National Vegetable Extension Network

VegNET

NEW SOUTH WALES

CASE STUDY

September 2024

# Improving water and nutrient management in a NSW greenhouse

## Introduction

Anjli Punia began farming in May 2022 in Corindi, northern NSW. She started with 12 tunnel houses and has since expanded to 21 houses across two locations, including a large multi-span greenhouse in Boambee from March 2023.

Water is sourced from a dam at the Corindi property, where some run-off is piped into a smaller dam which then flows into a larger dam. The dam can become low in dryer times and, as carted water costs $365 or more a day, water budgeting becomes very important.

"The goal is to use the optimum amount of water. I hate wastage; water is so precious," Anjli said.

The Boambee greenhouse is more prone to diseases such as fusarium and gummy stem than Corindi, therefore all the growing bags are lifted off the ground. Water is abundant in Boambee but used to a minimum where possible. As Anjli says: "Never waste water, it's destruction and it's not necessary."

Anjli attended VegNET NSW's Grower Pest and Disease Greenhouse Cucumber Farm Walk at Paul and Karmjit Singh's property in Bucca in November 2022. While the event focused on pests and diseases, it quickly turned into a drip and drain 'show and tell' once the participants headed into the greenhouse.

After seeing first-hand best practice growing at this event and suffering her own crop loss by lack of water budgeting and not examining plant nutrition intake, Anjli started monitoring her dam water for electrical conductivity (EC) and pH to improve crop quality.

Anjli spoke to VegNET NSW, Local Land Services and other growers, and decided to install a modified drip and drain monitoring station to measure drip and drain volumes and ensure she is reaching a target run-off of 30 per cent.

"There is nothing like losing an entire crop to get you focused to do things right. If you are going to do something, do it right, don't do it half-heartedly," Anjli said.

### Key messages

- After attending a VegNET NSW farm walk on greenhouse vegetable production, grower Anjli Punia was inspired to investigate the benefits of a drip and drain system at their property in northern NSW.
- Anjli installed a modified drip and drain system and began monitoring their dam water quality for electrical conductivity (EC) and pH to improve the quality of her cucumber and tomato crops. They were also keen to save as much water as possible.
- This approach has resulted in healthier crops, reduced likelihood of diseases such as fusarium and gummy stem, reduced fertiliser and irrigation inputs and strengthened collaboration with VegNET NSW and grower/industry networks.

**Image:** Workshop attendees at a VegNET NSW greenhouse farm walk in November 2022**. Credit:** Sylvia Jelinek

Hort Innovation Strategic levy investment | VEGETABLE FUND

This project has been funded by Hort Innovation using the vegetable research and development levy and funds from the Australian Government. For more information on the fund and strategic levy investment visit horticulture.com.au

AUSVEG | NSW GOVERNMENT Local Land Services Greater Sydney

# Improving water and nutrient management in a NSW greenhouse

CASE STUDY
New South Wales

## A 'drip and drain' approach

Anjli sources advanced seedlings of cucumbers and tomatoes from a local nursery, Provenance Propagation, in Wells Crossing and matches transplanting EC with the nursery EC. It is important to monitor EC in greenhouse production to maintain optimal nutrient levels and support crop growth and development.

When seedlings are three weeks old, irrigation is reduced to encourage root growth. Once the roots are visible and healthy, they are less susceptible to transplant shock which results in higher quality produce.

Necessary hardware to run a successful low-tech farm includes an EC Pen, or ppm (parts per million) Pen. This allows you to accurately measure the hydroponic nutrient solution, ensuring your plants receive sufficient nutrients for optimal results.

Other essential hardware includes a Dosatron (dosing pump) and pH meter. The EC meter is used daily while keeping an eye on any tank inconsistencies. EC is vital when cucumber plants are one metre tall, with EC in at 3.1 and EC out at 1.7.

Winter fertigation aims to cease at 2:30pm daily and at 5:00pm in summer. The media bags need to dry before nightfall as the cold and moisture brings perfect conditions for diseases like fusarium.

"It becomes a learned intuition, being able to feel when the time is right to water, backed by drip and drain checks," Anjli said.

