



System of  
Environmental  
Economic  
Accounting

# Advancing the SEEA Experimental Ecosystem Accounting – Experience from the UN pilot project

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A Community on Ecosystem Services (ACES) Conference 2016

Jacksonville, USA, 5-9 December 2016



United Nations

# Outline

- Overview
- Advancing Natural Capital Accounting (ANCA) project
  - > Country assessments
  - > Testing of pilot accounts – Mexico and South Africa
- Methodological development in 2016

# International bodies for SEEA

## United Nations Committee of Experts on Environmental Economic Accounting (UNCEEA)

*The governing body for the mainstreaming and implementation of the SEEA. Established by the UN Statistical Commission at its 36th Session in 2005.*

Chair: Bert Kroese, Statistics Netherlands || Secretariat: UNSD

Technical Committee of the SEEA  
Central Framework

Technical Committee of the SEEA  
Experimental Ecosystem Accounting

London Group on Environmental Economic Accounting

Forum of Experts on SEEA Experimental Ecosystem Accounting

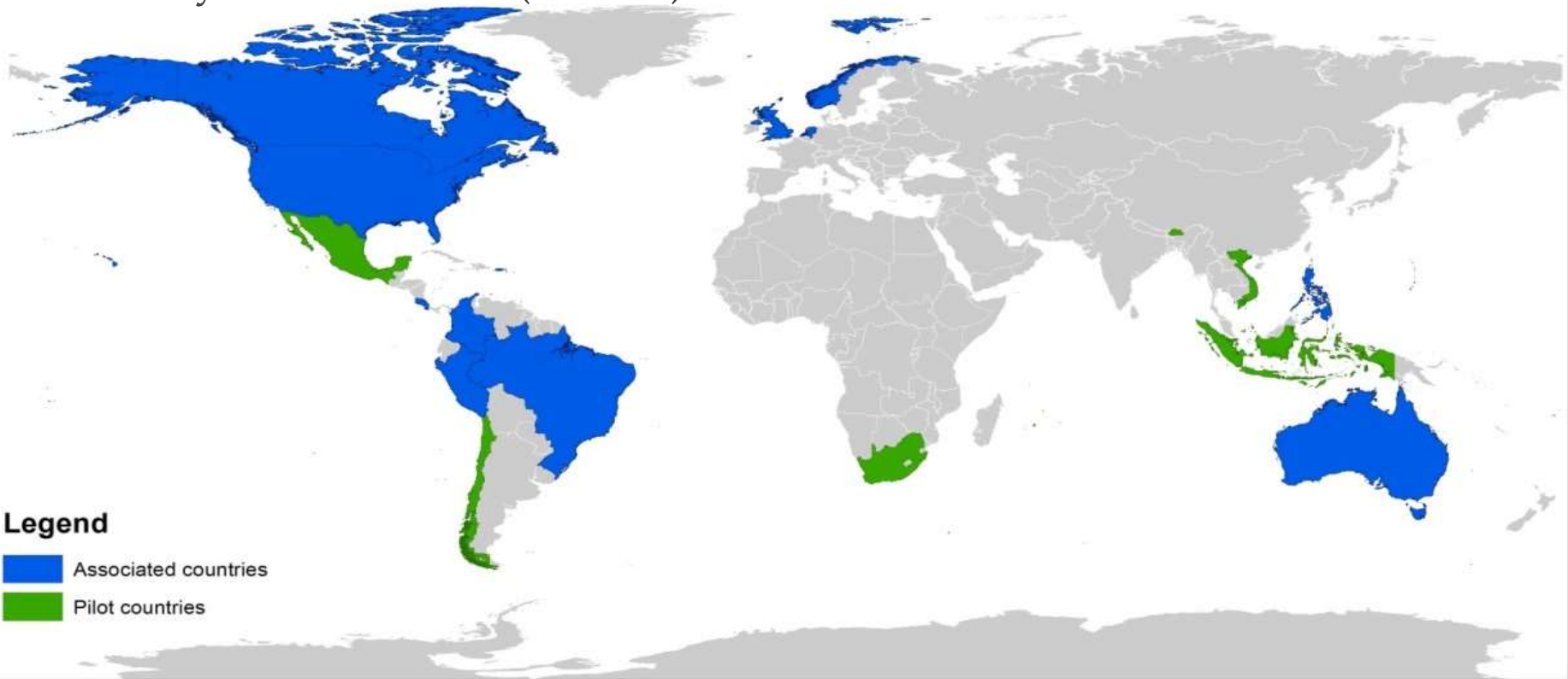
# System of Environmental-Economic Accounting (SEEA)

- The **SEEA Central Framework** was adopted as an international statistical standard by the UN Statistical Commission in 2012
- The **SEEA Experimental Ecosystem Accounting** complements the Central Framework and represents international efforts toward coherent ecosystem accounting



# Pilot countries for the UNSD-UNEP-CBD project

- > Pilot countries for the project: Bhutan, Indonesia, Chile, Mauritius, Mexico, South Africa, Vietnam (in green)
- > Non-exhausted list of associated countries that have pilot ecosystem accounts (in blue)



# Assessment and developing national plan

# Country assessment

What issues of interest?

What are the accounts that could inform these issues?

Which accounts are most feasible to produce?

What is the relative priority of each account?

What data are available?

What are the resources available?

What enabling factors are needed?

