

SANBI

Biodiversity for Life

South African National Biodiversity Institute



Linking Ecosystem Accounts to Policy in South Africa

Mandy Driver

Regional Perspectives on Natural Capital Accounting
Nairobi, 21-23 June 2016



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA



**Statistics
South Africa**



Overview

- Introduction to SA ecosystem accounting
- Ecosystem accounting pilots – key results
- Six lessons
- Next steps

South African National Biodiversity Institute



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

- Government agency
- Falls under Department of Environmental Affairs
- Bridging role between science and policy
- Often works in partnership with other organisations



Environmental Accounts in South Africa

Environmental-economic accounts compendium
produced annually by Stats SA →



Includes:

- Energy
- Fisheries
- Minerals

Underway:

- Water



Key partners in ecosystem accounting in SA

- Main agencies currently involved



- With additional support: Advancing SEEA Experimental Ecosystem Accounting project – SA one of 7 pilot countries



United Nations
Statistics Division

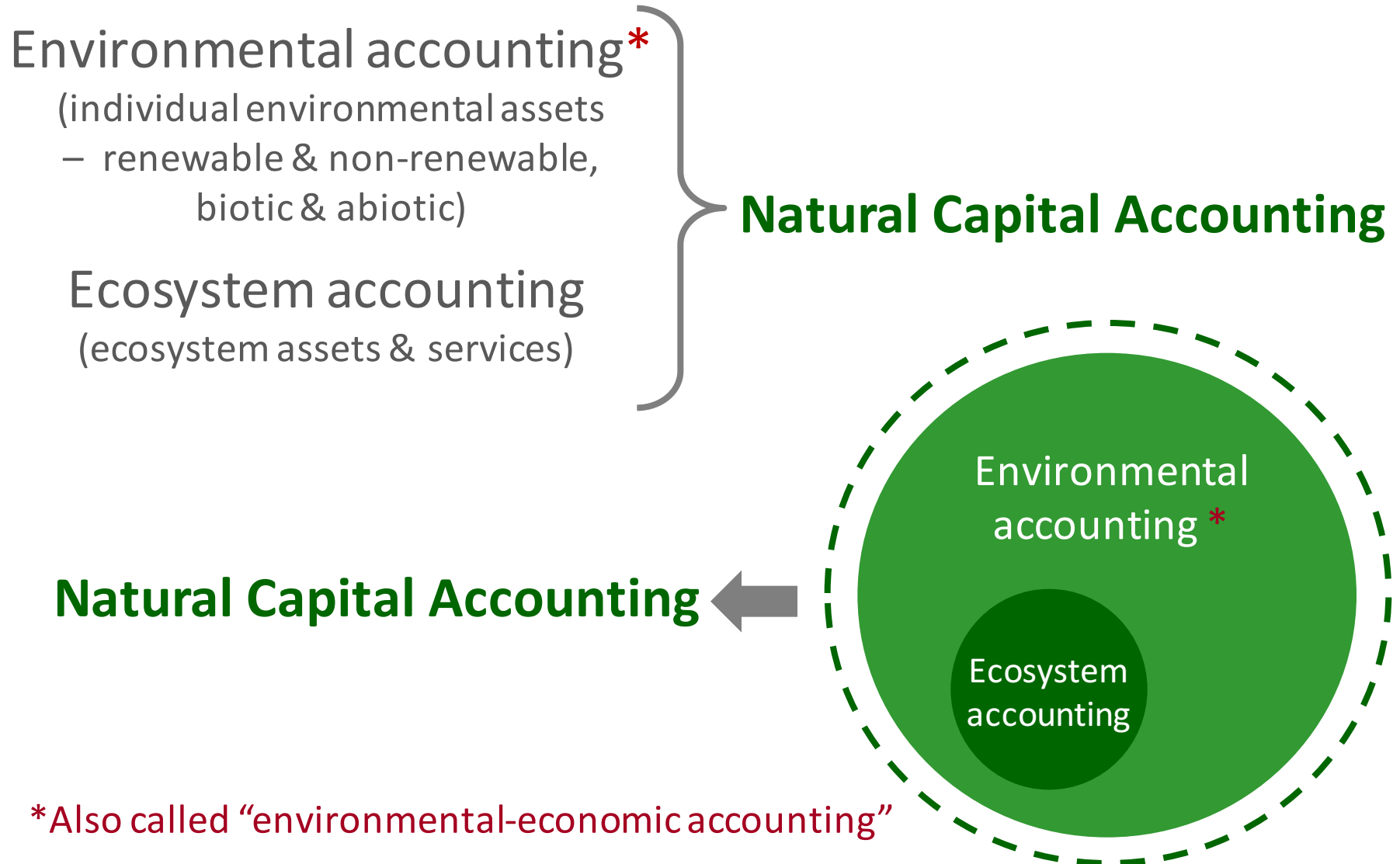


Convention on
Biological Diversity



NORWEGIAN MINISTRY
OF FOREIGN AFFAIRS

Relationship between eco accounting and NCA



Ecosystem accounting

- Inherently spatial
- Distinguishes between
 - Ecosystem assets
 - Ecosystem services

