Session 3: Ecosystem services classification and links to ecosystem functions and conditions

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Perspective on classification of ecosystem services

- Ecosystem accounting should build on the work of other initiatives e.g. CICES classification system

- Countries should be able to use information compiled through National Ecosystem Assessments to feed in ecosystem accounting

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Biodiversity Indicators Partnership

- Since 2007
- Set up to monitor progress towards 2010 Biodiversity target
- Around 40 organisations to develop, strengthen and communicate a suite of complementary indicators of biodiversity status and change
- Developed a suite of global biodiversity indicators to track the 20 Aichi Biodiversity Targets for the Strategic Plan for Biodiversity 2011-2020

- http://www.bipindicators.net/

Global Biodiversity Indicators

Relevance for ecosystem accounting

- Existing suite of indicators that countries can use to develop their own fit-for-purpose indicators (e.g. Uganda Living Planet Index)
- Opportunity for sharing lessons learnt
- Indicators from one process
- Not all BIP indicators can be calculated in the same way at a national level (e.g. Red List Index)
- Not all BIP indicators are 'active'
  - Extent of marine habitats
  - Forest fragmentation
  - River fragmentation and flow regulation

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Filling the gaps...

Ad-Hoc Technical Group on Indicators for the Strategic Plan on Biodiversity 2011-2020

- June/July 2015
- Identify potential indicators that could be used to monitor progress at the global level towards the Aichi Biodiversity Targets – focus on targets that are not currently well addressed:
  - Target 14 on essential ecosystem services
    - Biodiversity for food and medicine
    - Ocean Health Index
    - Red List Index for Pollinators
  - Target 15 on ecosystem resilience – global indicator ✖

- UNEP-WCMC providing supporting documents exploring:
  - Where are the gaps within the global BIP suite? For these gaps suggest new global indicators (where possible)
  - Which global indicators can be disaggregated to national level?
  - What are the barriers to national level use of global datasets?

Filling the gaps...

Ad-Hoc Technical Group on Indicators for the Strategic Plan on Biodiversity 2011-2020

- Critical review of BIP indicators underway - initial findings indicate that although 3 indicators under ABT14 exist their alignment is low (ability to track progress towards the target)

- Work to be done!

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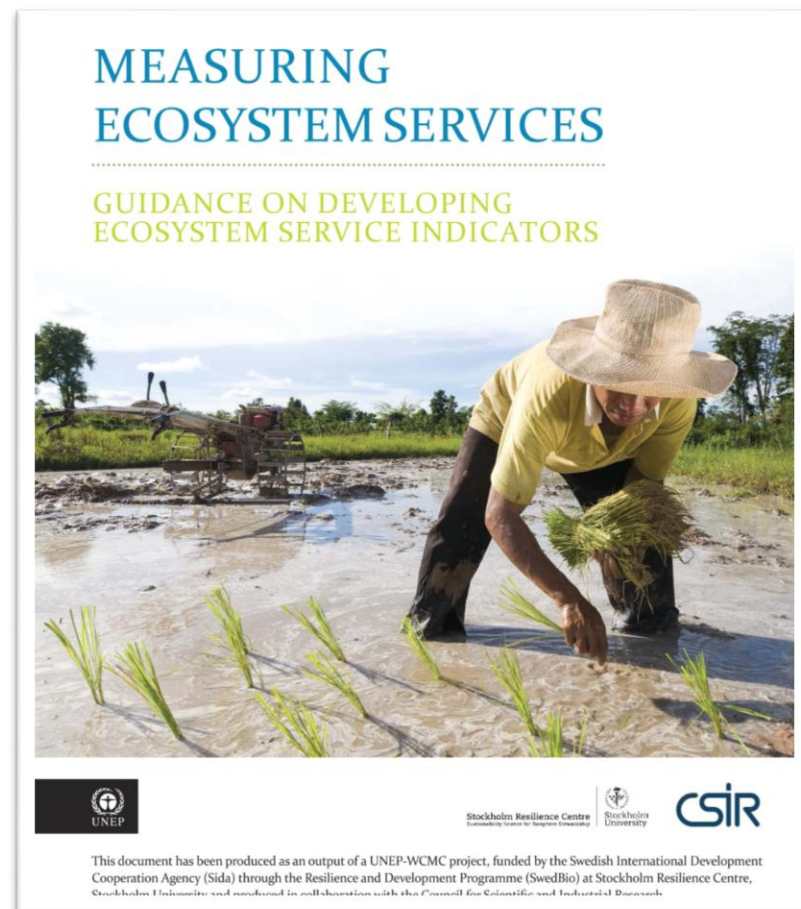# Useful resources for countries