## PHASE 1

- Institutionalisation
- Policy Issues
- Prioritized account
- Socialization

## PHASE 2

- Data availability
- Data gap analysis
- Capacity Building

## PHASE 3

- Drafting strategic plan to compile environmental account

## PHASE 4

- Implementation

# Country assessment reports

- National assessment reports were completed for each country focusing on the following issues
  - > Policy context and national strategies (national development plans, national sustainable development plans, NBSAPS, green economy strategies, etc.)
  - > Measurement initiatives in the country
    - Key institutions and institutional arrangements
    - Environmental accounts priorities
    - Technical capacity needs and data availability (data sources and data sharing tools)
    - Conclusions



# Stakeholders

	Bhutan	Chile	Indonesia	Mauritius	Mexico	South Africa	Vietnam
Statistics	Lead	√	Lead	Lead	Lead	Lead	√
Environment	√	Lead	√	√	√	√	√
Agriculture	√	√	√	√	√	√	√
Planning			√		√	√	√
Economy	√	√	√	√		√	
Central Bank		√		√			√
Biodiversity				√	√	Co-lead	√
Forest	√	√	√		√		√
University						√	
International agencies	UNDP	ECLAC UNDP	UNDP World Bank FAO UN-REDD+	UNEP UNDP IOC	UNDP UNEP EU	UNDP EU	UNDP World Bank FAO

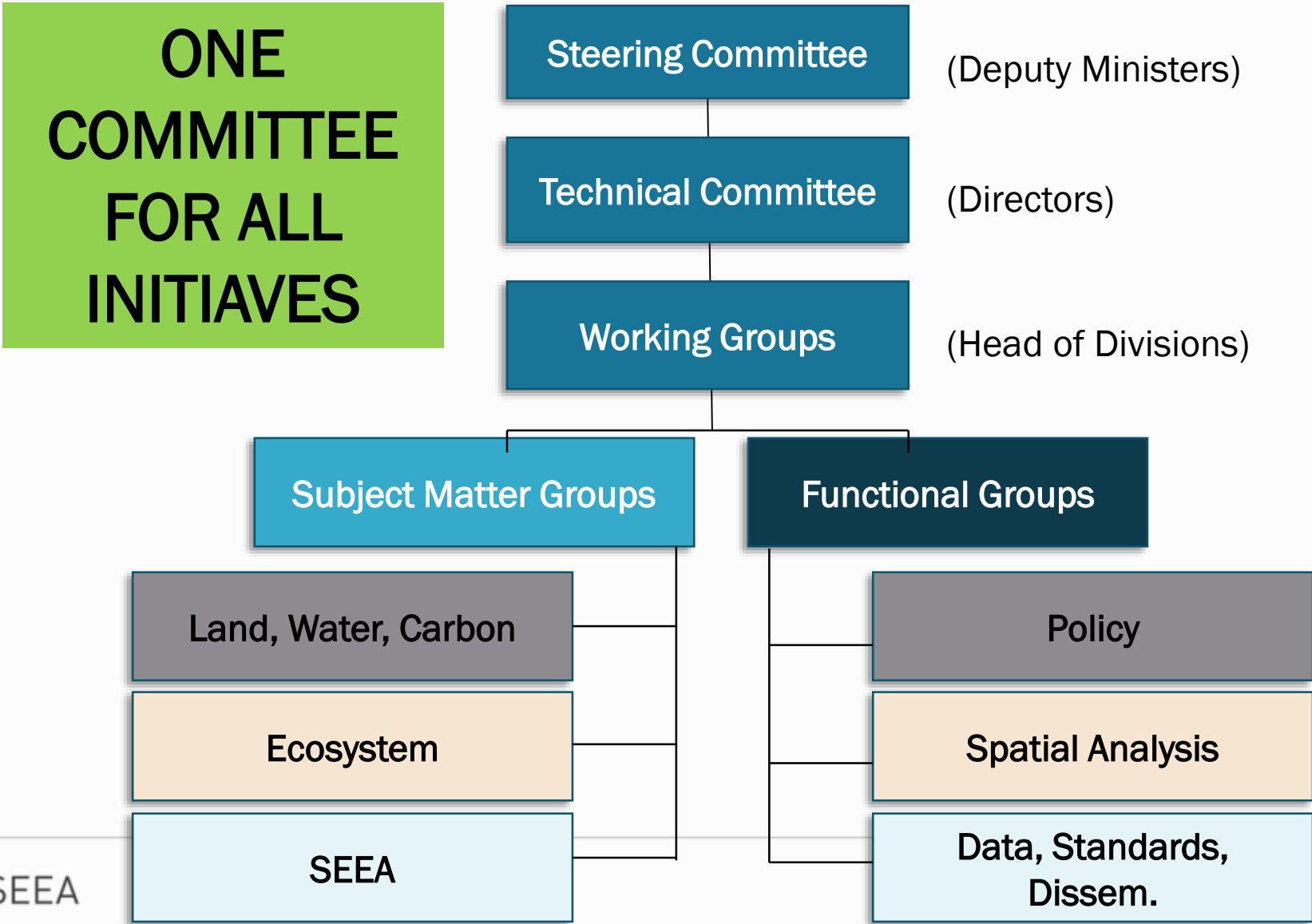
# National plans for advancing environmental-economic accounting

- National plan include:
  - > Rationale and justification
  - > High-level outcome
  - > Building blocks/outputs
  - > Common methodology
  - > Concrete actions
- National plan discussed during the second mission during a high level meeting with relevant stakeholders and adopted subsequently

