

Necessity of Mapping and Assessment of Ecosystems and Their Services in Planning and Decision Making Process

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LIFE13 ENV/LV/000839 projekts LIFE
Ekosistēmu pakalpojumi/ LIFE
EcosystemServices

Research questions

- * *(i) What is the concept and background of ecosystems and ecosystem services and how it relates with economics and human well – being?*
- * *(ii) How could policy makers, public and private sector representatives can benefit from ecosystem approach*
- * *(iii) How could ecosystem approach integrated in decision making processes?*

Concepts: Ecosystems and Ecosystem Services I

«An **ecosystem** is the interactive system established between biocoenosis (a group of living creatures) and their biotope (the environment in which they live)» (Tansley, 1935)

«An **ecosystem** is a dynamic functional unit consisting of all plants and animals (biodiversity) in an area, together with the non-living, physical components of the environment (water, soil and air) with which they interact.» (Christopherson 1997).

- * In economic terms, ecosystems may be regarded as a **special form of capital assets** with difference that depreciation of natural capital may be irreversible, or the systems may take a long time to recover.

Concepts: Ecosystems and Ecosystem Services II

- * **Plato (c. 400 BC)** - realised that deforestation could lead to soil erosion and the drying up of springs
- * **Marsh (1864)** - suggested that the Earth's natural resources were not unlimited by pointing to changes in soil fertility in the Mediterranean
- * **Study of Critical Environmental Problems (1970)**, which listed services such as insect pollination, fisheries, climate regulation and flood control.
- * 1990s - mainstreaming of ecosystem services in the literature and increased interest on methods to estimate their economic value.
- * **UN Millennium Ecosystem Assessment in 2005** - put ecosystem services firmly on the policy agenda.
- * **EU Biodiversity Strategy to 2020** - determines that *“Member States, with the assistance of the Commission, will map and assess the state of ecosystems and their services in their national territory by 2014, assess the economic value of such services, and promote the integration of these values into accounting and reporting systems at EU and national level by 2020”* (EU, 2011).

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Ecosystem functions and services

LEAVES, TWIGS, BRANCHES

ABSORB SOUND AND BLOCK
EROSION-CAUSING RAINFALL

BRANCHES, LEAVES

PROVIDE SHADE AND REDUCE
WIND SPEED

LEAVES

FILTER DANGEROUS
POLLUTANTS FROM
THE AIR

ROOTS, LEAVES, TRUNKS

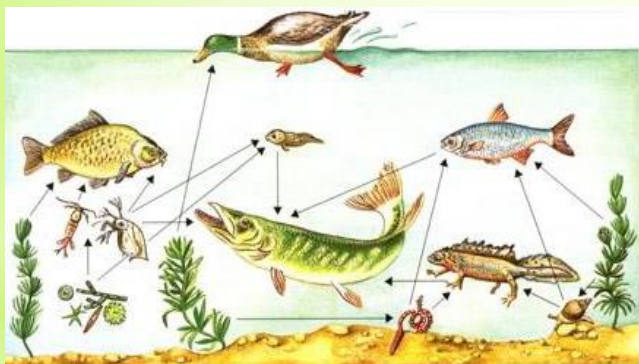
PROVIDE HABITAT FOR
BIRDS, ANIMALS, AND
INSECTS

