

8 MBASHE KEY AREA – WATER RESOURCE OVERVIEW AND STRATEGIC PERSPECTIVE

8.1 INTRODUCTION

This chapter describes the characteristics of the Mbashe key area and the yield water balance based on updated information gathered during the ISP investigation. The water resource management issues, constraints and available opportunities in the Mbashe ISP key area are also described. The detailed strategies to address these issues are described in **Part 2** of this ISP document.

8.2 MBASHE KEY AREA CHARACTERISTICS

Figure 8.1 presents the Mbashe key area which has a total surface area of 8 679 km². The mean annual precipitation (MAP) in the area is 810 mm and the total naturalised MAR is 1 129 million m³/a. The main river in the key area is the Mbashe River (T10). Its main tributaries are the Xuka and Xinika. There are also several coastal rivers (T90) including the Nqabara River.

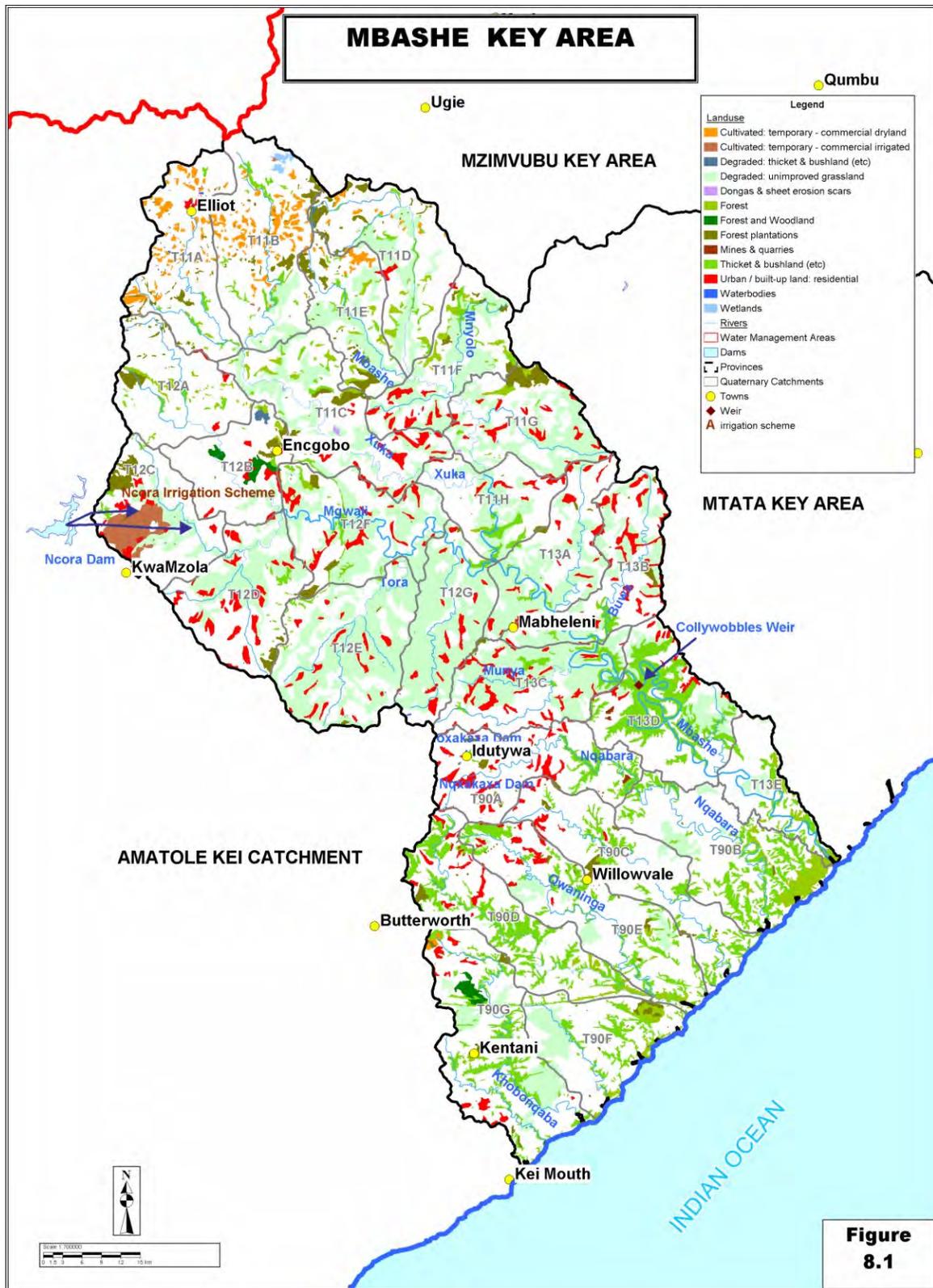
The population of the Mbashe key area is presented in **Table 8.1**. Approximately 94% of the population live in rural areas. The population is expected to decline in future due to migration and the effects of HIV/AIDS.

