

Adopting Open Hydroponics – factors to consider

Adopting an Open Hydroponics management program requires a reliable water supply, a significant investment in capital infrastructure, an increase in operating costs and a change in management skills. All of these factors need to be considered before a decision is made to adopt Open Hydroponics.

Understanding Open Hydroponics

Open Hydroponics is based on the principles of soil-less hydroponics. It is important to understand these principles to properly assess the suitability of Open Hydroponics for a given situation. This information is available from other publications (see more information).

As much information as possible should be gathered before investing in Open Hydroponics. Consultants can provide advice on design, installation procedures, operation, irrigation scheduling techniques, nutrient recipes and monitoring requirements. The following need to be considered when inquiring into an Open Hydroponics consultancy service:

- consultancy fees and structure for design, installation and management
- type of service, training and backup service provided
- irrigation system requirements and affiliations with irrigation companies
- previous experience and names of growers already using their services

Water Requirements

Open Hydroponics restricts the size of the wetted root-zone by limiting the number of dripper outlets per tree. Since the size of the wetted root-zone is restricted, so too is the volume of readily available water (RAW). Daily irrigation during daylight hours is required to maintain soil moisture at optimum levels. If water supply is cut for more than one day during peak water demands then trees could become water stressed resulting in a reduction in productivity. It is recommended that water supply needs is discussed with local water supply authorities. On-farm water storage, a backup pump and an electric generator may need to be installed. If considering on-farm water storage, it must be of adequate size and built correctly in order to minimise leakage (i.e. clay or plastic lined).

Productivity claims

Be wary of productivity information from an Open Hydroponics orchard. There are many other factors apart from water and nutrition that affect yield (e.g. tree density, variety, rootstock, soil type, climate, pests and disease). Comparisons of yield between regions and even orchards should not be made unless the factors that influence yield are similar. Furthermore, significant productivity gains may be made compared with conventional practice by simply implementing best irrigation and nutrition management.

Management skills and tools

Achieving maximum productivity from Open Hydroponics requires a high level of nutrition, fertigation and irrigation management skill. These skills include:

- calculating the nutrient composition of fertigation mixes
- safe handling of chemicals
- accurate procedures for mixing fertilisers and chemicals
- monitoring nutrient application rates
- operating a computer and fertigation equipment
- monitoring crop development to detect any early signs of nutritional imbalances
- monitoring soil salinity and potential toxic effects of salt
- calculating crop water requirements, irrigation run time and interval
- maintaining an irrigation water budget
- the use of soil moisture monitoring devices (e.g. soil capacitance probes)
- monitoring deep drainage and nutrient leakage
- keeping reliable and accurate records

Financial considerations

Investing in Open Hydroponics must be profitable. Sufficient increases in productivity and/or quality need to be made to justify the costs. This will be different for each orchard situation. A financial budget should be developed to assess the viability of investing in Open Hydroponics. All potential costs including financing, capital (e.g. infrastructure, fertigation and irrigation monitoring equipment) and operating (e.g. consultants, fertilisers, pruning) must be included. The financial budget should also include an assessment of other best management practice programs and options (i.e. improving irrigation management, converting to drip irrigation, fertigation) that can increase productivity.

Other options

The best management program is one that you can understand and manage to its full potential rather than the most highly technical. Adopting a management program that is difficult to use in your situation may result in a decrease in returns and great disappointment. Do not implement Open Hydroponics if the management intensity, skill level or farm infrastructure requirements of Open Hydroponics is not suitable for your farm situation or management style. Select another less intensive management program. Consultants and DPI extension officers can provide advice on alternative fertigation programs.

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)
- [Open Hydroponics: Risks and Opportunities, Stage I Project Findings Overview](#) (pdf 70Kb)
- [Open Hydroponics: Risks and Opportunities, Stage I: General Principles and Literature review](#) (pdf 836Kb)
- [Open Hydroponics: Risks and Opportunities, Stage I: Water Nutrient and Salt Balance Report](#) (pdf 535Kb)
- [Open Hydroponics: Risks and Opportunities, Stage I: Water Supply Impact Assessment Report](#) (228Kb)
- [Open Hydroponics: Risks and Opportunities, Stage I: Ecological Risk Assessment Report](#) (301Kb)
- [Open Hydroponics: Risks and Opportunities, Stage I: Final Report](#) (pdf 190Kb)
- [Open Hydroponics: Risks and Opportunities, Stage I: 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.