## Example: Indonesia – overview of policies and prioritized accounts

TYPE OF ACCOUNT	POLICY ISSUE	AGENCIES
<b>LAND ACCOUNTS</b> (including forest and agricultural land)	RPJMN 2015-2019, Gazetting Forest Lands, Spatial Planning Law, Green Economy, food security, REDD+, Aichi Target 2, One Map	BPS, LHK, BAPPENAS, MenKeu, DepTan, Bulog, LAPAN, BPPT, BIG
<b>WATER ASSET ACCOUNTS;</b> Water Supply & Use Accounts	RPJMN 2015-2019, Green Economy, Spatial Planning Law	BPS, LHK, BAPPENAS, MenKeu, DPU, LAPAN, BPPT
<b>CARBON STOCK ACCOUNTS;</b> Carbon Supply & Use Accounts;	RPJMN 2015-2019, Green Economy, Climate Change, REDD+	BPS, LHK, BAPPENAS, MenKeu, DehHut,
<b>ECOSYSTEM SERVICE ACCOUNTS</b> (especially for flood control)	RPJMN 2015-2019, Green Economy, Climate Change	BPS, LHK, BAPPENAS, MenKeu, BNPB
<b>Adjusted Net Savings</b> and economic valuation of natural capital	Financing of environmental initiatives	BPS, BAPPENAS, MenKeu
Ecosystem Condition and <b>Biodiversity Accounts</b>	RPJMN 2015-2019, Green Economy, REDD+, Aichi Target 2,	BPS, LHK, BAPPENAS

