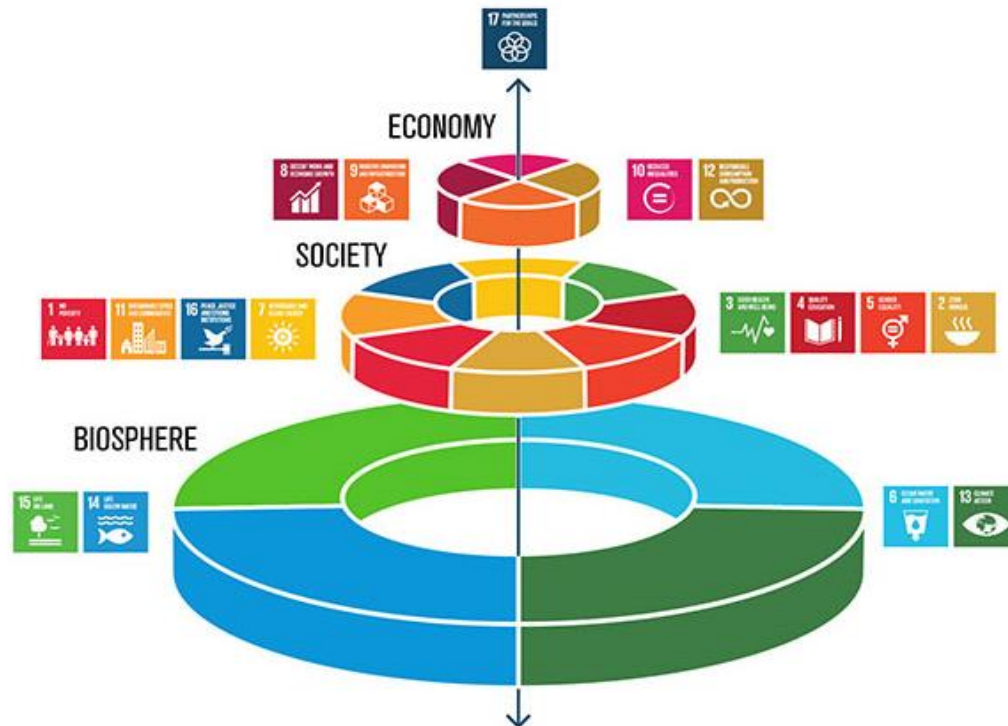


System of Environmental Economic Accounting

Using the SEEA EEA for Calculating Selected SDG Indicators

SEEA and the SDGs

- The SDGs and their targets are founded upon addressing the three dimensions of sustainability: The environment (biosphere); society; and, the economy



- The ability of the SEEA EEA to organise and integrate data on the environment and the economy in a consistent manner makes it a key framework to assist countries in delivering on the SDGs

Expert Meeting on SEEA Indicators for SDGs

- SDG 15.3.1: Proportion of land that is degraded over total land area
- **SDG 15.1.1: Forest area as a proportion of total land area (Additional)**



- SDG 6.6.1: Change in the extent of water related ecosystems over time



- SDG 11.7.1: Average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities

- **Protected Area Indicator! Outline for a subsystem developed with South Africa**

Expert meeting webpage: <https://seea.un.org/events/expert-meeting-seea-indicators-sdgs-and-post-2020-agenda>

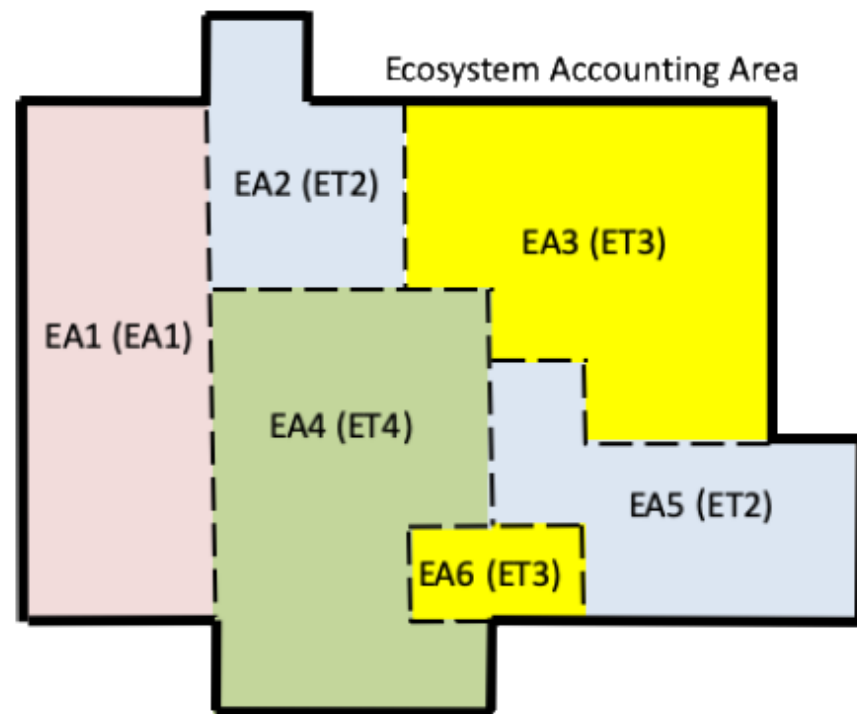
Working Paper: Using the SEEA EEA for Calculating Selected SDG Indicators

