Rwanda Natural Capital Accounting

Water Accounts: Overview and Key Results

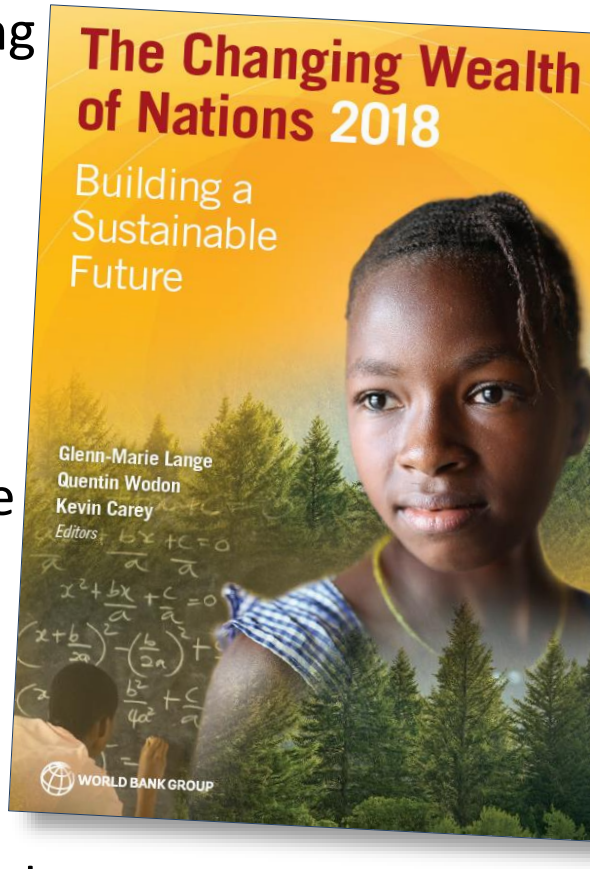
Introduction

- Rwanda started implementing NCA from early 2015.
- **Land, Water and Minerals** as key priorities.
- Focused on 4 key tracks:
  - ✓ *Accounts development;*
  - ✓ *Capacity building;*
  - ✓ *Policy analysis; and*
  - ✓ *Communication.*

- All 4 components implemented in parallel; work is continuous.

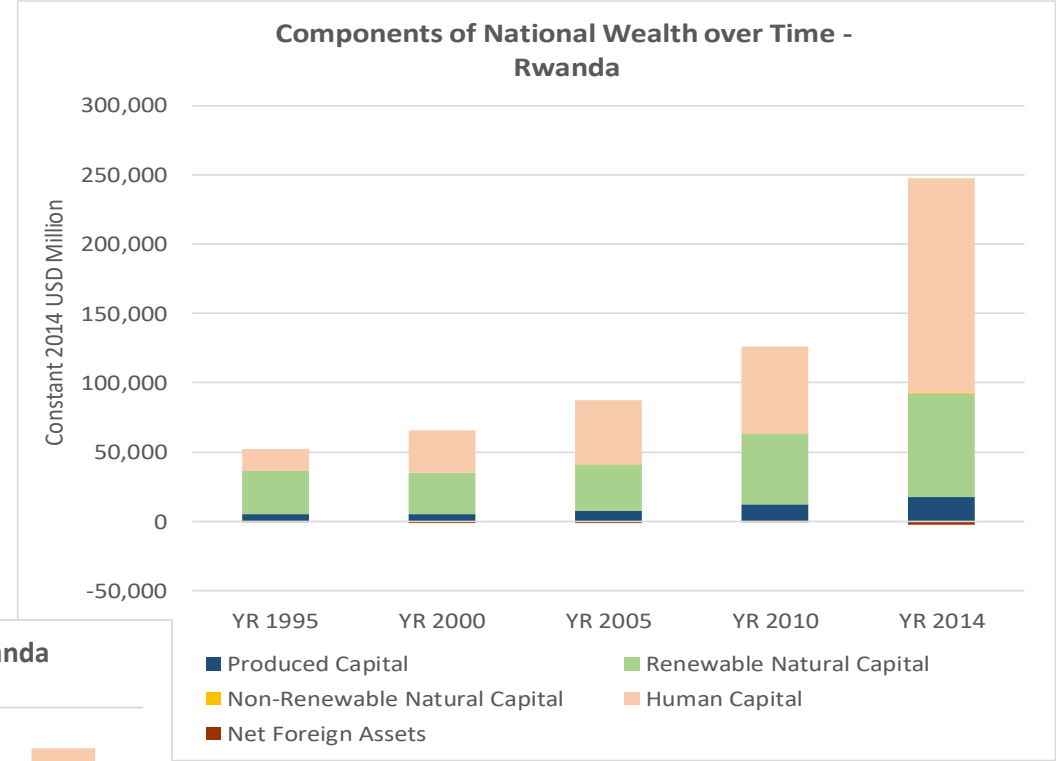
Wealth: The basis for income generation

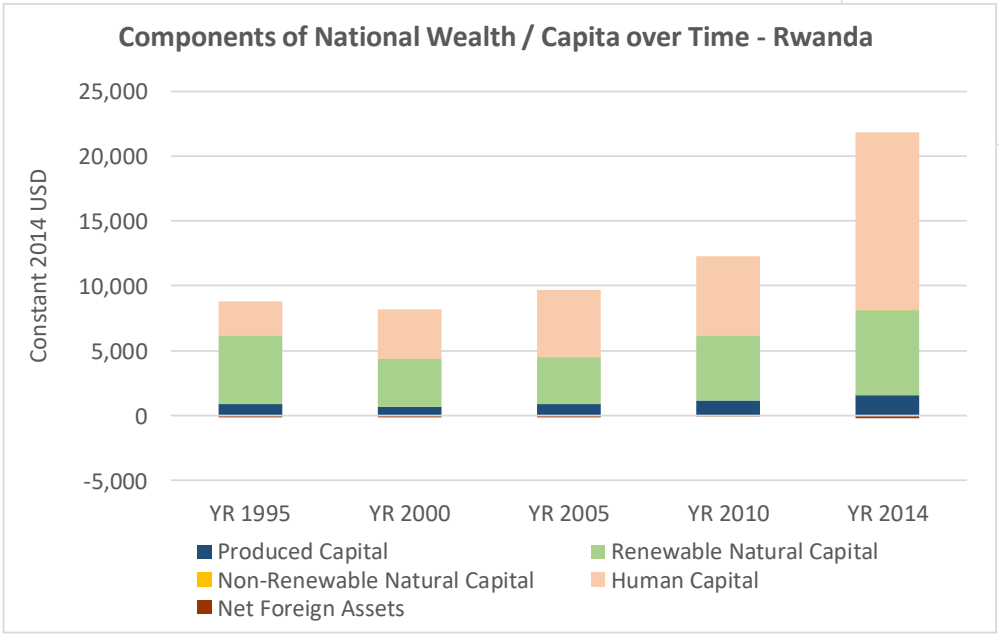
- Wealth accounting measures how a country's produced, natural, & human capital are contributing to long term income & growth.
- Wealth accounting measures underlying assets (machinery, infrastructure, land, forests, minerals, energy) that contribute to economic well-being.
- Wealth accounting indicators give a more complete picture of development and growth prospects.
- Helps to assess if a country is growing its income without depleting its stocks (assets).
- Natural capital accounting (NCA) focuses on the part of total wealth that comes from mineral, energy, agricultural, soil, timber, and water assets.



