



Optimising  
Irrigated Grains

# OPTIMISING WATER USE

IRRIGATION EFFICIENCY | LAND CLASSES | MIXED FARMING



GRDC

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## CASE STUDY FARM

**Location:** Pretty Pine, NSW

**Farmers:** Michael and Simone Hughes

**Total Area:** 2000ha

**Irrigation Infrastructure:** Various degrees of flood

**Average Annual Rainfall:** 300mm (evenly spread across year)

**Soil Type:** Mixed soil types including heavy sodic soils

**Crops:** barley, lupins, maize, vetch, rice

**Livestock:** 3000 self replacing merino's and 400 beef cattle in feedlot system

## DEVELOPING A FARM SYSTEM TO ADAPT TO CHANGING ENVIRONMENTS

Michael and Simone have been seriously considering their options to ensure their farm business remains profitable with increasing water values and decreasing allocation and rainfall. They developed a process to determine a viable business model with reduced water availability, by ranking paddocks based on their productivity potential. They were assessed on suitability for irrigation, grazing or dryland, current infrastructure, soil type, layout, location etc. and classified into three land use areas.

They are now managing the farm according to three key land use areas:

**1a - Fully irrigated** - 20% of land about 400ha, good irrigation layout, good soils, highly productive, mostly used for pasture, irrigated winter cereals and summer cropping.

**1b - Rice infrastructure** - approximately 10% of land, good country, good rice terraces to be irrigated in viable water years.

**2 - Opportunistic Irrigation** - Irrigated when there is viable water available, basically leave all critical infrastructure (channels, supply) but remove earth infrastructure such as banks removed.

**3 - Dryland** - generally undeveloped country, poorer soil structure. Use as dryland cropping/opportunistic grazing.

Optimising soil management was also a key to developing this land use system. With much of the country having a rice history, they have some soil issues that need to be considered and improved. Part of the thinking is "how to rectify old irrigation layouts to a dryland opportunity. Now that the land classes are established the next step is maximising their potential and looking at transitioning any relevant areas into different classes, for example, from 2 to 1.

Their system is a mixed farm which includes a merino enterprise and beef feedlot. The feedlot was a way to intensify - "if we have water and we are not using it on rice, how do we use it in the business". The beef enterprise provided risk mitigation for feed produced and it produces a lot of manure that is used on the farm to help improve soils.

The sheep are an integral part of the system, but do not change how crop rotation decisions are made, they fit in to utilise feed, but they do form a key part in water decisions, enough water needs to be allocated to ensure they can be finished off in spring.





## WHAT WAS YOUR MOTIVATION TO MAKE THIS CHANGE?

The motivation was to establish a viable farm business model based on predicted external changes that will impact farm businesses such as decreased water availability and increased prices. The key driver behind setting up land use areas was the realisation that the above mentioned changes made the economics of the traditional rice based systems unviable in the region. Michael doesn't focus on water allocation he focus on the water price "can you make money out of it". He estimated that about 35-40% of the yield comes from water, he needed a system where water can be turned on or off instantly and areas of the farm can be flexible to ensure realistic targets/aims are set for the different land use areas, hence optimising inputs.

## WHAT KEY BENEFITS WERE YOU LOOKING FOR?

The main driver behind developing this land class system was to determine a viable business model for the future with reduced water availability. The key benefits included:

- To be smarter with yields, smarter with water and more targeted with our capital expenditure.
- Strategically applying water for maximum benefit and flexible system.
- Improving soils.
- Flexibility with managing the cropping rotations and livestock.

## RESULTS SO FAR

It is early days, however the system has provided some clarity around managing the different land categories to ensure production, inputs and water use is maximised. Some of the key results we are noticing with changed management include:

- Better able to set realistic target yields and be more efficient with water and inputs.
- Positive change in areas where we have improved subsoils.
- Feedlot produces manure to apply to poorer soils.
- Long term legacy gains from using pulses in the system, particularly around nitrogen in the soil.

"Looking at how to apply water effectively, new systems need to evolve rapidly to meet the challenges of the future with water volatility"

"You have to have a system that can be flexible"

"Be smarter with our yields and smarter with our water allocation"

## WHAT INFORMATION DID YOU CONSIDER BEFORE MAKING THE DECISION TO ADAPT YOUR SYSTEMS?

Long term yield data and experience managing the farm over the years provided the basis to look at the various landscapes on the farm. The farm was classified into three key categories based on soil type, irrigation layout/infrastructure, location and topography. A business plan was developed to assist with decisions around rotations and management..

Soil testing and a soil pit provided sound information about the soil structure and health. After a long rice history Michael feels there is an issue at that 20-30cm depth in the soil, which needs assessment and amelioration through this process.

Keeping up to date with the latest research, talking to agronomists and relevant state Government agencies has also provided knowledge and confidence to make informed decisions.

# What's next? Do you have any additional changes planned?

The plan is to build a program around having 2000ML of water available and developing a mixed farm system to maximise returns for that resource. Some of the key areas to be considered include:

- Installing an overhead irrigation system on a 106ha block that lends itself to that sort of system. This would allow us to do more with the summer cropping program.



- Looking at how to transition areas between land uses areas for example, 2 to a 1 or from a 2 back to a 3.
- Strategic soil amelioration, including lime, manure gypsum and ripping.
- Expanding crop choices wouldn't rule out growing cotton if it fit into the system.
- Changing the size of the livestock enterprises to optimise resources.

## MORE INFORMATION

Here are some resources you might find useful.

Booklet to help navigate planning irrigation set-ups and upgrades produced by Ag Vic & the North Central & Goulburn The NSW land and soil capability assessment scheme - [read more](#)  
NSW DPI Irrigation information- [read more](#)  
Normalised Difference Vegetation Index (NDVI) - [read more](#)



The Irrigated Cropping Council in collaboration with key industry partners conducts research to assist farmers with making decisions and manage their water and crops efficiently to optimise profitability.

[VISIT SITE](#)



The optimising irrigated grains project is part of the GRDC investment in ICF1906-002RTX, FAR1906-003RTX and UOT1906-002RTX

