United Nations Economic and Social Commission for Asia and the Pacific

Key Indicators of Sustainable Development

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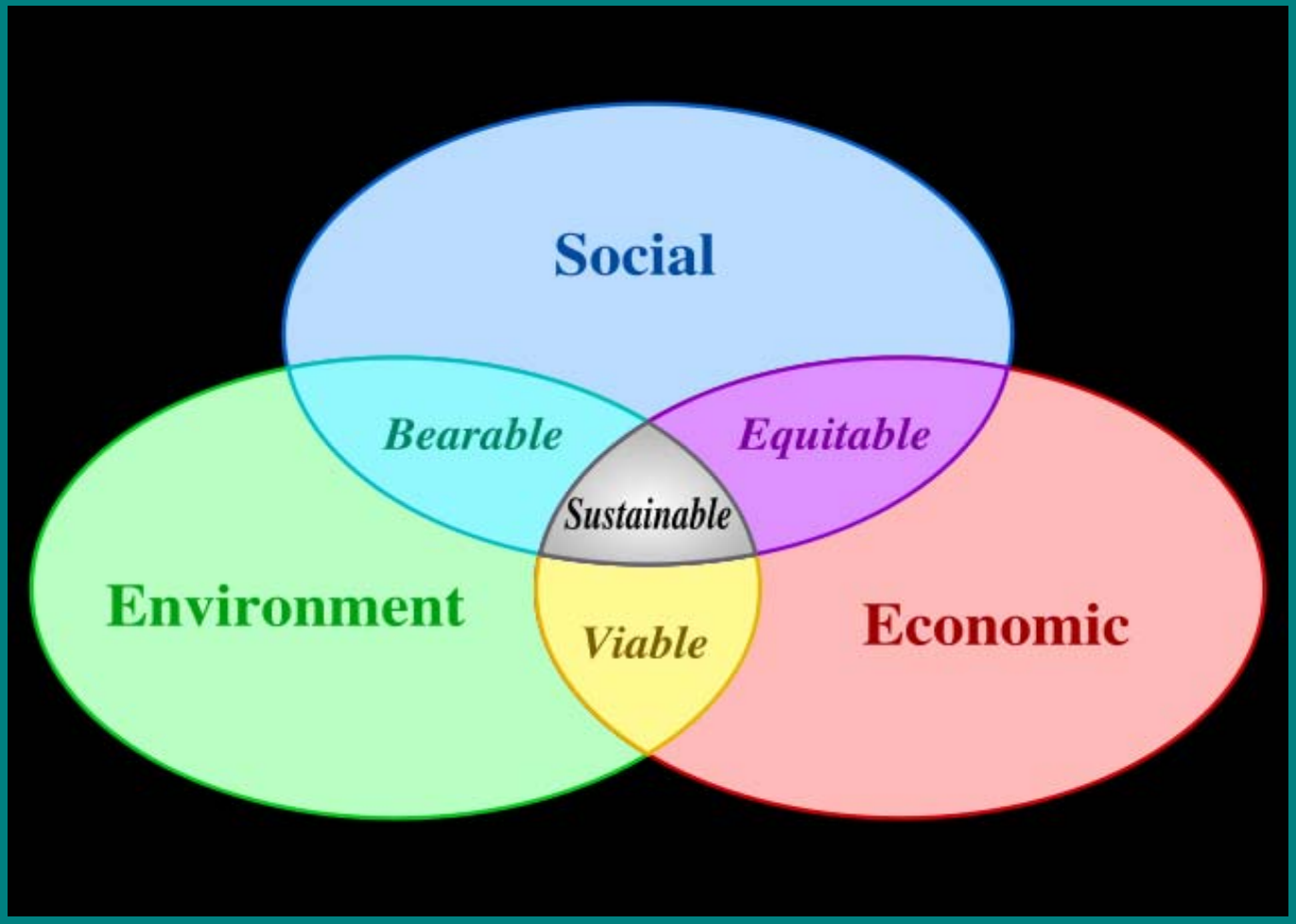
What is Sustainable Development?