Rwanda is Among Africa's Better Performers over Time

- Rwanda shows strong improvement (from a low base) over 20 years
- Human capital has increased most in recent years
- Effects of Genocide period can be seen in mid 1990s, especially in per capita figures





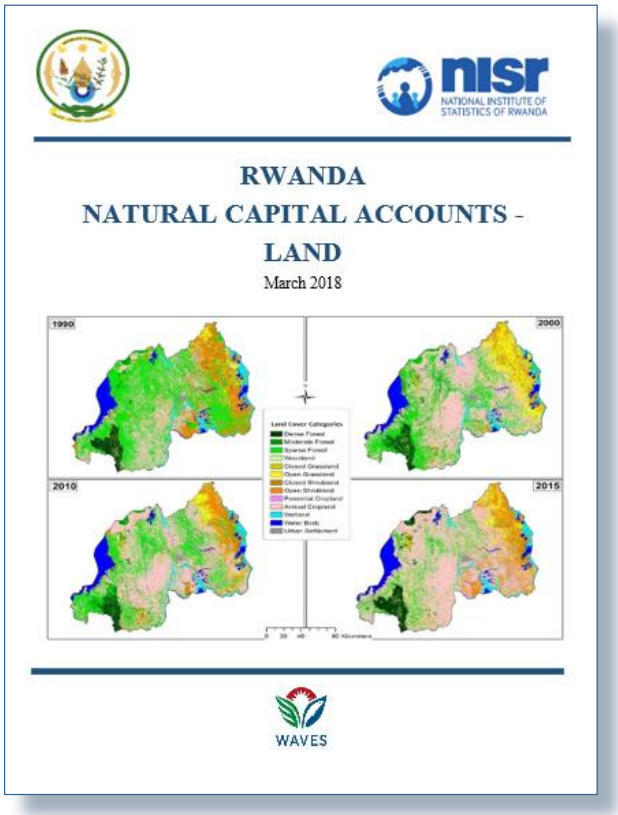
Natural Capital Accounts are linked to the System of National Accounts

- Important contributions of natural capital not fully captured in National Accounts (NA);
- Climate changing, fisheries depleted, soils degraded, water supplies overextended…Wealth depleted
- Yet depletion not reflected in GDP
- Need a measure that goes beyond GDP

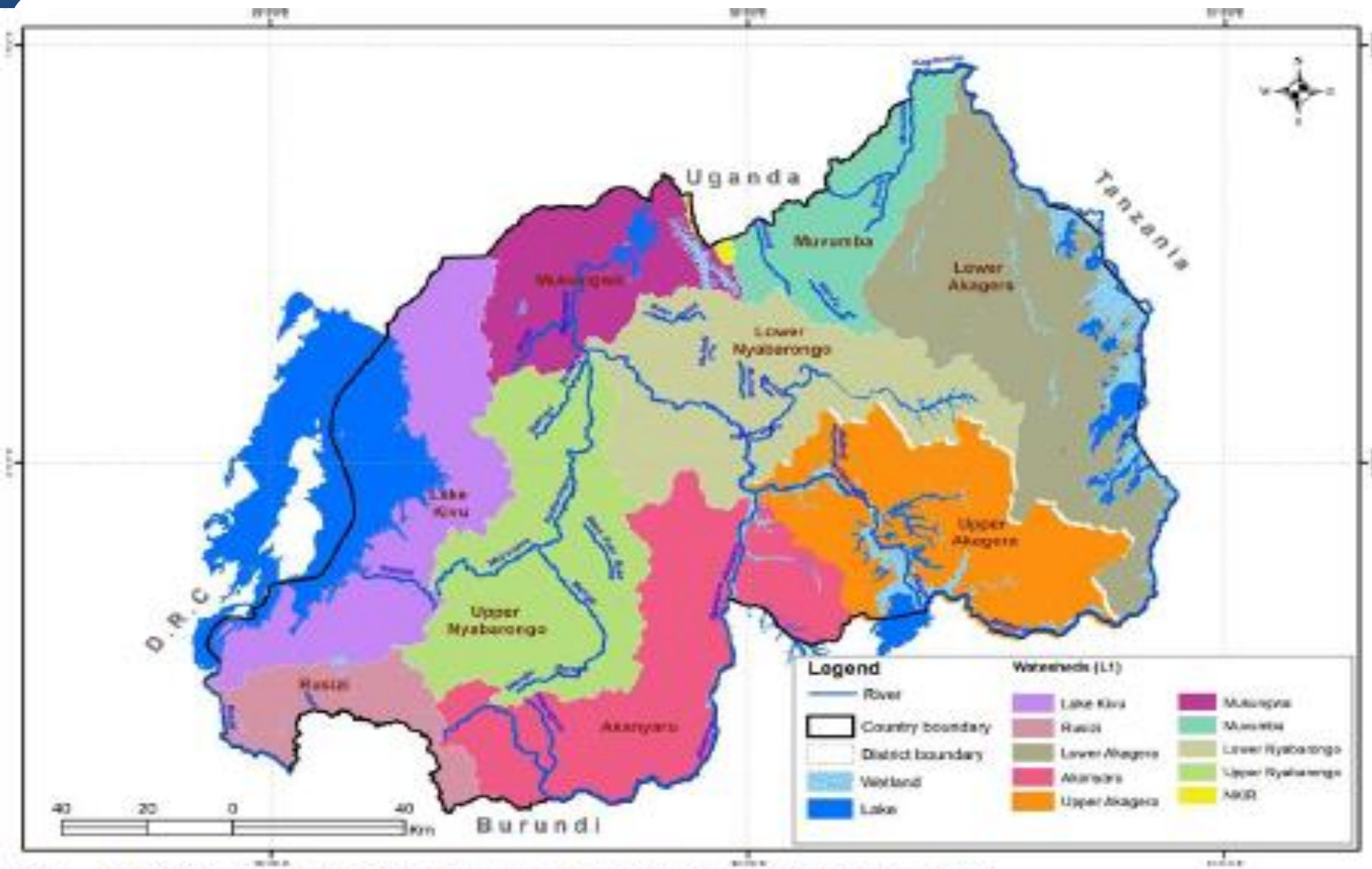
- SEEA describes interactions between the economy and environment, and the stocks and changes in stocks of environmental assets;