EVAPOTRANSPIRATION

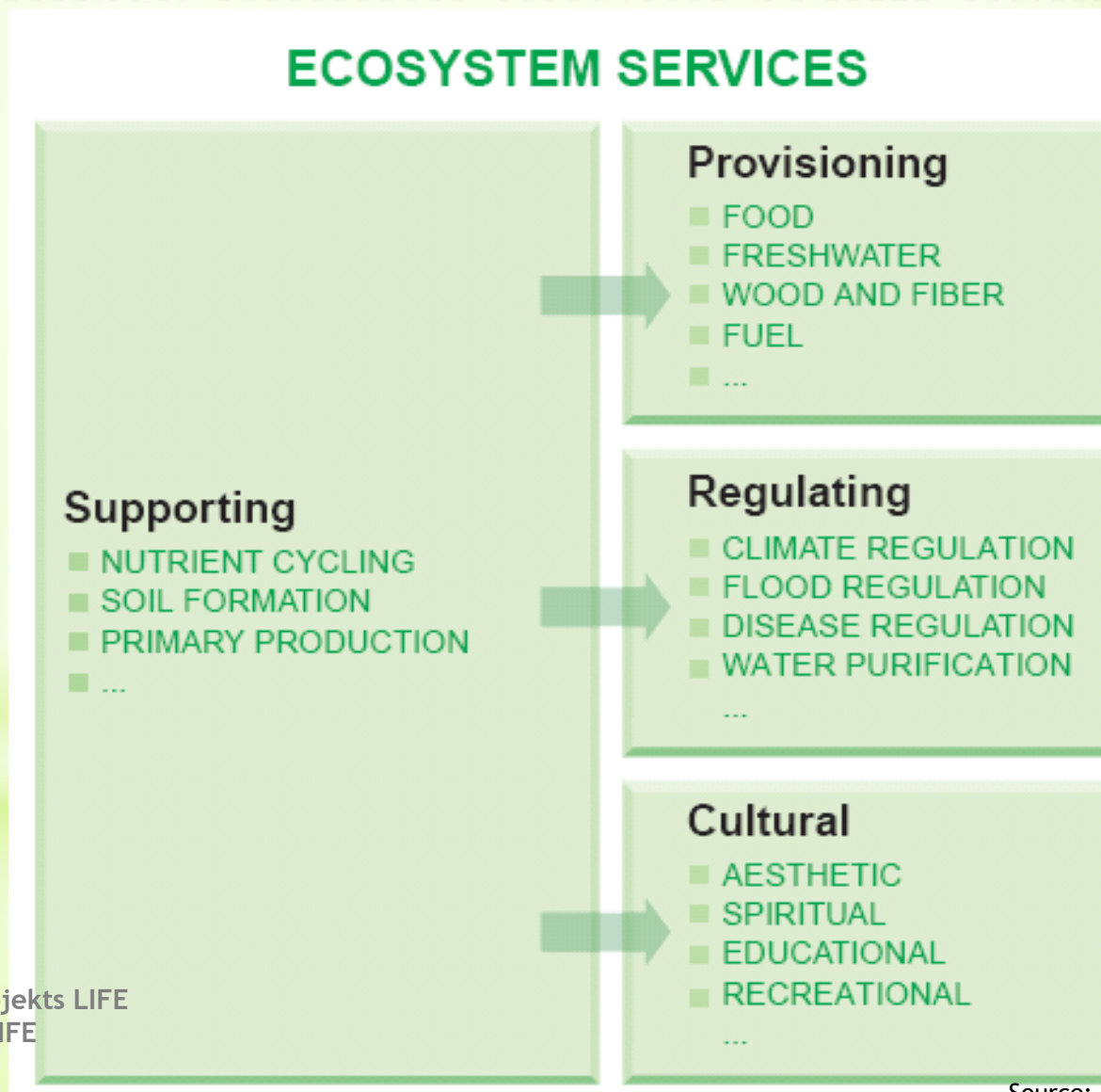
FROM LEAVES COOLS
SURROUNDING AIR

ROOTS

STABILIZE SOIL, PREVENT EROSION



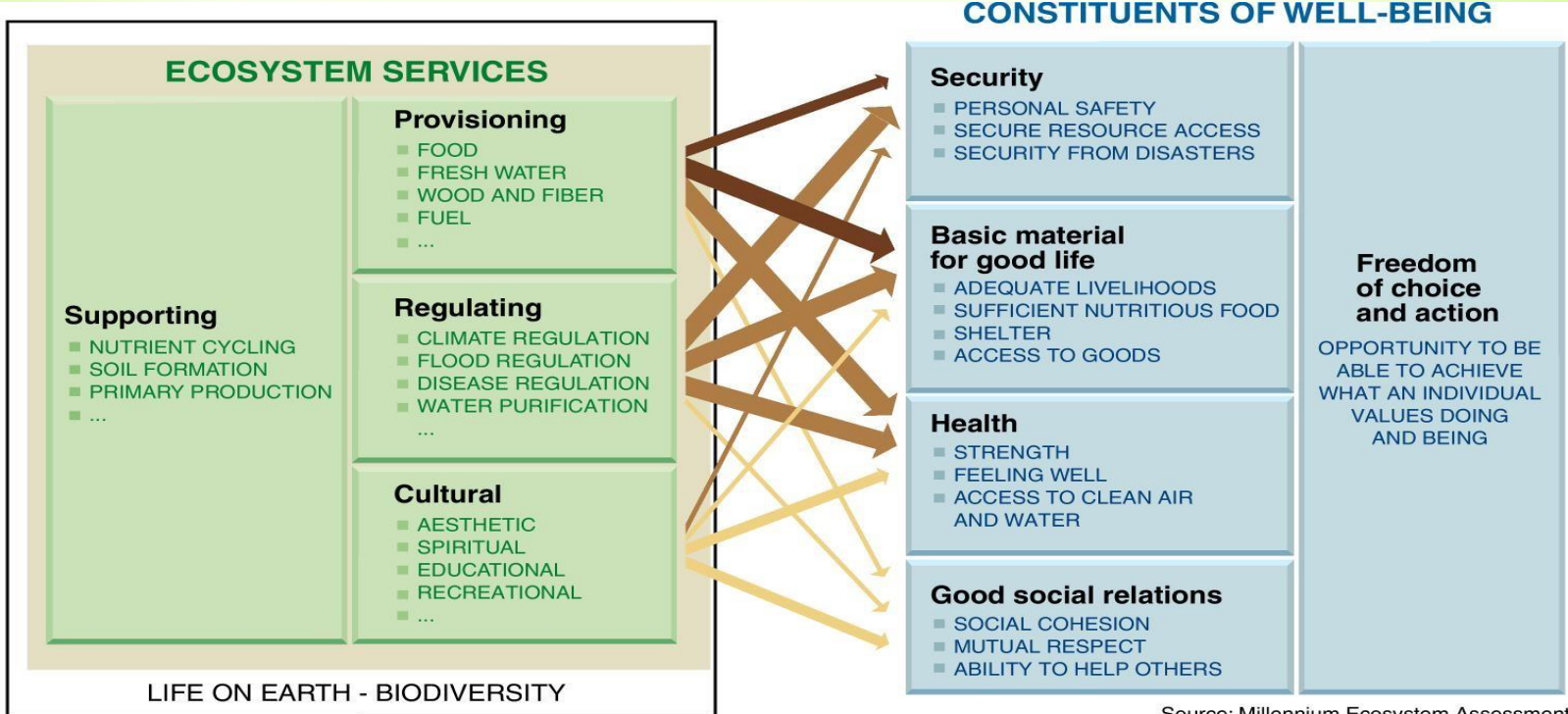
Ecosystem Services - The Benefits people obtain from ecosystems



Problems: Overview of Findings

- * Over the past 50 years, humans have *changed ecosystems more rapidly and extensively than in any comparable period of time* in human history, largely to meet rapidly growing demands for food, fresh water, timber, fiber and fuel;
- * The changes that have been made to ecosystems have contributed to substantial net gains in human well-being and economic development, but these gains have been *achieved at growing costs*
- * The degradation of ecosystem services could *grow significantly worse during the first half of this century and is a barrier to achieving the Millennium Development Goals*

