

Embedding Socio-economic and Ecosystem Services benefits in ENR management



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Effect of the Economy on Environment

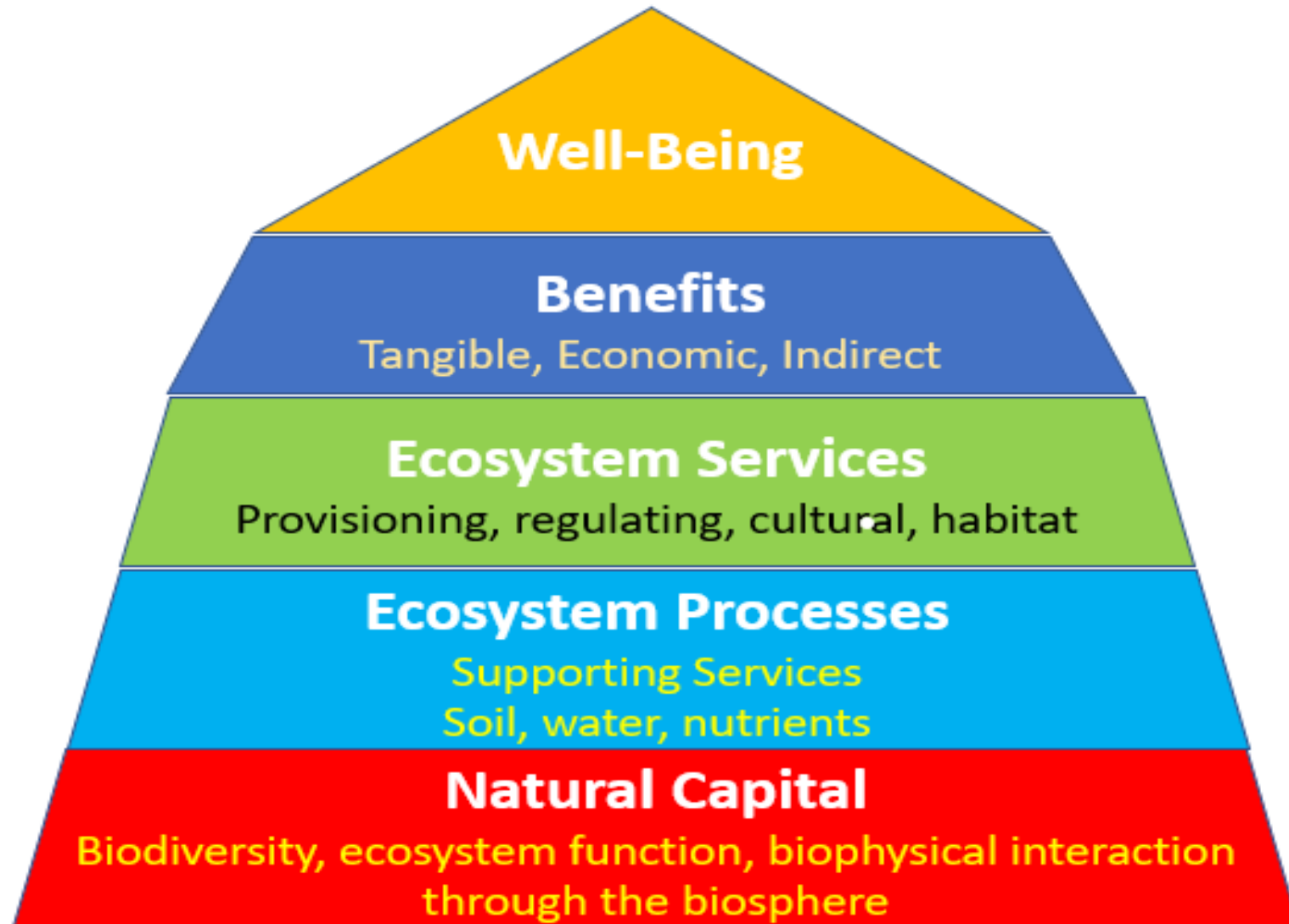
- Processing & use of resources
- Production of goods & services
- Transportation
- Waste generation
- GHGs

Socio-Economic Goals

- Food security, good nutrition
- Optimal health
- Improved income, livelihoods for all
- Affordable housing
- Quality education
- Strong communication
- Transport connectivity
- Robust commerce
- Cheap, renewable energy
- Good government
- Peace, safety, security



Natural Capital → **promotion of well-being**



Ecosystem services of Land



- **Ecosystems** – system of living and non-living things; supplies ecosystem services
- **Ecosystem functions** - physico-chemical, biological processes within ecosystems
- **Ecosystem services**– set of functions - regulating, provisioning, cultural, support
- **Land use** – use of land for socio-economic activities - agricultural, residential, industrial, recreational
- **Land transformation** – conversion, modification; land cover change over time