Rwanda Natural Capital Accounting Initiative

- Rwanda Committed to incorporate value of natural capital in public and private sector policies and decision-making;
- NCA provides tools to better measure and analyze natural resource opportunities, constraints, and trade-offs on the path to sustainability;
- Government prioritized NCA work on Land, Water, Minerals and Ecosystems .
- WAVES Global Partnership and World Bank provide support and technical assistance.

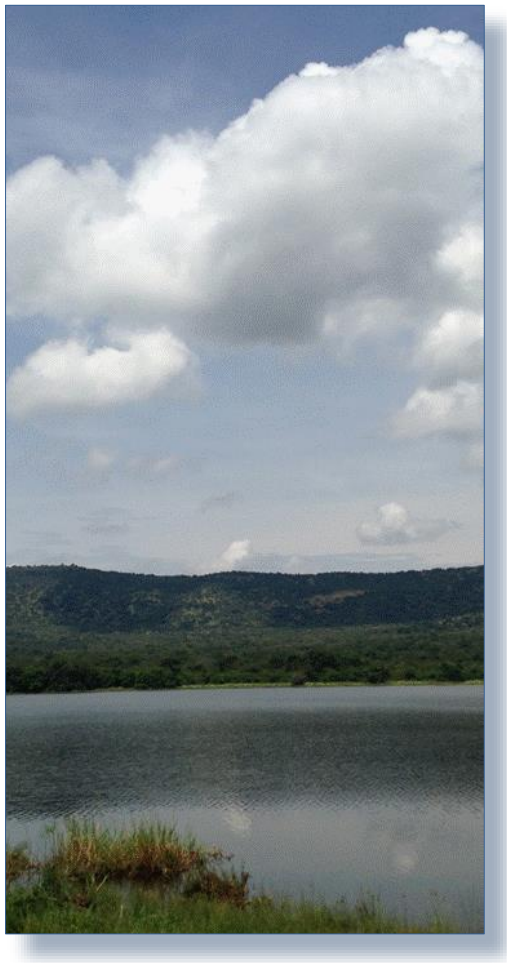


Results from newly published Land Account on 6th March 2018. Ecosystem Accounts & MRA underway



Map 1: Major waterbodies, with lakes and rivers in Rwanda, 2015
Source: Author's own elaboration.

Why Now Water Accounts?

