Zambia - climate change policy and accounting

Natural Capital Policy Forum

26-27 November 2018

WAVES

Wealth Accounting and the Valuation of Ecosystem Services **www.wavespartnership.org**

WORLD BANK GROUP

CLIMATE CHANGE AND WATER

❑ Objectives of the National Policy on Climate Change

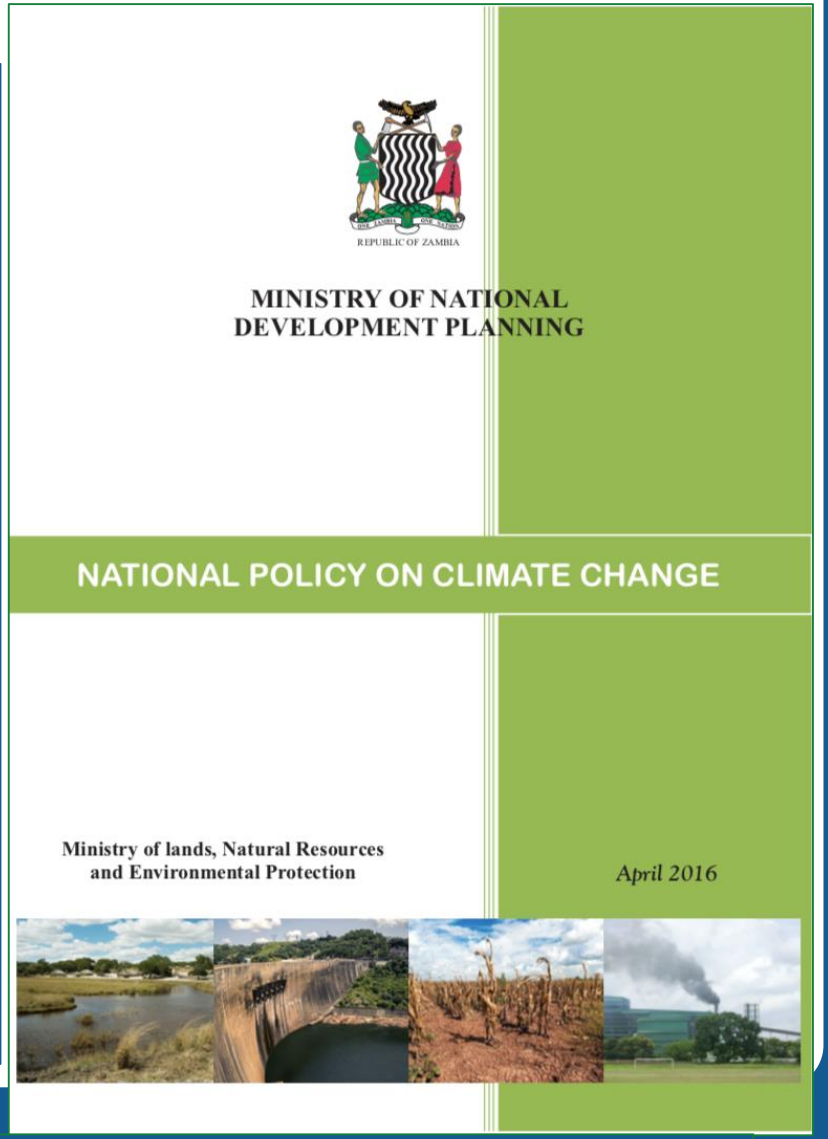
The overall objective is to provide a framework for coordinating climate change programmes in order to ensure climate resilient and low carbon development pathways for sustainable development towards the attainment of Zambia's Vision 2030.

❑ Specific Objectives:

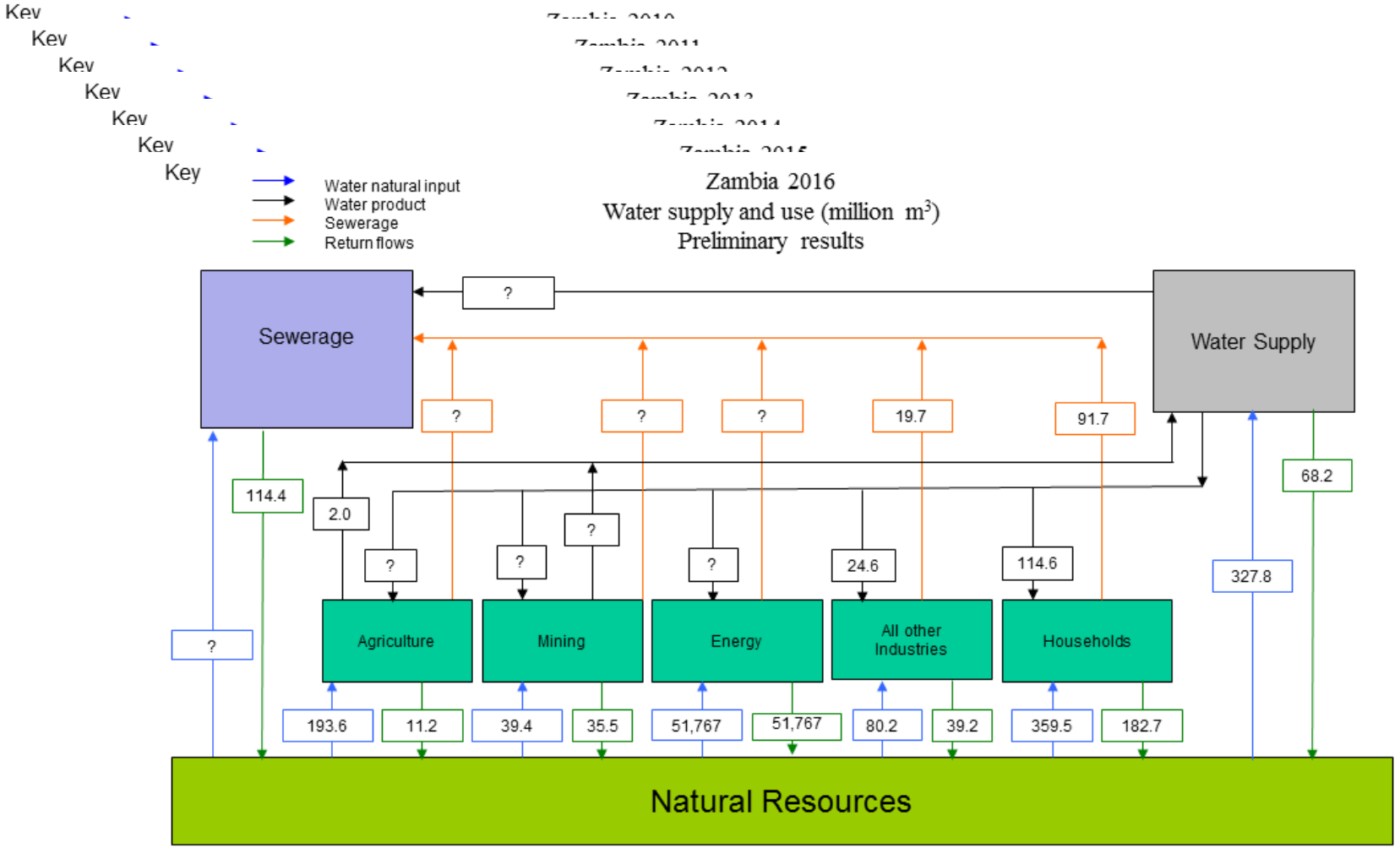
Adaptation and disaster risk reduction; Contribution to reduction of GHG emissions; Mainstreaming of CC in policies & programmes; Human & institutional capacity development in CC; Awareness raising for CC; R & D in Climate Change; Mainstreaming Gender in CC; Enhancing national absorptive capacity for CC technology

❑ Major sectors in Zambia impacted by Climate Change:

Water Sector; Agricultural Sector; Forest Sector; Wild life Sector; Tourism; Mining; Energy; and Health



THE WATER ACCOUNTS: Physical Flow Diagrams



THE WATER ACCOUNTS: Physical Supply & use tables

Table 1. Preliminary water physical supply and use tables for Zambia, 2010 (Mm3)

Table 2. Preliminary water physical supply and use tables for Zambia, 2011 (Mm3)

Table 3. Preliminary water physical supply and use tables for Zambia, 2012 (Mm3)

Table 4. Preliminary water physical supply and use tables for Zambia, 2013 (Mm3)

Table 5. Preliminary water physical supply and use tables for Zambia, 2014 (Mm3)

Table 6. Preliminary water physical supply and use tables for Zambia, 2015 (Mm3)

Table 7. Preliminary water physical supply and use tables for Zambia, 2016 (Mm3)

Physical supply table, 2016		Agriculture						Industry						Households	Environment	TOTAL
		Agriculture (large-scale irrigation)	Agriculture (small holder irrigation)	Agriculture (livestock)	Subtotal agriculture	Mining	Energy	Water utilities	Irrigation schemes	Subtotal water supply industry	Sewerage	All other industries	Subtotal industry			
Natural resources																
	Surface water														52,152.1	52,152.1
	Groundwater														615.4	615.4
	Rainwater tanks															0.0
	Total natural resources														52,767.5	52,767.5
Products																
	Natural water		2.0		2.0			207.4		207.4			209.4	-		209.4
	Sewerage											19.7	19.7	91.7		111.4
	Total water and sewerage products		2.0		2.0			207.4	-	207.4	-	19.7	229.1	91.7		320.8
Return flows																
	To surface water	11.2			11.2	35.5	51,767.0				111.4		51,925.1			51,925.1
	To groundwater*							68.2		68.2		39.2	107.4	187.2		294.6
	Total return flows	11.2	-	-	11.2	35.5	51,767.0	68.2		68.2	111.4	39.2	52,032.5	187.2		52,219.7
TOTAL SUPPLY		11.2	2.0		13.2	35.5	51,767.0	275.6	-	275.6	111.4	58.9	52,261.6	278.9	52,767.5	105,308.0