Consequences of Ecosystem Change for Human Well-being



Source: Millennium Ecosystem Assessment

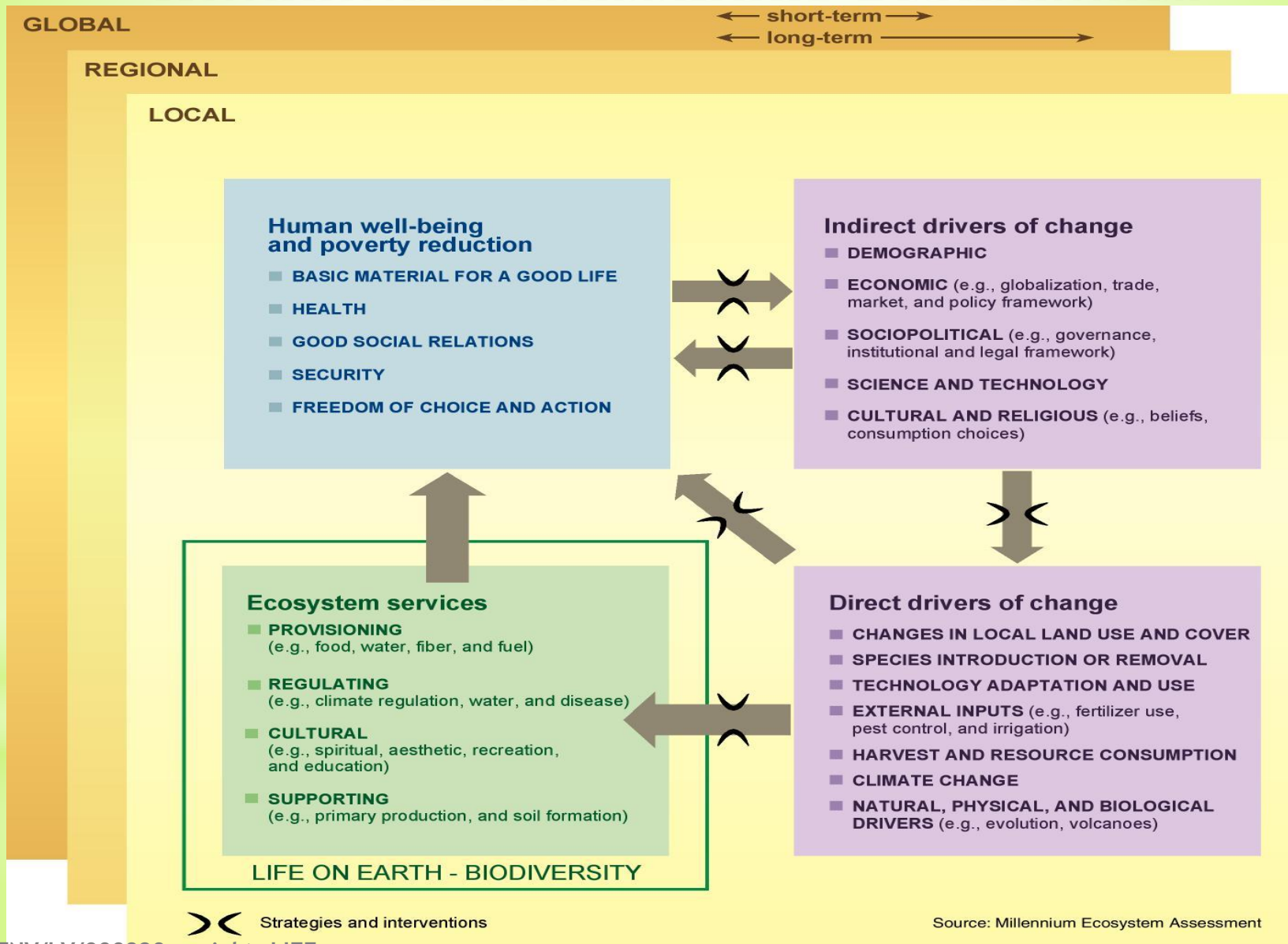
ARROW'S COLOR
Potential for mediation by socioeconomic factors

- Low
- Medium
- High

ARROW'S WIDTH
Intensity of linkages between ecosystem services and human well-being

- Weak
- Medium
- Strong

Millenium Assessment Framework



Economic thinking on natural resources

Period	Economics School	Conceptualization of nature	Value-environment relationship
19th Century	Classical economics	Land as production factor generating rent (income)	Labour theory of (exchange) value Nature's benefits as use values
20th Century	Neoclassical economics	Land removed from the production function	Land as substitutable/ producible by capital, and thus monetisable

Modern economics - interdependency of ecological and economic systems; it is about the relationship between humans and ecosystem services, choices, public goods, trade-offs, economic argument should complement not replace other arguments

A Philosophical View of Natural Capital in Economics

WAREHOUSE Image of Nature	GARDEN Image of Nature
Emphasis on humans as the exploiters of natural resources.	Emphasis on humans as managers or stewards of "natural assets".
Pristine wilderness exists on Earth in the sense that there is "Nature" beyond the realm of human agency.	No pristine wilderness left on Earth in the sense that there is "nature" beyond the realm of human agency.
Emphasis on passive or inert materials.	Emphasis on active materials (ecosystems/biodiversity).
Emphasis on passive or inert materials as inputs to human-directed technological forms of production.	Emphasis on nature's unassisted and assisted productions.
Nature (or "land") is indestructible.	Natural processes are depletable or depreciable.
The ecological conditions required for human economic activity are taken as given.	The ecological conditions required for human economic activity are not taken as given.