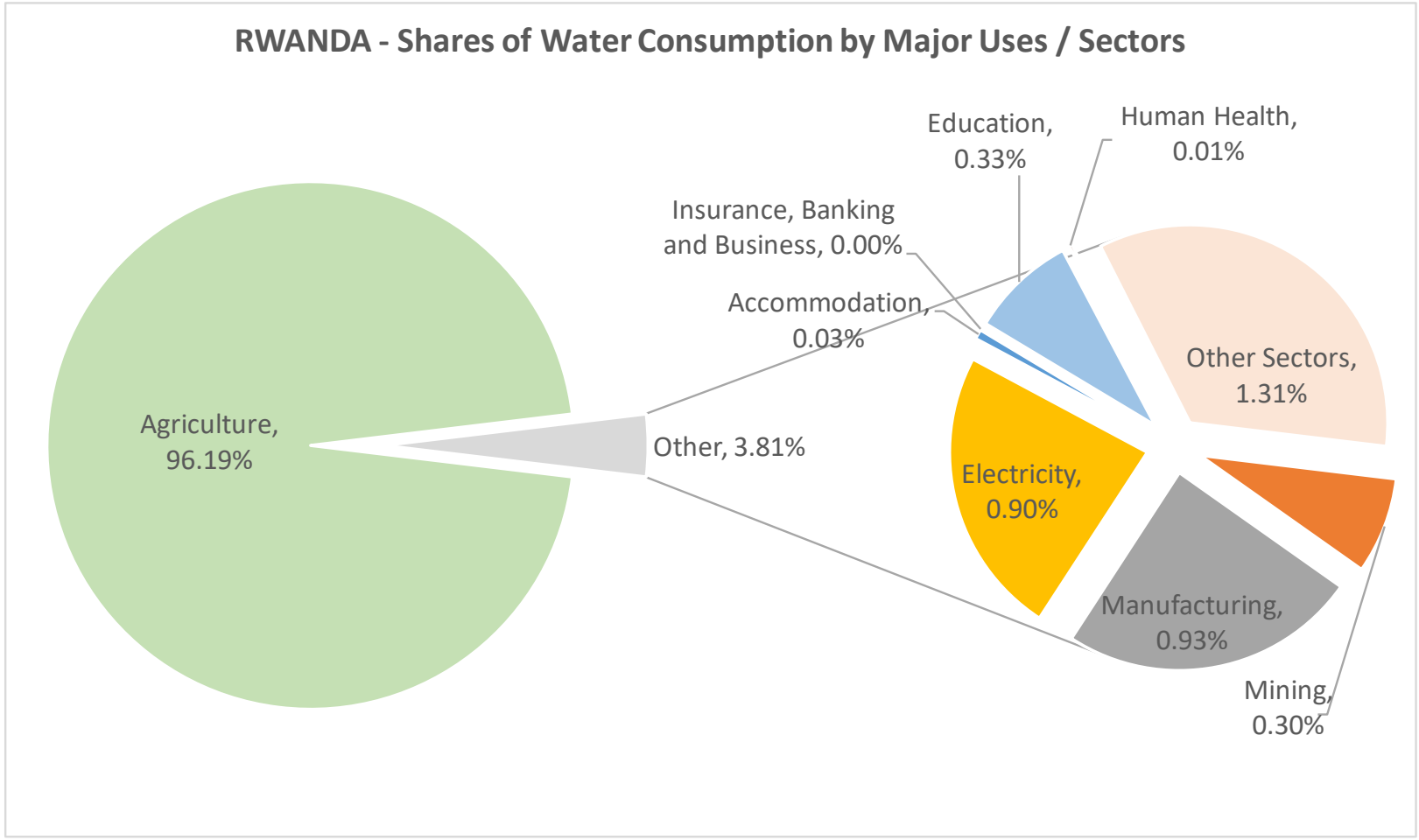


- Inform policy makers as a National Development priority sector;
- Clarify and compare the economic values of water in competing uses;
- Provide more accurate picture of overall water available, water use, potential constraints to growth;
- Relate economic production to water use, water productivity;
- Look after performance water supply sector;
- Monitor and enhance water productivity across sectors in Rwandan economy (use efficiency);
- Identify potential for improving performance in water supplying sector, like water efficiency in supply.

Water Accounts:
Key Findings and Policy Implications

Water Accounts: Findings

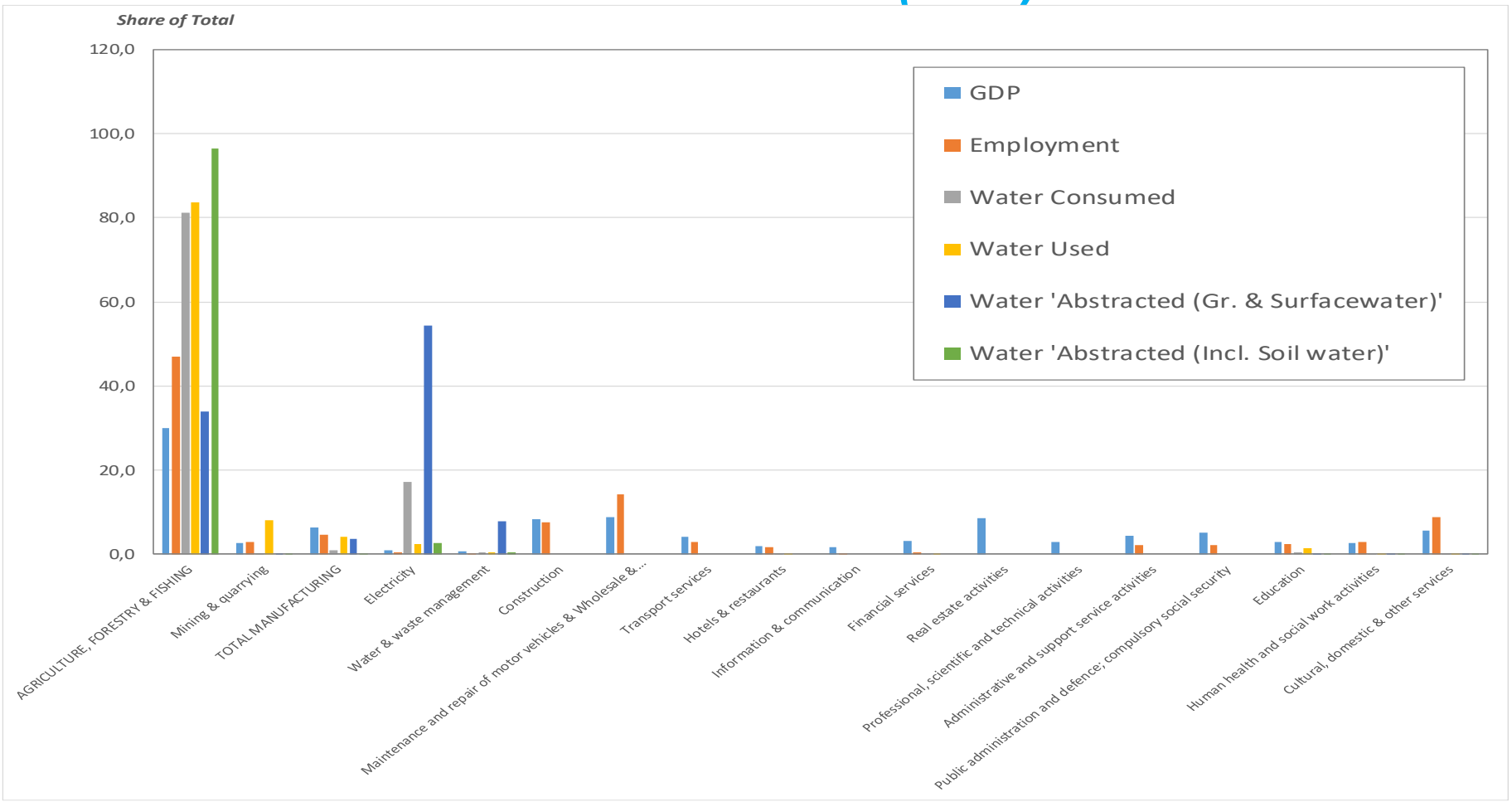
Water Use efficiency and Productivity: SDG 6.4.1



Shares of water consumption by major uses / sectors

Water Accounts Findings

Shares of GDP, employment (2016), water used, consumed, and 'abstracted' (2015)



