SECTION A

AGRICULTURAL WATER CONSERVATION AND DEMAND MANAGEMENT

A1. Agricultural Water Demand Management

1. INTRODUCTION

The information presented is based on the recently completed:

- Berg WMA Internal Strategic Perspective (ISP)
- Breede WMA ISP; and
- The Breede River Basin Study (BRBS)

The water available to virtually all the existing irrigation water supply schemes in the Berg and Breede WMAs is fully allocated, and agricultural water users must be encouraged to use water more efficiently. In the agricultural sector, conveyance losses and poor efficiency contribute to the overall losses. Irrigation accounts for an estimated 41% of total consumptive water requirements (i.e. excluding the ecological Reserve) in the Berg WMA. In the Breede WMA the agricultural water requirement constitutes 93% of the current total in-catchment water requirement, and this sector therefore offers significant potential savings. For example, a pilot study undertaken in the Robertson area suggests that less than 50% of the water diverted into Greater Brandvlei Dam reaches the farm boundaries.

A number of Water Conservation and Demand Management (WC/DM) options for improving the efficiency of irrigation water use have been identified and are briefly described below. No quantitative assessments and unit reference values of these options have previously been prepared, and none are presented here. However it is likely that some of the options will provide considerable savings at URVs comparable or lower than most additional schemes.

2. RIVER RELEASE MANAGEMENT

In the Berg WMA, releases from Misverstand Dam for irrigation uptake by farmers along lower Berg River take place via a bottom gate outlet, unsuitable for controlled releases. Furthermore, there is no remote sensing facility between Voëlvlei Dam and Misverstand Dam to control releases from Voëlvlei Dam so as reduce the risk of spilling at Misverstand. The installation of telemetry to automatically control releases and reduce spillage from the system, is seen as essential and likely to be highly cost effective.

Freshening releases to improve water quality contributes significantly to water loss in the Breede River catchment. These releases (about 22 million m^3/a) from Greater Brandvlei Dam in the Breede River are required to reduce salinity in the middle and lower reaches of the Breede River. Of the total release, approximately 10 million m^3/a is utilised opportunistically (as and when water quality is suitable) for irrigation in the lower reaches of the Breede River. Salinity management initiatives such as the use of interceptor drains should be considered. This is particularly important in catchments such as the Berg and Breede River catchments where the river channel serves both as a conveyance system and a collector drain for irrigation return flows.

Timing of releases from storage dams, (notably Theewaterskloof, Greater Brandvlei and Voëlvlei Dams, and in future the Berg River Dam) into the river channels and conveyance canals, for uptake by farmers is not as efficient as it could be as these are not based on short-term demand projections.

The manual interpretation by experienced water bailiffs as to the timing of releases ensures best operation under existing circumstances. In future, decision support systems may be required to assist operators who are less experienced.

3. IRRIGATION PRACTICES

Within both the Berg and Breede WMAs, on-farm losses occur between the point of abstraction and the field edge. Actual irrigation technologies are, for the most part, modern and sophisticated and do not leave much room for improvement. It is recognised that many farmers have installed efficient on-farm irrigation methods such as drip and microjet.

4. IRRIGATION CANAL LOSSES

The overall impression is that with the exception of invasive alien plant removal, virtually no WC/DM measures are being applied to the conveyance systems, river channels and canals.

Irrigation canals are extensively used in the Breede River catchment. Whilst little can be done to reduce evaporation losses, proper maintenance and upgrading of ageing water distribution infrastructure serving the Water User Associations (WUAs), can significantly reduce conveyance losses. Within the Breede River catchment, some of the WUA infrastructure is in excess of 100 years old. Concrete lined canals, exposed to “soft water” become rough and eventually undermine the structural strength.

The BRBS has indicated that capital replacement costs of typical irrigation canals could be in the order of R25 000 per scheduled hectare and the operating and loan repayment costs between R5 000 and R10 000 per hectare. From a cost perspective there is therefore huge motivation for maintenance and upgrading of existing infrastructure.

Many of the canals are weakened with the consequence that losses are high and that elevated saline return flows occur. Canal lining refurbishments might not be affordable by irrigators and the possibility of the lining being undertaken by the urban sector could be considered. In return, an exchange for some of the additional water that would become available could be considered as a trading option.

5. FARM DAM LOSSES

The Berg and Breede catchments contain a vast number of private farm dams. In the Berg WMA for example it is estimated that 40% of the total irrigation requirement is met from farmers’ own sources. Over and above evaporation losses, losses from farm dams can be significant. The Robertson pilot study (mentioned previously) indicated that farm dam seepage losses amounted to 6% of the volume released for irrigation purposes. It is likely though that the costs associated with lining of farm dams will be prohibitively expensive.

6. CROP SELECTION

The type of crop selected for a particular area is the most important factor influencing the quantity of water required for irrigation. Whilst on the one hand the selection of alternative crop types

could reduce water requirements, the potential income must also be taken into account. Planting low value “thirsty” crops in water scarce areas should be avoided.

7. CROP DEFICIT IRRIGATION

This is a technique aimed at providing controlled water stress by periodically irrigating at less than the full irrigation demand of the crop. It offers the opportunity to take maximum advantage of the available yield. This technique requires meticulous monitoring of soil moisture content, well designed irrigation systems and proper management of pruning and fertilising.

8. METERING

Very limited metering of irrigation usage currently takes place. The metering of all irrigation releases from source to point of abstraction from canals, and to field application is necessary to provide a detailed understanding of utilization and losses. This would assist in defining the benefits to be obtained from the various WC/DM measures, in controlling abstractions and usage by irrigators, and in billing for water actually consumed.