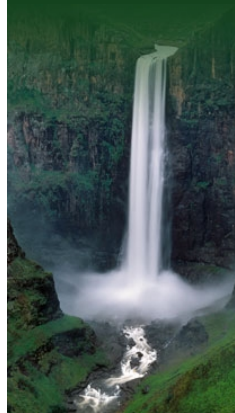


# Orange-Senqu River Awareness Kit


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## Resource Management

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### Water Demand in the Basin: Mining and Industry

The mining and industrial sectors account for a smaller fraction of water withdrawals in the Orange-Senqu River basin than do the agricultural and urban sectors. However, several of the largest mines in South Africa are located in the Orange-Senqu River basin, and in Lesotho industry represents 49% of the total water use.

*Table: Total industrial and mining water demand of the basin states.*

Country	Mining and industrial water demands (Mm <sup>3</sup> /a)	Percentage of total water use
Botswana	0,11 <sup>1</sup>	9,8%
Lesotho	22,00 <sup>1</sup>	50,8%
Namibia	7,35 <sup>2</sup>	4,6%
South Africa	274,00 <sup>3</sup>	6,8%
<b>Total</b>	<b>303,46</b>	

1 A total of mining, manufacturing and services, Lange et al. 2007. 2 ORASECOM 2007b (2005 value). 3 DWAF 2003a,b,c,d,e (A total of mining and bulk industrial water demands for the Lower and Upper Orange Water Management Areas (WMA) and all Vaal WMAs for 2000)

Although the mines use relatively small amounts of water in comparison to agriculture, the water must be supplied at a very high level of assurance (quantity, not necessarily quality) due to the large investment involved in any major mining concern. The mines in the Orange-Senqu River basin produce a wide variety of valuable metals and minerals including diamonds, gold, copper, manganese and iron.

#### Botswana

There is little formal mining in the Orange-Senqu River basin in Botswana and only a limited amount of industry, all related to services (Lange et al. 2007). However, one large diamond mine is present just inside the basin. Debswana Jwaneng mine, located in the Naledi valley just to the west of Jwaneng, in the Kweneng district of Botswana. This mine operates at a recovery rate of approximately 12.5 to 15 million carats per year, making it the richest diamond mine, by value, in the world.

#### Lesotho

49% of Lesotho's total water use is used in industry, specifically in the manufacturing and services industry making this sector important for water demand and management in the Upper Orange (Lange et al. ) Industries include textiles for large international clothing retailers, among others. This 49% equates to 21 Mm<sup>3</sup>/a of water abstracted from the basin.

Letseng diamond mine in Lesotho is the highest in the world at 3 200 m elevation, but water abstraction for diamond mining in Lesotho is negligible.

#### Namibia

There is a significant amount of mining activity to the north of the Lower Orange River basin in Namibia. In 2000, the calculated water use for mines was 1.43 Mm<sup>3</sup>/a. Mines include Oranjemund, Rosh Pinah, Skorpion Mines and a number of smaller mines in the Rehoboth district). Diamond mining is excluded from these figures—although the diamond mining headquarters are located at the mouth of the Orange in Oranjemund, most of the actual mining takes place along the coast and offshore, and uses seawater. The small amount of water used for industry in Namibia is mostly associated with processing agricultural goods.



**The SASOL refinery at Sasolburg, South Africa.**  
Source: Sasol 2008  
(click to enlarge)

#### South Africa

#### The Upper Orange River Water Management Area

The majority of the industrial requirements for water in the Upper Orange River Water Management Area for South Africa are found at the Riet/Modder sub-area with the main demand areas being the urban areas of Bloemfontein and Thaba 'Nchu.



**Basin Map**

Explore the sub-basins of the Orange-Senqu River

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**Water Management**

Explore the water management systems around the basin - including intra-basin transfers and sectoral water requirements

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**Dams**

Investigate the dams and water infrastructure in the Orange-Senqu basin

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Tour video scenes along the Orange-Senqu River related to Meeting the Water Challenge

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In the Upper Orange Water Management Area, the main products of mining are diamonds and salt. There are no significant direct water requirements by mines in this Water Management Area. The most significant mine is De Beers Koffiefontein. Dolerite mining and quarrying for gravel often take place during road construction, and clay and sandstone are mined for construction.

### Lower Orange River Water Management Area

Mining activities in the Lower Orange Water Management Area focus mainly on the extraction of alluvial diamonds, copper, asbestos, Tiger's eye, alumni silicate, limestone, dolomite. The mining of alluvial diamonds, which occurs mainly along the coast (with seawater), is still very important. Copper is mined in the Okiep Copper District, which includes Springbok and Nababeep, as well as at Aggenys.

### Vaal River Water Management Area

The growing urban and industrial areas located in the northern and western parts of the Vaal basin, were historically established around mining activities and represent 80% of the total water requirements in the Upper Vaal. Large industries include:

- Sasol I at Sasolburg (petro-chemicals)
- Iscor near Vanderbijlpark (iron and steel products)
- Sappi, AECI and Sasol Synthetic Fuels (SSF) near Secunda (petro-chemicals)
- In the Lower Vaal Water Management Area, Lichtenburg is the largest manufacturing town and Kimberley the second largest, with about half the output of Lichtenburg

There are no significant power stations located in the Middle Vaal, but three coal fired power stations are located in the Upper Vaal:

- Lethabo
- Tutuka
- Majuba

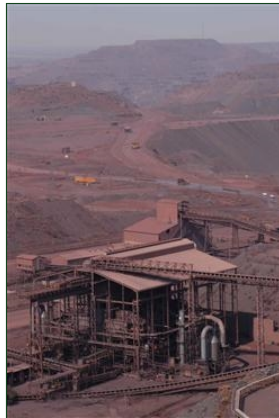
Mining is responsible for about 20% of the water used in the Middle Vaal Water Management Area.

Products of the mining industry in the Upper Vaal include coal, precious metals (gold, uranium, etc.), base metals, semi-precious stones and industrial minerals. The economy of the Middle Vaal is dominated by gold mining in the Free State and North West Goldfields areas. Mining activities in the Lower Vaal include diamonds, iron ore, manganese and other minerals, such as limestone, dolomite and amphibole asbestos. Kimberley has been a centre of diamond mining since the late 1800s. Today Kimberlite diamonds are still mined at the Finsch Mine at Lime Acres (De Beers Company).

Sishen Mine (Kumba Iron Ore Ltd.), located some 280 km north-west of Kimberley, is currently the major supplier of iron ore in South Africa and uses a lot of groundwater for its operation.. Other important mining areas include:

- Kudumane (iron, manganese and asbestos etc)
- Ganyesa (diamonds, mica group clay and salt)
- Taung (diamonds, limestone, dolomite and salt)

Overall, only a small amount of the total water use in this region is attributed to mining and industry.



**Mining is an important industry in the basin.**

Source: Vogel 2009  
(click to enlarge)



**Compared with irrigated agriculture mining uses very little water.**

Source: Vogel 2009  
(click to enlarge)

**Next: Hydroelectric Power Generation in the Orange-Senqu River Basin**