Physical use table, 2016		Agriculture						Industry						Households	Environment	TOTAL
		Agriculture (large-scale irrigation)	Agriculture (small holder irrigation)	Agriculture (livestock)	Subtotal agriculture	Mining	Energy	Water utilities	Irrigation schemes	Subtotal water supply industry	Sewerage	All other industries	Subtotal industry			
Natural resources																
	Surface water	37.3		156.3	193.6		51,767.0	148.5		148.5			52,109.1	43.0		52,152.1
	Groundwater					39.4		179.3		179.3	-	80.2	298.9	316.5		615.4
	Rainwater tanks				-			-			-	-	-			-
	Total natural resources	37.3	-	156.3	193.6	39.4	51,767.0	327.8	-	327.8	-	80.2	52,408.0	359.5		52,767.5
Products																
	Natural water		-		-			70.2				24.6	94.8	114.6		209.4
	Sewerage				-						111.4		111.4	-		111.4
	Total water and sewerage products		-		-			70.2			111.4	24.6	206.2	114.6		320.8
Return flows																
	To surface water														51,925.1	51,925.1
	To groundwater*														294.6	294.6
	Total return flows														52,219.7	52,219.7
TOTAL USE		37.3	-	156.3	193.6	39.4	51,767.0	398.0	-	327.8	111.4	104.8	52,614.2	474.1	52,219.7	105,308.0

*Losses in distribution plus unaccounted for water (e.g. from leaky pipes)

POLICY CONSIDERATIONS

Climate Change and Water

- **Mitigation of climate change and water accounts**
  - In 2014 14,000 megawatt was from hydropower
  - In 2016 11,000megawatt of electricity production was from hydropower
  - Decline due to severe drought in rain season from 2014-2015 with effect in 2016 production.
  - There is additional untapped capacity to produce more hydropower
  - But changes to rainfall pose a risk to electricity production from hydropower
  - Removal of electricity subsidy correlated with increases in use of charcoal meaning more greenhouse gases

POLICY CONSIDERATIONS

Climate Change and Water

- **Adaptation to climate change and water accounts – minimizing risks and maximizing returns**
- **Likely higher variability and lower availability of water poses risks to:**
  - Electricity production
  - Agricultural production
  - Ecosystems and wildlife and the tourism dependent on it
- **Accounts can help/Impact of WAVES**
  - Assess which industries deliver the highest returns for the amount of water used (and preliminary investigations are that nature based tourism would deliver higher returns than agriculture – this was certainly the case in Botswana)

Elephants use 225 litres of water per day
Photo courtesy of Kirk Hamilton

POLICY CONSIDERATIONS

Climate Change and Water

- **Adaptation to climate change and water accounts – water availability**
- **Less rain is likely to mean higher reliance on groundwater**
  - Evidence of this already in Lusaka with falling water table
- **Water asset accounts can help**
  - Show how much groundwater is available
  - Levels of recharge (and how these are related to forest cover via forest accounts)
  - Assist with determining sustainable abstraction levels
  - With existing MSUT and PSUT assist with price setting
- **Water quality and emission accounts can help**
  - Show which water is suitable for which purposes (e.g. drinking water)
  - Which industries are emitting the pollution causing declines in water quality (e.g. abandoned mines)

ELSEVIER

Physics and Chemistry of the Earth, Parts A/B/C

Volume 33, Issues 8–13, 2008, Pages 648-654

Evidence and implications of groundwater mining in the Lusaka urban aquifers

N.H. Mpamba [a], A. Hussen [a], S. Kangomba [a], D.C.W. Nkhuwa [b], I.A. Nyambe [b], C. Mdala [b], S. Wohnlich [c], N. Shibasaki [d]