Biodiversity Indicators
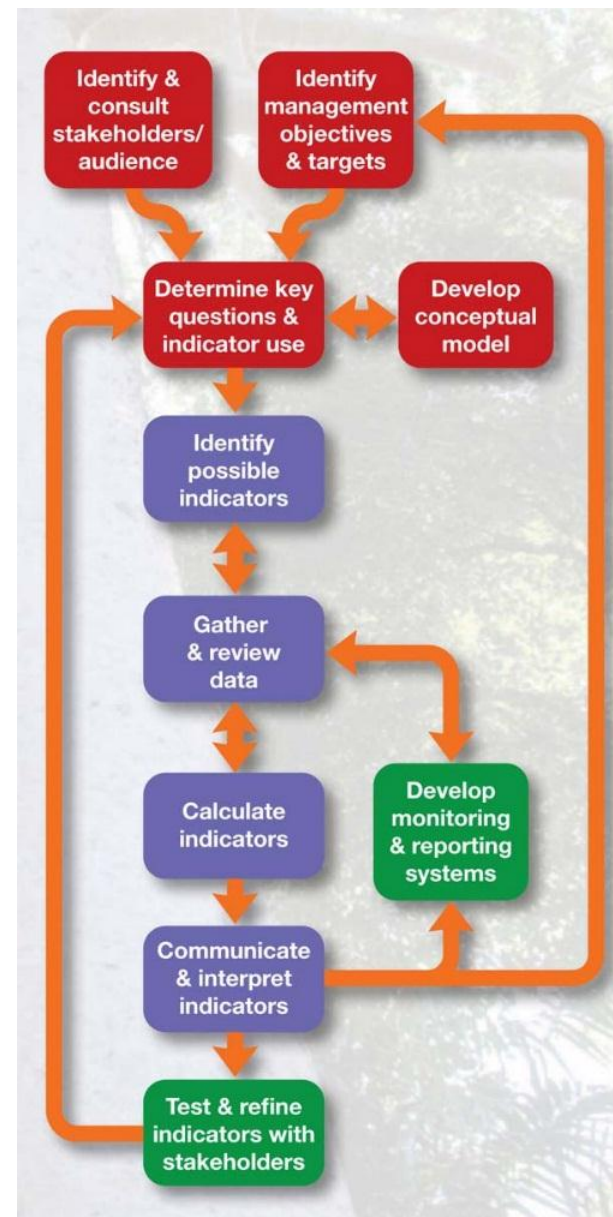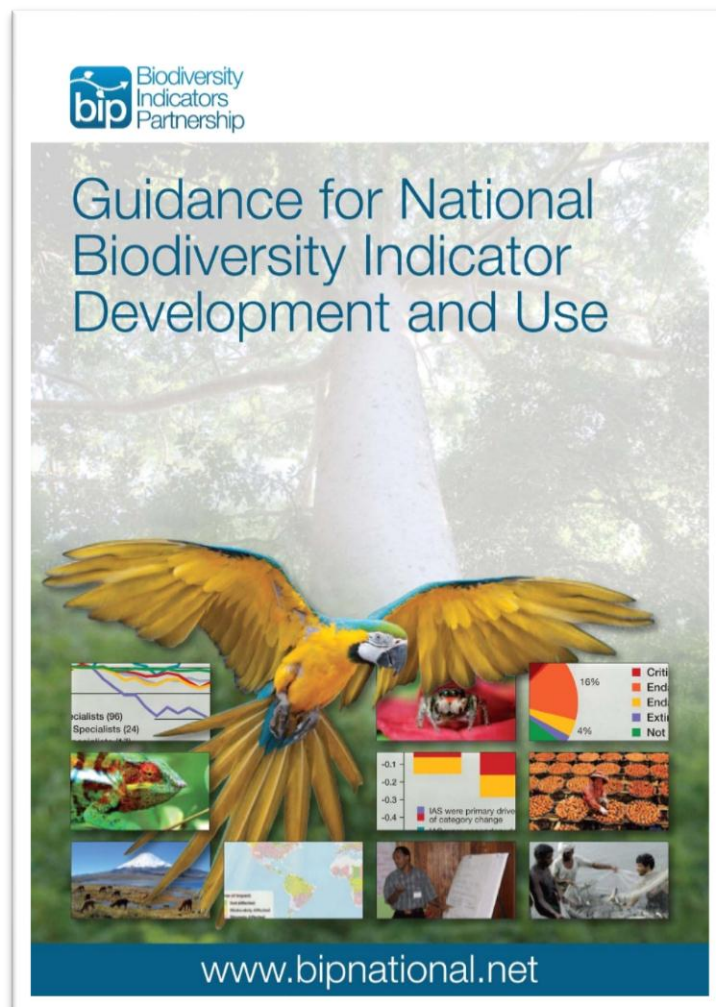
Biodiversity Indicator Development Framework

Useful resources for countries

Developing Ecosystem Service Indicators

- Aimed at national / sub-national scales
- Understand condition, trends and rate of change in ecosystem services
  - Development framework
  - Mainstreaming indicators into monitoring and reporting systems of economic and biodiversity policies and plans
  - Example indicators from South Africa

MEASURING ECOSYSTEM SERVICES

GUIDANCE ON DEVELOPING ECOSYSTEM SERVICE INDICATORS

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Developing ecosystem service indicators

