water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

INKOMATI NWRCS Description of Operational Scenarios

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NWRCS integrated steps

1: Delineate units of analysis and describe the status quo

2: Initiation of stakeholder process and catchment visioning

3: Quantify EWRs and changes in Ecosystem Services

4: Identification and evaluation of scenarios within IWRM

5: Draft Management Classes

6: Resource Quality Objectives (EcoSpecs & water quality (user))

7: Gazette class configuration

Scenarios: Where does it fit in?

Scenarios

- Scope of this presentation
  - Recap: What is a scenario?
  - Presentation of final scenarios
  - Presentation of how scenarios impact on water availability within the Inkomati WMA

Recap: What is a scenario?

- A scenario is a plausible definition (or setting) of all the factors (variables) that influence the water balance and water quality in a catchment and the system as a whole.
- Scenarios are used to assess different levels of water use and protection with the aim of finding a balance between ecological protection and utilisation of the resource.
- In essence, water resource classification is the process of evaluating scenarios and recommending the preferred (after stakeholder consultation) scenario for implementation.

KOMATI SCENARIOS

- Natural
  - No water use, only natural flows. This sets the baseline upon which all other scenarios are built.
- Present Day
  - The situation as currently understood taking into account all known water users and operating rules.

KOMATI SCENARIOS

- Include ecological water requirements (REC = PES)
  - The REC ecological water requirements was included as a priority water requirement (in addition to the Revised Present Day water use)
- Future water use
  - This scenario allows for increased water use in the catchment based on the following data sources:
    - Komati Basin Treaty
    - All Towns Reconciliation Study
    - Interim IncoMaputo Agreement
  - This future water use scenario was modelled with the ecological water requirements included.

KOMATI SCENARIOS

- Uptake of unutilised demands
  - There is approximately 14.8 million m^3/annum of allocated to irrigators but currently unutilised water in the upper Komati. The Department of Rural Development and Land Affairs (DARDLA) are planning to reinstate this irrigation, some of which could be located downstream of Swaziland.
- Impact of mining operations on the water quality in the upper Komati
  - This scenario considered the impact of uncontrolled mining development with eventual acid mine drainage.
  - This was modelled with and without transfers of water from the Usuthu catchment.

KOMATI SCENARIO MATRIX

Scenario	Scenario variables					
	Update water demands	Domestic growth and increase irrigation	IIMA[1] Flows	DARDLA	Silingane Dam (DS Maguga)	EWR
Sc K1	Yes	No	No	No	No	No
Sc K2	Yes	No	No	No	No	Yes
Sc K31	Yes	Yes	Yes	No	No	Yes
Sc K32	Yes	Yes	Yes	No	No	No
Sc K41	Yes	Yes	Yes	Yes	No	Yes
Sc K42	Yes	Yes	Yes	Yes	No	No
Sc K43	Yes	No	Yes	Yes	No	No
Sc K5	Water quality scenario (not for ecological assessment), includes mining aspects)					
Sc K6	Yes	Yes	Yes	Yes	Yes	Yes

CROCODILE SCENARIOS

- Natural
  - No water use, only natural flows. This sets the baseline upon which all other scenarios are built.
- Present Day
  - The situation as currently understood taking into account all known water users and operating rules.

CROCODILE SCENARIOS

- Include the so-called 'Present Day' ecological water requirement as implemented by the IUCMA.
- Include ecological water requirements (REC and PES)
  - The ecological water requirements were included as a priority water requirement
- Future water use
  - This scenario allowed for increased water use as obtained from the following sources:
    - All Town Reconciliation Strategies
    - Mbombela Reconciliation Strategies
  - Increased cross border flow in terms of the Interim IncoMaputo Agreement will be included in this strategy
  - This scenario was modelled with the REC and PES ecological water requirements.

