combat HIV/AIDS, Malaria and other diseases

Goal 7
Ensure Environmental Sustainability

Goal 8
Develop a Global Partnership for Development

CSOs
SDG1 Sustainable Consumption and Production
SDG2 Sustainable livelihoods, youth & education
SDG3 Climate sustainability
SDG4 Clean energy
SDG5 Biodiversity
SDG6 Water
SDG7 Healthy seas and oceans
SDG8 Healthy forests
SDG9 Sustainable agriculture
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SUSTAINABLE DEVELOPMENT INDEX

- Researchers have recently proposed a number of composite Index aimed to integrate information from Gross Domestic Product to better represent wellbeing increase:

- ✓ ***HDI – Human Development Index*** (UNDP) => focus on social aspects, no environmental measurements
- ✓ ***GS – Genuine Savings*** (Pearce and Atkinson, 1993) => WB, sustainable income as the maximum that can be consumed without reducing wealth (human-made and natural capital)
- ✓ ***ISEW – Index of Sustainable Economic Welfare*** (Daly and Cobb, 1989) and ***GPI – Genuine Progress Indicator*** => corrects GDP considering capital natural depreciation, environmental deterioration costs, social costs

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