Sustainable use of Natural capital

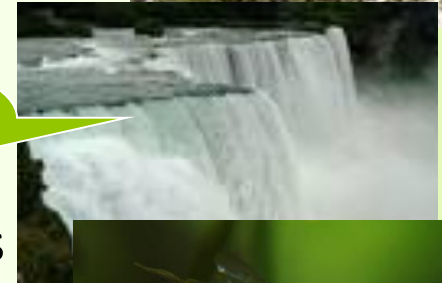


Biodiversity & ecosystem business impacts & dependence

Business impacts on ecosystems and ecosystem services



Ecosystem change creates business **risks** and **opportunities**



Business depends on ecosystems and ecosystem services



Biodiversity & ecosystem risks & opportunities

- * **Operational** (e.g. increased scarcity and cost of raw materials)
- * **Regulatory and legal** (e.g. public policies like taxes and moratoria on extractive activities)
- * **Reputational** (e.g. relationships and image from media and NGOs)
- * **Market and product** (e.g. consumer preferences)
- * **Financing** (e.g. availability of capital)

An Ecosystem Approach

- * **Re-connecting** people with the natural environment
- * **Working together** across boundaries to improve the environment
- * Reflecting the **value of ecosystem services** in decision-making
- * Respecting **environmental limits**, in sustainable development, and taking **ecosystem functioning** into account
- * Making decisions at an **appropriate spatial scale**
- * Making the case for **investing in ecosystems** to achieve economic development goals
- * Advancing policies and incentives for **sustaining ecosystems**
- * Providing a systematic way of managing **ecosystem service trade-offs**

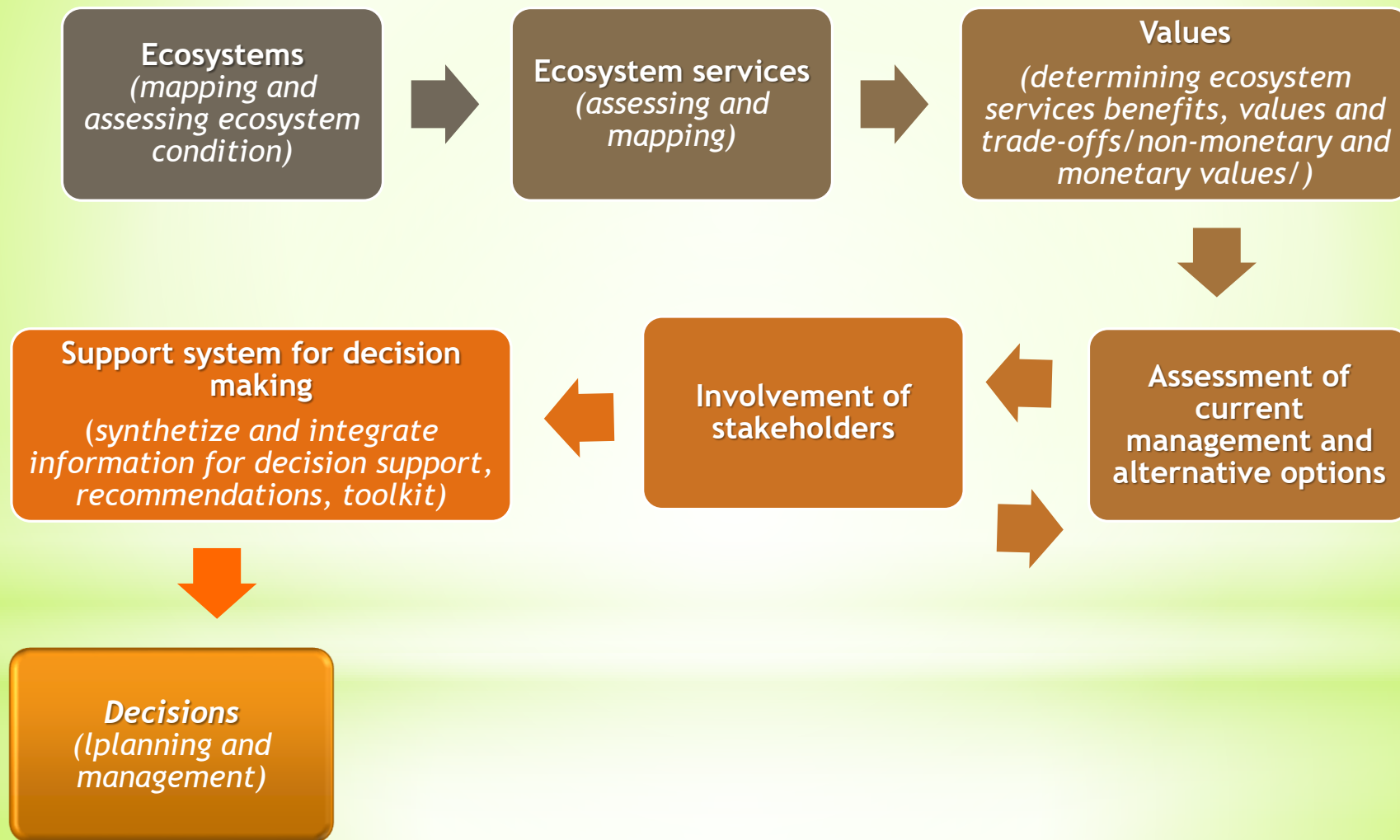
How thinking in terms of ecosystem services might help