Agriculture created about 6% of formal jobs, but many more are informal

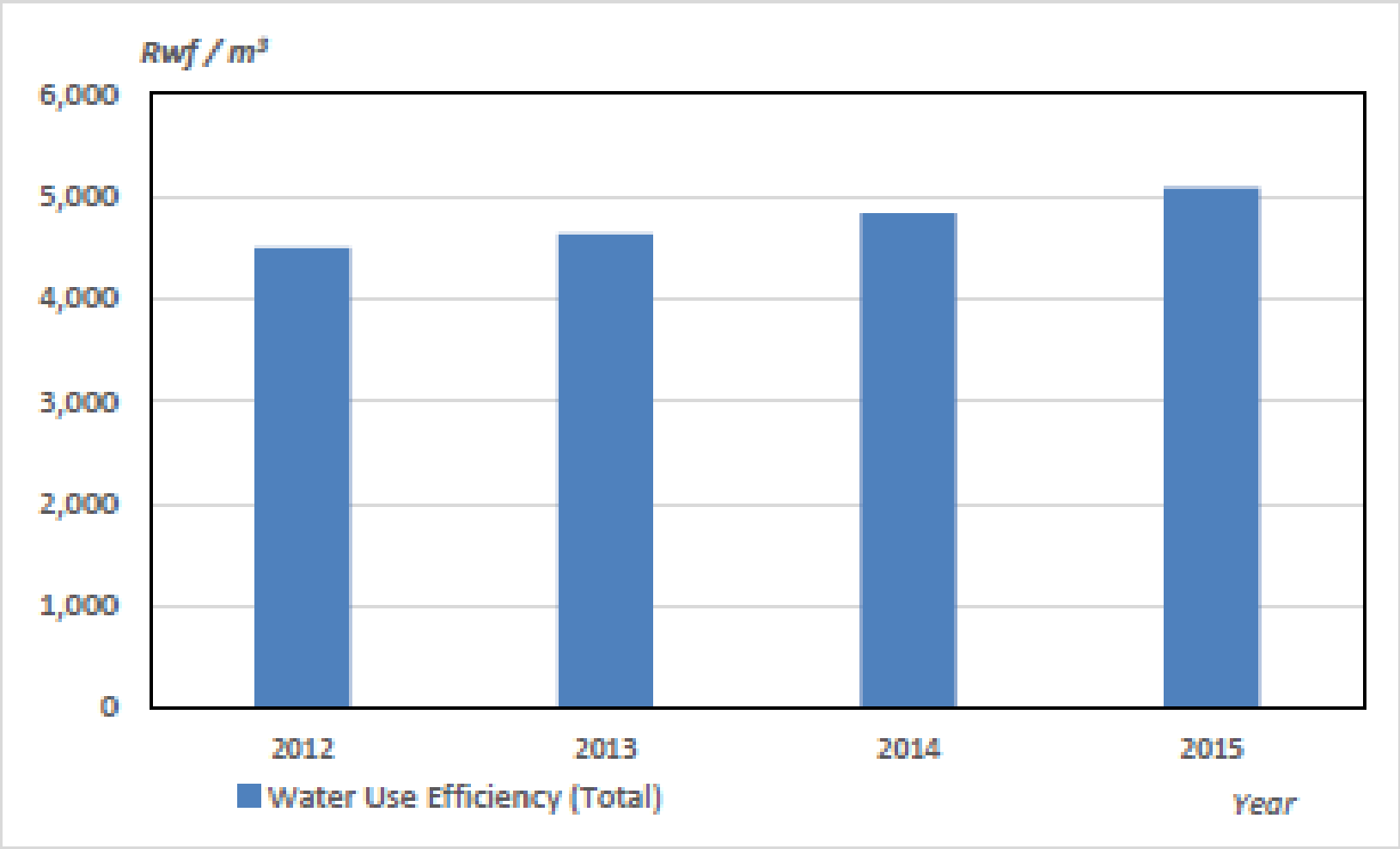
Source Data: Labour force statistical table

Water accounts results on water use efficiency at country level

SDG 6.4.1

Water Productivity or 'Total Water Use' Efficiency (Rwf/m^3) for 2015 for selected industries

Economic Sector	Productivity or Use Efficiency = GDP / m^3 of water used (Rwf / m^3)	% of Water used
Agriculture	118.4	91.12%
Mining	6,236.1	0.15%
Manufacturing	523.0	4.36%
Electricity	138.4	2.41%
Water & waste management	576.1	0.35%
Accommodation	6.297.8	0.11%
Financial services	2,352,460.5	0.0005%
Education	699.3	1.47%
Human health	33,876.9	0.03%
Cultural, domestic & other services	2,133,842.5	0.001%



Total Water Use Efficiency, Using definition of SDG 6.4.1 in RWF/m³

- Water demand is expected to increase mainly due:
  - Economic and population growth
  - Increasing urbanization (Kigali, secondary cities and others)
  - Leading to: trade-offs or conflicts that will need to be managed

- Policy makers need coherent information and policy framework for making water allocation trade-offs to ensure that there is enough water of sufficient quality for all potential users.

- e.g. it will be important to consider how to allocate scarce investment resources in water infrastructure that serves different sectors

- Water Accounts compute and help to monitor Water stress indicator (SDG 6.4.2)

Water accounts results on water availability per capita at country level

Water Accounts Results on Water Availability per capita, National Level

Year	TRWR	Population by NISR	TRWR / capita
	(Million m^3)	*(# capita)*	*(m^3/capita/yr)*
2012	11,659.3	10,482,641	1,112.0
2013	10,329.2	10,978,053	941.0
2014	11,925.3	11,002,628	1,084.0
2015	11,256.3	11,262,564	999.0

** NWRMP based on long term average is 670 m^3 per capita per year.*

*** Figures in the table are computed based on short term data and on SEEA methodology*

Water accounts results on water stress per capita at country level

SDG 6.4.2

Water Accounts Results on Water Stress, National Level

Year	TRWR (A)	Environmental needs (B)	TWW as by RBM&E study and NCA - WA (C)	Water Stress C / (A-B)
	(Million m^3)	*21.9% of TRWR*	*(Million m^3)*	
2012	11,659.3	2553.4	656.2	7.2%
2013	10,329.2	2262.1	673.3	8.3%
2014	11,925.3	2611.6	695.4	7.4%
2015	11,256.3	2465.1	716.2	8.1%

Water accounts results on water stress in Rwanda at country level

WS = TWW / (TRWR-Environmental needs) * 100

The severity of water stress (WS) is classified by:

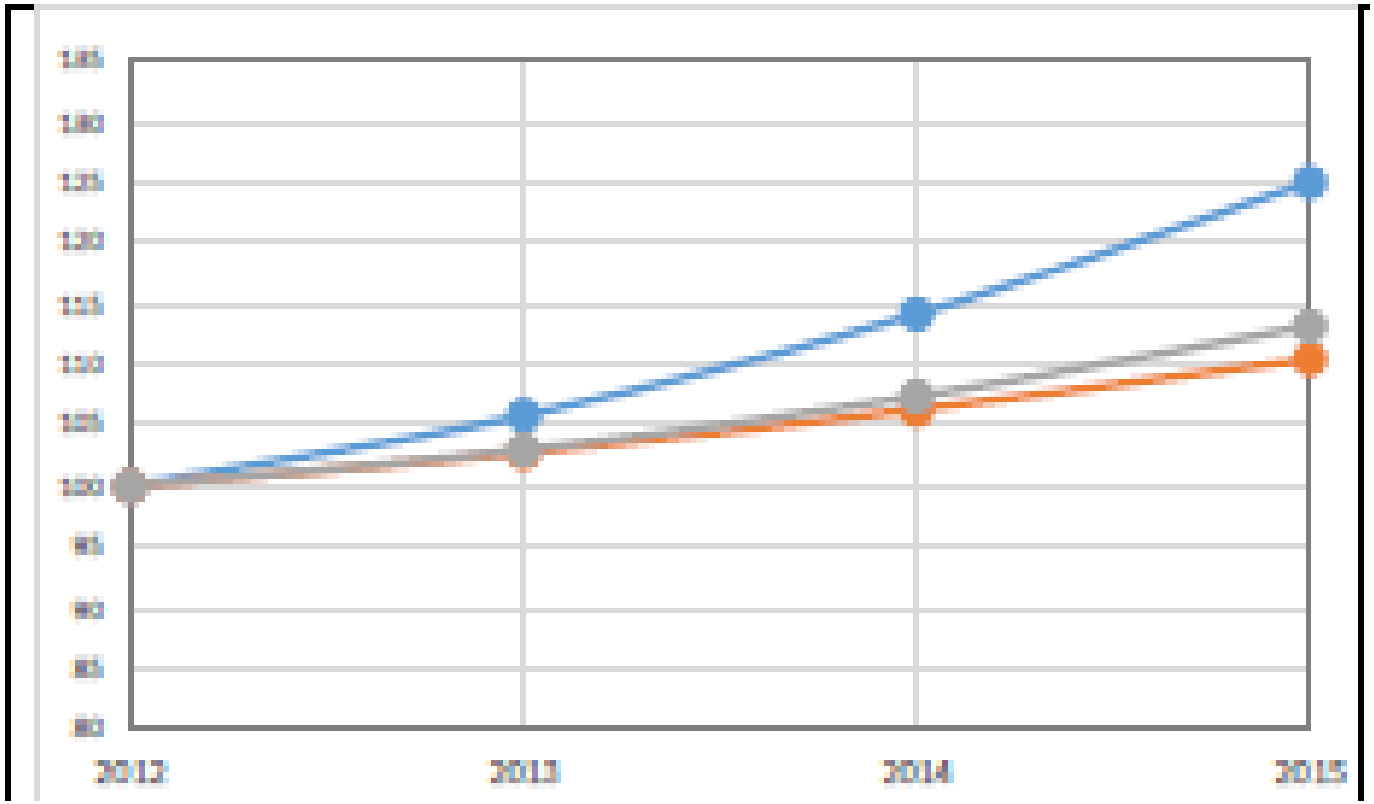
(WS < 10%) **no water stress,**
(10% < WS < 20%) low water stress,
(20% < WS < 40%) moderate water stress,
(40% < WS) high water stress

"De-coupling" Economic Growth from Resource Use

- NCA unable the analysis of the process of ***decoupling*** of economic development (growth) from environmental pressures and natural resource exploitation;

- ***Relative decoupling*** is observed when the growth rate of the environmentally relevant variable is positive, but less than the growth rate of the economic variable

- ***Absolute decoupling*** occurs when the natural resource (or environment) variable is stable or decreasing over time while the economic driving force is growing



With economic output growing faster than water use, Rwanda is decoupling growth from water resource use, good trend

- Gross value added – “Total” (irrigated agriculture, Industries, and services
- Water Use – “Total”
- Water Use Efficiency – “Total”

Domestic water supply

- Water has value: productive uses, non-consumptive use such as recreation, and maintaining environmental services
- But also, water has costs including: the management of water in the natural environment, the cost of extracting, treating and distributing it to end users
- There is also an opportunity cost of using water in one sector relative to its use in another sector
- The cost of water management and use accrue to different parties: (i) The public sector bears some of the costs of managing water in the natural environment; (ii) Water supply companies bear the cost of treating and delivering water to customers

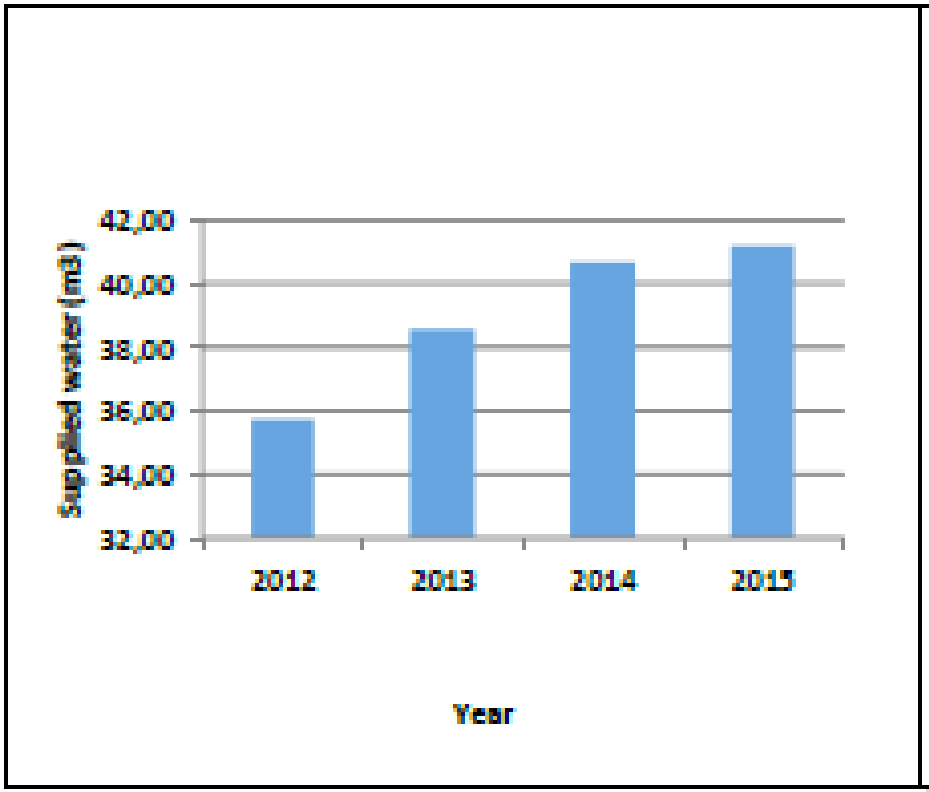
Domestic water supply (Continued)