Sustainable Development Measurement Challenges

Design Indicators

- Social Dimension
- Trans-boundary issues
- Set of indicators versus composite indices

Prioritize

Prioritize and Interpret Indicators

- Conceptual framework

Collect and Process Data

- *Feasibility* of data within available resources
- Methodologies for processing

Interpret

Prioritizing and Interpreting Indicators

- Clear conceptual framework vital to prioritize and analyze sustainable development indicators given the wide scope and range of issues
- Some examples:
  - National sustainable development strategy
  - Capital approach
  - Accounting framework, e.g. System of Integrated Environmental Accounting or Social Accounting Matrix

Designing Indicators

- Difficulty of measuring social dimension
  - Diverse interpretation of the social dimension across countries
  - Difficulty of measuring social capital
- Capturing trans-boundary effects
  - Indicators measured at country-level do not cover, e.g. pollution, natural disasters, environmental externalities that cross borders
- Sets of indicators versus composite indices

Collecting and Processing Data

- Current availability problems
- Feasibility within resources to obtain the desired data especially in developing countries
- Complex methodologies used in data processing especially for composite indices

United Nations and Sustainable Development

- 1983: Brundtland Commission/Report coined the term *sustainable development*
- 1992: United Nations Commission on Sustainable Development established to follow-up the Earth Summit in Rio
- 1996: CSD indicators published
- 2001 and 2005: CSD indicators revised

UNCSD framework

- 14 themes
- *One* reference set of 96 indicators, 50 core
- http://www.un.org/esa/sustdev/natlinfo/indicators/factSheet.pdf
- Recommendation in process:
  - Needs to be adapted to national framework
  - Integration into other international indicator processes (MDG, 2010 Biodiversity Indicators Partnership, Hyogo Framework for Action)

UNCSD SDI THEMES

1. Poverty
2. Governance
3. Health
4. Education
5. Demographics
6. Natural Hazards
7. Atmosphere
8. Land
9. Oceans, seas & coasts
10. Freshwater
11. Biodiversity
12. Economic Development
13. Global Economic Partnership
14. Consumption and Production Patterns

CSD Core Indicators (1)

- **Poverty**
  1. Proportion of population living below national poverty line*
  2. Ratio of share in national income of highest to lowest quintile
  3. Proportion of population using improved sanitation facilities*
  4. Proportion of population using an improved water source*
  5. Share of households without electricity or other modern energy services
  6. Proportion of urban population living in slums*

CSD Core Indicators (2)

- **Governance**
  1. Percentage of population having paid bribes
  2. Number of intentional homicides per 100,000 population
- **Health**
  1. Under-five mortality rate*
  2. Life expectancy at birth
  3. Percent of population with access to primary health care facilities
  4. Immunization against infectious childhood diseases
  5. Nutritional status of children
  6. Morbidity of major diseases such as HIV/AIDS, malaria, tuberculosis

CSD Core Indicators (3)

- **Education**
  1. Gross intake ratio to last grade of primary education
  2. Net enrolment rate in primary education*
  3. Adult secondary (tertiary) schooling attainment level
  4. Adult literacy rate
- **Demographics**
  1. Population growth rate
  2. Dependency ratio
- **Natural Hazards**
  1. Percentage of population living in hazard prone areas

CSD Core Indicators (4)

- **Atmosphere**
  1. Carbon dioxide emissions*
  2. Consumption of ozone depleting substances*
  3. Ambient concentration of air pollutants in urban areas
- **Land**
  1. Arable and permanent cropland area
  2. Proportion of land area covered by forests*
- **Oceans, seas and coasts**
  1. Percentage of total population living coastal areas
  2. Proportion of fish stocks within safe biological limits
  3. Proportion of marine area protected

CSD Core Indicators (5)

- **Freshwater**
  1. Proportion of total water resources used
  2. Water use intensity by economic activity
  3. Presence of faecal coliforms in fresh water
- **Biodiversity**
  1. Proportion of terrestrial area protected, total and by ecological region
  2. Change in threat status of species

CSD Core Indicators (6)

- **Economic development**
  1. GDP per capita
  2. Investment share in GDP
  3. Debt to GNI ratio
  4. Employment-population ratio
  5. Labor productivity and unit labor costs
  6. Share of women in wage employment in the non-agricultural sector*
  7. Internet users per 100,000 population*
  8. Tourism contribution to GDP

CSD Core Indicators (7)

- **Global Economic Partnership**
  1. Current account deficit as percentage of GDP
  2. Net Official Development Assistance (ODA) given or received as a percentage of GNI
- **Consumption and Production Patterns**
  1. Material intensity of the economy
  2. Annual energy consumption, total and by main user category
  3. Intensity of energy use, total and by economic activity
  4. Generation of hazardous waste
  5. Waste treatment and disposal
  6. Modal split of passenger transportation