# Example: Indonesia – Proposed governance

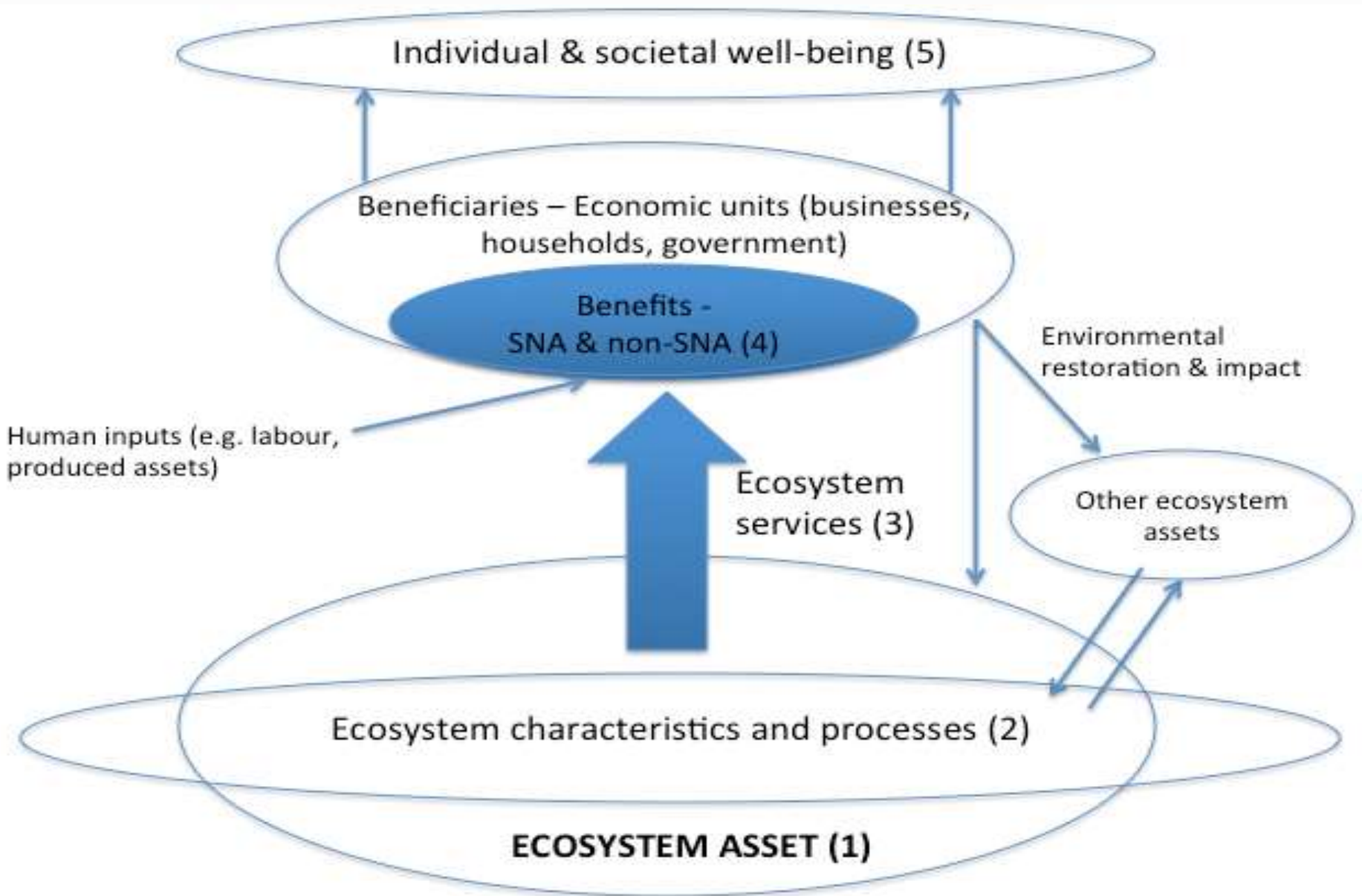


# Observations

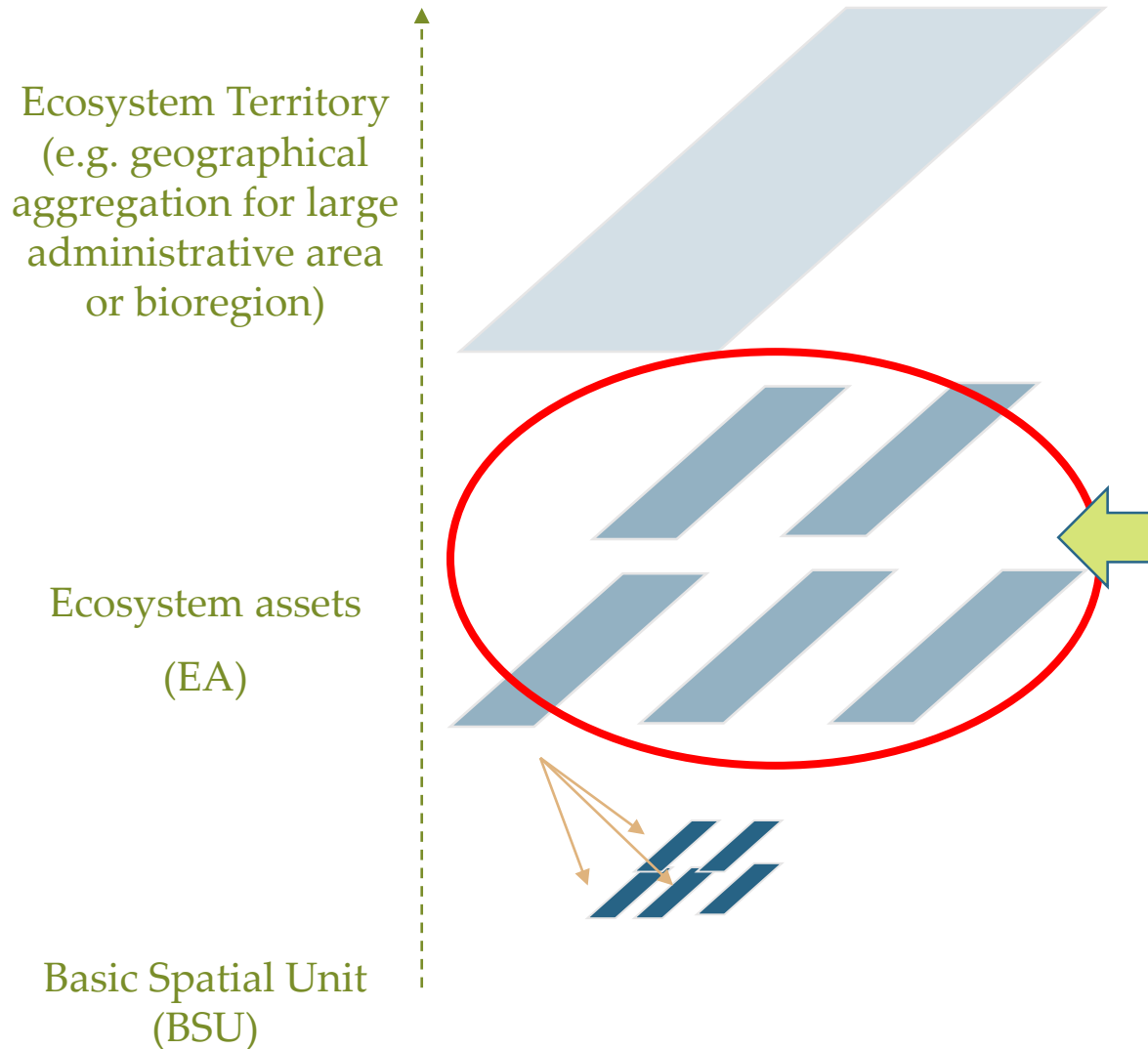
- Political support for the national plan varies in different countries. Important to have a political champion
- National plan serves as a basis for developing the work programme and soliciting funding and capacity support for the work
- One steering committee for overseeing different (international) initiatives allows better coordination and use of resources
- Links to the System of National Accounts and the SEEA Central Framework were often highlighted during the assessment
- Important to establish data sharing mechanism among different agencies. National statistics offices has a role to play on this

