

Water Resource Accounts

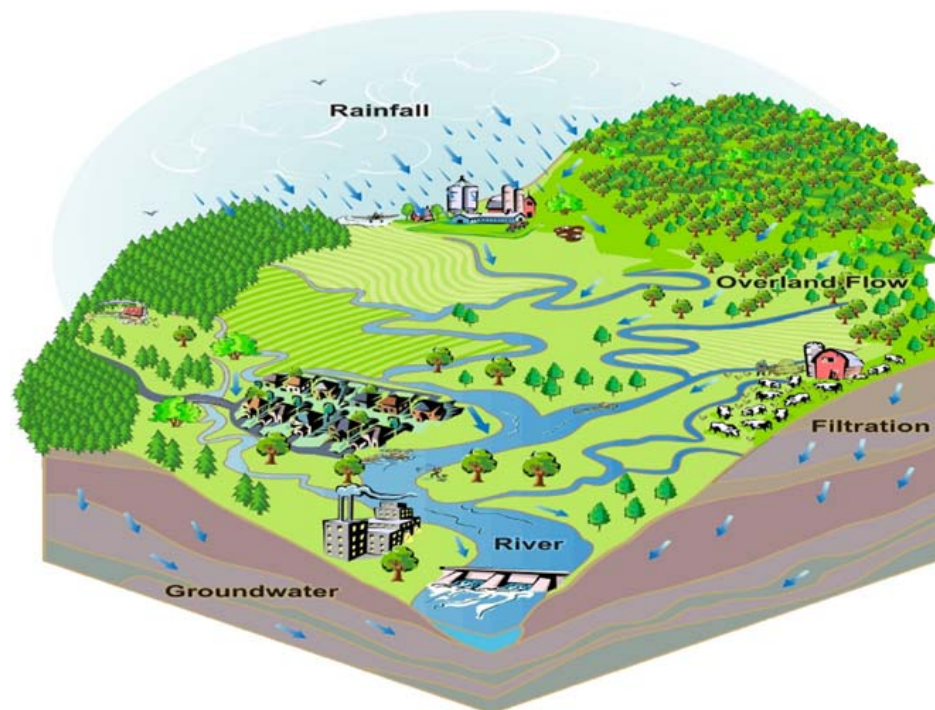
National NCA Forum 2019

11th July 2019

INSPIRING GREATNESS

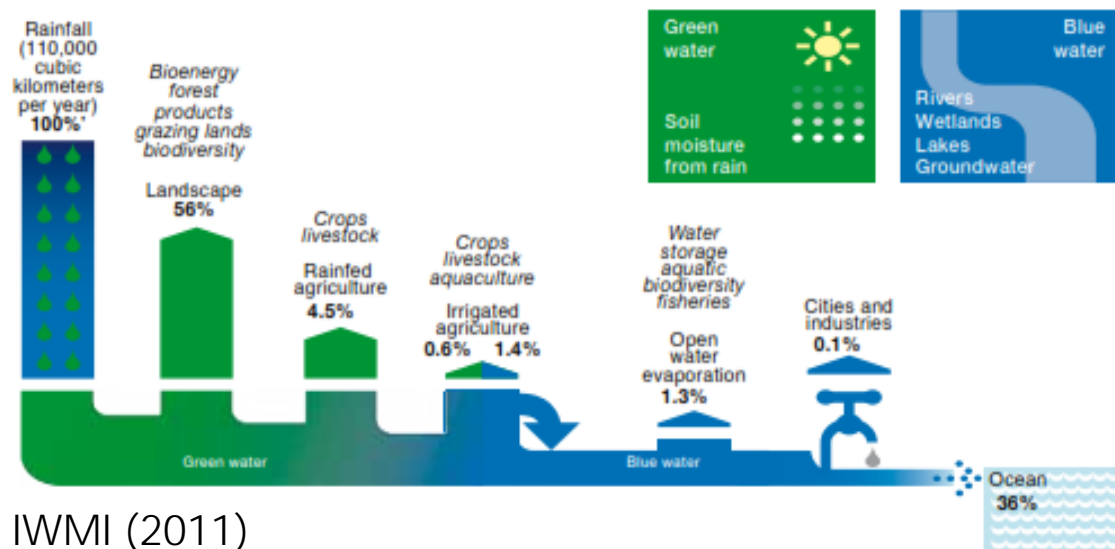
Introduction

- ▶ Ubiquitous, renewable – why water accounts?
- ▶ Quantify, understand, communicate
- ▶ Stocks and flows
- ▶ A long story - integration of many upstream natural and engineered processes



What has been done?

- ▶ WRC funded projects: 1x SEEA-Water, 2x CWRR
- ▶ Reviewed: SEEA-Water, WA+ and AWAS
- ▶ Different perspective to SEEA-Water – but compatible
 - ▶ Economics, national reporting, flows between environment and economy
 - ▶ Hydrological, water resource systems, management
- ▶ Water Resource Accounts



IWMI (2011)

Challenges

- ▶ Climate - high spatial and temporal variability
- ▶ Natural and engineered flows
- ▶ Scale influences the story: cause and effect
- ▶ How much detail? Value for effort?
- ▶ Data availability
 - ▶ Some good datasets
 - ▶ Monitoring network: sparse, declining
 - ▶ Monitoring mostly at a point scale
 - ▶ Urban, irrigation, mining abstractions and return flows
 - ▶ Stocks

Resource Base Sheet

Resource Base Sheet: Example (1000 km²) for 2015-10 to 2016-09

Units = x 10³ m³