- Provides a set of suggested steps for the implementation of a national programme of work for calculating SDG target indicators using the SEEA EEA framework.
- Supporting testing note circulated to the NCA & VES countries



Aligning Ecosystem Typologies and SDG Indicators

- The IUCN Global Ecosystem Typology (IUCN GET) has been adopted as the SEEA ecosystem type reference classification
- Countries will also employ their own national ecosystem typologies
- Mutually Exclusive, Collective Exhaustive ecosystem typologies may sometimes be difficult to align with the SDG definitions (e.g., Ramsar for wetlands, FAO for Forest)
- Bridging tables can be used to make these differences explicit (see latter)
- Spatial Units WG1 under SEEA EEA Revision process continuing to research alignment between typologies



Forests fulfil a number of functions that are vital for humanity.

- Target 15.1: By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests.
- **SDG Indicator 15.1.1: Forest area as a proportion of total land area**



Forests in Ecosystem Extent Accounts

	T2.1 Boreal and montane needle-leaved forest and woodland*	T2.3 Cool temperate rainforests*	T4.4 Temperate wooded savannas^	T4.5 Temperate grasslands	T6.4 Temperate alpine meadows and shrublands	T7.1 Croplands	T7.2 Sown pastures and old fields	T7.3 Plantations*	T7.4 Urban and infrastructure lands	FT1.2 Seasonal floodplain marshes	FT1.5 Boreal, temperate and montane peat bogs	TOTAL LAND AREA	F1.1 Permanent upland streams	F1.2 Permanent lowland rivers	F2.2 Large permanent freshwater lakes	F2.3 Small permanent freshwater lakes	F4.1 Large reservoirs	TOTAL AREA
Opening Stock (ha)	A1	A2						A3				B						
Additions to stock																		
Managed expansion																		
Natural Expansion																		
Upward reappraisals																		
Other additions																		
Total additions to stock																		
Reductions in stock																		
Managed regression																		
Natural Regression																		
Downward reappraisals																		
Other reductions																		
Total reductions in stock																		
Net change in stock																		
Closing stock (ha)	A1 ¹	A2 ¹						A3 ¹				B ¹						

* Green Indicates ecosystem types relevant to forest area of SDG indicator 15.1.1.

^ Orange indicated the type may conflate forests with other vegetation types that do not contribute to SDG 15.1.1

Calculating SDG 15.1.1 – An example

	T2.1 Boreal and montane needle-leaved forest and woodland*	T2.3 Cool temperate rainforests*	T4.4 Temperate wooded savannas^	T4.5 Temperate grasslands	T6.4 Temperate alpine meadows and shrublands	T7.1 Croplands	T7.2 Sown pastures and old fields	T7.3 Plantations*	T7.4 Urban and infrastructure lands	FT1.2 Seasonal floodplain marshes	FT1.5 Boreal, temperate and montane peat bogs	TOTAL LAND AREA
Opening Stock (2010, ha)	40,000	40,000	5,000	30,000	25,000	80,000	30,000	15,000	7,500	7,500	2,500	282,500
Additions to stock												
Managed expansion												
Natural Expansion												
Upward reappraisals												
Other additions												
<i>Total additions to stock</i>	1,000	500	1,000	300	50	2,000	1,300	15,500	1,500	50	-	23,200
Reductions in stock												
Managed regression												
Natural Regression												
Downward reappraisals												
Other reductions												
<i>Total reductions in stock</i>	500	-	1,500	1,450	750	9,000	5,000	1,500	300	3,000	250	23,250
Net change in stock	500	500	(500)	(1,150)	(700)	(7,000)	(3,700)	14,000	1,200	(2,950)	(250)	(50)
Closing stock (2015, ha)	40,500	40,500	4,500	28,850	24,300	73,000	26,300	29,000	8,700	4,550	2,250	282,450

* Green Indicates ecosystem types relevant to forest area of SDG indicator 15.1.1.