# Testing of pilot accounts – Experiences from Mexico and South Africa

# Ecosystem Accounting model



# Statistical units



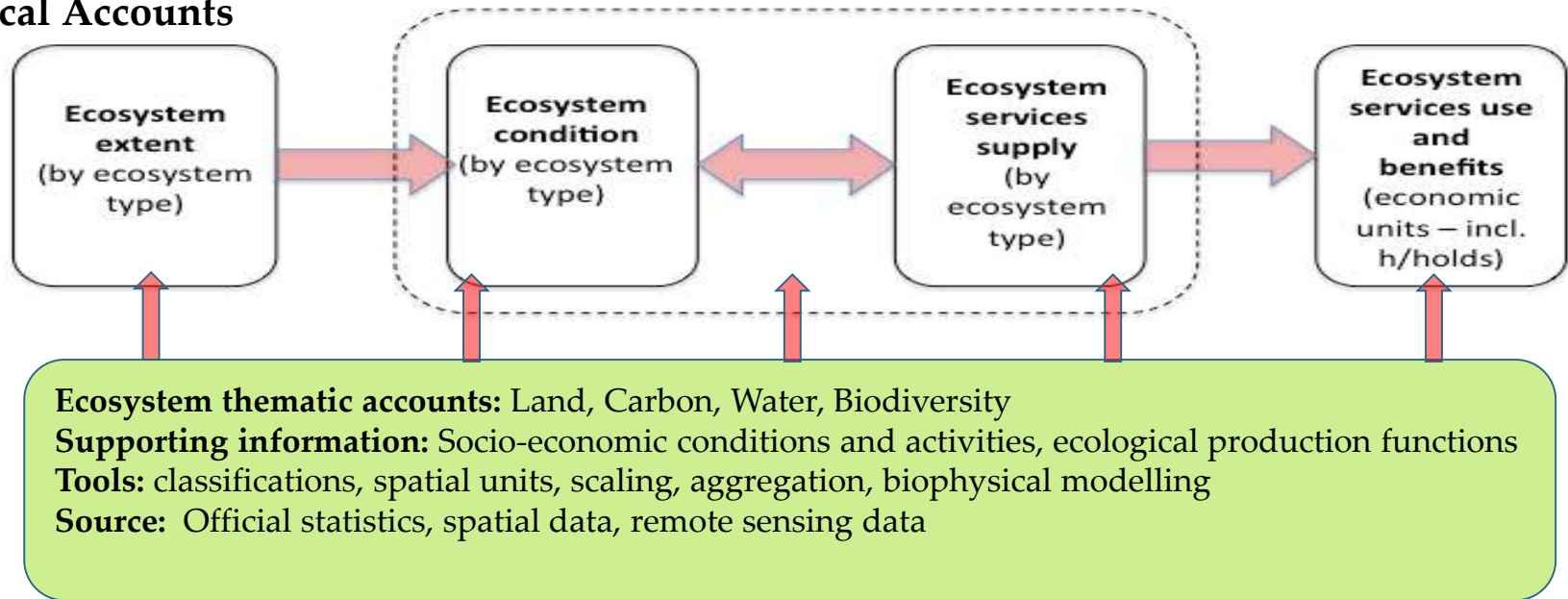
## Ecosystem assets

- Spatial areas that form the conceptual base for accounting and the integration of relevant statistics.
- Delineation is based on ecological characteristics
- Where various ecological data are not available, a land cover based delineation can be used as a starting point

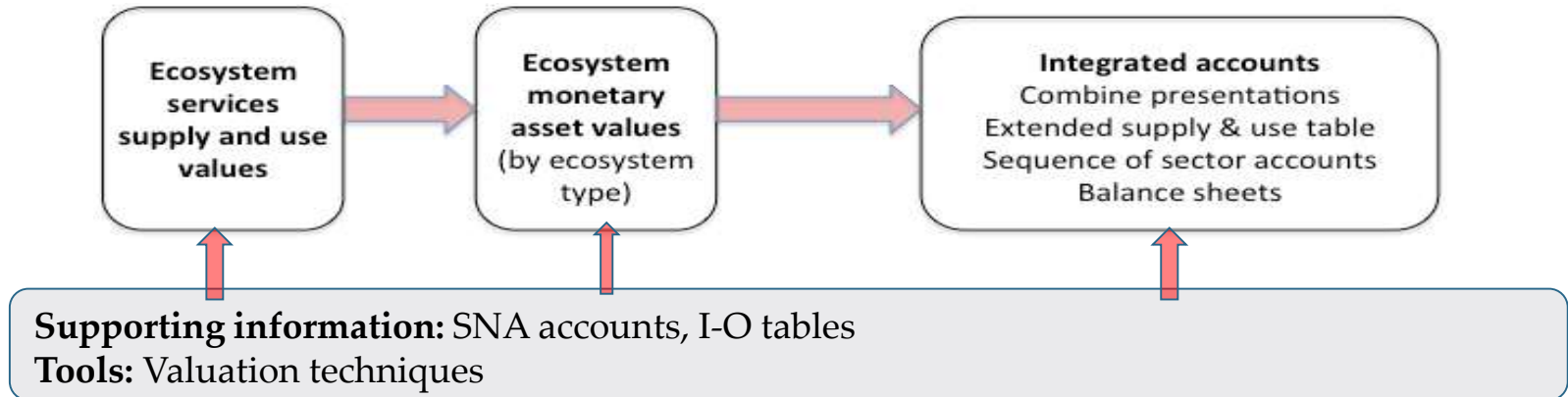


# Broad steps in ecosystem accounting

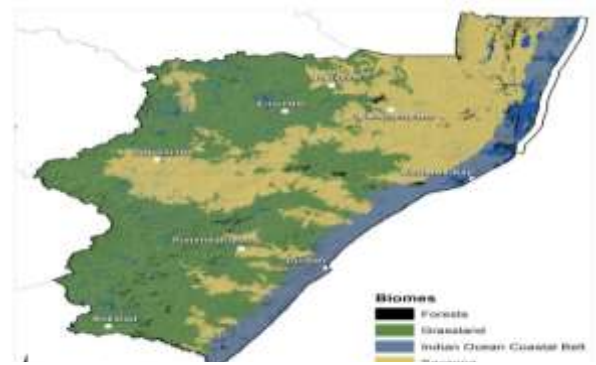
## a. Physical Accounts



## b. Monetary Accounts



# South African pilot study - Ecosystem extent accounts (by biome) for KZN



Hectares	Grassland	Savanna	Indian Ocean Coastal Belt	Wetland	Forest
<b>Opening balance 1840</b>	4 581 933	3 259 059	893 967	393 718	202 822
Total reductions in stock	1 651 736	840 380	528 754	107 567	18 208
Total reductions as a % of 1840	36	26	59	27	9
<b>Opening balance 2005</b>	2 930 197	2 418 679	365 213	286 151	184 614
Total reductions in stock	277 108	208 607	59 723	18 276	9 792
Total reductions as a % of 1840	6	6	7	5	5
<b>Opening balance 2008</b>	2 653 090	2 210 072	305 490	267 875	174 822
Total reductions in stock	68 092	34 757	11 782	9 082	3 128
Total reductions as a % of 1840	1	1	1	2	2
<b>Opening balance 2011</b>	2 584 998	2 175 315	293 708	258 793	171 694

Source:

Driver, A., Nel, J.L., Smith, J., Daniels, F., Poole, C.J., Jewitt, D. & Escott, B.J. 2015. Land and ecosystem accounting in KwaZulu-Natal, South Africa. Discussion document for Advancing SEEA Experimental Ecosystem Accounting Project, October 2015. South African National Biodiversity Institute, Pretoria.

