



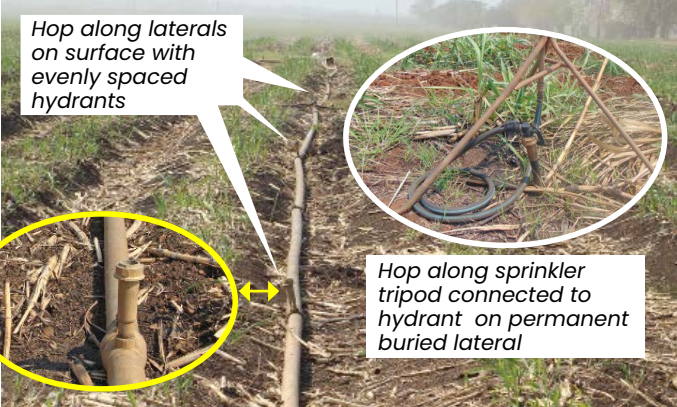






Information Sheet

5.7 Introduction to irrigation systems

This information sheet provides a basic description of suitable irrigation systems typically used in the sugar industry.

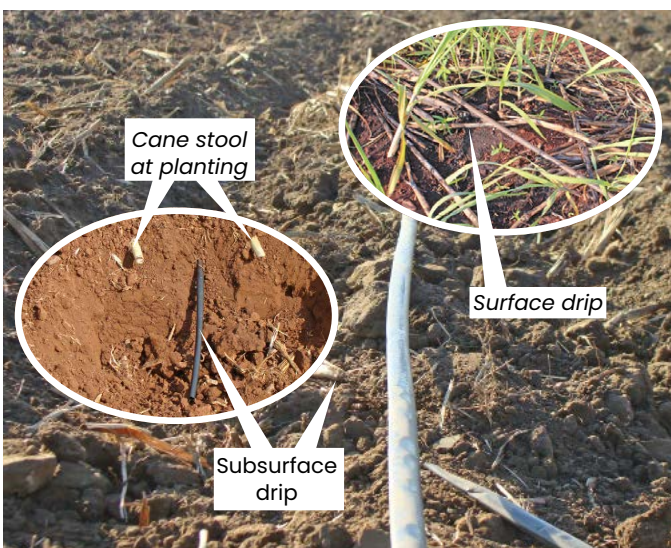
Table 1. Irrigation systems suitable for sugarcane (Following the ARC Irrigation Design Manual, 2002).

System Type		Description
Furrow		<p>Water is diverted into constructed irrigation furrows. Water infiltrates into the soil as it flows along a designed slope adjacent to the sugarcane rows.</p>
Permanent overhead (solid-set) sprinkler		<p>Irrigation pipes and sprinklers are permanently installed at a predetermined spacing. No pipes or sprinklers need to be moved in the field. The different irrigation blocks are scheduled by controlled valves.</p>
Hop along semi-permanent (semi solid) sprinkler		<p>The irrigation main lines and laterals are permanently installed and only the sprinklers are moved from hydrant to hydrant after each irrigation event. The lateral pipes may or may not be buried. Hydrants (sprinkler connecting points) are above the surface at a predetermined spacing.</p>

System Type		Description
Quick coupling semi-permanent sprinkler		Above ground lateral pipes (usually made of light steel, aluminium, polyethylene or uPVC), with sprinklers mounted onto them are moved after each irrigation event.
Dragline sprinkler		Sprinklers are coupled to laterals by means of a flexible (dragline) hose pipe. In South Africa, laterals are typically permanent and only the sprinkler and hose are moved to predetermined positions after each irrigation event. Hose pipe lengths are usually 18, 36 or 45 m in length. By using the dragline hose, the number of laterals required and the associated capital costs are reduced.
Traveling Big Gun		A large sprinkler, namely the Big Gun, is mounted on a trolley/ metal frame and pulled across a field by a cable and winch during an irrigation event. The winch is usually driven by the systems water pressure.
Centre pivot		A centre pivot consists of emitters (customised sprinklers) which are mounted onto pipes spanning above the crop. The metal pipes are held together by a metal frame which is supported by 'A' frames on wheels at fixed intervals. One end is fixed at the centre and the remaining structure moves around the centre in a circle.

System Type		Description
Linear system		<p>Same structure as a centre pivot, except that the structure moves linearly across the field and not in a circle like the centre pivot.</p>

Drip (surface and sub-surface)



Drip irrigation consists of small diameter black polyethylene pipes equipped with drippers at fixed intervals. A dripper dispenses small quantities of water (0.6 to 2.0 l/hr, max 8.0 l/hr) through a small opening. The dripper lines are laid parallel to sugarcane rows, either on or permanently just below the soil surface. Drip emitters, spaced at fixed distances on the pipes, distribute water across the field. Water dripping onto the soil is distributed horizontally and vertically by capillary and gravity forces. Filters, to keep sediments from clogging emitters are also an important component of drip systems.

Floppy sprinkler irrigation



The floppy sprinkler is a uniquely designed light weight sprinkler, consisting of a plastic nipple mounted in a flexible silicone tube. The tube cuts the stream of water into uniform, medium sized water droplets. Over and above the low pressure requirements, each sprinkler is equipped with a flow controller. The floppy system is, typically, a permanent system where sprinklers can either be mounted on an overhead cable system or traditional risers.

Ashiel Jumman (SASRI Agricultural Engineer)

March 2016

All copyright and other intellectual property rights subsisting in this work, including without limitation all text, images and graphics contained in this work (collectively, the "Contents") are owned by the South African Sugar Association ("the Owner"). Neither this work nor any of its Contents may be shared, modified or copied in whole or part in any form, or be used to create any derivative work without the owner's prior written permission. Whilst every effort has been made to ensure that the information contained in this work is accurate, the owner makes no representation, warranty or guarantee relating to the information contained in this work. The use of this work is at your own risk and neither the Owner nor its consultants or staff can be held liable for any loss or damage, whether direct or indirect, caused by the reliance on the information contained in this work. The use of proprietary names should not be considered as an endorsement for their use.