Table 8.1: Mbashe key area population distribution

	1995 Population	2025 Population	Average annual growth rates
Rural	547 400	494 400	-0.34%
Urban	32 000	29 200	-0.30%
Total	579 500	523 700	-0.34%

Land-use activities include significant commercial dryland agriculture in the upper catchments around Elliot. The main irrigation development is the Ncora Irrigation Scheme. This scheme relies on the transfer of water (approximately 17 million m³/a) from the Ncora Dam situated in the Kei River catchment (also refer to the Amatole-Kei ISP report). Commercial forestry has also developed in these catchments, especially since 1990. Because most of the Mbashe key area is rural, much of the rest of the area is used for subsistence farming, cattle grazing and small-scale agriculture, mostly dryland.

The water use of the Mbashe key area is dominated by the hydro-electric power generation at Collywobbles in the T13D catchment, for which between 85 and 102 million m³/a of water is transferred from the Ncora Dam in the Kei catchment. The Collywobbles hydro-electric scheme makes use of a weir to create the head and to regulate the flow through the turbines. The Collywobbles weir is continuously silting up, and this negatively impacts on the hydropower generation capacity. There is a need to develop operating rules for the apportionment of transferred water between the irrigation scheme and the power station. The DWAF EC Region intends to install a gauging weir to measure the total volumes transferred to the Mbashe River.



8.3 COMPARISON BETWEEN WATER AVAILABILITY AND WATER USE – NWRS VERSUS ISP

The basis of the comparison between the NWRS figures and the information obtained for the ISP on the water availability and use is as discussed in section 4.4.

8.3.1 Comparison of Water Availability – Current Situation

The Mbashe catchment is unusual in that while there is very little development or actual consumptive water use in this catchment, there is a large transfer into the catchment from the Ncora Dam in the Kei River catchment. Most of this transfer is used, non-consumptively, to generate power at Eskom's Collywobbles hydropower scheme.

The remainder of the total transfer is used for irrigation at the Ncora Irrigation Scheme that is located in the upper reaches of the Mbashe River catchment. Although current water use is low because the scheme is not fully functioning, there are plans to revitalise the scheme.

There is a large difference between the local yield of the key area as quoted in the NWRS and the re-assessment conducted for this ISP. This difference is discussed below.

Table 8.2 presents a comparison between the water availability figures in the NWRS and the ISP figures.

Table 8.2: Comparison of the water availability in the Mbashe key area (year 2000) between NWRS and ISP

Yield category	Available water (million m ³ /a)	
	ISP	NWRS
Gross surface water yield	67	132
Subtract:		
- Ecological Reserve (Impact on yield)	20	20
- Invasive Alien vegetation (Impact on yield)	0	0
<i>Net Surface water yield</i>	47	112
Ground water	1	1
Return flows	1	1
Net local yield	49	114
Transfers in	102	85
Total available yield	151	199

Since there are no dams of any significance in the Mbashe catchment, the water yield is derived from run-of-river and the transfers in from the Kei River catchment. The run-of-river yield as determined independently in this ISP project using the Rapid Simulation Model, at 67 million m³/a is significantly less than the 132 million

m³/a published in the NWRS.

A duration curve of the cumulative flows at the mouth of the Mbashe River clearly indicates that the yield could not be as high as 132 million m³/a. It is believed that the large yield figure in the NWRS comes from the wrongful inclusion of the transfer amount of 85 million m³/a in the surface water resource yield, resulting in the eventual double counting of the transfer. The lower Rapid Simulation Model figure of 67 million m³/a was therefore accepted for this ISP report.

The impact of the Reserve on the available yield, as given in the WMA report, has been adopted for this report.

The transfers in include the 85 million m³/a allocation for Eskom power generation and 17 million m³/a for Ncora Irrigation Scheme. The NWRS did not include the irrigation water requirement. The two transfers have been included in the total available yield of the key area.

8.3.2 Comparison of water requirements

Table 8.3 presents a comparison of the water requirements between the NWRS and the ISP for the year 2000.

