**2.3.1 Physiography**

The physiography of the Orange River catchment area largely comprises the central

plateau which slopes westwards from the Lesotho massif to the cold Atlantic Ocean.

To the east, the land drops rapidly from an escarpment with rolling hills to the Indian

Ocean. The two oceans influence climatic conditions to the extent that the land

between the warm Indian Ocean and the escarpment is moist with a relatively

equitable climate, whereas the land on the plateau is dry and harsh.

**2.3.2 Climate**

The climatic range encountered within the Orange River and Eastern Cape systems

is almost as wide as the range covering the whole of South Africa. This climatic

range extends from cool temperate subarid to hot desertic.

Rainfall occurs largely in the summer months and, for the most part, is well below

potential evapotranspiration. Only in very localised patches, such as along the east

coast and the eastern escarpment, do subhumid conditions prevail.

Expressed in terms of Ehlers' climatic zones (Ehlers, 1974), the codes range from

46/14 for the cold upper reaches of the Caledon River, becoming gradually warmer

in summer with decreasing elevation towards the west, to Prieska with a code of

87/14. Towards the west, both summer and winter temperatures become warmer,

culminating in the very hot zone, 99/46. Here, the hottest South African summer

temperatures occur but the winters are cooler than those, for example, on the

KwaZulu-Natal coast.

Winters are cold over most of the area, with the Ehlers' climatic zone 14

predominating. Frost is thus a hazard to crop production throughout the Orange

River and Eastern Cape systems, except for a narrow coastal strip near the Orange

River mouth and a strip in the Eastern Cape stretching inland from the sea to the

Uitenhage-Grahamstown-Williamstown area. The climate within this strip is cool

tropical (Ehlers' climatic code, 67A/36).

**2.3.3 Evaporation**

The lower Orange River region experiences not only the hottest conditions in South

Africa but also the highest evaporation rates. At Goodhouse, temperatures of up to

47,8°C and a mean January maximum of 39,3°C have been recorded. At Upington,

maximum evaporation rates from a Class 'A' pan of more than 600 mm per month

have been recorded in December and January. The mean monthly evaporation rate

at Upington is 311 mm.

During these high evaporation periods in the summer, it becomes physiologically

impossible for the roots of some crop plants to supply water to the rest of the plant

at a rate to balance evapotranspiration.

In contrast, the mean monthly evaporation at Douglas (Middle Orange region) and

Hobhouse (Upper Orange/Caledon region) are 201mm and 168mm respectively.

In the Eastern Cape region, the mean monthly evaporation at Somerset East is

164mm, with a maximum of 330mm being recorded in January

**2.3.5 Hail**

Hail can be a hazard to crop production on the higher parts of the plateau, with

about six hailstorms occurring annually in the upper reaches of the Caledon, four at

Hopetown (Middle Orange region), two at Somerset East (Sundays/Fish River) and

less than one on the Eastern Cape coast and west of Upington (Lower Orange

region).