

OUR RURAL LANDSCAPE

Sustainable development through innovation

Technical note 7

May 2006



Our Challenge

Our Rural Landscape aims to produce greater value from sustainable use of natural resources, and to improve the adaptation of agricultural systems to Victorian environments.

This requires more efficient uses of resources. In the case of this project, it means obtaining maximum value for the community from water resources, and particularly the water available for food production.

Fresh water is arguably the most valuable natural resource, with many rural communities dependent on

Multiple Use of Water in Agricultural Landscapes

water supplies from rivers, irrigation storages and distribution networks for household consumption, recreational uses and to sustain irrigated crops and pasture. Access to water for irrigation, and maintenance of stream ecology, is an important policy issue, and the economic value of water is now illustrated by water trading.

Irrigation water is under-utilised within traditional, single-use farming systems, and saline groundwater and nutrient rich, urban wastewater typically have limited use and value. However, all water resources have the potential to increase in value and sustainability by applying integrated, multiple-use systems incorporating various forms of aquaculture and agriculture. These systems have the potential to increase farm profitability through generating additional revenue and offsetting irrigation management and infrastructure costs, without any net increase in water consumption and external impacts. Multiple water-use systems recover and add value to otherwise wasted aquatic resources. They can, for example, facilitate cost-effective, ecological bioremediation systems for wastewater as an adjunct to more conventional, highly engineered treatment plants.

Our challenge within this project is to provide new agribusiness opportunities based on multiple water-use systems for profitable and sustainable regional development, and to facilitate commercial uptake and community support for such practice change.

Our Aim

The primary aim of the project is to increase the value and sustainability of water in Victorian agricultural landscapes by:

- developing, demonstrating and evaluating innovative, fully integrated, multiple water-use systems for irrigated agrifood production and wastewater reuse applications;
- utilising novel species with such systems to generate new products and associated supply chains; and
- triple-bottom line benchmarking and reporting of 'water-use sustainability' within selected irrigation regions for monitoring, reporting and future planning purposes.

Our Project

To achieve this aim, the project is undertaking a series of three field-based case studies to trial various integrated production systems and species within selected industry irrigation and wastewater sectors. These studies will develop and evaluate innovative aquaculture systems that can be integrated with:

- fresh water used in irrigated horticulture in the Red Cliffs area of the Sunraysia Irrigation Region (Case Study #1 – Multiple use of irrigation water); use of irrigation water);
- urban wastewater treatment systems at Mildura for combined bioremediation and recycling/

irrigation re-use and environmental watering (Case Study #2 – Multiple use of urban wastewater); and

- saline groundwater that can be used for conjunctive irrigation of dairy pasture near Kyabram in the Shepparton Irrigation Region (case Study #4 – Multiple use of saline groundwater).

These case studies are established on a pilot, commercial scale at existing industry sites (ie. commercial farms at Red Cliffs and Kyabram, and a wastewater treatment plant at Mildura) and will operate as regional demonstration sites for northern Victoria. The regional demonstration sites and associated case studies will evaluate the economic viability and risk management of different production systems, species and products, and their interaction with other irrigated agribusiness and wastewater treatment enterprises.

A fourth, desk-top case study (#3 – Water-use sustainability benchmarking) is being undertaken to develop a method of benchmarking and reporting on water-use sustainability within selected irrigation regions of Victoria. This case study will also develop a new conceptual framework for water use in agricultural landscapes, which will be modelled on a simulative basis to analyse various future management scenarios with and without multiple water use systems such as those being tested in field experiments.

A fifth, desk top study (#5 – Integrated agri-aquaculture wastewater systems investment analysis) of the potential for aquaculture bioremediation of waste water, and the potential use of such waste water for integrated agri-aquaculture systems production, will provide the framework for future research on such systems. The study will document the policy and operational context for use of urban wastewater in Victoria, establish a database of biological and chemical hazards in urban wastewater relevant to risk management for new commercial primary production that integrates horticulture and

aquaculture systems, and benchmark these against existing legislative/regulatory standards.

Our Progress

Case Study #1 consists of three demonstration sites, each at a different farm at Red Cliffs in the Sunraysia irrigation region of north-western Victoria. These sites have been progressively commissioned during the period May-December 2004, with all sites now fully operational and aquaculture trials underway. Each of the sites consists of a discrete aquaculture production system located within private irrigation storage dams primarily managed for large-scale irrigated horticulture (ie. table and wine grapes, other fruit and vegetables). The systems include a conventional floating cage (net pen) system, and recently developed floating tank system (McRoberts P/L Semi Intensive Floating Tank System – SIFTS) and floating raceway system (TAMCO P/L). The cage system relies on passive water exchange from within the storage dam but supplemented by auxiliary paddlewheel aeration as required, whereas the other two systems rely on active water exchange via air-lift pumping systems located on the adjacent pond bank. All systems have duplicate rearing units and are accessed via floating walkways anchored to the bank of the storage ponds.

An initial, short term, 'shakedown' trial on overwintering agistment/growout of Atlantic salmon has been successfully completed during 2004 at the 'cage' site. A longer term, year-round Murray cod growout trial commenced in January 2005 at all three sites. All trials are measuring various fish production (growth, survival and feed conversion environmental (water quality), economic (production costs & revenue) and market (food safety/product integrity, market acceptance/sensory analysis) parameters. Various community engagement and industry development extension and commercialisation activities are proposed at these sites based on the case study and associated trials.

The Mildura and Kyabram demonstration sites (Case Study #2 & 4 respectively) are still under development but are expected to be fully commissioned by June 2005 in anticipation of various trials to be undertaken over the next two years of the project. The two desk-top studies (Case Study #3 & 5) have been commissioned during 2004. Interim results are being reported on a quarterly milestone basis for Case Study #3 and a draft final report for Case Study #5 is due in June 2005.

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