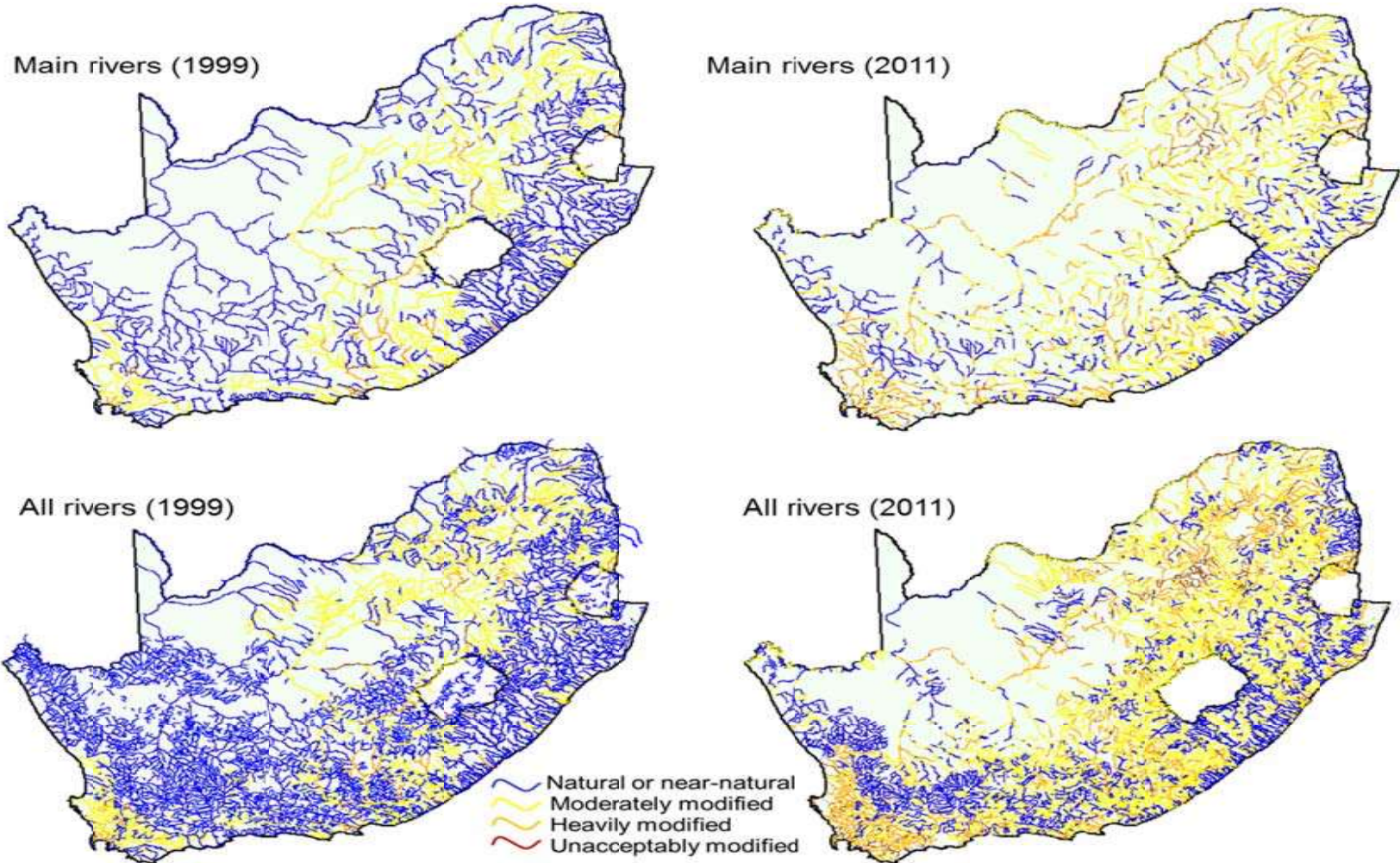
# National river ecosystem condition account

<b>Kilometres</b>	<b>Main rivers</b>	<b>Tributaries</b>	<b>All rivers</b>
Opening stock 1999	76 310	87 223	163 533
Opening stock as % of total river length	47	53	100
Additions/reductions			
Additions/reductions as a % opening stock			
Opening stock 2011	76 310	87 223	163 533
Opening stock as % of total river length	47	53	100

