South Africa faces a water crisis of staggering proportions.

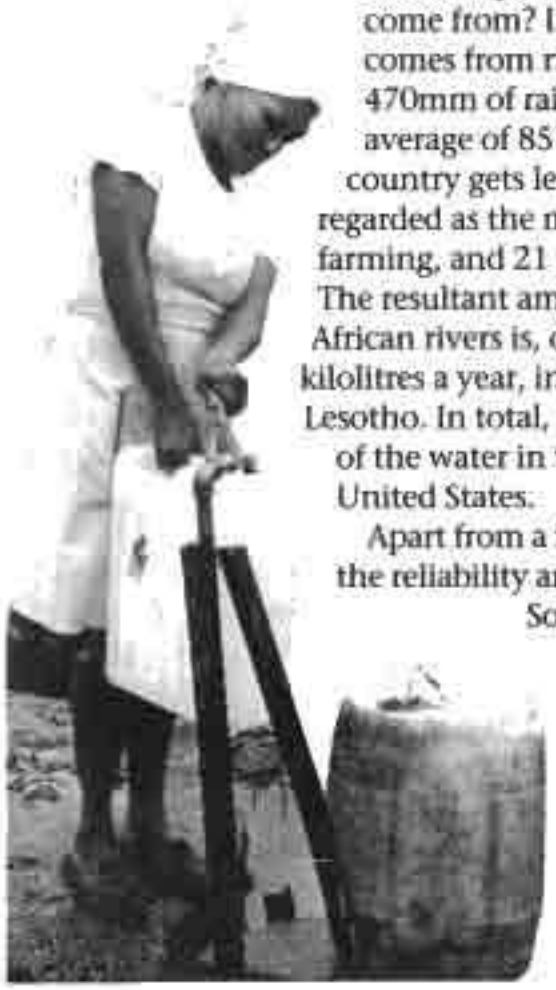
CATE BROWN looks at the causes of the parched future that awaits us.

Running on empty

THE MOST frightening of projected figures for our new democracy are those predicting our water demands into the early part of the next century. There can be no doubt that South Africa is facing a water crisis of staggering proportions: without desalinisation or recycling, we are likely to deplete our available water resources within the next 15 years – and this is the scenario even with careful use and management of water supplies as well as the addition of exploitable groundwater resources.

South Africa's population, which stood at 31 million in 1991, is growing at an annual rate of between 2,3 and 3,6 percent. This translates into a current annual water demand of between 25 888 and an alarming 49 000 million kilolitres (1 kilolitre equals 1 000 litres) by the year 2110.

Add to this the fact that there are now 12 million people without access to clean drinking water and over 20 million without adequate (water-borne) sanitation. On top of this, consider the following statement made in May by the Minister of Water Affairs and Forestry, Kader Asmal: "The immediate aim of the department is to establish a national water and sanitation programme which will assist in all households securing a clean, safe water supply of 20 to 30 litres a person a day [the World Health Organisation recommends 50 litres a person a day] within a 200-metre reach and adequate safe sanitation facilities. The long-term goal is to ensure that every South African has accessible water and sanitation."



This begs the question: where will the water come from? In South Africa, almost all water comes from rivers, which are fed by less than 470mm of rain a year, compared with a world average of 857mm. Sixty-five percent of the country gets less rain than the amount usually regarded as the minimum for successful dry-land farming, and 21 percent less than 200mm a year. The resultant amount of water in all South African rivers is, on average, about 53 500 million kilolitres a year, including that flowing out of Lesotho. In total, this forms not quite one eighth of the water in the Mississippi River in the United States.

Apart from a fluctuating rainfall which affects the reliability and variability of river flow in South Africa, there is the additional complication of inordinately high annual evaporation rates over most of the country. These range between 1 100mm and 3 500mm a year (for example, 2 000mm at Cape Town, 2 400mm at Pretoria and 35 000mm at Upington), well in excess of annual rainfall.

The result is that only about 33 000 million kilolitres of the annual runoff can be economically exploited. This amount is further reduced by land use practices such as commercial afforestation, the construction of farm dams and artificially inflated evaporation losses from the myriad of storage dams on rivers around the country. For example, the soon-to-be renamed Hendrik Verwoerd Dam, our largest reservoir, which can hold up to 5 673 000 kilolitres of water, annually loses an average of 500 000 kilolitres through evaporation.

Furthermore, the regions of economic growth are poorly distributed in relation to the available water, and water has to be transported for great distances to areas of increasing demand. Even Cape Town, with a relatively high annual rainfall, has outgrown its local water supplies and relies on water piped in from as far afield as Franschhoek.

Who, one wonders, is using all of this water? Latest available figures show that 52,4 percent is used for agricultural irrigation and stock watering, 12 percent for municipal and domestic purposes, 7,6 percent by industry (it takes up to 500 000 litres of water to produce one motor car), 2,7 percent by mining and 2,3 percent for power generation. Of the remainder, one percent is used directly for nature conservation, 7,51 percent is taken by forestry plantations before it reaches the rivers and 14,5 percent is allocated for ecological uses, such as maintaining estuaries (the nursery areas for many of the inshore marine fish species on which our recreational and subsistence line-fishermen depend). Future projections indicate that the percentage of the total water used by agricultural practices will effectively reduce (45,9 percent in 2010) in comparison to domestic consumption, which will increase to 17,3 percent by 2010.

When things get a little parched, the slice of the pie most often grumbled about is that allocated to rivers themselves for ecological uses. Water rights of various kinds are set to become one of the most controversial issues of the next few decades in South Africa and rivers will feature prominently in such a controversy. Thus, the way they are managed is critical, for if they are managed badly the costs could be exceedingly high in both environmental and human terms.

Rivers themselves are not simply drains transporting water from the mountains to the sea. They are complex, living systems, and are perhaps our most valuable resource. Sustainable utilisation of this resource for future generations demands that we allocate enough water for systems to continue functioning.

More people, demanding more water, means pollution. Evaporation from water stored in dams exacerbates the pollution problem by increasing the concentration of pollutants, particularly salts, in the water, and nutrient build-up has caused toxic algal blooms in many of our storage dams. The bottom-line is that the quality of what little water we have available is steadily declining. Clearly, we have to reduce the amount of pollution entering our rivers and, at the same time, we are going to have to look elsewhere to augment our water supplies. ■

Cate Brown is scientific officer at the Freshwater Research Unit, Department of Zoology, University of Cape Town.