

Open Hydroponics: Risks and Opportunities Stage I Project Findings Overview

Introduction

Open Hydroponics (OH) is an innovative horticultural management program with over 2700ha currently being adopted in Australia and presents an opportunity for more sustainable production (economic and environmental). Conventional drip irrigation growers are also adopting selected Open Hydroponic principles, which use similar practices and carry the same possible benefits and environmental risks.

OH aims to increase productivity by continuously applying a balanced nutrient mixture (fertigation), limiting the root zone and maintaining the soil moisture near field capacity. The combination of these practices is claimed to provide a greater control and manipulation of nutrient and water uptake. Since very little scientific data on OH is published, the basis and environmental risks of these claims are unknown.

Private diverters have good access to a reliable water supply to conduct OH. Similarly, the adoption of advanced water ordering strategies will ensure a reasonably reliable water supply from a high number of pressurised pipe delivery systems and the majority of channel delivery systems to meet the needs of OH. However, this reliability is variable and highly dependant upon individual circumstances. On-farm water storage was identified as an important risk management strategy and may need to be implemented in some pressurised pipe delivery situations and a significant number of channel delivery situations. A poorly designed and constructed on-farm water storage supply system can have major negative environmental impacts.

Findings to date

A desktop water, nutrient and salt balance study identified that irrigation and nutrition management principles used by OH can be efficient. The level of efficiency was directly linked to the implementation of good management. Poor management significantly reduces efficiency and increases the risk of adverse environmental impacts. Management skill and associated training is a key factor to the success of OH.

A preliminary ecological risk assessment resulted in the identification of several major risks from irrigation to sensitive catchments. These include:

- 1) Leaching of nutrients into waterways, resulting in eutrophication and toxicity to aquatic organisms. Leaching could be exacerbated by increases in hydraulic loading through irrigation management practices or episodic rainfall events.
- 2) Increased levels of boron in the soil.
- 3) Increased salinity and sodicity of soils from salt accumulation, which may be less of a problem in sandy soils, but could be a serious issue in heavier soils.
- 4) The various compounds often associated with irrigation/horticulture such as pesticides and cleaning agents, whose identity and pathways remain unknown.

Further information

More information about the project assessing open hydroponics is available from the NPSI website in the 'Current Research Projects' section, www.npsi.gov.au/research.asp.

The following fact sheets and papers produced by the project are also available:

- [Introduction to Open Hydroponics \(pdf 70Kb\)](#)
- [Adopting Open Hydroponics: Factors to Consider \(pdf 70Kb\)](#)
- [Open Hydroponics: Risks and Opportunities, Stage 1: General Principles and Literature review \(pdf 836Kb\)](#)
- [Open Hydroponics: Risks and Opportunities, Stage 1: Water Nutrient and Salt Balance Report \(pdf 535Kb\)](#)
- [Open Hydroponics: Risks and Opportunities, Stage 1: Water Supply Impact Assessment Report \(228Kb\)](#)
- [Open Hydroponics: Risks and Opportunities, Stage 1: Ecological Risk Assessment Report \(301Kb\)](#)
- [Open Hydroponics: Risks and Opportunities, Stage 1: Final Report \(pdf 190Kb\)](#)
- [Open Hydroponics: Risks and Opportunities, Stage 1: Workshop Report \(pdf 2Mb\)](#)

Open Hydroponics: Risks and Opportunities Project Team

Steven Falivene^{1,2} (Principle investigator), Ian Goodwin^{2,3}, David Williams^{2,4} and Anne-Maree Boland^{2,5}

- 1 NSW Department of Primary Industries (P.O. Box 62, Dareton, 2717)
- 2 CRC Irrigation Futures, PO Box 56, Darling Heights Qld 4350.
- 3 Department of Primary Industries, Victoria (Private Bag 1, Tatura VIC 3616)
- 4 NSW Department of Primary Industries (P.O. Box 865 Dubbo NSW 2830)
- 5 Department of Primary Industries, Victoria (Private bag 15, Ferntree Gully Delivery Centre, VIC 3156)

About the Program

The National Program for Sustainable Irrigation focuses research on the development and adoption of sustainable irrigation practices in Australian agriculture. The aim is to address critical emerging environmental management issues, while generating long-term economic and social benefits that ensure irrigation has a viable future. The Program has 14 funding partners: Land & Water Australia (Managing Partner); Sunwater, Queensland; Horticulture Australia Limited; Goulburn-Murray Water, Victoria; Cotton Research and Development Corporation; Harvey Water, Western Australia; Lower Murray Water Authority, Victoria; Wimmera Mallee Water, Victoria; Ord Irrigation Cooperative, Western Australia; Australian Government Department of Agriculture, Fisheries and Forestry; Department of Natural Resources and Mines, Queensland; Department of Primary Industries and Resources South Australia; Department of Environment Water and Catchment, Western Australia; and Department of Agriculture, Western Australia.