- * Provide a conceptual shift in the way people think about conservation, increasing public support for conservation efforts;
- * Improve governments' ability to measure the benefits of particular environmental actions, enabling better goal-setting and program evaluation;
- * Open up new opportunities for environmental markets
- * Understanding the full value of the natural environment enables:
 - decisions on the natural environment that do not compromise benefits to society, business and the economy
 - improved delivery of services through better use of the natural environment
 - reduced business risk and increased business opportunity

Bringing Ecosystem approach into decision making

- * Objective of the ecosystem services assessment is to provide a critical evaluation of the best available information for guiding decisions on complex public issues
- * EU Biodiversity strategy stress the assessment of ecosystem services and its integration into decision making at EU and national level by 2020”
- * Provide information to decision makers not only about the state and trends of ecosystem services but also identify spatial dependencies and trade-offs
- * Involve different interest groups and facilitate communication including those that represent environmental needs and future demands, and integrate their preferences into decision-making
- * Contribute to choose the economically most advantageous and sustainable options for territorial development and calculate the returns on investments in environmental conservation

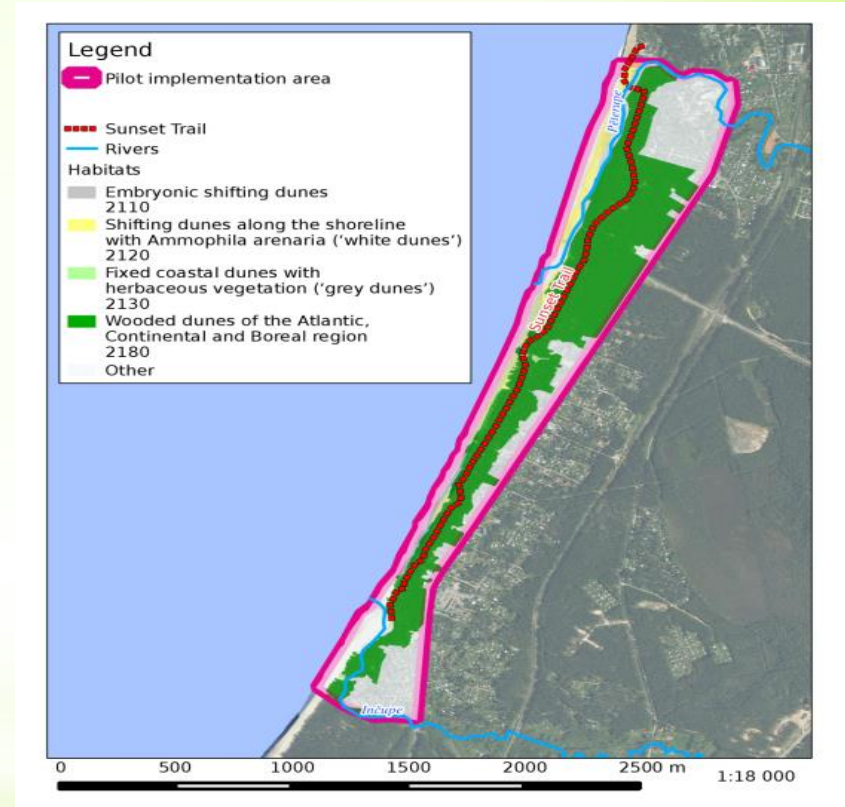
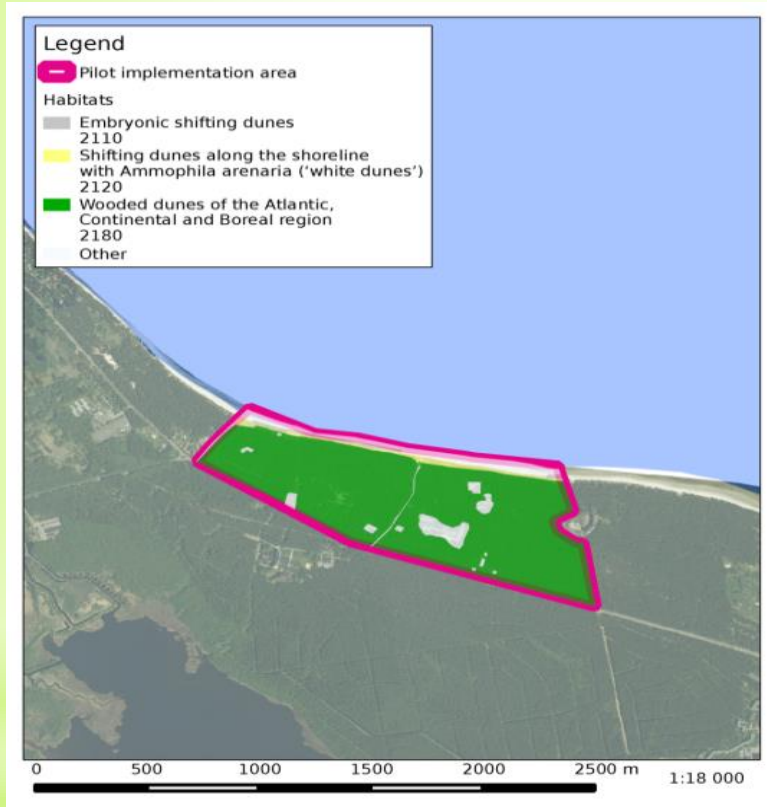
A Framework for Ecosystem Approach Integration into Decision Making



ECOSYSTEM SERVICES-BASED APPROACHES IN PRACTICE I

- * Ecosystems and their services assessment in coastal areas of Latvia (in the framework of EU supported project “*LIFE EcosystemServices*”)
- * General objective - create a clearly comprehensive ecosystems services assessment system and create innovative approach within the spatial planning processes in Latvia, thus finding a balance between environmental protection, biodiversity conservation, social and economic aspects.