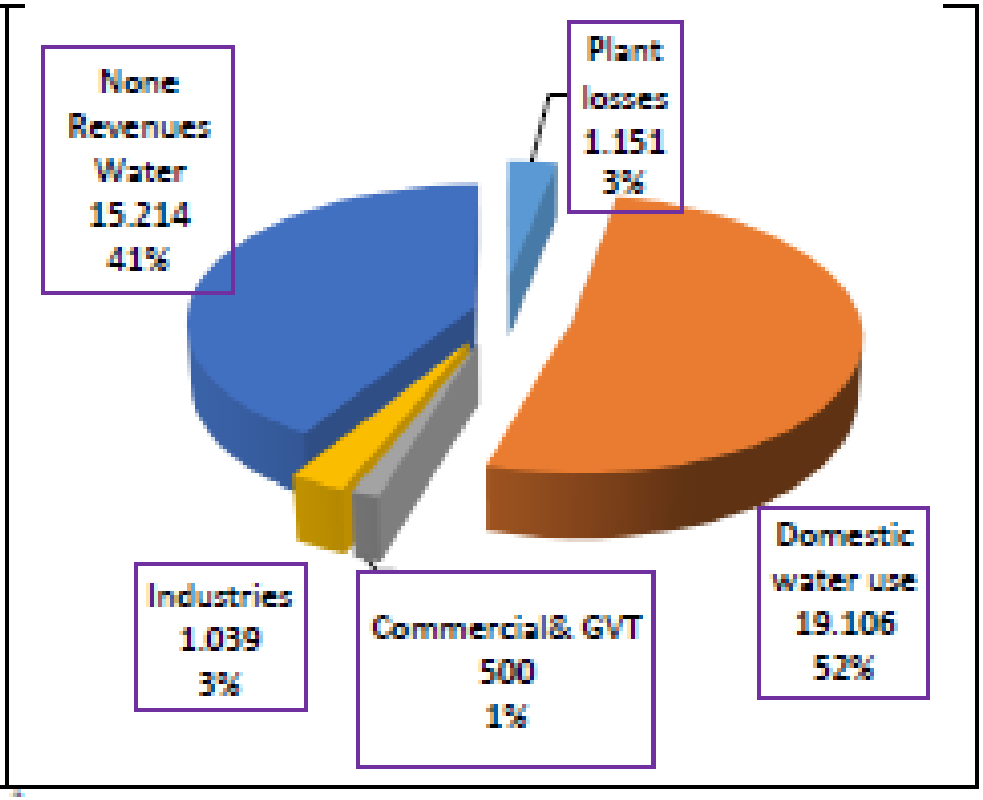
- Rwanda has several water supply companies permitted to abstract, treat and deliver water to customers
- WASAC is the largest, serving 15 cities and towns, with 150,000 connections and around 300 standpipes

Company	Estimated Population Served	Area Served / Comment
WASAC	2,500,000	Mainly urban areas
Aquavirunga	363,000	Mainly rural areas
Others: • Ayateke Star • Procom	1,429,000	
Total	4,292,000	~ 37.3% of 11.5 Million Rwandans

- In rural areas, drinking water is supplied by 39 private operators or cooperatives, water users committees (650), and privately-owned systems (circa 60)

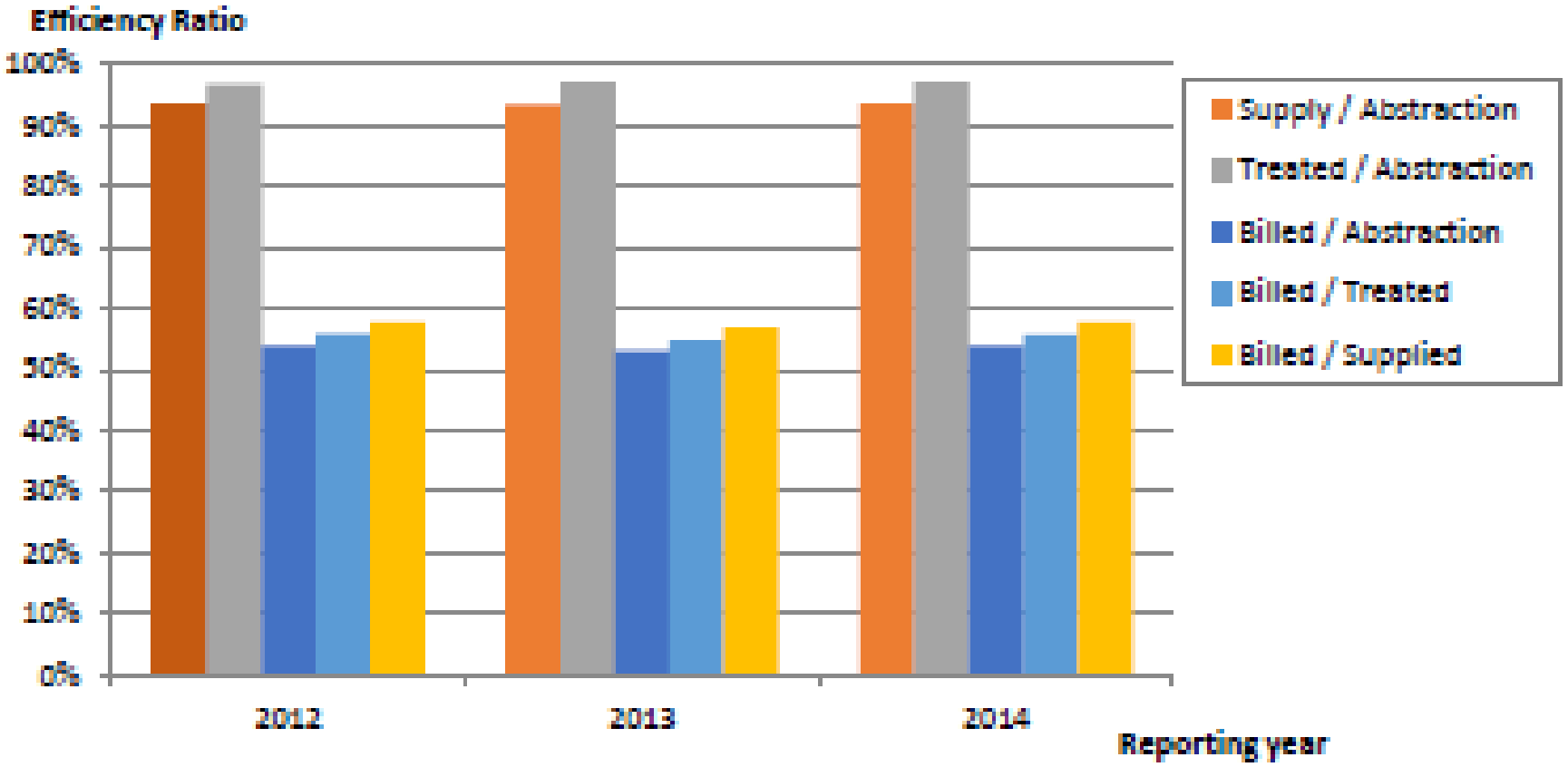
WASAC water supply (in Mm3) and Shares (% in 2012)