ΔS_{rGW} -27119.7 -6 mm -0.9 %		ΔS_{rSoilM} -43840.4 -10 mm -1.5 %		ΔS_{rSW} -120706.8 -27 mm -4.2 %		Gross Inflow 3047555.4 106.7 %	Q_{inSW} 0.0 0.0 %	Precipitation 2935357.4 659 mm 102.8 %
Net Inflow 2855888.5 100.0 %			$Q_{inTransfers}$ 112198.0 3.9 %		Q_{inGW} 0.0 0.0 %			
Exploitable Water 343115.2 12.0 %						Landscape ET 2512773.3 564 mm 88.0 %		
Available Water 182122.0 6.4 %						<ul style="list-style-type: none"> - Natural 1183498.4 266 mm 41.4 % - Cultivated 882336.0 198 mm 30.9 % - Urban 349925.6 79 mm 12.3 % - Mining 1013.7 0 mm 0.0 % - Waterbodies 95999.6 22 mm 3.4 % 		
Utilized Flow 45606.9 1.6 %						<ul style="list-style-type: none"> - Natural 0.0 0 mm 0.0 % - Cultivated 6371.2 1 mm 0.2 % - Urban 39235.7 9 mm 1.4 % - Mining 0.0 0 mm 0.0 % - Waterbodies 0.0 0 mm 0.0 % 		
Reserved Outflow 160993.2 5.6 %						Consumed Water 2558380.2 89.6 %		
Utilizable Outflow 136515.1 4.8 %						Total Evaporation (ET) 2558380.2 574 mm 89.6 %		
Non-recoverable Flow 0.0 0.0 %						<ul style="list-style-type: none"> Open Water Evaporation 52182.8 12 mm 1.8 % Soil Water Evaporation 816969.0 183 mm 28.6 % Transpiration 943660.7 212 mm 33.0 % Interception 745567.8 167 mm 26.1 % 		
$Q_{outTransfers}$ 160993.2 5.6 %		Q_{outGW} 0.0 0.0 %		Q_{outSW} 136515.1 4.8 %				
Outflow 297508.2 10.4 %								



