

# Development and Environment: An Overview

# SDGs

...“We can be the first generation to succeed in ending poverty; just as we may be the last to have a chance of saving the planet.”

*From Paragraph 50 of Transforming Our World: The 2030 Agenda for Sustainable Development*

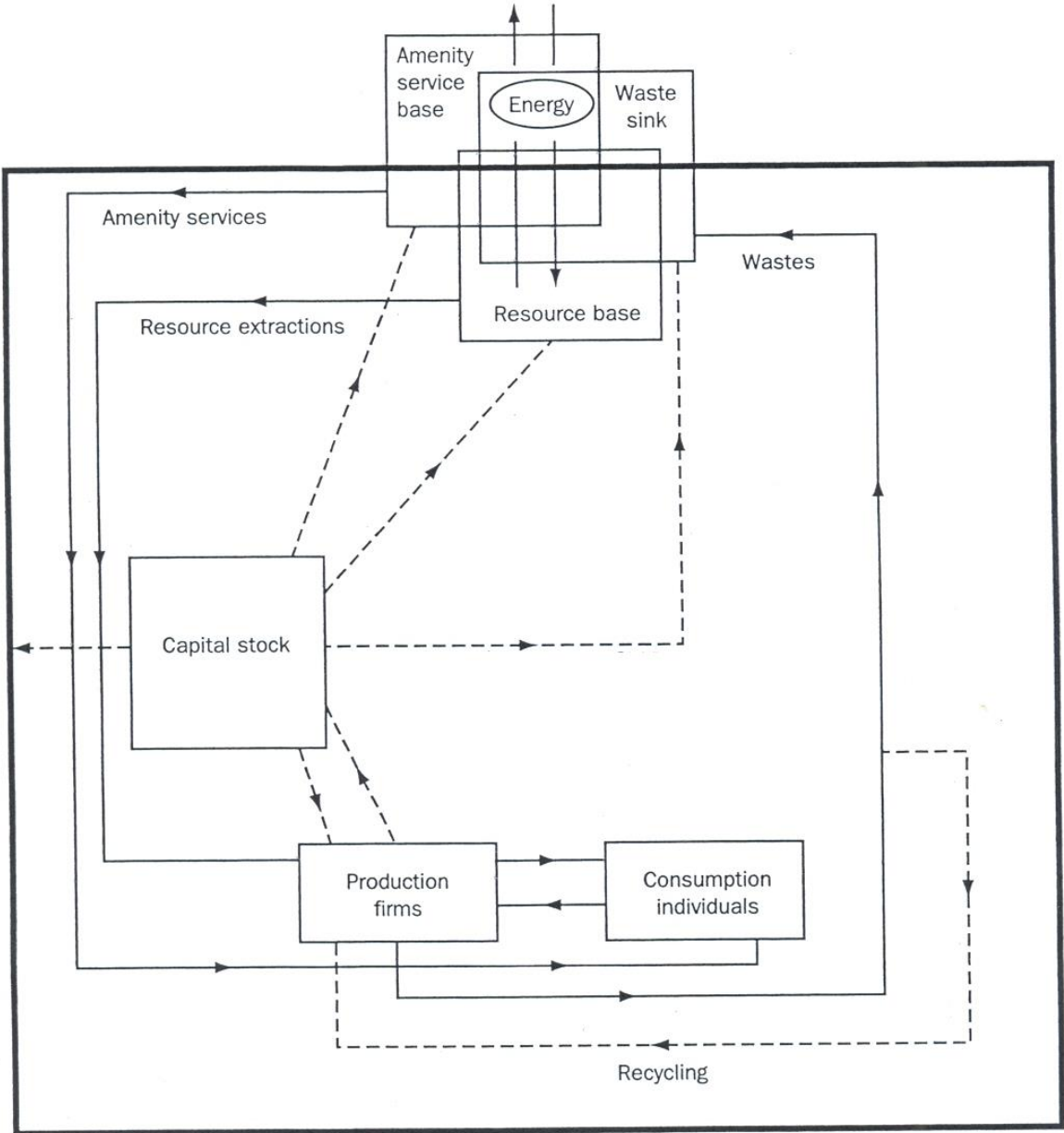
# Drivers of Environmental Degradation

- Direct Drivers: climate change, plant nutrient use, land conversion leading to habitat change, and invasive species and diseases.
- Indirect Drivers: demographic, economic, sociopolitical, scientific and technological, and cultural and religious.
- World population will likely peak before the end of the twenty-first century at less than 10 billion
- Global economic activity increased nearly sevenfold between 1950 and 2000. Average income per person almost doubled during this period.

# Drivers ..

- 1776
  - 750 Million people
  - \$ 150 billion GNP
  - \$ 200 per capita income
- 1976
  - 4.2 Billion people
  - \$ 3.5 Trillion GNP (2333% increase)
  - \$ 1300 per capita income
- 2015
  - 7.3 Billion people, 9.7 billion by 2050
  - \$ 102.6 Trillion GDP (68000% increase)
  - \$ 14048 per capita income

# Economic Activity in the Natural Environment



# Biodiversity

- Biodiversity—the diversity of genes, populations, species, communities, and ecosystems—underlies all ecosystem processes.
- Estimates total number of species on Earth lie between 5 million and 30 million. Of this total, roughly 2 million species have been formally described; the remainder are unknown or unnamed.
- Extinctions of known species over the past 100 years, indicates extinction rates are around 100 times greater than rates characteristic of species in the fossil record.
- Between 12% and 52% of species within well-studied are threatened with extinction.

