

PRINCIPLES FOR PRECISION SUGARCANE IRRIGATION



Drip irrigation has been a proven sugarcane irrigation practice for several decades. Given the harvesting practices employed in sugarcane production, subsurface drip irrigation has become the preferred method. It makes it possible for farmers to implement drip irrigation to support the crop in all growth stages, without the lines being damaged at harvesting. It also enables drip irrigation installations to be used season after season.

Drip irrigation allows producers to take full control of water and nutrient delivery. There are so many factors that producers cannot control. Why not seize full control of those that can be controlled? The result: consistent and profitable production in the field – year after year.

By selecting the correct system, doing proper planning and preparation, ensuring proper installation, management and maintenance, drip irrigation and the efficiency it brings can be the sugar industry's shield against the many challenges it faces.

/Benefits of Drip on Sugarcane

<p>Overall higher yield and stable yield</p>	<p>Precision irrigation and fertigation gives the plants what it needs when it needs it, minimising stress and optimising the impact of water and nutrition.</p>
<p>Mitigation of climate change effects</p>	<p>The precision of drip irrigation allows increased production with reduced resource input and across a vast range of soil and climate conditions.</p>
<p>Better plant quality, with higher sucrose content</p>	<p>Custom dry-off management – the management flexibility of drip irrigation can be harnessed to manipulate sugar accumulation while ensuring high yield.</p>
<p>More ratoons from each planting cycle</p>	<p>Drip irrigation allows rapid post-harvest resumption of irrigation at a high irrigation frequency. Precise irrigation and fertigation reduce internal stress signals, enhancing bud germination. All of this leads to extended ratoon life.</p>
<p>Considerably lower water use</p>	<p>Efficient subsurface drip irrigation systems lead to reduced water-use as run-off, evaporation and other sources of water loss are limited. Available water is used more efficiently for better results.</p>
<p>Optimal use of odd-shaped or steeply sloping land</p>	<p>Design and application flexibility allows every piece of land to be used optimally. Pressure-compensating technology in drippers means that uniform and precise delivery can be maintained despite pressure differences due to steep slopes.</p>
<p>Reduced energy costs</p>	<p>Lower required pressures and lower flow rates enable reduced system energy requirements.</p>
<p>Efficient delivery of plant protection, fertilizer and mill effluents</p>	<p>Subsurface drip irrigation is the fastest and most efficient method to deliver a broad range of substances directly to the root system. Agents can be applied more efficiently and with a lower impact on the environment.</p>
<p>Synchronisation with crop mechanisation</p>	<p>Hydraulic and product advantages can be implemented to design sugarcane fields efficiently and economically to match crop mechanisation needs with those of an efficient irrigation system.</p>

/Dripline Selection

The following selection parameters must be considered based on detailed information collected in the planning phase. **(Recommendations included)**. Take note that each irrigation system will differ depending on the environmental conditions and system requirements at hand. Be sure to involve the necessary experts in product selection and system design.

SELECTION PARAMETER	RECOMMENDATION	COMMENT
Wall thickness	Medium (0.4 – 1 mm)	Thicker wall driplines may be proposed, but replanting practices generally mean that a medium wall dripper offers the best ROI.
Pipe diameter	16 mm and 22 mm for longer haulage runs	Shorter spacing between drippers will have higher costs but will be more effective. Decisions around dripper spacing must be based on soil texture and water holding capacity.
Dripper flow rate	Decisions on dripper flow rates and spacing must be based on soil texture and water holding capacity.	The availability of lower flow rates enables irrigation of a larger area at once.
Dripper spacing	Decisions on dripper flow rates and spacing must be based on soil texture and water holding capacity.	Shorter spacing between drippers will have higher costs but will be more effective.
Pressure compensation	Pressure-compensating (PC) drippers	PC drip costs more per meter but will lead to more uniform delivery. This is especially a requirement when fields are sloped, and longer laterals are used.
Dripper Features	Flap outlet/AS (anti siphon) technology	This prevents dirt suction and is especially important in subsurface installations.

Netafim generally recommends DripNet™ PC AS with 16 mm diameter and 0.63 mm wall thickness.

/In the Field

In sugarcane production, experience has shown that proper soil preparation before planting creates an ideal soil condition for healthy root development in the top 30 – 50 cm and effective water distribution. This leads to larger and healthier root zones and ensure consistently high crop production. It is important to ensure that the correct amounts of water and nutrients are delivered to the root zone at the right time to ensure that the crop is never under stress. Well-planned and informed scheduling is required to prevent over or under irrigation.

For subsurface installation, the dripline is buried 15 – 20 cm below the soil surface. This means that it is 5 – 8 cm below the planted cane (cuttings) between two rows when dual rows are planted. Special drip installation machines are used for this purpose. It is important that the machine is used correctly, and that installation is done correctly to prevent dripline damage and installation at the incorrect depth. Tractor speed, for example, is very important as going too fast will stretch the pipe. Speak to Netafim for expert installation advice.

Take care when covering the seedcane in the furrow. Rather offset the disc slightly further out, so that the cane does not get pushed on top of dripline, and that it remains in a dual row (tramline).

/Grow More with Netafim

Netafim is the global leader in smart irrigation solutions. Netafim's experience in sugar cane irrigation allows it to offer a high level of support to the industry. Our product offer includes a wide range of leading irrigation and complementary solutions to solve challenges in the field.

We offer expertise around:

- ▮ Agronomic decisions and scheduling recommendations.
- ▮ Soil preparation and water analysis.
- ▮ Drip delivery and spacing requirements.
- ▮ Correct product selection related to cultivation practices and soil type.
- ▮ Maintenance recommendations and installation support.