^ Orange indicated the type may conflate forests with other vegetation types that do not contribute to SDG 15.1.1

$$SDG\ 15.1.1 = \frac{40,000 + 40,000 + 15,000}{282,450} = \frac{95,000}{282,450} = 0.34\ or\ 34\% \ (For\ 2010)$$

Bridging Tables – Hypothetical Example

Summary Forest Extent Bridging Table showing relationship of Ecosystem Extent Accounts measure to SDG 15.1.1

		<i>Forest extent (ha)</i>		
	+/-	2005	2010	2015
Ecosystem Extent Account - Extent of forest ecosystem types		100,000	95,000	110,000
<i>minus</i>				
	(-)			
<i>plus</i>				
Extent of forest in T4.4 Temperate wooded savannas	(+)	3,000	2,500	2,250
Forest extent reported under SDG 15.1.1		103,000	97,500	112,250

- Assumption is that majority of the extent of T4.4 Temperate wooded savannas meets the FAO definition of forests
- However, there may be patches of less dense woodland that do not (e.g., canopy cover < 10%).
- These areas are identified and included in the extent of forest reported under SDG 15.1.1.
- This example is meant to be illustrative and not exhaustive!

Wetlands and other water related ecosystems are critical for the supply ecosystem services.

- Target 6.6: By 2020 protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes
- **SDG indicator 6.6.1: Change in the extent of water-related ecosystems over time**

6 CLEAN WATER AND SANITATION



Water related ecosystems in Ecosystem Extent Account

	Ecosystem type (IUCN ET)																					
	T2.2 Temperate deciduous forests and shrublands	T4.4 Temperate wooded savannas	T4.5 Temperate grasslands	T6.4 Temperate alpine meadows and shrublands	T7.1 Croplands	T7.2 Sown pastures and old fields	T7.3 Plantations	T7.4 Urban and infrastructure lands	FT1.2 Seasonal floodplain marshes*	FT1.3 Subtropical/temperate forested wetlands*	F1.1 Permanent upland streams*	F1.2 Permanent lowland rivers*	F2.2 Large permanent freshwater lakes*	F2.3 Small permanent freshwater lakes*	F4.1 Large reservoirs*	MFT1.1 Coastal river deltas*	MFT1.3 Intertidal marshes*	FM1.2 Permanently open riverine estuaries and bays*	TOTAL AREA OF WATER-RELATED ECOSYSTEMS*	TM1.3 Sandy Shores		M1.7 Subtidal sandy bottoms
Opening Stock (ha)																						
Additions to stock																						
Managed expansion																						
Natural Expansion																						
Upward reappraisals																						
Other additions																						
<i>Total additions to stock</i>																						
Reductions in stock																						
Managed regression																						
Natural Regression																						
Downward reappraisals																						
Other reductions																						
<i>Total reductions in stock</i>																						
<i>Net change in stock</i>																						
Closing stock (ha)																						

* Blue Indicates ecosystem types relevant to water-related ecosystems and SDG target indicator 6.6.1

Calculating SDG 6.6.1 – An example

	Ecosystem type (IUCN ET)															TOTAL AREA
	T7.3 Plantations	T7.4 Urban and infrastructure lands	FT1.2 Seasonal floodplain marshes*	FT1.3 Subtropical/temperate forested wetlands*	F1.1 Permanent upland streams*	F1.2 Permanent lowland rivers*	F2.2 Large permanent freshwater lakes*	F2.3 Small permanent freshwater lakes*	F4.1 Large reservoirs*	MFT1.1 Coastal river deltas*	MFT1.3 Intertidal marshes*	FM1.2 Permanently open riverine estuaries and bays*	TOTAL AREA OF WATER-RELATED ECOSYSTEMS*	TM1.3 Sandy Shores	M1.7 Subtidal sandy bottoms	
Opening Stock (2010, ha)	15,000	7,500	7,500	2,000	100	300	1,000	750	500	250	450	180	13,030	750	1,000	37,280
Additions to stock													-			-
Managed expansion													-			-
Natural Expansion													-			-
Upward reappraisals													-			-
Other additions													-	50	-	50
Total additions to stock	2,000	1,500	50	20	-	-	-	-	100	40	25	20	255			3,755
Reductions in stock													-			-
Managed regression													-			-
Natural Regression													-			-
Downward reappraisals													-			-
Other reductions													-			-
Total reductions in stock	1,500	300	1,500	210	-	-	-	50	-	15	100	30	1,905	100	-	3,805
Net change in stock	500	1,200	(1,450)	(190)	-	-	-	(50)	100	25	(75)	(10)	(1,650)	(50)	-	-
Closing stock (2015, ha)	15,500	8,700	6,050	1,810	100	300	1,000	700	600	275	375	170	11,380	700	1,000	37,280