Utilized Flow Sheet

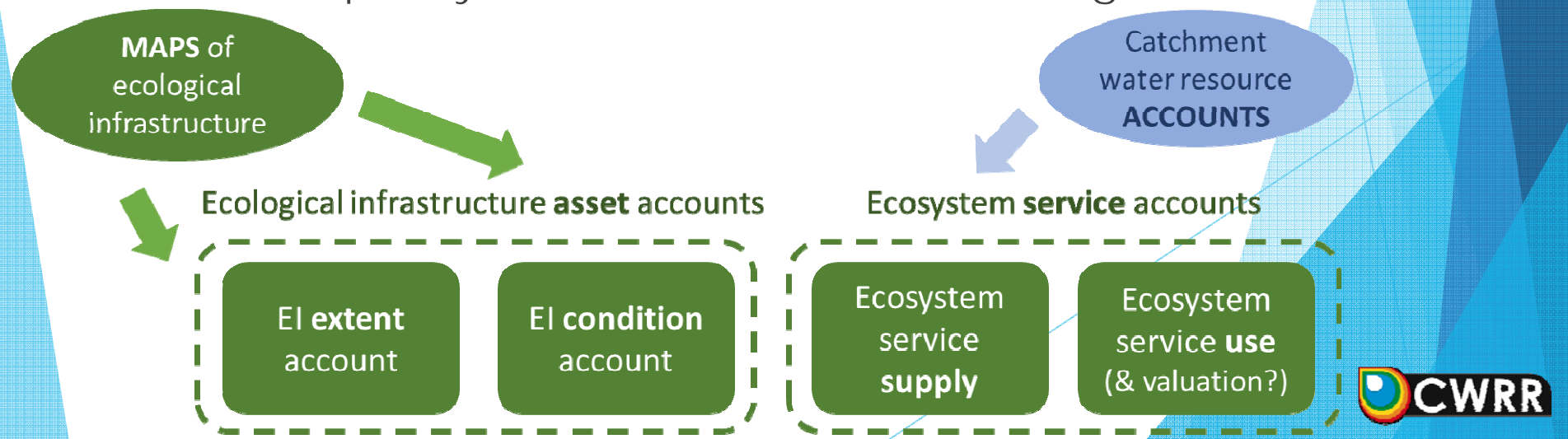
Utilized Flows Sheet: Example (1000.0 km²) for 2015-10 to 2016-09

Units = x 10³ m³

Gross Demand 111845.7 100.0 %	Gross Withdrawal 110064.8 98.6 %	Surface Water 101424.7 92.2 %	Natural 0.0 0.0 %	Returned 0.0 0.0 %	Total Consumed 38861.0 35.3 %		
			Cultivated 6539.4 5.9 %	Consumed 5011.0 76.6 %			
				Returned 22.0 0.3 %			
		Groundwater 0.0 0.0 %	Urban 103516.5 94.1 %	Consumed 33841.2 32.7 %	Total Returned 64148.6 58.3 %	Surface Water 59550.0 92.8 %	
				Returned 64126.6 61.9 %			
			Mining 0.0 0.0 %	Consumed 0.0 0.0 %			Groundwater 0.0 0.0 %
				Returned 0.0 0.0 %			
		Transfers 8640.1 7.8 %	Waterbodies 8.8 0.0 %	Consumed 8.8 100.0 %	Transfers 4598.6 7.2 %		
			Hydropower 0.0 0.0 %	Returned 0.0 0.0 %			
			Deficit 1780.9 1.6 %				

EI4WS Project

- ▶ Explore links between various NCA:
 - ▶ water resource, ecological infrastructure, ecosystem service
 - ▶ ecosystems as producer of water services vs consumer
- ▶ Water resource accounts for demonstration catchments
 - ▶ uMngeni and Breede Catchments
- ▶ Explore use of water resource accounts
- ▶ Build capacity in water resource accounting



Vision

- ▶ Water resource accounts
 - ▶ For the whole of South Africa
 - ▶ Annually (possibly monthly)
 - ▶ Quaternary catchment scale (or smaller)
- ▶ An operational water resource accounting system that provides modelled spatially and temporally consistent summaries of the country's water resources to promote informed, sustainable and equitable use of these resources