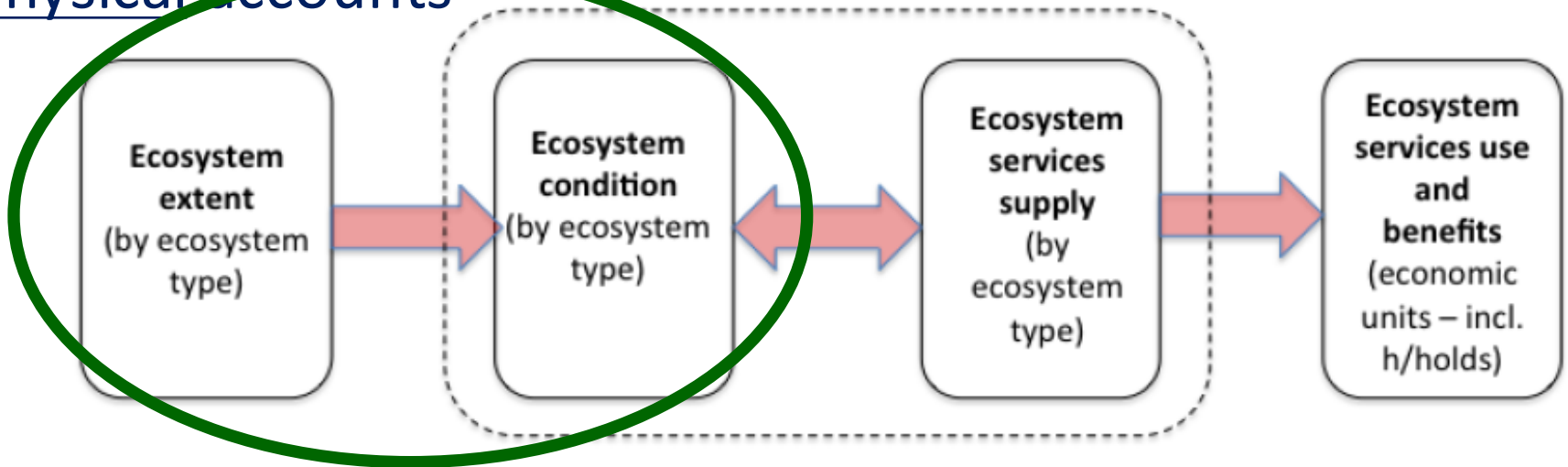


South Africa's pilot ecosystem accounts

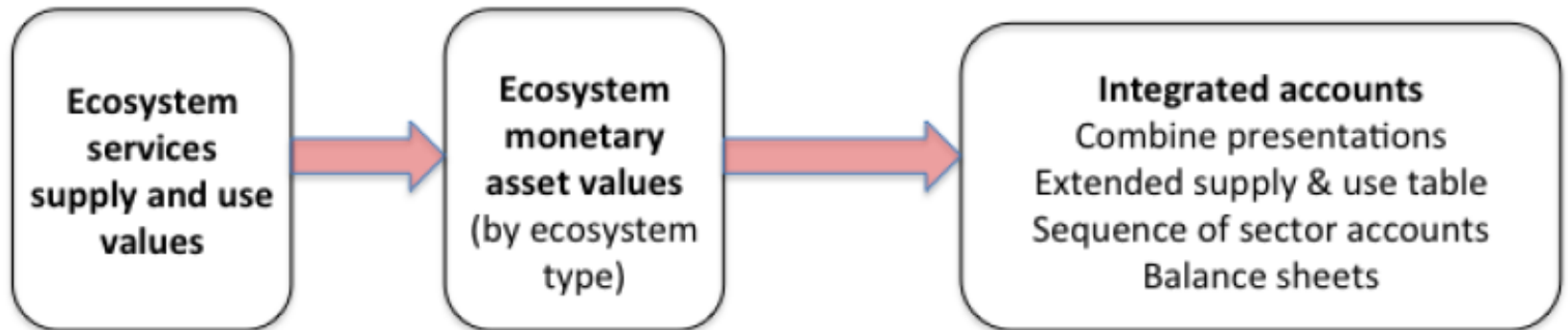
- Land and ecosystem accounts for KwaZulu-Natal (a province of South Africa)
- National river ecosystem accounts

Overview of ecosystem accounts

Physical accounts



Monetary accounts



Land and ecosystem accounts for KZN

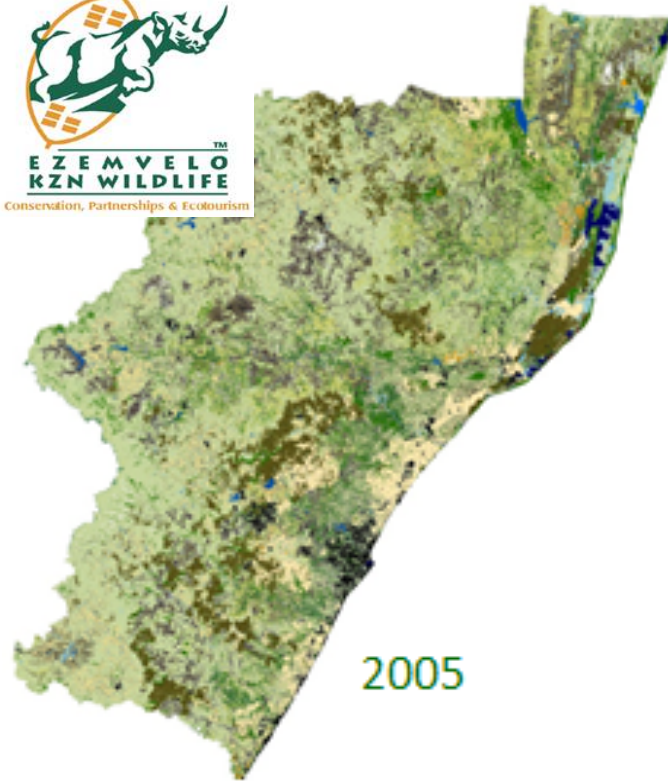
- Possible because of
 - Large investment in land cover data – time series
 - Existing map of vegetation types (ecosystem units)



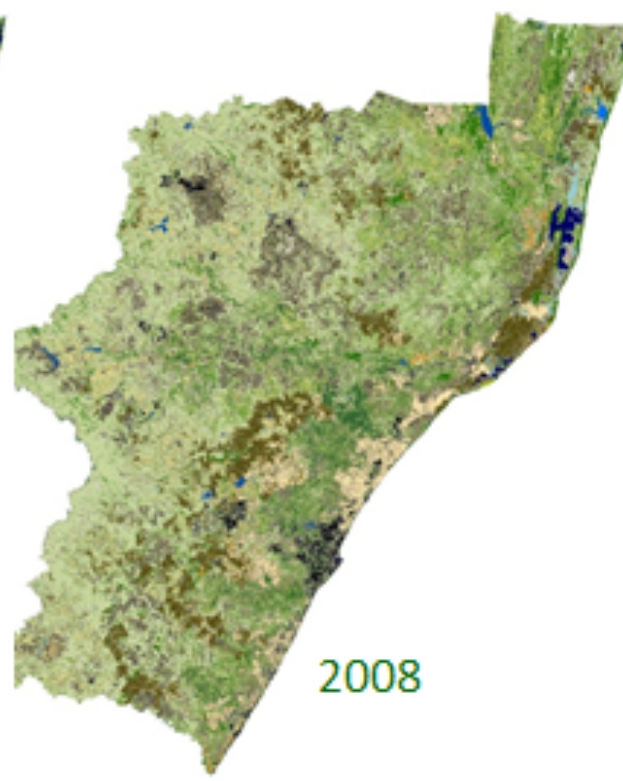
KwaZulu-Natal (KZN)

- 11 million people
- 16% of GDP
- Major port, coal mining, steel production, sugar cane, fruit farming, crops, stock farming, timber plantations, ecotourism

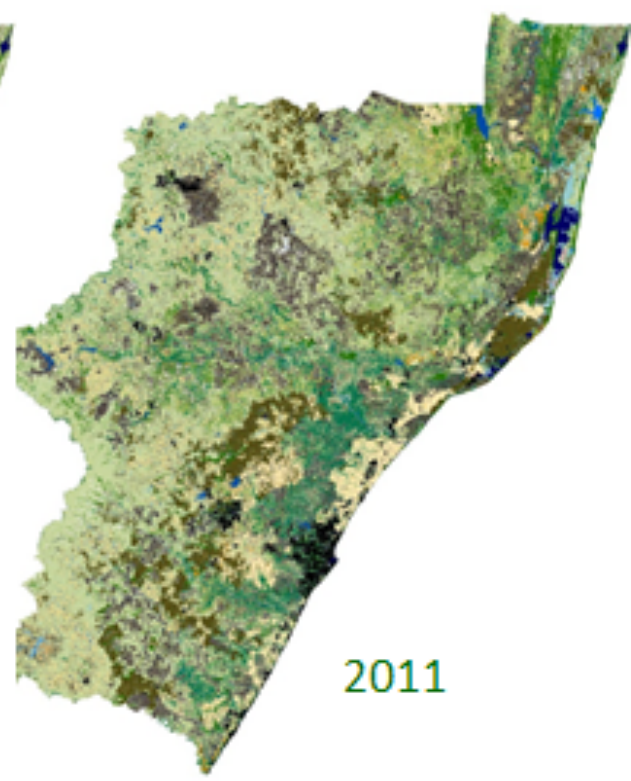
Land cover datasets for KZN – excellent data