Other Relevant Indicator Initiatives

- European Commission
- Organization of Economic Cooperation and Development (OECD) Sustainable Development Indicators (18 indicators)
- United Nations Environment Program (UNEP)
- Global Environment Outlook (GEO) Indicators (10 indicators; little linkage among SD dimensions)

Sets of Indicators, Assessment

- Many indicators are in scope of sustainable development due to the multi-dimensionality of the subject
- Conceptual framework is not always provided with the set of indicators
- National/regional sustainable development strategies needed in order to use them effectively
- Difficult to establish trade-offs and synergies
- Difficult to interpret the results

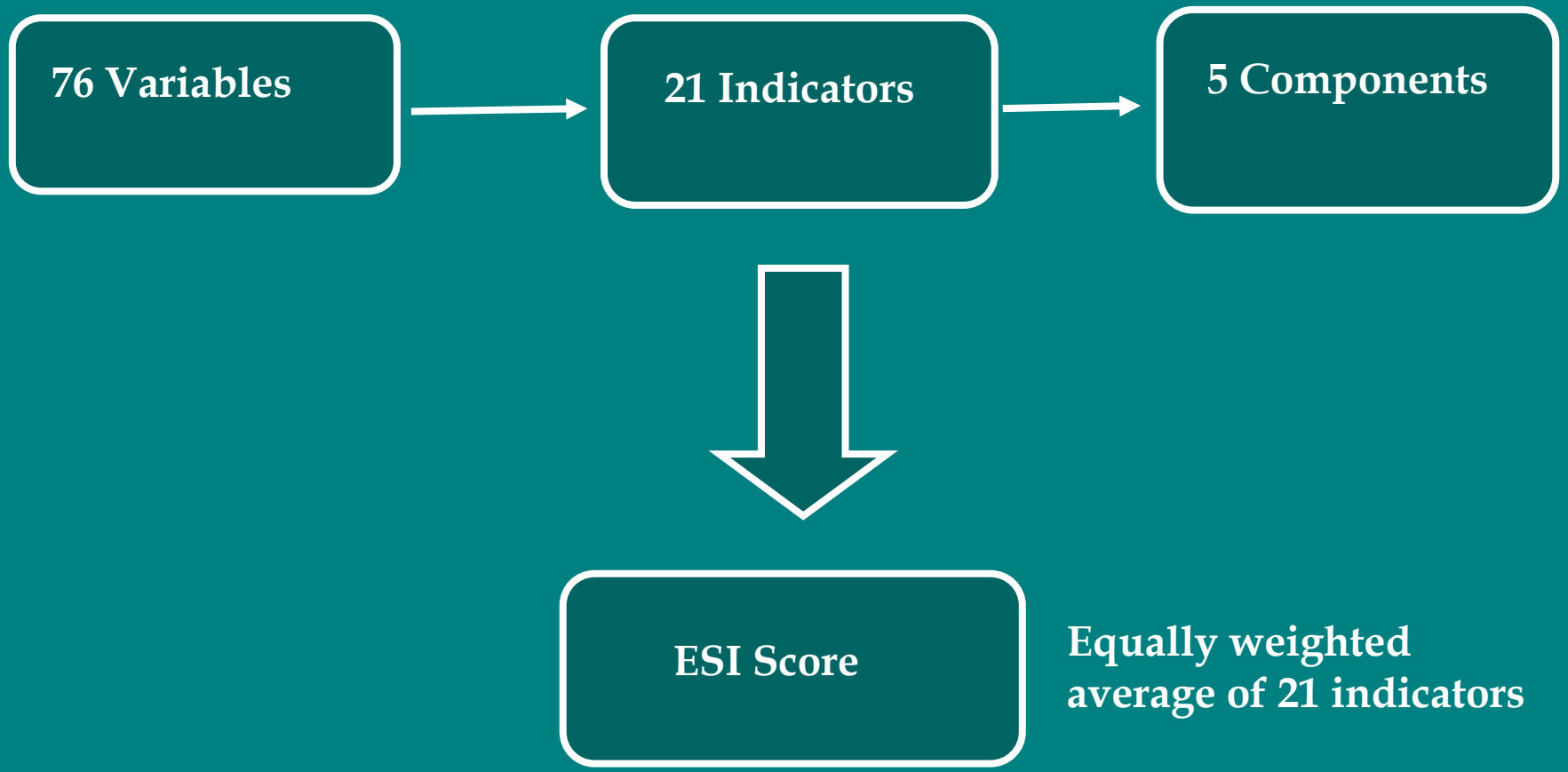
International Composite Indices

- Environmental Sustainability Index
- Environmental Performance Index
- Ecological Footprint
- Happy Planet Index
- Resource and Environment Performance Index