Table 8.3: Comparison of water requirements (year 2000) (1:50 year assurance) between NWRS and ISP

User sector	Requirement (million m ³ /a)	
	ISP	NWRS
Irrigation	20	3
Urban	2	2
Rural	6	6
Industrial and mining	0	0
Afforestation	3	0
Total requirement	31	11

The only differences between the ISP and the NWRS figures occur in the irrigation and afforestation sectors. The large difference in the water for irrigation is attributed to the 17 million m³/a (at 98% assurance of supply) of transferred water used by the Ncora Irrigation Scheme. This allocation was not included in the NWRS. Although the full allocation is not currently being utilised because the irrigation scheme is not fully operational the full allocation is reserved and committed for eventual use by resource-poor farmers. This approach has also been taken up in the development of strategies for the key area.

The NWRS did not consider the impact of commercial forestry. The ISP has included an impact of 3 million m³/a on the available yield due to the approximately 24 600 ha of commercial forestry located in the upper catchments of the key area.

8.4 WATER REQUIREMENT

Irrigation is limited to the Ncora scheme, with 17 million m³/a allocated for transfer from the Kei River. The next largest water user is the rural sector, which makes use of run-of-river flows and springs in the upper catchments of the key area.

There is a significant area of afforestation in the Mbashe key area (24 600 ha) and this reduces the runoff by an estimated 19 million m³/a. The NWRS gives the impact of this on the available yield as zero. This was re-evaluated using the Rapid Simulation Model and the impact on the yield is now estimated at 3 million m³/a. **Table 8.3** lists all the ISP known current (year 2000) consumptive water uses in the Mbashe key area.

8.5 MAIN ISSUES, CONSTRAINTS AND OPPORTUNITIES

8.5.1 Reconciliation of requirements and available water

Based on the figures shown in **Tables 8.2 and 8.3** there is a substantial surplus of 120 million m³/a in the Mbashe key area. This large surplus is largely due to the non-consumptive use of 85 million m³/a for the generation of hydro-electricity at Collywobbles. This water could be made available for use depending on the pattern of use. Despite the apparent downstream surplus, there are local deficits in the upper catchments (T11) where commercial forestry is prevalent. That deficit has a negative impact on the rural domestic users who depend on run-of-river yield and springs for domestic supply and stock watering. Any further forestry development will increase the impact on those communities unless storage is developed. The other option would be increased use of groundwater and springs.

There are some uncertainties relating to the actual magnitude of the total surplus, which will need to be resolved before making any large-scale allocations for further use. There is also uncertainty regarding the actual volume that is being transferred for irrigation as well as the allocation to Eskom for the hydropower scheme. A strategy has been developed that addresses the water use from the Ncora Dam and this is discussed in detail in **Strategy 3.3**.

8.5.2 Water quality

The high silt content in surface water creates problems in the Mbashe key area. It is especially problematic for the Collywobbles hydropower plant where the intake works tend to silt up. The high sedimentation rate is exacerbated by over-grazing in the catchment. The strategy for water quality management in the ISP area is described in **Strategy 2.2**.

8.5.3 Future scenarios

From a water resources perspective no significant changes are expected within the key area in the foreseeable future. However, possible major changes in the actual transfer into the key area from the Ncora Dam need to be considered.

Eskom has confirmed that the Collywobbles hydropower station is an important element in the power supply to the Eastern Cape. Water for the power station will continue to be required in future. There is pressure from the Chris Hani DM to make water available from the Ncora Dam for rural requirements but this demand is unlikely to exceed 5 million m³/a. There is a need to re-assess the yield of the Ncora Dam and to verify the transfer requirements in order to establish what surplus would remain for further allocation from the Ncora

Dam. This is discussed in detail in the reconciliation strategy for the Mbashe key area (refer to **Strategy 3.4**).

8.6 MBASHE KEY AREA STRATEGIC PERSPECTIVES

8.6.1 General

The Mbashe key area is characterised by high natural runoff and very limited consumptive water use. The area presently under irrigation is only about 500 ha which uses an allocation of 17 million m³/a transferred from the Ncora Dam on the Kei River. There is a significant area of 24 600 ha planted to commercial forests. There are no significant dams in this key area and the available surface water yield is derived from run-of-river. There is also a large transfer (85 million m³/a) of water into the catchment from the Kei River catchment for hydro-power generation. The potential to use this water consumptively downstream of the power station to create additional economic benefits could be considered.

This surplus, which is mainly downstream of the Collywobbles weir, could be used for:

- Community garden projects
- Small-scale irrigation schemes
- Other productive uses.

The high sedimentation of the Mbashe key area is cause for concern and would need to be taken into account if the construction of any major dams in the key area were to be considered.