CROCODILE SCENARIOS

- Mountain View Dam
  - This scenario included Mountain View Dam on the Kaap River.
  - This scenario was modelled with and without ecological water requirements
- Boschjeskop Dam
  - This scenario included Boschjeskop Dam on the Nels River.
- Mountain View and Boschjeskop Dam

CROCODILE SCENARIO MATRIX

Scenario	Scenario Variables						
	Update water demands with revised PES EWR	Updated water demands	Domestic growth	IIMA[2] Flows	Mountain View Dam (Kaap)	Boschjes kop Dam (Nels)	EWR
C1	Yes	No	No	No	No	No	No
C2	No	Yes	No	No	No	No	REC
C3	No	Yes	Yes	Yes	No	No	PES
C4	No	Yes	Yes	Yes	No	No	REC
C5	No	Yes	Yes	Yes	Yes	No	No
C61	No	Yes	Yes	Yes	Yes	No	REC
C62	No	Yes	Yes	Yes	Yes	No	PES
C71	No	Yes	Yes	Yes	No	Yes	REC
C72	No	Yes	Yes	Yes	No	Yes	No
C81	No	Yes	Yes	Yes	Yes	Yes	REC
C82	No	Yes	Yes	Yes	Yes	Yes	PES

Preliminary Scenarios: Sabie and Sand

- Natural
  - No water use, only natural flows. This sets the baseline upon which all other scenarios are built.
- Present Day
  - The situation as currently understood taking into account all known water users and operating rules.

SABIE AND SAND SCENARIOS

- Include ecological water requirements (REC and PES)
- The ecological water requirements were included as a priority water requirement (REC and PES scenarios considered)
- Future water use (Sabie)
  - This scenario allowed for increased domestic water use and possible increased irrigation for emerging farmers.
- Future water use (Sand)
  - This scenario allowed for increased domestic use and increased afforestation

SABIE AND SAND SCENARIOS

- New Forest Dam (Sand)
  - This scenario included New Forest Dam on a tributary of the Sand River.
- Return flows
  - An issue identified during the modelling in the Sand River is that currently there is very limited sewage treatment and hence limited return flows.
  - With improved water service delivery, there should be significant return flows in future.
  - Two return flow scenarios were considered:
    - 50% return flows
    - 25% return flows

SABIE SCENARIO MATRIX

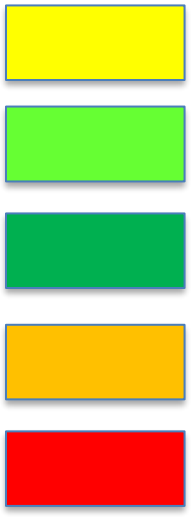
Scenario	Update water demands	Growth in water demands	EWR
S1	Yes	No	No
S2	Yes	No	Yes (REC)
S31	Yes	Yes	Yes (REC)
S32	Yes	Yes	No
S6	Yes	Minimised to meet REC	Yes (REC)

SAND SCENARIO MATRIX

Scenario	SCENARIO VARIABLES				
	Update water demands	Growth in water demands	Reinstate Sand Forestry	New Forest Dam (Mutlumuvi River)	EWR
S1	Yes	No, no return flows	No	No	No
S51	Yes	Yes, 50% return flows	Yes	Yes	Yes, REC
S52	Yes	Yes, 50% return flows	Yes	Yes	No
S53	Yes	Yes, 50% return flows	Yes	Yes	Yes, PES
S71	**Yes**	**Yes, 25% return flows**	**Yes**	**Yes**	**Yes, REC**
S72	**Yes**	**Yes, 25% return flows**	**Yes**	**Yes**	**No**
S73	**Yes**	**Yes, 25% return flows**	**Yes**	**Yes**	**Yes, PES**

Evaluation of Yield

- The water supplied to each sector in each economic Zone under each scenario was determined using a water resources model.
- These water supply estimates were then supplied to the economist to evaluate the economic impact on each sector for each scenario.
- The changes in water supply are presented in a summary form here as follows:



No change from Present Day

Significant increase in water supply from Present Day

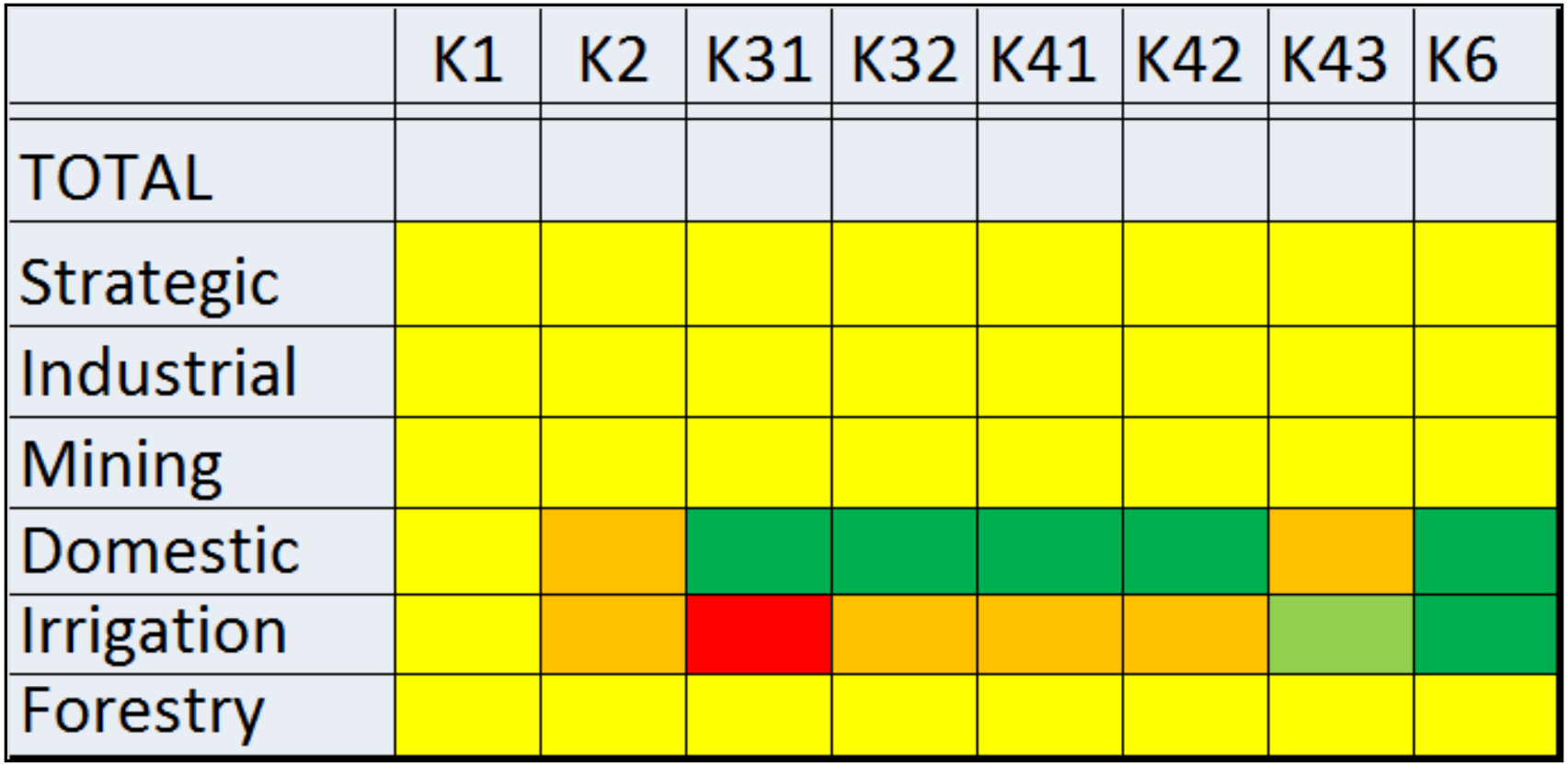
Large increase in water supply from Present Day

Significant decrease in water supply from Present Day

Large decrease in water supply from Present Day

Water resources availability results of scenarios

KOMATI



Water resources availability results of scenarios

Crocodile

	C1	C2	C3	C4	C5	C61	C62	C71	C72	C81	C82
TOTAL											
Strategic											
Industrial											
Mining											
Domestic											
Irrigation											
Forestry											

Water resources availability results of scenarios

Sabie/Sand