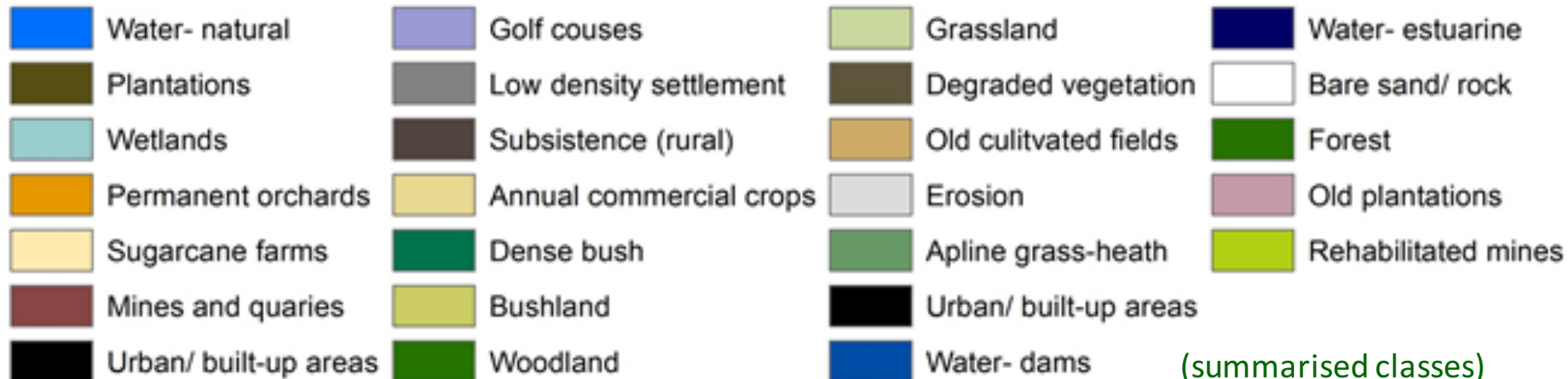
2005



2008



2011



(summarised classes)

Physical account for land cover in KZN

hectares	Natural	Degraded	Fallow lands	Timber plantations	Subsistence agriculture	Dryland cultivation	Irrigated cultivation
Land cover 2005	6284888.4	641270.5	43114.2	694125.8	240491.5	251002.6	119379.9
Total additions to stock	0.0	176067.0	26288.9	66319.4	398723.8	67897.8	23290.0
Total reductions in stock	672172.8	110937.4	3742.8	23070.3	26965.0	10026.0	4162.5
Net additions (additions - reductions)	-672172.8	65129.6	22546.1	43249.1	371758.8	57871.9	19127.5
Net additions as % of opening land cover	-10.7	10.2	52.3	6.2	154.6	23.1	16.0
Total turnover (reductions + additions)	672172.8	287004.5	30031.7	89389.8	425688.9	77923.8	27452.6
Total turnover as a % of opening land cover	10.7	44.8	69.7				
No land cover change	5612715.6	530333.0	39371.4				
No land cover change as a % of opening LC	89.3	82.7	91.3				
Land cover 2008	5612715.6	706400.1	65660.3				
Total additions to stock	105.0	8002.8	2381.6				
Total reductions in stock	126981.4	41473.8	3386.8				
Net additions (additions - reductions)	-126876.4	-33471.1	-1005.2				
Net additions as % of opening land cover	-2.3	-4.7	-1.5				
Total turnover (reductions + additions)	127086.4	49476.6	5768.4				
Total turnover as a % of opening land cover	2.3	7.0	8.8				
No land cover change	5485734.2	664926.2	62273.5				
No land cover change as a % of opening LC	97.7	94.1	94.8				
Land cover 2011	5485839.2	672929.0	64655.2				

Key elements:

- Opening stock
- Additions to stock
- Reductions in stock

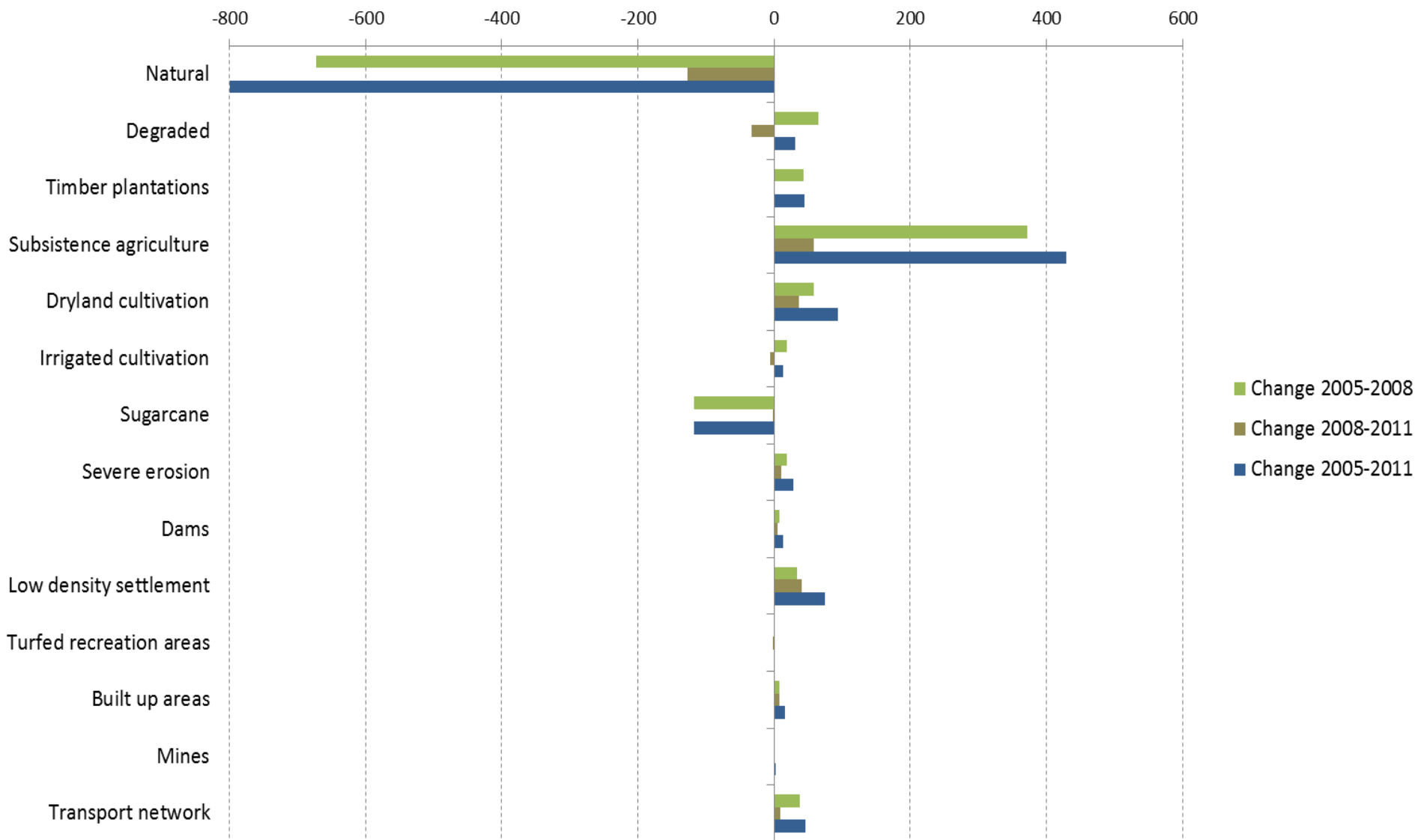
Key elements:

- Opening stock
- Additions to stock
- Reductions in stock
- Closing stock

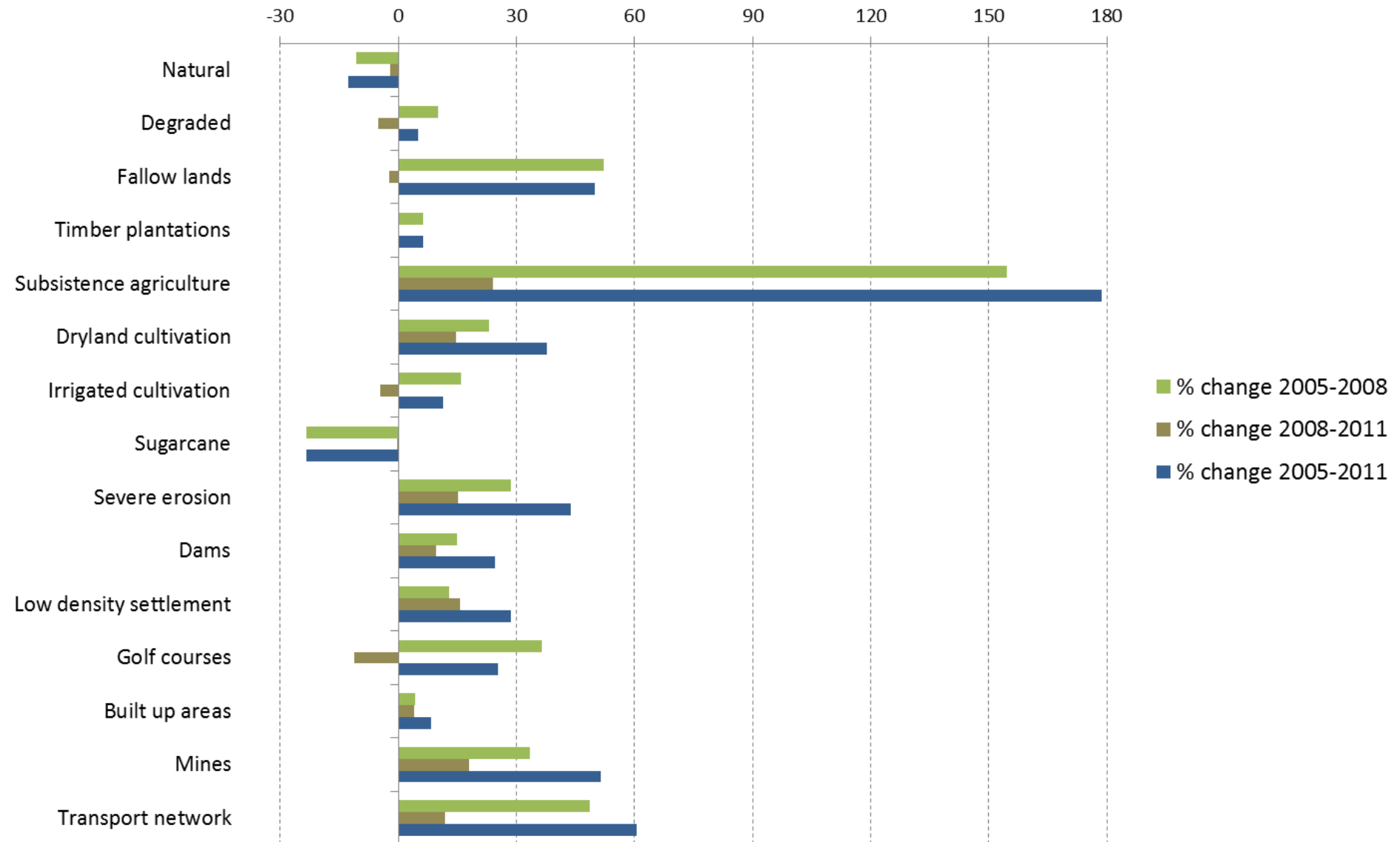
Organised according to a set of land cover classes

Sugarcane	Rehabilitated mines	Se	- Closing stock								Total
503759.8	0.0		Organised according to a set of land cover classes								9438276.0
52252.4	3035.9										
169944.7	0.0										
-117692.4	3035.9										
-23.4	--										
222197.1	3035.9										2156976.7
44.1	--										22.9
333815.1	0.0		57562.4	51259.1	237484.0	2733.5	172728.2	4173.2	70128.8	6707.4	8359787.6
66.3	--		87.0	97.7	91.8	87.9	90.0	92.3	91.7	98.2	88.6
386067.5	3035.9		85056.1	60346.8	292129.7	4242.8	200284.9	6035.3	113698.0	105596.1	9438276.0
3633.7	288.4		11233.6	5354.0	47300.7	137.6	8075.44	1145.76	9084.48	16.92	
3758.5	1584.4		1149.3	343.0	6493.1	485.9	449.96	331.92	21.16	0	
-124.8	-1296.0		10084.3	5011.0	40807.6	-348.3	7625.5	813.8	9063.3	16.9	
0.0	-42.7		11.9	8.3	14.0	-8.2	3.8	13.5	8.0	0.0	
7392.2	1872.8		12383.0	5697.0	53793.8	623.5	8525.4	1477.7	9105.6	16.9	448616.4
1.9	61.7		14.6	9.4	18.4	14.7	4.3	24.5	8.0	0.0	4.8
382309.0	1451.5		83906.8	60003.8	285636.6	3756.9	199834.9	5703.4	113676.8	105596.1	9213967.8
99.0	47.8		98.6	99.4	97.8	88.5	99.8	94.5	100.0	100.0	97.6
385942.7	1739.9		95140.4	65357.8	332937.3	3894.5	207910.4	6849.2	122761.3	105613.0	9438276.0