Land as Natural Capital

A. Physical Factors

Finite

Immobile

Physical characteristics

Multiple uses

Suitability – slope, elevation, soil characteristics

B. Social Factors

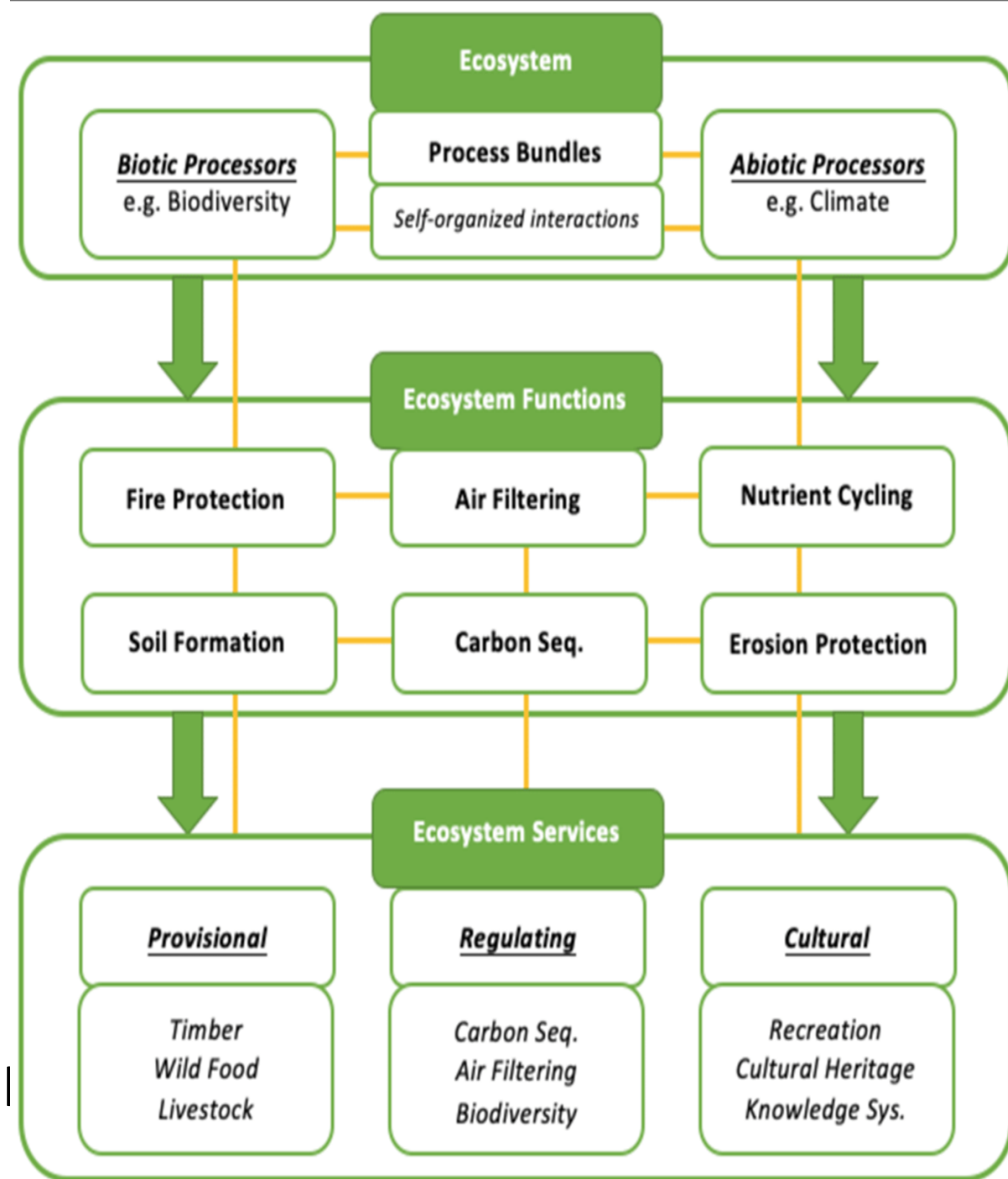
Personal aspirations, biases, prejudices

Political motivations

C. Economic Factors

Microeconomic - market prices

Macroeconomic - excluding environmental values, shifting impacts ex-situ





Urban Land Use

- Follows a natural historical process; direct driving force of local / global economic transformation & environmental change
- Intense flows of materials, energy, info; shifts regional ecosystem services to support highly concentrated human activities
- Significant risks & impacts on the structure, function, spatial evolution of regional ecosystems & ecosystem services

Effects of Urbanization on Ecosystem Services

Positive (+)

- Accommodate high concentrations of urban population & economic industries
- Significant expansion on the structure, function & spatial evolution of local & regional ecosystems
- Abundant economic goods & services
- High investor confidence

Negative (-)

- Removal of natural land, occupation of cultivated lands
- Lack of open spaces as buffer zones due to intense activities, dense population, jam-packed structures
- Increase in impervious surfaces, heat island effect
- Increase in pollution, waste discharge, nutrient loading, soil erosion, GHGs
- Unbalanced land use allocation

Agricultural land use

How?

Management: inputs, technologies

How much?