* Blue Indicates ecosystem types relevant to water-related ecosystems and SDG target indicator 6.6.1

$$SDG\ 6.1.1 = \frac{11,380 - 13,030}{13,030} \times 100 = -13\% \text{ (for 2010 to 2015)}$$

Bridge Tables

Summary Water-Related Ecosystem Extent Bridging Table showing relationship of Ecosystem Extent Accounts measure to SDG 6.6.1

		<i>Water related ecosystem extent (ha)</i>		
	⁹ +/-	2005	2010	2015
Ecosystem Extent Account - Extent of water-related ecosystem types		42,000	41,000	40,500
<i>minus</i>				
	(-)			
<i>plus</i>				
Extent of seasonally flooded agricultural land in T7.2 Sown pastures and old fields	(+)	5,000	4,000	3,900
Water-related ecosystem extent reported under SDG 6.6.1		47,000	45,000	44,400

- Ramsar definition of wetlands, which includes seasonally flooded agricultural land
- These areas of agricultural land may be reported within the IUCN ET Sown pastures and old fields (T7.2)
- These areas are identified and included in the extent of water related ecosystems reported under SDG 6.6.1.
- This example is not exhaustive! Other classification issues may emerge around ephemeral wetlands

If cities are well planned and developed, they can promote economically, socially and environmentally sustainable societies

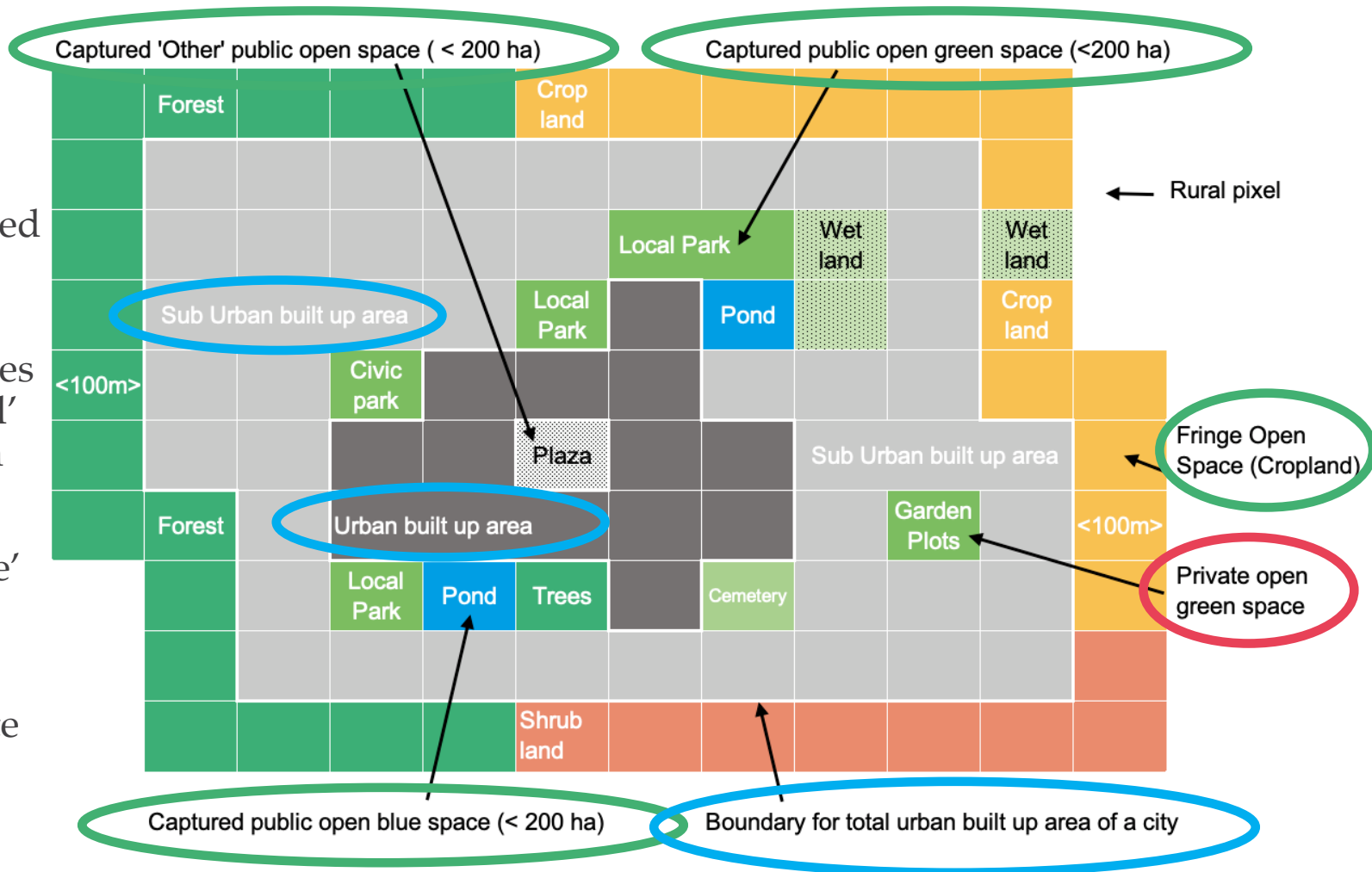
- Target 11.7: By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities
- **SDG Indicator 11.7.1: Average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities**