Change in land cover classes in hectares



% change in land cover classes

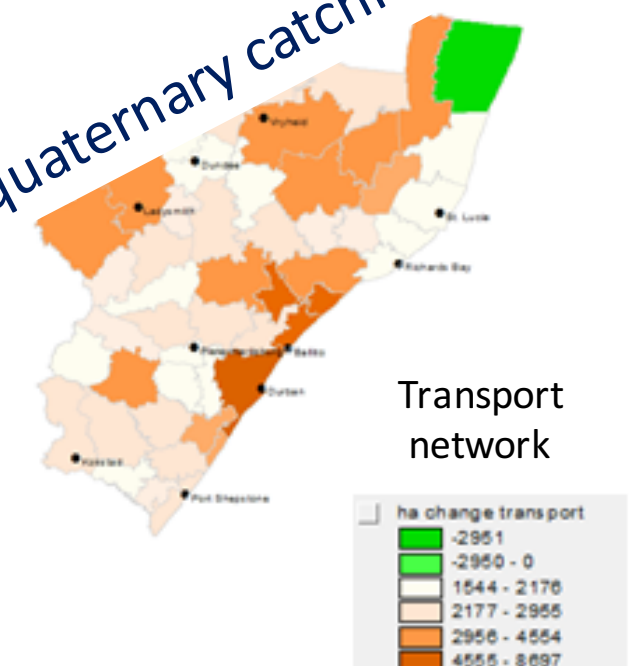
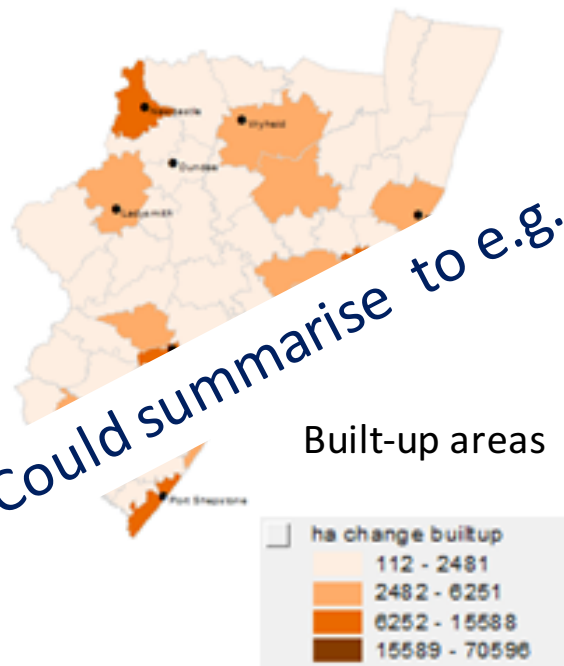
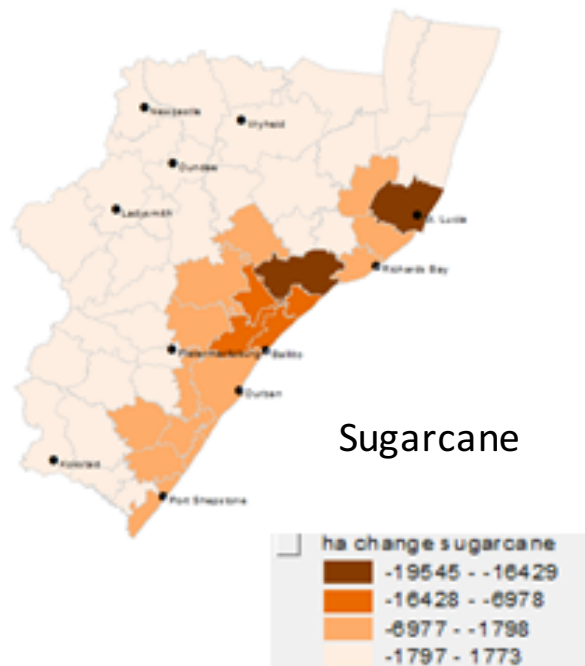
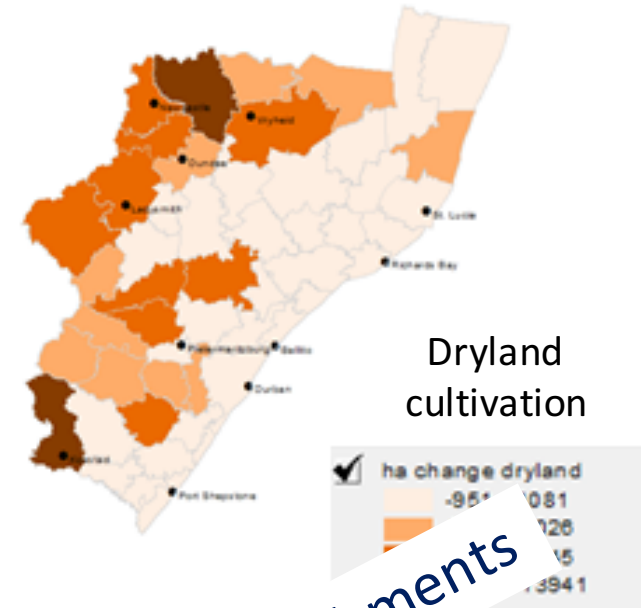
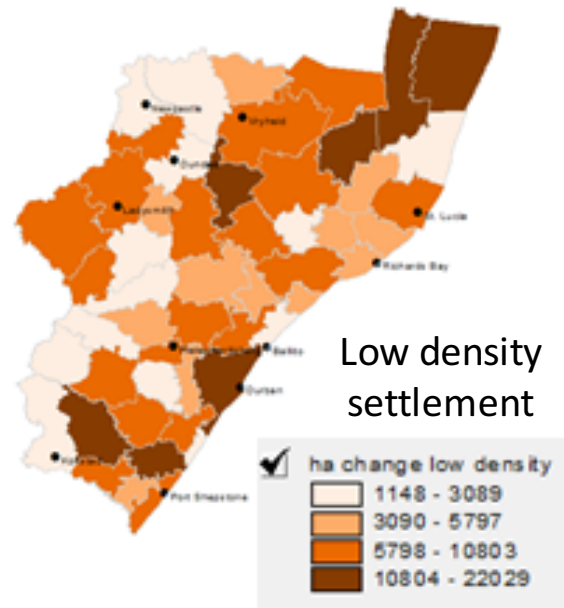
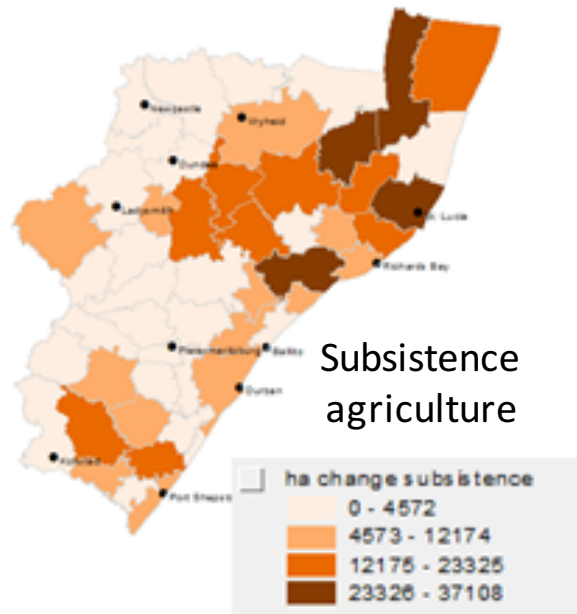