Environmental Sustainability Index (ESI)

- Developed by Yale and Columbia Universities
- Based on 76 variables, 21 indicators
- 5 Components: Environmental systems, environmental stress, human vulnerability, social and institutional capacity and global stewardship
- Covers 146 countries
- "ESI score quantifies the likelihood that a country will be able to preserve valuable environmental resources effectively over the period of several decades."
- Higher ESI scores suggest better environmental stewardship

ESI Framework



Environmental Performance Index (EPI)

- Developed by Yale and Columbia Universities
- Based on 16 variables
- 6 policy areas: Environmental Health, Air Quality, Water Resources, Biodiversity and Habitat, Productive Natural Resources, and Sustainable Energy. EPI measures proximity-to-target for each indicator (established by international agreements, national standards or scientific consensus with a range of 0-100), which does not vary by country.
- 2 objectives: Reduce environmental stress on human health and promote ecosystem vitality and sound natural resources management
- Covers 133 countries
- Scores are calculated for 6 policy areas, 2 objectives and an average of the score of the 2 objectives is the EPI.
- The higher the score the better the environmental performance of the country

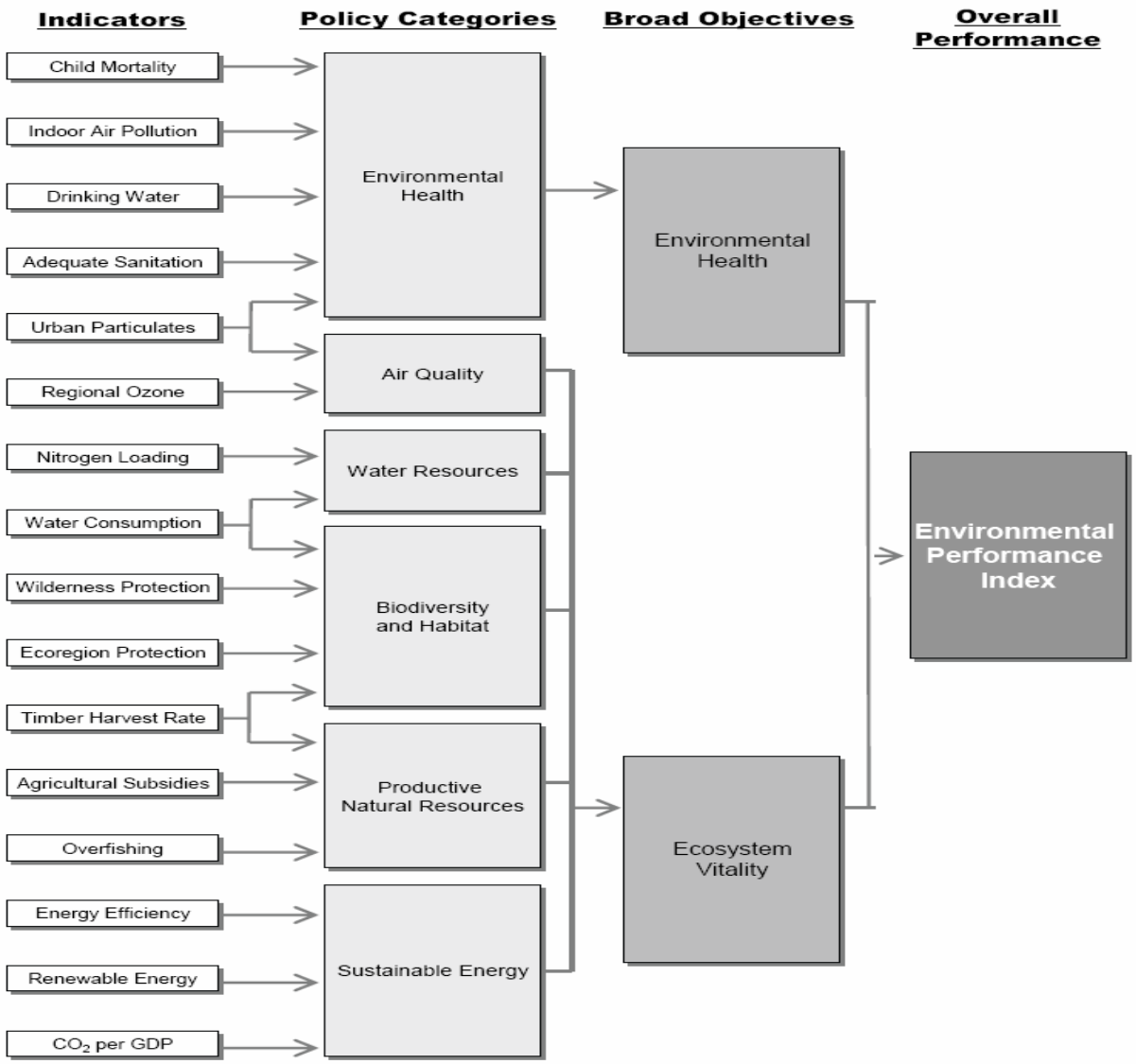


Figure 2: Construction of the EPI

Ecological Footprint (EFP)

- It is an *accounting* methodology
- Calculated by Global Footprint Network (more than 70 partners)
- Based on international data (UNSD, FAO, IEA, IPCC) for more than 200 resource categories
- Covers 150 nations 1961-2003.
- Measures amount of land and water area humans require to produce resources for and absorb waste due to consumption
- National Ecological Footprint figures give the biological capacity necessary to produce goods consumed and to absorb waste generated by people in that country. Unit of expression is usually global hectares but it can be expressed in planets (1 planet = earth's biological capacity)

Happy Planet Index (HPI)

- Calculated by the New Economic Foundation, which was established by The Other Economic Summit (TOES) of leaders other than G8
- Scores rank between 0 and 100
- 177 countries covered (many values imputed)
- Higher score indicates better performance
- Life satisfaction is a subjective measure

$$HPI = \frac{\text{Life satisfaction x Life expectancy}}{\text{Ecological Footprint}}$$

International Resource and Environment Performance Index (REPI)