11 SUSTAINABLE CITIES AND COMMUNITIES



Urban Ecosystem Assets

- Urban Ecosystem Accounting Areas defined in multiple ways
- Various types of 'captured' public open space
- Also 'Fringe' open space counts
- Omit private open space



Urban Ecosystem Extent Accounts

	Urban							Suburban							Fringe open space					TOTAL URBAN EXTENT (Urban + suburban + fringe open space)		
Classifications >>	Public open green space [^]	Public open blue space [^]	Other public open space	Area allocated to streets	Private open space*	Building footprint and other infrastructure	Total urban area	Public open green space [^]	Public open blue space [^]	Other public open space	Area allocated to streets	Private open space*	Building footprint and other infrastructure	Total suburban area	Public open green space [^]	Public open blue space [^]	Other public open space	Not publicly accessible	Total fringe open space area	Public open blue / green space	All public open space	TOTAL AREA
Opening Stock (Ha, 2015)																						
Additions to stock																						
Total additions to stock																						
Reductions in stock																						
Total reductions in stock																						
Net change in stock																						
Closing stock (Ha, 2020)																						

[^] Public open green and blue space can be disaggregated by ecosystem type (e.g., cropland, wetland and forests in the city or fringe) or detailed descriptors for open space, such as cemetery, local park, etc.

* Private Open Space could be further disaggregated to green, blue and other public access space

Urban Ecosystem Extent Accounts

		Urban						Suburban						Fringe open space				TOTAL URBAN EXTENT (Urban + suburban + fringe open space)				
Classifications >>	Public open green space^	Public open blue space^	Other public open space	Area allocated to streets	Private open space*	Building footprint and other infrastructure	Total urban area	Public open green space^	Public open blue space^	Other public open space	Area allocated to streets	Private open space*	Building footprint and other infrastructure	Total suburban area	Public open green space^	Public open blue space^	Other public open space	Not publicly accessible	Total fringe open space area	Public open blue / green space	All public open space	TOTAL AREA
Opening Stock (Ha, 2015)																						
Additions to stock																						
Total additions to stock																						
Reductions in stock																						
Total reductions in stock																						
Net change in stock																						
Closing stock (Ha, 2020)																						

Urban

Suburban

Fringe

Total

^ Public open green and blue space can be disaggregated by ecosystem type (e.g., cropland, wetland and forests in the city or fringe) or detailed descriptors for open space, such as cemetery, local park, etc.

* Private Open Space could be further disaggregated to green, blue and other public access space

Calculating SDG 11.7.1 – An example

$$SDG\ 11.7.1\ (open) = \frac{750}{10,000} = 7.5\%$$

$$Sup.\ SDG\ 11.7.1(open) = \frac{400}{10,000} = 4.0\%$$

$$SDG\ 11.7.1\ (close) = \frac{725}{10,000} = 7.1\%$$

$$Sup.\ SDG\ 11.7.1(close) = \frac{420}{10,200} = 4.1\%$$

Classifications >>	TOTAL URBAN EXTENT (Urban + suburban + fringe open sapce)		
	Public open blue / green space	All public open space	TOTAL AREA
Opening Stock (Ha, 2015)	400	750	10,000
Additions to stock			
<i>Total additions to stock</i>	50	25	300
Reductions in stock			
<i>Total reductions in stock</i>	30	50	100
Net change in stock	20	(25)	200
Closing stock (Ha, 2020)	420	725	10,200

The productive potential of land must be increased to deliver the goods and services required by a growing population.