In a recent example at Anjli's property, advanced seedlings were ordered/seeded on 29 April, then received/planted on 23 May with picking commencing on 24 June. By mid-July in one day, 60 boxes were picked with only one box of second grade produce from 15,000 plants of mainly cucumbers and some tomatoes.

The Corindi farm is far from neighbouring farms and strict biosecurity entry is enforced.

### The benefits of drip and drain

'Drip and drain' is a very basic water nutrient analysis. Drip (also called feed) is the nutrient solution fed to the crop through the irrigation system and the drain (also called runoff) is the excessive nutrient solution that drains away from the crop.

Measuring these two elements gives growers a snapshot of how much the plant is taking up, so they can tweak the electrical conductivity (EC) to be more accurate in delivery, saving water and nutrients.

NSW vegetable grower Anjli Punia was interested in this approach as cost saving measure and to produce healthier plants.

"Drip and drain is the most crucial task for running a low-tech greenhouse," she said.

## Improving grower productivity, profitability, preparedness and competitiveness

The modified drip and drain system and monitoring of dam water has produced encouraging results for Anjli. Following an optimum irrigation/fertigation schedule, plants are healthier and less susceptible to diseases.

"I now save water and fertiliser as a result and can adjust levels as the crop matures when I am actively monitoring the crop," she said.

Anjli has also strengthened their relationships with the VegNET NSW team and peer to peer mentoring with longtime grower Sid Sidhu and Melanie Power from Ecomix. Melanie has been a great adviser, assisting with EC changes and setting up the crop, as well as cleaning out media bags with Ecomix coco peat.

**Image:** Julie Dart from North Coast Local Land Services in greenhouse with drip and drain (November 2022). **Credit:** Sylvia Jelinek

**Image:** Growers discussing the use of a drain tray with Cheyne Clarke (in hi-vis shirt) their farm (May 2023).

Hort Innovation Strategic levy investment | VEGETABLE FUND

This project has been funded by Hort Innovation using the vegetable research and development levy and funds from the Australian Government. For more information on the fund and strategic levy investment visit horticulture.com.au

AUSVEG | NSW GOVERNMENT Local Land Services Greater Sydney

# Improving water and nutrient management in a NSW greenhouse

CASE STUDY
New South Wales

Anjli uses pulse irrigation through the bags with hydrogen peroxide (never chlorine). Thoroughly root flushing after the end of each crop means they can grow three crops from the same media bags as a result.

After attending VegNET NSW events, Anjli always makes changes to their growing practices to incorporate what was learnt. For example, after attending an integrated pest management (IPM) workshop at Paul and Karmjit Singh's, Anjli purchased the gun sprayer on display.

"It's amazing. Resources like the greenhouse guide to cucumber production and pest ID guides get used all the time; the information is so useful," she said.

## Next steps

Anjli plans to install new rainwater tanks to harvest more water after rainfall events. She will also install a reverse osmosis (RO) system to recycle captured water.

Anjli will suggest to the landowner of Corindi to level out some sections of the property to have a better natural run-off and dam capture.

They will also consider grafted plants to have a more vigorous and disease tolerant advanced seedling stock and investigate installing fans in tunnels in Corindi as this property is five degrees warmer than the Boambee farm.

## Lessons learnt: Crop loss drives your knowledge to grow better

NSW vegetable grower Anjli Punia shares their lessons learnt from greenhouse production.

- The worst thing to do is have no water when you could have used it wisely and had enough.
- It is important to budget, plan and tweak electrical conductivity (EC) and pH wherever possible.
- Work on your business, not just in your business.
- The set up of greenhouses is important – consider manual labour, inputs and identify your cash inflows as this will feed into your cash outflows.
- Farming doesn't break your back, it's your brain that breaks it.

## Further information

Contact VegNET NSW Regional Development Officer Sylvia Jelinek at sylvia.jelinek@lls.nsw.gov.au or 0427 086 724.

**Images:** Modified drip and drain at Anjli Punia's Corindi property. **Credit:** Matthew Plunkett.