# Fresh Water

- Only about 15% of global population live with relative water abundance.
- Forest and mountains provide 85% renewable water supplies to at least 4 billion people
- Cultivated – generate 16% runoff, serve 4-5 billion people, susceptible to pollution
- Ground water depletion – (5-25%)
- Water scarcity affext 1–2 billion people worldwide, significant and accelerating
- Water withdrawals from rivers and lakes doubled since 1960; most water use (70% worldwide) is for agriculture.
- Disease from inadequate water, sanitation, and hygiene totals 1.7 million deaths and the loss of at least 50 million healthy life years. Some 1.1 billion people lack access to safe drinking water and 2.6 billion lack access to basic sanitation

# Marine Resources

- Some global reports show an estimated 40% of the world's oceans are heavily affected pollution, depleted fisheries, and to loss of coastal habitats.
- Plastic pollution in oceans is emerging issue a sizable problem now garnering needed attention.
- In Asia, Of the 63 large marine ecosystems, 16% are in the “high” or “highest risk” categories for coastal eutrophication.
- Proportion of global marine fish stocks within biologically sustainable levels declined from 90% in 1974 to 68.6% in 2013



# Marine Resources

- Approximately 20% of the world's coral reefs were lost and an additional 20% degraded in the last several decades of the twentieth century, and approximately 35% of mangrove area was lost during this time

# Land/Agriculture

- More land was converted to cropland in the 30 years after 1950 than in the 150 years between 1700 and 1850. Cultivated systems now cover one quarter of Earth's terrestrial surface – Forest cover lost
- Since 1960, flows of reactive (biologically available) nitrogen in terrestrial ecosystems have **doubled**, and flows of phosphorus have **tripled**. More than half of all the synthetic nitrogen fertilizer, which was first manufactured in 1913, ever used on the planet has been used since 1985.
- More than two thirds of the area of 2 of the world's 14 major terrestrial biomes and more than half of the area of 4 other biomes had been converted by 1990, primarily to agriculture.
- Genetic diversity has declined globally, particularly among cultivated species.

# Land

- More land was converted to cropland in the 30 years after 1950 than in the 150 years between 1700 and 1850. Cultivated systems (areas where at least 30% of the landscape is in croplands, shifting cultivation, confined livestock production, or freshwater aquaculture) now cover one quarter of Earth's terrestrial surface.

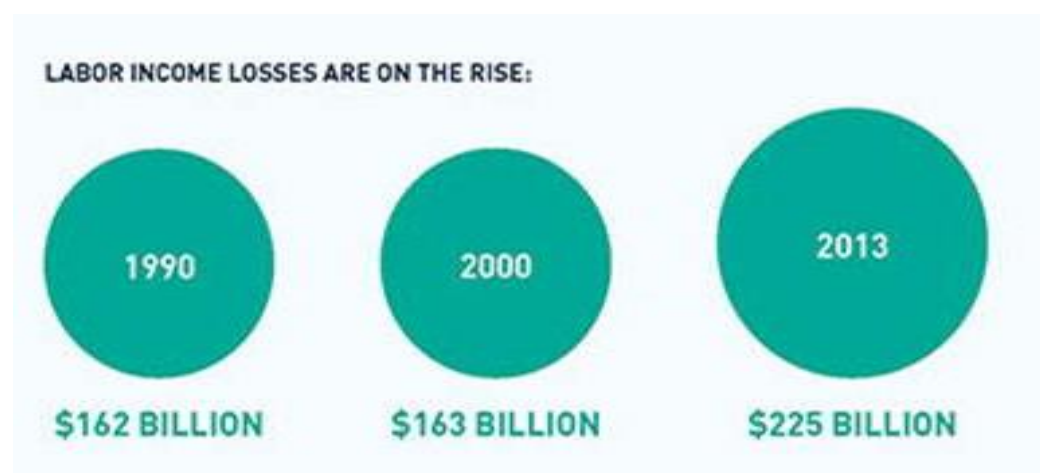
# Climate Change

- Since 1750, the atmospheric concentration of carbon dioxide has increased by about 32% primarily due to the combustion of fossil fuels and land use changes. Approximately 60% of that increase (60 parts per million) has taken place since 1959.

# Air Pollution

- **4.2 million** deaths every year as a result of exposure to ambient (outdoor) air pollution.
- **3.8 million** deaths every year as a result of household exposure to smoke from dirty cookstoves and fuels
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- **Health Effects (deaths, global):**
  - lung cancer (29%)
  - acute lower respiratory infection (17%)
  - stroke (24%)
  - ischaemic heart disease (25%)
  - 43% of all deaths and disease from chronic obstructive pulmonary disease

**Air pollution costs the global economy about \$225 billion in foregone labor income each year, due to 5.5 million premature deaths from air pollution. Morbidity may add an additional 10% to these costs.**



(Source: VVB and IHME, 2016)

# SDGs: New Impetus for Environmental Sustainability



# SDGs

## **Environment and climate**

Goal 12: Sustainable consumption, production

Goal 13: Climate change

Goal 14: Marine resources

Goal 15: Terrestrial resources

## **Sustainable infrastructure**

Goal 6: Water, sanitation

Goal 7: Green energy

Goal 9: Infrastructure, industrialization

Goal 11: Green cities

## **Sustainable growth**

Goal 1: Ending poverty

Goal 4: Education

Goal 8: Economic growth

Goal 17: Global partnership for sustainable development

## **Human security**

Goal 2: Hunger, food security

Goal 3: Health, well-being

Goal 5: Gender equality

Goal 10: Reducing inequality

Goal 16: Peace, justice, accountability