Module 3.9 IRRIGATION & DRAINAGE		STATEMENT OF INTENT Irrigation systems are planned and managed to conserve water
Measures		Notes
Better Management Practice	**Planning and design of irrigation systems** • The irrigation system can meet the daily peak crop water requirements (ET) (or some agreed proportion of the daily peak crop water requirement) • The volume of water applied per irrigation event (target application depth) should not be greater than 50% of the storage capacity of the soil (Total Available Water – TAW) • The water source is taken into account in planning and design of an irrigation system	**Climate and Crop -** The irrigation system capacity is largely a function of the maximum crop water requirements, Evapotranspiration (ET), which is dependent on prevailing weather conditions. The irrigation system should be capable of meeting the daily crop water requirement (or an acceptable portion of the crop water requirement in the case where rainfall is relatively high and irrigation is used as supplementary). **Soil -** The volume of water applied per irrigation event (target depth) should not be greater than the storage capacity of the soil (Total Available Water – TAW). Generally, the maximum application depth should not be greater than 50% of the TAW. The depletion level should also match the application depth such that some space is available in the soil to capture and store rainfall. These, however, are guidelines and may be altered for specific applications. Estimates of soil TAW are given for soils of the SA sugar industry in Bulletin No. 19, 'Identification and Management of the Soils of the South African Sugar Industry', the third edition of which was published by SASRI in 1999. Suitability of the main soil groups for irrigation is given in Table 9 on page 151 of the bulletin (see also Module 3.10: Soil Conservation: Layout, Mapping of soils). The volume of water applied by the irrigation system can be adjusted by the altering the emitter, the stand/set time or the cycle length. In addition, the rate at which water is applied (emitter application rate) should not be greater than the rate at which the soil can absorb the water (infiltration rate). Emitter applications which exceed infiltration rates will result in runoff. **Water source -** The location of the water source relative to the farm/field will dictate to a large degree the capital and operating costs of the system. Hence, care must be taken in the planning phase to ensure that the irrigation system is economical viable. The second issue relates to the water quality available. Poor water quality can limit the use of micro-irrigation systems, in addition to degrading the soil and diminishing the crop yield. See monitoring and evaluation section for more details on procedures for taking water samples and water quality standards suitable for irrigation. Silt laden river water could also inflict excessive wear on pump impellers and nozzles in pressurised systems.

Better Management Practice	• The growers' preferences are taken into account in planning and design of an irrigation system • The irrigation system is designed in accordance with SABI norms • Design documentation for irrigation systems must be retained	**Grower's preferences** The irrigation system must be well suited to the end user's preferences. These preferences would mostly be related to availability of labour, capital costs of the system and knowledge levels required for effective management of the system. The irrigation system layout and routine management requirements should be presented and agreed upon by the farmer at the planning stage. A common problem is the inability to isolate irrigation systems or irrigation blocks so that crops with different requirements can be managed appropriately. On sugarcane farms, only a portion of the crop is harvested at a time. This results in fields with crops of various ages and water requirements. Similarly, some fields maybe fallowed or planted with a green manure crop with no or different irrigation requirements. Hence, the irrigation system controls and block layout should be aligned with the field layout for easy matching of irrigation applications to crop water requirements. **SABI Norms** Irrigation engineering is a highly specialised design discipline, with every type of irrigation system having its own specific design norms that have to be adhered to. While the designer has a role to play, the end user needs to take ownership by ensuring that the appointed designer (preferably, a SABI approved designer) meets both the SABI design Norms and Standards and the end-user's requirements. For details of design norms and accredited irrigation designers, contact SABI – http://www.sabi.co.za. SABI design norms are also available in the Irrigation Design Manual published by the ARC - Institute for Agricultural Engineering, P/Bag X134, Pretoria, 0001 or email iaeinfo@arc.agric.za. **Design Documentation** For new irrigation systems and/or upgrades, the professional irrigation designer should provide the irrigator with a design report. This document should be stored safely. It may be required when further considering expansions and/or modifications to the system. The design report should, at very least, contain: • layout plans, • detailed drawings, • pump curves (illustrating the pump duty point, rated efficiency and power, and suction height specifications) • maintenance and management manual, • SABI peak design form, • list of quantities, and • cost estimation