The strategy for this key area is first to confirm the volume of surplus water available for future use, taking into account the local deficits in the upper catchments of the key area. Poverty eradication should be the prime focus of such allocations although, due to the lack of suitable soils in the catchment, a productive use other than irrigation would have to be found. Community and commercial forestry is an option, but the potential for expansion of forestry is rather limited.

The following sections provide the major issues and broad strategic perspectives that are specific to the Mbashe key area.

8.6.2 Water Balance and Reconciliation perspectives

There is significant potential for water resource development in the Mbashe River catchment. Some development would be dependent on investments by large anchor projects such as heavy-metal dune mining near the Kei River mouth. There are heavy mineral sand dunes in the lower Centane area. The area has potential for titanium but mining development is on hold for environmental reasons. Any development will require regulation of the water resources from either the Kei or Mbashe rivers. Use of the abundant water resources of the Mbashe River key area should however focus on promoting social equity and poverty eradication.

The water supply scheme at the town of Idutywa does not have sufficient water to meet the RDP standards. Groundwater is a feasible option north of the N2. The Mbashe River is the only feasible source of supply for the southern portions of the Mbashe Local Municipality. The strategic approach regarding sources of water supply to local authorities is as addressed in **Strategy 1.4**.

There is potential for development of community forestry. There are uncertainties regarding the total water

resources available in the Mbashe key area including the amount of transfer from the Ncora Dam for hydropower generation and the Ncora Irrigation Scheme. A resource availability study is required to determine the actual surpluses before water allocation planning is done. This will also include the verification of existing lawful water use in the key area.

8.6.3 Water Use Management

The Ncora Irrigation Scheme is not fully developed but has infrastructure to support 4 745 hectares. The available water source can only support half of the potential area that can be developed. Supporting factors of production such as water, finance, management support, access to markets and effective institutional support will have to be made available to new emerging farmers.

8.6.4 Water Resource Protection Strategic Perspective

A number of desktop Reserve determinations have been conducted in the Mbashe key area. In the upper catchments, the present ecological states (PES) of the rivers are generally in a C or D category, indicating aquatic ecosystems that are highly modified (DWAf, 2003) ⁽⁶⁾. This is mostly due to the commercial forestry activities. The recommendations have been to maintain the PES and to protect the resource base from further degradations.

In the coastal rivers of the ISP area the PES is generally in category B which indicates that the river systems are slightly modified. The operation of the Collywobbles hydro-electric power station is causing an alteration of the flow regime of the Mbashe River downstream of the power station. Further development of afforestation will result in further reduction in runoff and this will impact on the ability to satisfy the ecological component of the Reserve. The strategy is therefore to get a balance between resource protection and development to create employment and improve the welfare of communities.

There are a number of springs supplying domestic water to a large number of communities. Most of the springs are situated in low-lying areas where contamination is likely. There have been cholera outbreaks in the upper catchments of the Mbashe key area. A spring-protection programme is required. An inventory of the springs in the Mbashe key area and other current information is not reliable. The data will need to be updated before a detailed spring-protection programme can be implemented.

8.6.5 Water conservation and water demand management (WC/WDM)

There are large water losses in the main urban areas of the Mbashe key area. These include Engcobo, Idutywa and Kentani. Although Water Services Development Plans (WSDPs) describe the need for implementation of WC/WDM measures in the urban areas of the Mbashe key area, they do not clearly highlight the situation with regard to water losses in existing water supply infrastructure and the potential for implementing WC/WDM measures.

The local municipalities use less water than other water use sectors. However, most of the urban areas in the catchment need augmentation of existing water supplies. The proposed strategy is to ensure that the municipalities make more efficient use of available water before new supplies are developed. This will reduce the cost of further water resource development as well as delaying the augmentation of sewage treatment works in towns such as Elliot.

WC/WDM will also indirectly assist efforts to improve the levels of water resource protection (particularly for

the pristine estuaries) in the Mbashe key area. WSDPs should describe the measures required to implement WC/WDM.

The main irrigation scheme in the Mbashe key area is the Ncora Irrigation Scheme. This scheme is not fully developed. Only 25% of the scheme is in operation at present.

There is scope for improved on-farm irrigation water use efficiency. DWAF has upgraded the main conveyance and irrigation distribution system and this is operating satisfactorily.

The strategic perspective for irrigation must include the following:

- Improvement of land tenure system
- Establishment of water user associations
- Strengthening agricultural support services including extension services, and agricultural credit. DWAF can only support and influence these aspects through co-operative governance.