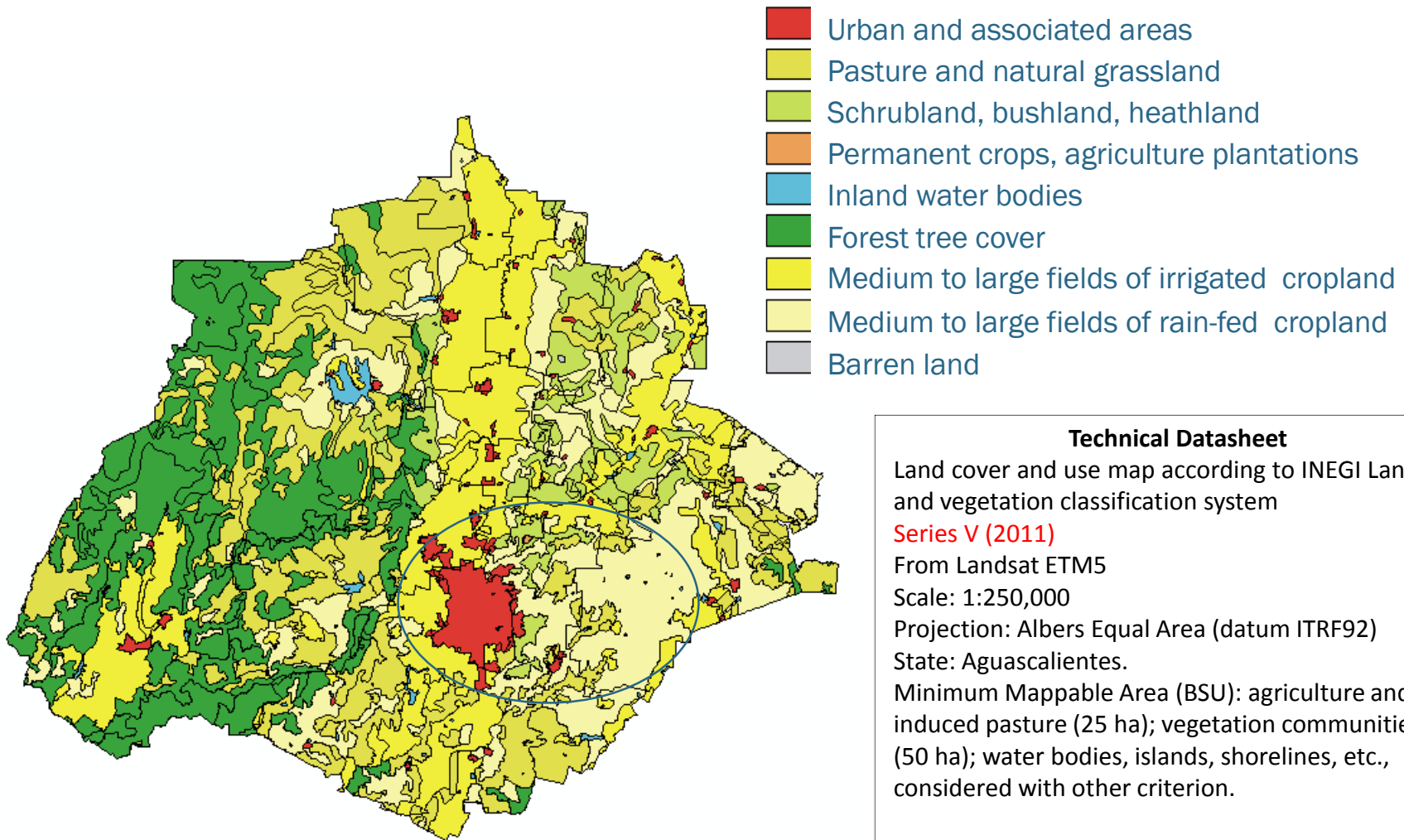
# National river ecosystem condition accounts

Kilometres	Degree of modification from natural					Total
	Natural	Moderately modified	Heavily modified	Unacceptably modified	No Data	
<b>MAIN RIVERS</b>						
<b>Opening stock 1999</b>	<b>46 541</b>	<b>22 315</b>	<b>2 791</b>	<b>1 026</b>	<b>3 637</b>	<b>76 310</b>
Opening stock as a % total river length	61	29	4	1	5	100
Increase/decreases	-24 100	9 467	13 168	1 465		
Increases/decreases as % opening stock	-52	42	472	143		
<b>Opening stock 2011</b>	<b>22 441</b>	<b>31 782</b>	<b>15 960</b>	<b>2 492</b>	<b>3 637</b>	<b>76 310</b>
Opening stock as a % total river length	29	42	21	3	5	100
<b>TRIBUTARIES</b>						
<b>Opening stock 1999</b>	<b>40 294</b>	<b>7 470</b>	<b>2 084</b>	<b>328</b>	<b>37 047</b>	<b>87 223</b>
Opening stock as a % total river length	46	9	2		42	100
Increase/decreases	-17 062	11 339	4 766	957		
Increases/decreases as % opening stock	-42	152	229	292		
<b>Opening stock 2011</b>	<b>23 232</b>	<b>18 809</b>	<b>6 850</b>	<b>1 285</b>	<b>37 047</b>	<b>87 223</b>
Opening stock as a % total river length	27	22	8	1	42	100
<b>ALL RIVERS</b>						
<b>Opening stock 1999</b>	<b>86 835</b>	<b>29 784</b>	<b>4 875</b>	<b>1 354</b>	<b>40 684</b>	<b>163 533</b>
Opening stock as a % total river length	53	18	3	1	25	100
Increase/decreases	-41 163	20 806	17 935	2 422		
Increases/decreases as % opening stock	-47	70	368	179		
<b>Opening stock 2011</b>	<b>45 673</b>	<b>50 591</b>	<b>22 810</b>	<b>3 776</b>	<b>40 684</b>	<b>163 533</b>
Opening stock as a % total river length	28	31	14	2	25	100

# National river ecosystem condition accounts (mapping)



# Extent Account in Mexico



## Technical Datasheet

Land cover and use map according to INEGI Land use and vegetation classification system

Series V (2011)

From Landsat ETM5

Scale: 1:250,000

Projection: Albers Equal Area (datum ITRF92)

State: Aguascalientes.

Minimum Mappable Area (BSU): agriculture and induced pasture (25 ha); vegetation communities (50 ha); water bodies, islands, shorelines, etc., considered with other criterion.

# Mexico - step forward

- To continue with the development of the accounts for **all entities and municipalities of the country**.
  - 32 federal entities in the country
  - 2,456 municipalities
- To evaluate the **minimum mappable level**. Each Federal Entity has different level of statistical and geographic information development.