Subsistence agriculture



Photo: John Craigie, Ezemvelo KZN Wildlife

Hectare changes per local municipality

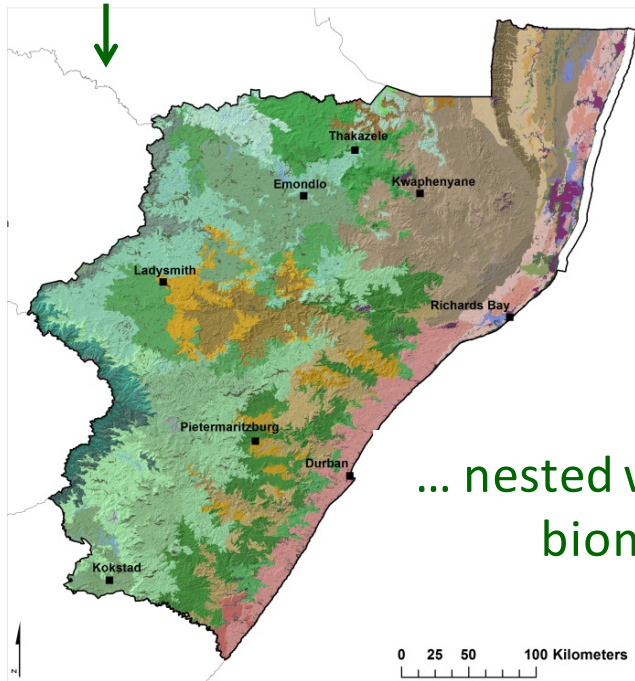


Could summarise to e.g. quaternary catchments

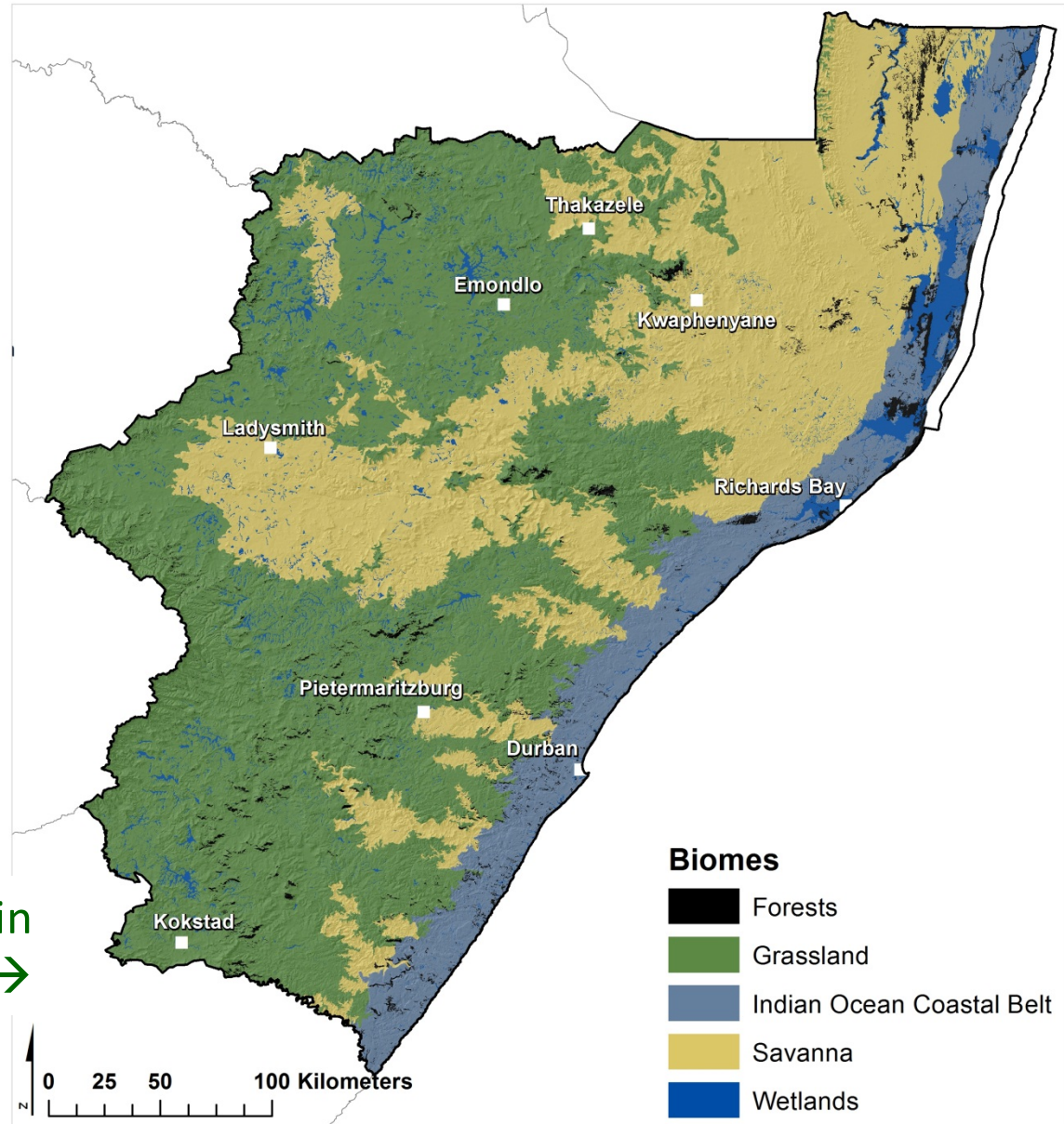
Ecosystem extent accounts for KZN

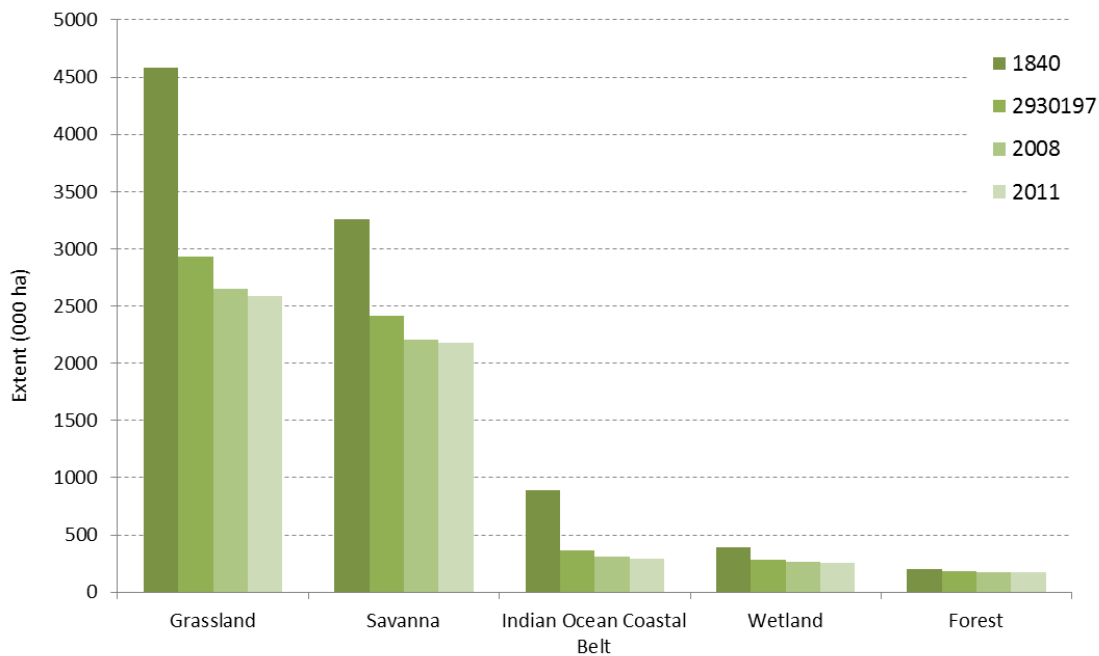
- Useful to summarise at biome level

Vegetation types (~100)

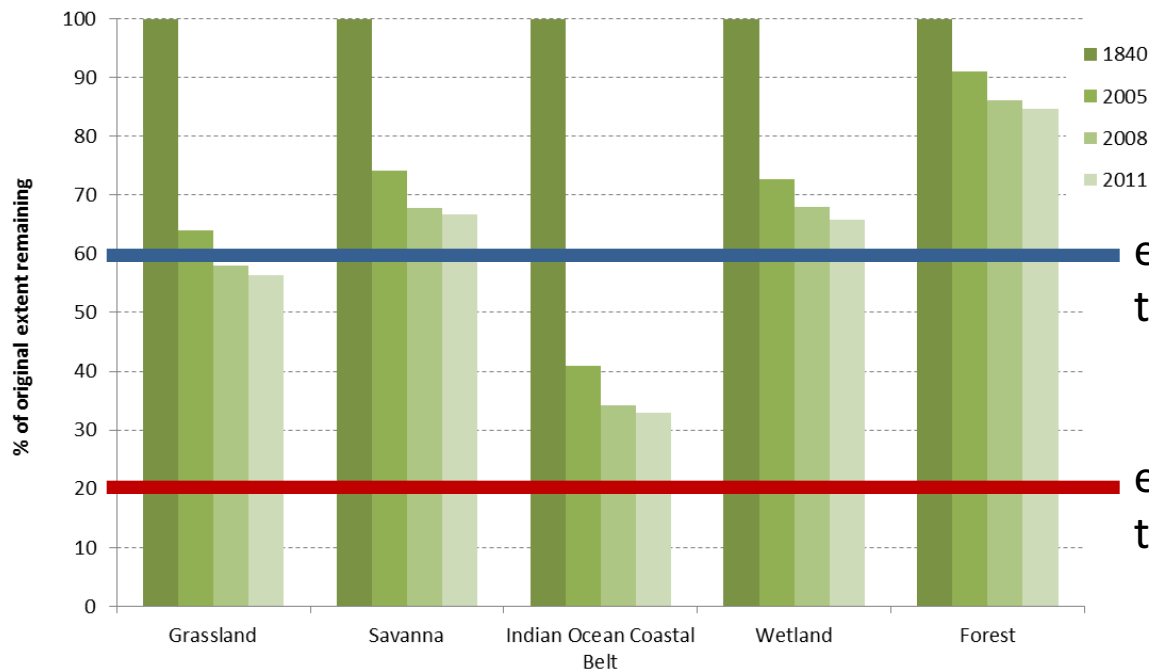


... nested within
biomes →





- Largest absolute decline in extent – Grassland biome



- Largest proportional decline in extent – Indian Ocean Coastal Belt

ecological function threshold

extinction threshold

Integrated land & ecosystem account for vegetation types

A few examples

hectares	Increases (positive numbers) and decreases (negative numbers) in land cover									
Vegetation type	Natural	Degraded	Fallow lands	Timber plantations	Subsistence agriculture	Dryland cultivation	Irrigated cultivation	Sugarcane	Rehabilitated mines	Severely eroded
Freshwater Wetlands (all)	-8,335	1,039	563	365	3,104	2,331	548	-1,102	-193	
Alluvial Wetlands (all)	-18,363	-344	775	209	10,066	5,045	680	-2,710	-1,961	
Subtropical Dune Thicket	-285	293	0	1	0	0	0	-11	0	
Mangrove Forests	-245	233	0	-3	39	0	0	-2	0	
Midlands Mistbelt Grassland	-53666	8033	334	13143	12296	11508	1619	-2785	-124	
Mabela Sandy Grassland	-144	-98	0	-1	0	215	16	0	0	

- Conversion of **alluvial wetlands** (floodplains) and **freshwater wetlands** to subsistence agriculture, dryland cultivation and dams → flood risk?
- Degradation of **Subtropical Dune Thicket** → coastal storm risk?