- Target 15.3: By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world
- **SDG Indicator 15.3.1: Proportion of land that is degraded over total land area**
 - Land cover
 - Land productivity
 - Carbon stock



Ecosystem change matrix– Define flows nationally

<div> <div>Type in 2015</div> <div>Original Type in 2000</div> </div>	Ecosystem change matrix (IUCN ET)															Opening Extent (2000)	Reductions
	T2.2 Temperate deciduous forests and shrublands	T4.4 Temperate wooded savannas	T4.5 Temperate grasslands	T6.4 Temperate alpine meadows and shrublands	T7.1 Croplands	T7.2 Sown pastures and old fields	T7.3 Plantations	T7.4 Urban and infrastructure lands	FT1.2 Seasonal floodplain marshes	FT1.5 Boreal, temperate and montane peat bogs	F1.1 Permanent upland streams	F1.2 Permanent lowland rivers	F2.2 Large permanent freshwater lakes	F2.3 Small permanent freshwater lakes	F4.1 Large reservoirs		
T2.2 Temperate deciduous forests and shrublands^	220				10	5	10	5								250	30
T4.4 Temperate wooded savannas^		215			10	10	-	15								250	35
T4.5 Temperate grasslands		5	55			20		20								100	45
T6.4 Temperate alpine meadows and shrublands				245		5										250	5
T7.1 Croplands	0	5		20	165			55	5							250	85
T7.2 Sown pastures and old fields	0	0			20	195	5	25	5							250	55
T7.3 Plantations	0	0	10	10	20		110		0							150	40
T7.4 Urban and infrastructure lands	0	0	5					45	10							60	15
FT1.2 Seasonal floodplain marshes					5	10	-		45							60	15
FT1.5 Boreal, temperate and montane peat bogs										60						60	0
F1.1 Permanent upland streams											5					5	0
F1.2 Permanent lowland rivers												10				10	0
F2.2 Large permanent freshwater lakes													20			20	0
F2.3 Small permanent freshwater lakes														10		10	0
F4.1 Large reservoirs															10	10	0
Closing Extent (2015)	220	225	70	275	230	245	125	165	65	60	5	10	20	10	10	1,735	
Additions degradation					25	25	10	40								100	
Additions improvement	0	5	5						20							30	
Additions stable	0	5	10	30	40	25	5	80	0	0	0	0	0	0	0	195	

Ecosystem condition accounts for SDG 15.3.1

Classifications >>		T2.2 Temperate deciduous forests and shrublands	T4.4 Temperate wooded savannas	T4.5 Temperate grasslands	T6.4 Temperate alpine meadows and shrublands	T7.1 Croplands	T7.2 Sown pastures and old fields	T7.3 Plantations	T7.4 Urban and infrastructure lands	FT1.2 Seasonal floodplain marshes	FT1.5 Boreal, temperate and montane peat bogs
Annual Net Primary Productivity (million tonnes dry matter / ha / year)	Opening (2000)										
	Closing (2015)										
Soil Organic Carbon Stocks (tonnes carbon / ha)	Opening (2000)										
	Closing (2015)										

SDG 15.3.1 - Bringing it all together

- Ultimately all three indicators need to be integrated in a spatially explicit manner (e.g., by BSU / Grid Cell or for Individual Ecosystem Assets) to calculate SDG 15.3.1.
- A combined presentation of this information is also required for analysis (a land degradation summary table is proposed in the technical notes).
- The Trends.Earth platform provides a means of calculating the sub-indicators using global data. But the outputs are qualitative and difficult to align with the proposed framework for Ecosystem Condition Accounting.
- .

Key points for NCA & VES country testing

- SDG 15.1.1 & 6.6.1
 - Aligning typologies to the FAO and Ramsar / UNEP definitions
 - Use of bridging tables
- SDG 11.7.1
 - Defining urban ecosystem accounting areas
 - Defining urban ecosystem types
- SDG 15.3.1
 - Defining ecosystem / land cover change matrix
 - Integrating information on sub indicators
 - Measuring condition variables
- Capture lessons learned and update Method Notes



THANK YOU

seea@un.org