Quantities: areas, products, ..

When?

Timing of operations

What?

Objectives: Products, services

Why?

eg. reasons (biophysical, socio-economic,..)

Where?

Location & spatial extent



Major characteristics of agricultural land use

Versus Land cover... the observed (bio)physical cover on the earth's surface (LCCS, 2000)

Effects of Agriculture on Ecosystem Services

Positive impact on ecosystem services	Negative impact on ecosystem services
<ul style="list-style-type: none">❖ Agriculture provides habitats to wild species and creates aesthetic landscapes	<ul style="list-style-type: none">❖ Pesticides, as well as landscape homogenisation, can decrease natural pollination
<ul style="list-style-type: none">❖ Forests help maintain healthy aquatic ecosystems and provide reliable sources of clean water	<ul style="list-style-type: none">❖ Deforestation or poor management can increase flooding and landslides during cyclones
<ul style="list-style-type: none">❖ Animal excreta can be an important source of nutrients, seed dispersal and can maintain soil fertility in grazed grasslands	<ul style="list-style-type: none">❖ Excess of animal excreta and poor management can lead to water pollution and threaten aquatic biodiversity
<ul style="list-style-type: none">❖ Sustainable and integrated aquaculture can enhance the mangrove functionality of flood protection	<ul style="list-style-type: none">❖ Overfishing has a devastating impact on ocean communities as it destabilizes the food chain and destroys the natural habitats of many aquatic species

An ecosystem-based approach to ENR management (structure, function, process)

Ecosystem Services (means)

R-Regulating, P-Provisioning

C- Cultural, S- Supporting

- R-climate regulation, P-trees, S-habitat
- R-bio-decomposition, P-decomposers, S-habitat
- R-flood control, P-watershed, S-catchment basin
- P-natural parks, C-aesthetic value, S- living spaces
- P-natural pathways, C-social relations
- R-climate regulation, P-sun, wind, geothermal
- R-air quality regulation, P-unlimited air

Socio- Economic Benefits (end)

- Urban heat island mitigation
- Integrated waste management
- Stormwater, drainage & flood management
- Recreational areas
- Sustainable transportation
- Renewable energy
- Fresh air



Market-driven Land Use

Sustainable

- Good governance
- Socio-economic benefits
- Equity
- Environmental Protection
- Promotes sustainable economic health, improves standard of living for a designated area, benefiting businesses & State
- Stimulates local economy by utilizing existing resources, fostering community-driven processes

Market-driven Land Use

Poor planning

- Unstable growth & production
- Poverty & insecure livelihoods
- Rampant degradation, wasted resources
- Depleted ecosystem services



Socio-Economic Impacts of Land Use Change

Land Use Change

Impacts

- | | |
|---|---|
| 1. Conversion of farmland, forests to urban areas | • Reduces land for food & timber; reduce open space & environmental amenities |
| 2. Soil erosion, salinization, desertification, soil degradation due to agriculture & deforestation | • Reduce land quality & productivity |
| 3. Urban development | • Reduce the “critical mass” of farmland for the economic survival of local agri. economies |
| 4. Urbanization patterns | • Affect lives of individuals & how society is organized |

Socio-Economic Impacts of Land Use Change

Land Use Change

Impacts

- | | |
|--|---|
| <ol style="list-style-type: none">5. Urban development encroaching on rural communities6. Suburbanization7. Excessive land use control8. Land use regulations that aim at curbing land development9. Land use regulation | <ul style="list-style-type: none">• Community identity can be lost• Intensifies income segregation, economic disparities among communities• May hinder market functions• Could raise housing prices, housing less affordable to middle- to low-income households• Tricky balance bet. private property rights & public interest |
|--|---|



Considerations in Land Use Planning



In order to derive ecosystem services & socio-economic benefits:

- 1. B**alance efficient, adaptive land use, & its acquisition/disposition for its highest & best use (HABU)
- 1. R**econcile land use conflicts to meet existing & future needs
- 2. R**educe costs of public services, infrastructure & regulate wasteful development
- 3. R**estore, protect, conserve, preserve sensitive ecosystems, natural capital, ecosystem services, historical, aesthetic & cultural values
- 4. D**irect, harmonize & influence private & public sectors relative to land use & management

Sustainable Land-based ENR plan

Policies for Land
Development &
Redevelopment

Improvement of
Transportation
Network

Framework for various
Transect Zones

Plan Primary
Development
Locations in different
contexts & scenarios

Retrofitting Plans for
Suburban Areas

Design for
Downtown Areas
& Surrounding
Neighborhoods

Environment
Protection &
Sustainable
Development

Preservation of
History & Culture of
the Area

Strategies on
Affordable Housing

Embedding socio-economic benefits in ENR

Promote innovation & entrepreneurship

Enhance productivity, business competitiveness

Attract investment, regional integration & cooperation

Conserve & regenerate the environment

Empower constituents & focus on social inclusion

Let's continue the conversation!

Post questions and comments in the IAIA24 app.



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