National river ecosystem accounts

- Extent
- Condition ←

Based on two national assessments of condition of rivers by
Department of Water & Sanitation
in 1999 and 2011



water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

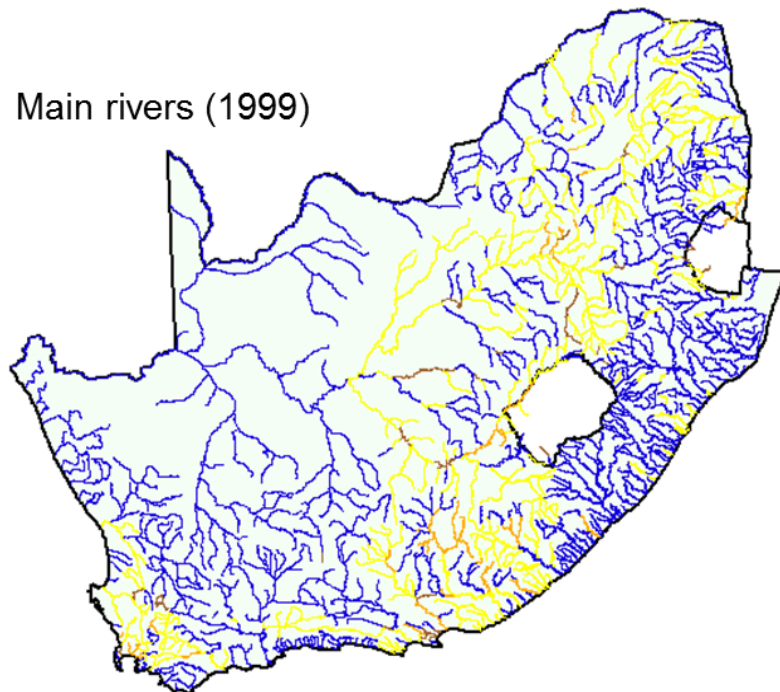
Ecosystem condition account for rivers

All rivers (km)	Natural	Moderately modified	Heavily modified	Unacceptably modified	No Data	Total
Opening stock 1999	86 835	29 784	4 875	1 354	40 684	163 533
Opening stock as % total river length	53	18	3	1	25	100
Increases/decreases	-41 163	20 806	17 935	2 422	0	
Increases/decreases as % opening	-47	70	368	179	0	
Opening stock 2011	45 673	50 591	22 810	3 776	40 684	163 533
Opening stock as % total river length	28	31	14	2	25	100

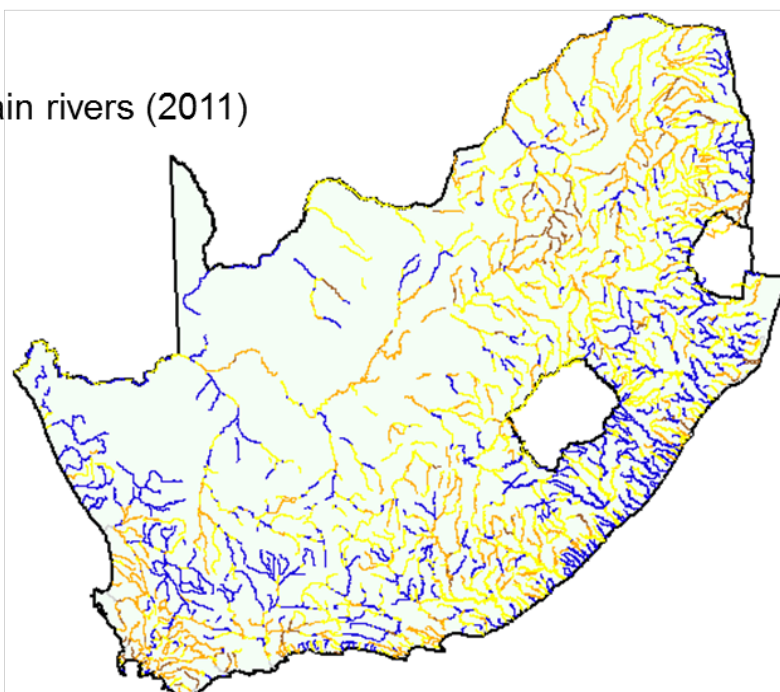
- Big decrease in extent of river length in natural category

Ecological condition category

Main rivers (1999)

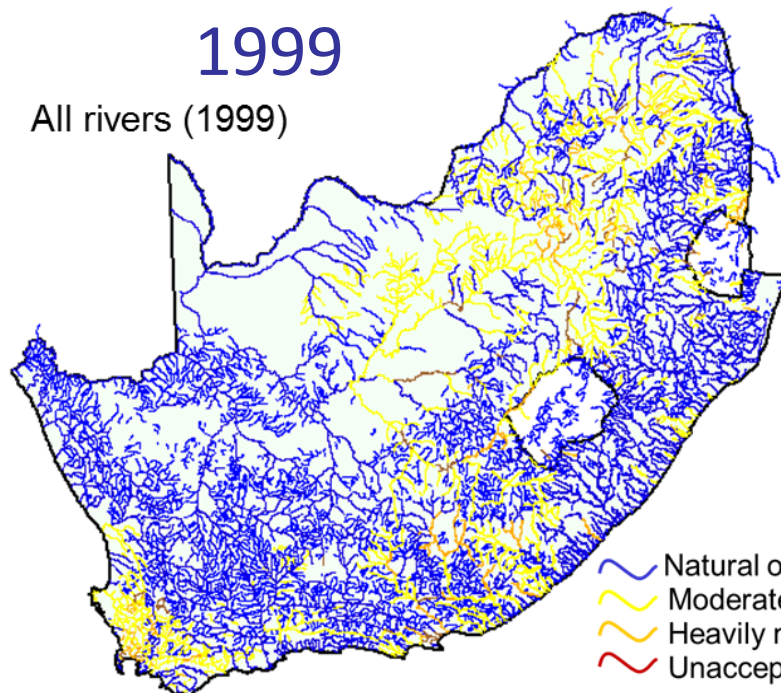


Main rivers (2011)



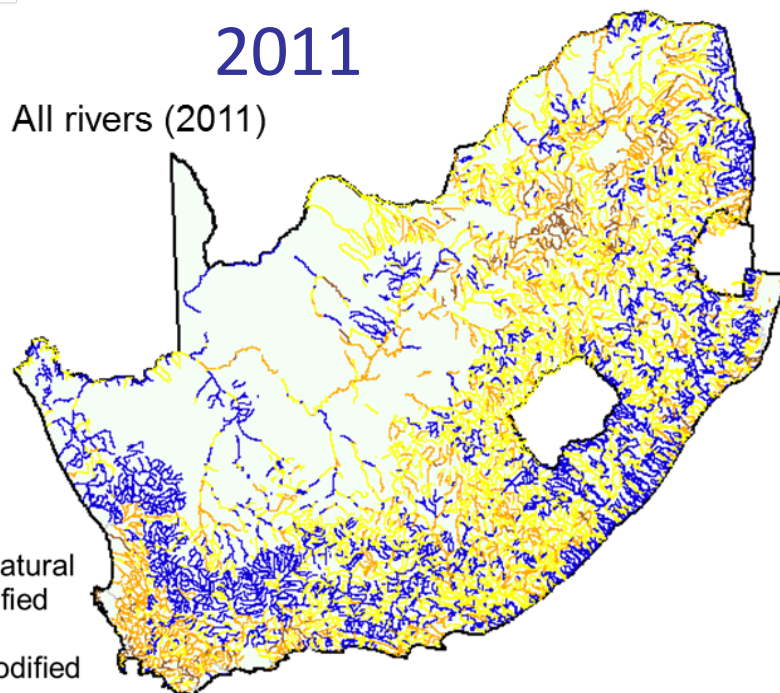
1999

All rivers (1999)