# Progress in 2016 - step forward

	AGS	COL	VER	CHIH	CAM P	MORS	CHI	BC	BCS
<b>1. Ecosystem extent accounts</b>	Finished	Finished	Finished	Finished	Finished	Finished	In process	In process	In process
<b>2. Ecosystem condition accounts</b>									
2.1. Soil	Finished	Finished	Finished	In process	In process	In process	In process	In process	In process
2.2. Water	Finished	In process	In process	To do	To do	To do	To do	To do	To do
2.3. Carbon	Finished	Finished	Finished	To do	To do	To do	To do	To do	To do
2.4. Biodiversity	Finished	In process	Finished	To do	To do	To do	To do	To do	To do
<b>3. Ecosystem services supply and use accounts (physical units)</b>									
3.1. Soil	Finished	Finished	Finished	To do	To do	To do	To do	To do	To do
3.2. Water	Finished	In process	In process	To do	To do	To do	To do	To do	To do
3.3. Biodiversity	Finished	In process	In process	To do	To do	To do	To do	To do	To do
3.4. Carbon	To do	To do	To do	To do	To do	To do	To do	To do	To do
<b>4. Ecosystem services supply and use accounts (monetary units)</b>									
4.1. Soil	To do	To do	To do	To do	To do	To do	To do	To do	To do
4.2. Water	To do	To do	To do	To do	To do	To do	To do	To do	To do
4.3. Biodiversity	To do	To do	To do	To do	To do	To do	To do	To do	To do
4.4. Carbon	To do	To do	To do	To do	To do	To do	To do	To do	To do

2016

- Finished
- In process
- To do



# Data sources

- Data sources – Although international data source could provide for a minimum of data harmonization, national data are the logical and preferred starting point for data collection.,
- The following is a list of national data sources used for measuring extent and condition of water-related ecosystem services
  - > Survey and administrative data on water flows and volume of water from the national statistics office,
  - > Survey and administrative data on water flows and volume of water from the Ministry of water or relevant line ministries
  - > Hydrological/meteorological data from national meteorology office
  - > Land cover data/spatial data from the relevant mapping agencies
- In South Africa is an example, where SANBI and Department of Water and Sanitation, and Statistics South Africa has worked together in building the water ecosystem account

# Observations:

- Investment in land cover datasets in time series is required, as this is an essential foundation for land and ecosystem accounts.
  - > Data need to be available at regular interval
  - > Data need to be comparable over time
  - > All area should be accounted for
- Land cover classes may not particularly useful for delineating ecosystem units, but can be a useful proxy for ecosystem condition, especially where no better data on condition exists.
- The scope of the ecological condition data is recommended to be national, but the spatial scale should be sufficiently disaggregated

# Observations

- Indicator of ecological conditions should reflect a combination of
  - > System drivers in the class of ecosystems concerned (such as hydrological changes in freshwater systems)
  - > Habitat attribute (such as degree of fragmentation, instream siltration)
  - > Biological responses of ecosystems and associated species (such as changes of population of particular species, loss of species richness)
- Indicators should be assessed/quantified in relation to a reference condition for the ecosystem type concerned

# Observations

For fully integrated land, ecosystem asset and ecosystem services accounts, **several elements are required:**

- Stable ecosystem units based on ecosystem types that have been mapped and classified to reflect ecological characteristics related to composition, structure and function,
- An understanding of how these ecosystem units link to ecosystem services (via their functional characteristics)
- An understanding of how conversion of each ecosystem unit from natural to various semi-natural or substantially modified land cover classes impacts on its ability to provide ecosystem services. ecosystem extent, ecosystem condition and ecosystem service supply

# Methodological development in 2016

# Updated SEEA EEA Research agenda

- Updated in 2016 to reflect the priorities and additional research issues identified by the UNCEEA in June 2016,.
- Identified priorities for the research agenda includes
  - > Spatial units and their delineations;
  - > Indicators of ecosystem condition;
  - > Selection and measurement of ecosystem services including ecosystem services classifications;
  - > Articulation of the links between ecosystem assets, their conditions and the supply of ecosystem services
  - > Valuation of ecosystem services and assets, and relating market land values to ecosystem asset values.

# SEEA EEA Technical Recommendations

- Complements the SEEA EEA to provides a range of content to support testing and research on ecosystem accounting
- Currently undergo consultation process

## Topics

1. Introduction
2. Ecosystem accounts and approach to measurement
3. Organizing spatial data and accounting for ecosystem extent
4. The ecosystem condition account
5. Accounting for flows of ecosystem services
6. Valuation in ecosystem accounting
7. Accounting for ecosystem assets in monetary terms
8. Integrating ecosystem accounting with standard national accounts
9. Thematic accounts – Land, Water, Carbon and Biodiversity

# Ecosystem services classification

- Two expert group meetings organized in collaboration between the European Environment Agency, US Environmental Protection Agency and UNSD were held in 2016:
  - > review the three existing classification for ecosystem services,- CICES, FEGS-CS, and NESCS;
  - > explored the role of each system for the compilation of the SEEA Experimental Ecosystem Accounting;
  - > discussed the key criteria, principles, and structure for an international classification for ecosystem services.
- Meeting report (1<sup>st</sup> meeting in June, New York)

[http://unstats.un.org/unsd/envaccounting/workshops/ES\\_Classification\\_2016/Towards%20a%20Standard%20International%20Classification%20on%20Ecosystem%20Services%20-%20Final%20report](http://unstats.un.org/unsd/envaccounting/workshops/ES_Classification_2016/Towards%20a%20Standard%20International%20Classification%20on%20Ecosystem%20Services%20-%20Final%20report)

- Follow-up workshop has been proposed in 2017 to go through the outcome of follow-up technical work between key players and potentially the results of the case-study comparisons. Meeting report:



# Earth observation data for official statistics

- As part of work of the UN Big Data Global Working Group Task Teams on Satellite Imagery and Geospatial Data, the drafting of the handbook on Earth Observation Data for Official Statistics has been undergoing in 2016 to provide guidance to the National Statistics Offices for the use of earth observation data and to explore the use of statistical method to improve the earth observation data.
- It is expected the ongoing work in this area will contribute to SEEA EEA research and testing agenda, in particular on issues related to land cover and spatial units.

# Acknowledgements

The ANCA project is a collaboration between The United Nations Statistics Division (UNSD), United Nations Environment Programme (UNEP) and the Secretariat of the Convention on Biological Diversity (CBD) and is supported by the Government of Norway.

# THANK YOU

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<http://unstats.un.org/unsd/envaccounting>