Show more

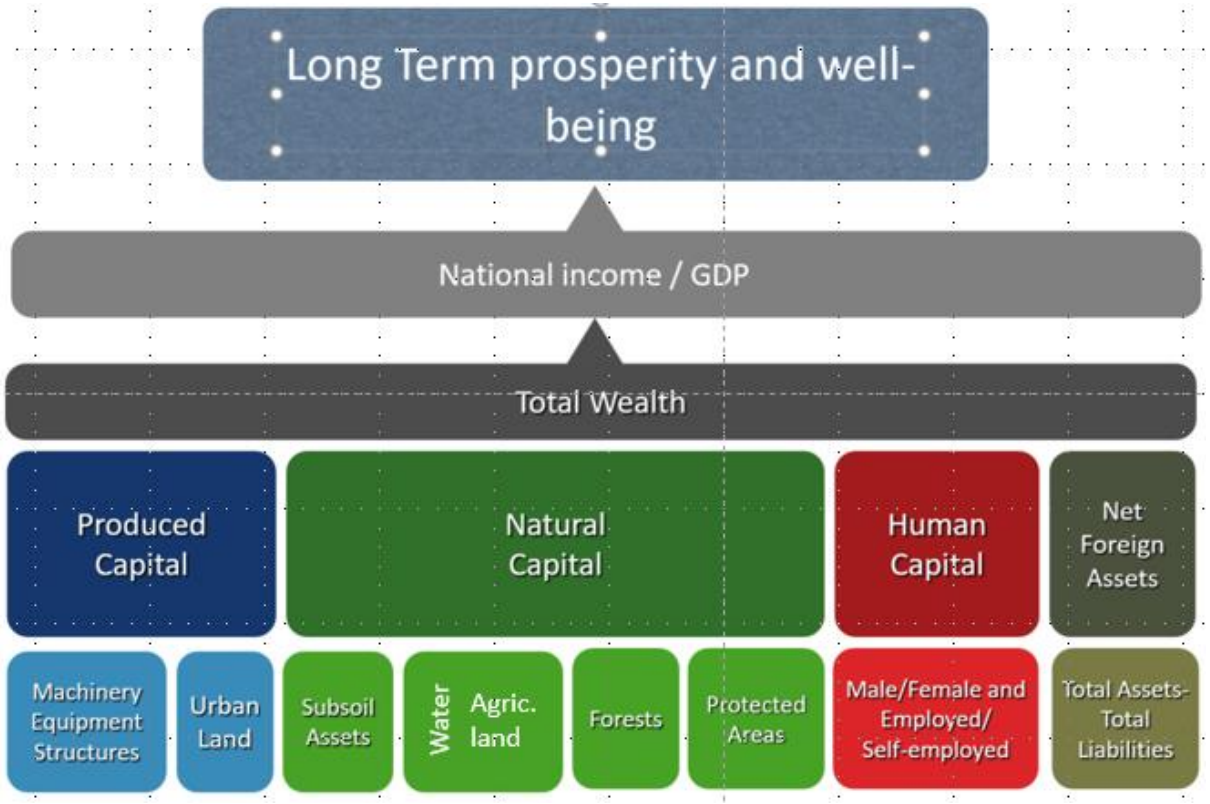
https://doi.org/10.1016/j.pce.2008.06.015

Abstract

The Lusaka Plateau hosts some of the most productive karstic carbonate aquifers, which are historically a dependable water supply source for the city of Lusaka. While it has been an important and cheap groundwater source for various users, the schist aquifer on the other hand compliments the supply. The present and future water demand pose the greatest challenge for the Lusaka city aquifers and is recognised to be the reason for high private prospecting for groundwater as a result of the ever increasing demand. Lusaka Water and Sewerage Company (LWSC), the water utility company responsible for water supply to the city, abstracts about 50% of its water requirements from aquifers in the Lusaka urban and adjacent areas. Current abstraction is estimated to be in the range of 50.265×10^6–65.385×10^6 m^3 $year^{-1}$, which is already well over the annual recharge of 45.44×10^6 m^3 $year^{-1}$ at 8% of the annual rainfall. However, groundwater resources availability in terms of quantity, quality, as well as annual recharge, and recharge mechanisms have been more difficult to establish largely due to inadequate hydrogeological data. Although the recharge values are on record, these vary widely from 8% to 35% of the annual rainfall. Recent monitoring of groundwater levels shows evidence of groundwater mining that is reflected by a steady decline of groundwater table during the dry months. Preliminary observations suggest that the main recharge area south of Lusaka city offers dilution effect to groundwater recharged from other parts of the city where anthropogenic influences are significant. Continued groundwater monitoring is recommended so that the resource is managed effectively and sustainably for the social and economic benefit of Zambia.

ENGAGEMENT WITH PARLIAMENT

- **Parliamentary committees on:**
  - Agriculture, Lands and Natural Resources; and
  - Energy, Water Development and Tourism
- **Feedback was positive:**
- **Main issues that arose centered on:**
  - Accessibility to adequate water supply;
  - Groundwater regulations & charges for groundwater abstraction;
  - Need for raising awareness among members of parliament as change agents and champions for NCA



Natural Capital Accounting is focused on the part of total wealth that comes from land, water, mineral, energy, soil, forests and timber, and ecosystem assets

NATIONAL ASSEMBLY OF ZAMBIA

THANKYOU!!!