WASAC suffers form: low cost recovery (tariff issues), and large water losses (about 42% of Non-Revenue Water)

WASAC efficiency and performance ratios



(i) WASAC has analyzed NRW by district and found that cost recovery ranges from 22 to 63 % from the best to the worst operating district

(ii) WASAC and the Government are aware of these challenges and working to resolve them

Discussion on ways out and areas of improvement for WASAC

- To make the situation financially sustainable:

(i) there would need to be an increase in WASAC's water treatment capacity by about 2/3 (this requires large investment costs)

(ii) an increase in the per cubic meter weighted average tariff (this requires political action by the Government)

(iii) A combination of the two approaches above.

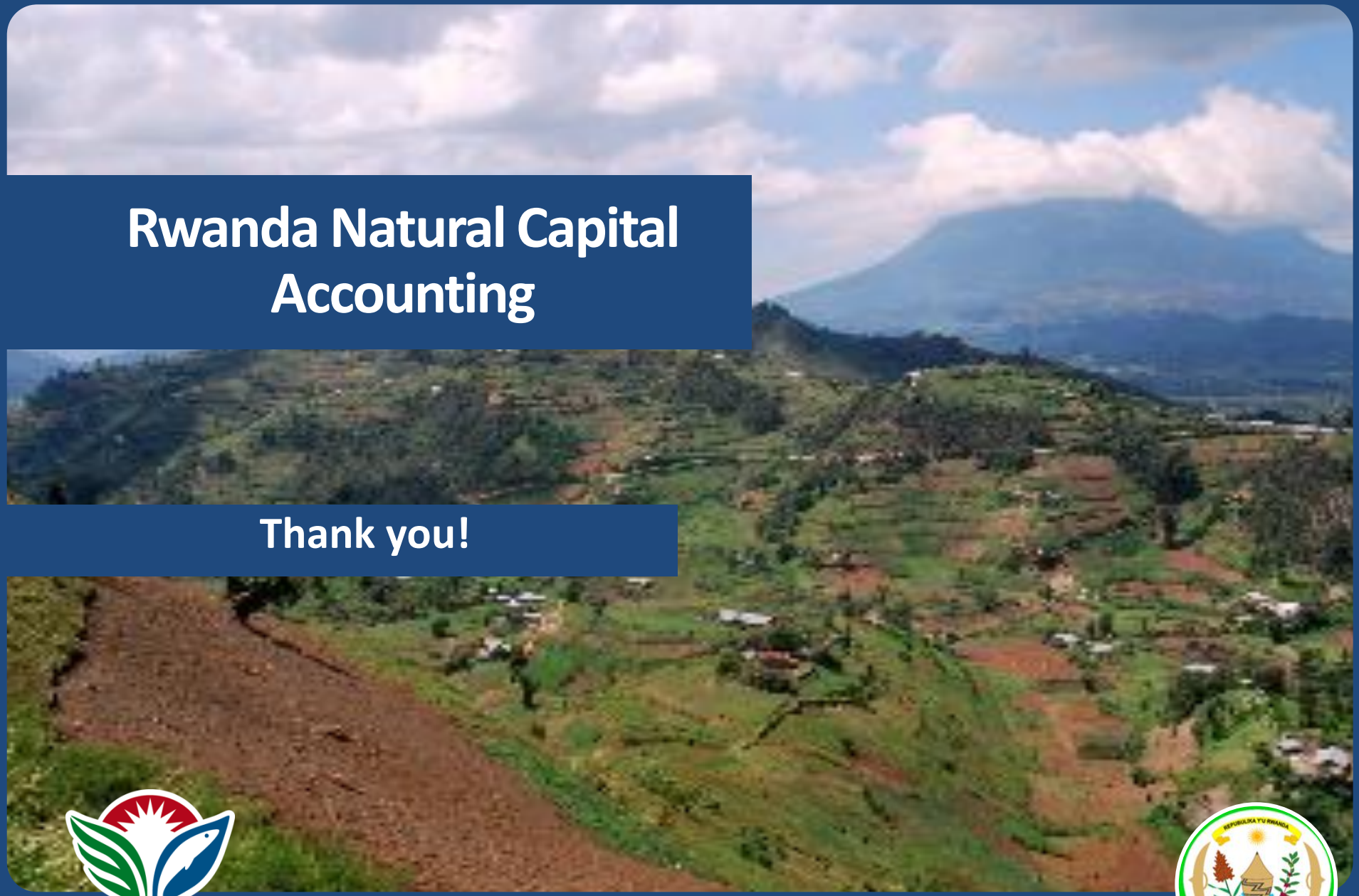
(iv) Reduce deficiencies in the physical infrastructure, as well as deficiencies in the billing and collection system

Water Accounts: Policy Implications

- Improve cost recovery, so that users getting high returns on water use also pay for the provision of that water;
- Develop water allocations rules that help to preserve permanent green countryside for recreation and tourism;
- Consider improved water and agricultural management practices and technologies (groundwater recharge, reduce water losses, enhance efficiency) to improve wise use and storage of water resources;
- Note that improved technologies will help to improve food security relative to traditional rain fed agriculture;
- Develop coherent information and policy framework to address growth in water demand and inform water allocation trade-off decisions.

Rwanda Natural Capital Accounting

Thank you!



WAVES