- Developed by Resource-efficient and Environment-friendly (Reef) Society, China
- Covers 59 countries
- Weighted average of the ratio of selected resources consumption and pollutants discharge performance intensity:
  - Numerator: consumption or pollutant discharge of resource *i* per unit of GDP of country *j* or region
  - Denominator: consumption or pollutant discharge of resource *i* per unit of GDP at the global level
  - REPI > , =, < 1, the country is performing less efficiently than, as efficiently as and more efficiently than world average REPI.

$$REPI_j = \frac{1}{n}\sum_j^n w_{ij}\frac{x_{ij}/g_j}{X_{i0}/G_0}$$

International Composite Indices, Assessment

- ESI, EPI, REPI, are highly correlated with development level—higher income countries systematically perform better
- EFP and HPI are also strongly correlated with income—lower income countries perform better
- Sensitivity of results to different weighting and aggregation
- Data gap, heavy imputation

International Composite Indices, Assessment

- Weak theoretical framework:
  - ESI has been calculated 3 times (2001, 2002, 2005) but the composition of the index has changed each time which makes it impossible to compare values
  - Periodic methodological changes take place in the case of Ecological Footprint as well
- Strong assumptions underlying all these composite indices, e.g. EFP assumes that most resources and waste flows can be measured in terms of the biologically productive area necessary to maintain these flows

National Composite Indices, Asia Pacific

- Thai Sustainable Development Index
- Korean Sustainable Development Index
- Resource and Environmental Performance Index for China
- Gross National Happiness of Bhutan
- Thai Gross Domestic Happiness
- Malaysian Quality of Life

National Composite Indices, Assessment

- Give an idea about the national interests in terms of sustainable development
- But policy relevance often is not clear
- All but REPI fail to create linkage between economy and environment
- National indicators need to be complemented with international indicators, especially in order to capture the trans-boundary effect of environmental issues

Key Steps to Design, Use and Interpret SDI

- Conceptual framework applicable at national, sub-regional and regional levels in Asia and the Pacific region to prioritize and interpret indicators
- Ensure availability and quality of data
- Disseminate not only figures but also messages
- Provide metadata and guidelines for users