- * The approach of ecosystems and ecosystem services assessment for Latvia is approbated in two coastal pilot areas - Jaunķemeri and Saulkrasti

ECOSYSTEM SERVICES-BASED APPROACHES IN PRACTICE II



Results so far...

- * Mapping ecosystems and assessing ecosystems condition
- * The ecosystem services identification and classification (based on CICES and expert method). Development of ecosystem services matrix. *As the whole 3 ecosystems (dunes, woodlands, rivers), 40 ecosystem services provides by these ecosystems and 10 land cover types are identified in the pilot areas.*
- * Assessment of ecosystem services (expert – based method)
- * Mapping of ecosystem services
- * Development and assessment of different development scenarios for pilot areas (3 scenarios for each pilot area)
- * Economical evaluation of separate ecosystem services – in the process
- * Recommendations for decision makers and planners for integration of ecosystem services approach into planning and decision making process – web based toolkit – in the process
- * Support for decision makers at different levels
- * Increasing awareness and dissemination of information

Conslusions

- * Decision makers do not necessarily need an exhaustive understanding of the social-ecological system, but they need sufficient arguments to make a choice between policy and management options.
- * There is important to provide the framework for improvements for the strategic planning documents (National and Regional Development Plans, Spatial Development Plans and Nature Conservation Plans)
- * It is important to promote the understanding of the various stakeholder groups on the topics of sustainable planning for the enhancement of common benefits.
- * It is important the greater focus on decision making basing on relevant ecosystem services assessment values and support system
- * It is important stronger linkage between the same assessment process and
- * information needs by decision makers from the outset of the assessment process

Thank You!

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