Challenges

- The **ability of indicators to convey information** about ecosystem services is **low** overall although it varies wildly among services
- Indicators available for most ecosystem services are **not comprehensive** and are often **inadequate to characterize the diversity and complexity of the benefits** they provide
- **Data are often insufficient** to support the use of these indicators
- Indicators for **regulating and cultural services lag behind** provisioning services in each of the limitations identified above

Key gap

- **Measures the level of ecosystem services** provided by a particular area (e.g. crop production, water regulation) but do not provide an **indication of the actual benefit gained** by people and how these **benefits are distributed across space and time**
- Need to be able to **understand benefit flows** from services to assess consequences of ecosystem service change for human well-being

| Type of services | Ecosystem Service Component | | | |
	Supply	Delivery	Contributions to well-being	Value
Provisioning	Amount of biomass available for fodder (pasture or forage, Tons) Biomass or abundance of important species	Total production of all commercial crops (Tons), Caloric or micronutrient content of fish landings (grams) Volume of harvested wood (m3)	% caloric or micronutrient intake contributed by crops, % income or number of jobs contributed by aquaculture Basic needs satisfied via ecosystem good or service	Market value of all livestock products (US$) Marginal contribution of irrigation to crop market value Change in malnutrition rate due to wild harvest food
Regulating	Amount of carbon absorbed by vegetation from the atmosphere (Tons of C) Mass of nutrients, organic matter, sediments, or toxic organisms or compounds removed (Kg), changes in temperature, pH Pollinator abundances and pollination rates	Water conditions (e.g. nutrient content, presence of harmfull bacteria) in relation to standards for different water users at or above withdrawal point Marginal contribution of soils to agricultural, forestry and biofuel production Area of avoided flood damaged due to regulation by vegetation and soils (ha)	% of population with reduced negative impacts (e.g. from floods, wind, drought) Number of people protected from infrastructure loss, flooding and erosion from coastal protection Marginal contribution of pest control to food or biofuel production	Market value of carbon uptake (US$) Avoided water treatment costs (US$) Avoided economic loss by flood regulation from vegetation and soils (US$)
Cultural	Area that provides aesthetic views Area that is suitable for nature-based tourism Abundance of plants	Nature based tourism visitation rates, collection rates of plants used for ritual practices	Marginal contributions to income or well-being of visitors and to local inhabitants derived from aesthetic views, attendance at ritual events, frequency of cultural activities	Economic revenues derived from visits to aesthetic areas, marginal contribution to real estate prices by nature-based tourism (US$), strength of cultural identity

- There is not yet a generally accepted approach to measuring the complete bundle of ecosystem services provided by an area

Source: GEO BON Ecosystem Service Working Group

Indicators for provisioning services delivered by forests (MAES 2014)

Table 1 (left)

Division	Group	Class	Indicators
Nutrition	Biomass	Cultivated crops	
		Reared animals and their outputs	• Meat production (Iberian pig species)
			• Meat consumption (Iberian pig species)
			• Number of indiv
			• Meat production
			• Meat consumpt
			• Number of indiv
		Wild plants, algae and their outputs	• Distribution of h
			• Distribution of p
			• Distribution of v (NFI plot data)
			• Distribution of v
			• Honey production
			• Honey consump
			• Wild berries, fru
		Wild animals and their outputs	• Amount of meat
			• Value of game
			• Hunting records
		Plants and algae from *in-situ* aquaculture	
		Animals from *in-situ* aquaculture	
	Water	Surface water for drinking	• Total supply of v
			• Area of forest d
			• Surface water s level)
			• River discharge
			• Reservoir water
			• Population and
		Ground water for drinking	None

Table 2 (right)

Division	Group	Class	Indicators
Materials	Biomass	Fibres and other materials from plants, algae and animals for direct use or processing	• Forest biomass stock
			• Forest biomass increment
			• Forest for timber, pulp wood, etc. Production
			• Commercial forest tree volume & harvesting rates
			• Trees (presence) cork oak for cork & pines for resins
			• Tree species (timber trees)
			• Wood consumption (industrial roundwood, fuelwood)
			• Consumption of cork and resins
		Materials from plants, algae and animals for agricultural use	• Distribution of foraging areas in forest; estimate of grassland shrubland (NPP)
			• Marketed forage
		Genetic materials from all biota	• Distribution of plants species with biochemical/pharmaceutical uses
			• Raw materials for medicines
	Water	Surface water for non-drinking purposes	*Same as for drinking purposes*
		Ground water for non-drinking purposes	
Energy	Biomass-based energy sources	Plant-based resources	• Wood fuel stock (fraction of forest biomass stock)
			• Wood fuel production (fraction of forest biomass increment)
			• Distribution of tress for wood production
			• Fuel wood consumption
		Animal-based resources	
	Mechanical energy	Animal-based energy	

Colours indicate readiness of use

Closing points

- For countries to understand the changes in their ecosystems and services, they should be collecting data for:
    - Habitat map – changes in extent and condition
    - Range of species indicators
    - Key ecosystem service indicators

- Countries are setting national targets and indicators in their NBSAPs – are these fit for accounting?