2011

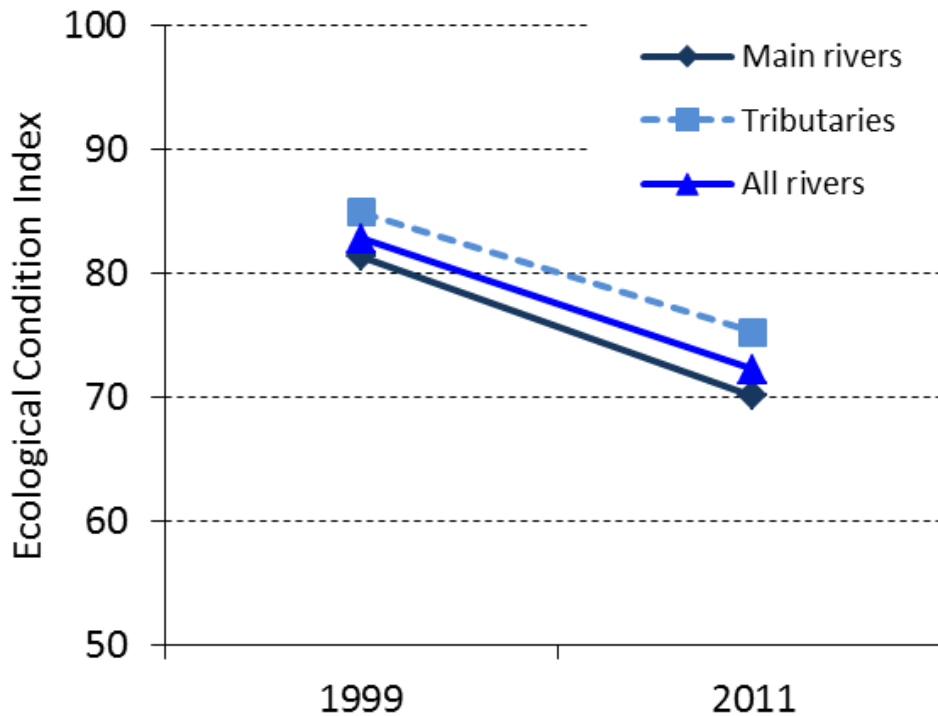
All rivers (2011)



- Natural or near-natural
- Moderately modified
- Heavily modified
- Unacceptably modified

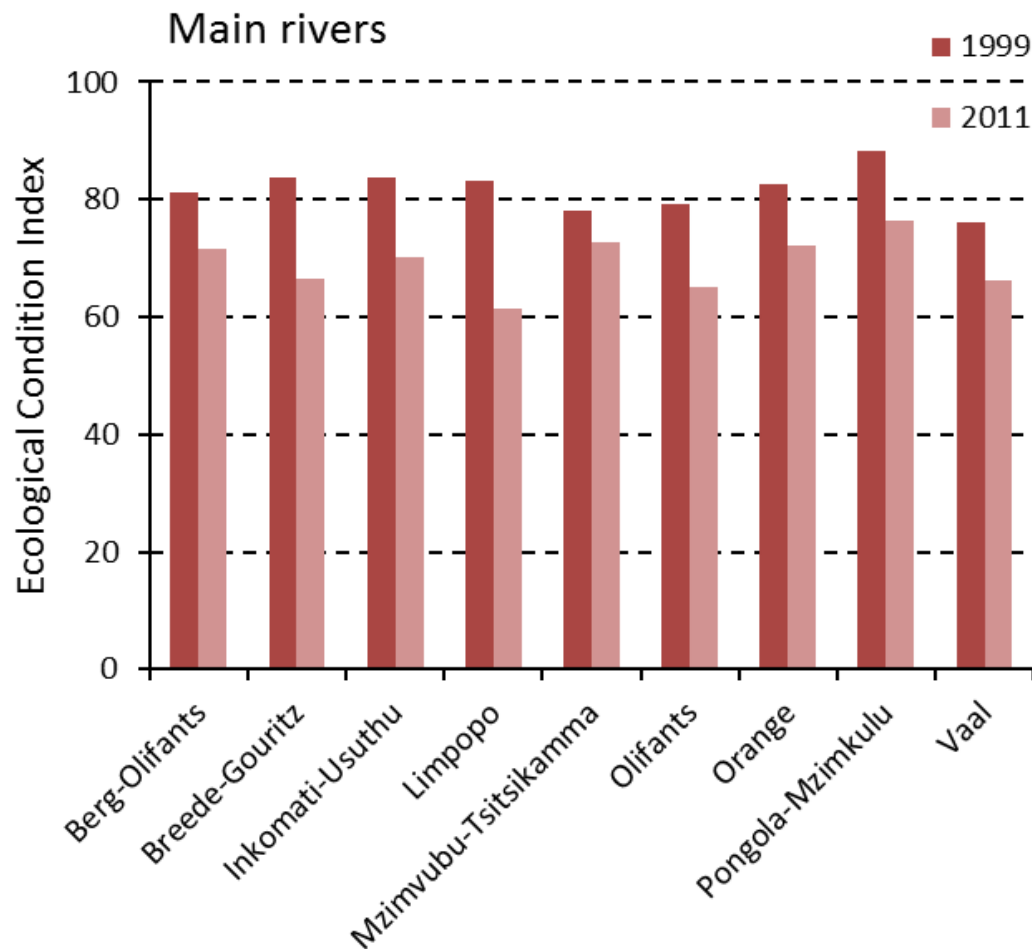
Ecological Condition Index

	Main rivers	Tributaries	All rivers
1999	81.3	84.9	82.8
2011	70.1	75.2	72.2
Change between 1999 and 2011	-11.2	-9.7	-10.6



Overall
10% decline in
ecological condition
of rivers
1999 - 2011

Ecological Condition Index by Water Management Area (WMA)



- Biggest decline: Limpopo WMA (>20%)
- Smallest decline: Mzimvubu-Tsitsikamma WMA

Ecosystem accounting reports available at
SANBI's Biodiversity Advisor website
<http://biodiversityadvisor.sanbi.org>
(under "Planning and Assessment" section)

Six lessons

1. Initial work is often supply-driven
 - not requested by decision-makers
2. Physical accounts are powerful in their own right
 - not just as a precursor to monetary accounts
3. Accounting framework helps to translate ecosystem science into a form that speaks to decision-makers

Six lessons

4. Ecologists need to be centrally involved in producing ecosystem accounts
 - Ecological perspective is different from environmental economics perspective
5. Good-enough science is sufficient
 - Don't wait for perfect science/perfect data
6. No need to involve all stakeholders in all aspects
 - e.g. distinguish technical stakeholders from strategic stakeholders

Next steps

- Early days but lots of interest and enthusiasm from wide range of sectors
- Clear set of priorities for national ecosystem accounting going forward
- Integrating natural capital accounts into National Statistical System
- Linking natural capital accounts to reporting on SDGs