

# Farming systems WUE survey 2010 – practices

Naomi Scholz and Nigel Wilhelm

SARDI, Minnipa Agricultural Centre

**SURVEY**

## Searching for answers

### SURVEY INFORMATION

#### Location

District: Upper Eyre Peninsula  
Farmer responses: 49 farmers (90 responses relating to soil type)

#### Rainfall (annual, averages across upper EP)

2009: 368 mm  
2008: 269 mm  
2007: 277 mm

#### Yield (wheat, averaged across upper EP)

2009: 2.1 t/ha  
2008: 0.8 t/ha  
2007: 0.7 t/ha

## Key messages

- A survey was conducted in early 2010 to determine the current management practices of farmers and the average water use efficiency of farms on upper Eyre Peninsula.
- The survey will be repeated in 2013 to see if there are changes in the management practices and water use efficiency.

## Why do the survey?

The Minnipa Agricultural Centre (MAC) has been funded by Grains Research and Development Corporation (GRDC) to run a research and extension program (Eyre Peninsula Farming Systems 3 – Responsive Farming Systems) to improve water use efficiency on farms by 10% on upper Eyre

Peninsula (EP). This is seen as one of the main ways to improve profit and manage risk for farm businesses.

An essential part of this program is to determine on farm water use efficiency (WUE) and what practices farmers are using which are thought to improve WUE. A survey was deemed the most efficient method to collect this information from a sample of all farmers across upper EP.

Farmers will be surveyed again in 2013, to see if there have been any changes in practices and subsequent changes in overall water use efficiency on EP farms.

## How was it done?

In early 2010 a comprehensive survey of 50 questions was emailed or posted as an excel spreadsheet to 200 farmers across upper EP. 90 responses were considered necessary to obtain a representative sample. Farmers then had the option of completing the survey electronically, via mail, over the phone or in person.

Farmers were asked to consider their responses to the questionnaire in relation to the land zone/s:

- grey calcareous sands,
- redder soils and/or
- sand over poorly structured clay.

Information was collected on demographics of people employed on farms; income from different enterprises, changes to farm businesses being made or planned, yields, methods used to increase WUE of cropping and

livestock enterprises, barriers to improving yield, management over summer, time of sowing, in-crop management, break crops, using technology, managing risk and future challenges to farming systems on EP.

Individual information is being kept strictly confidential.

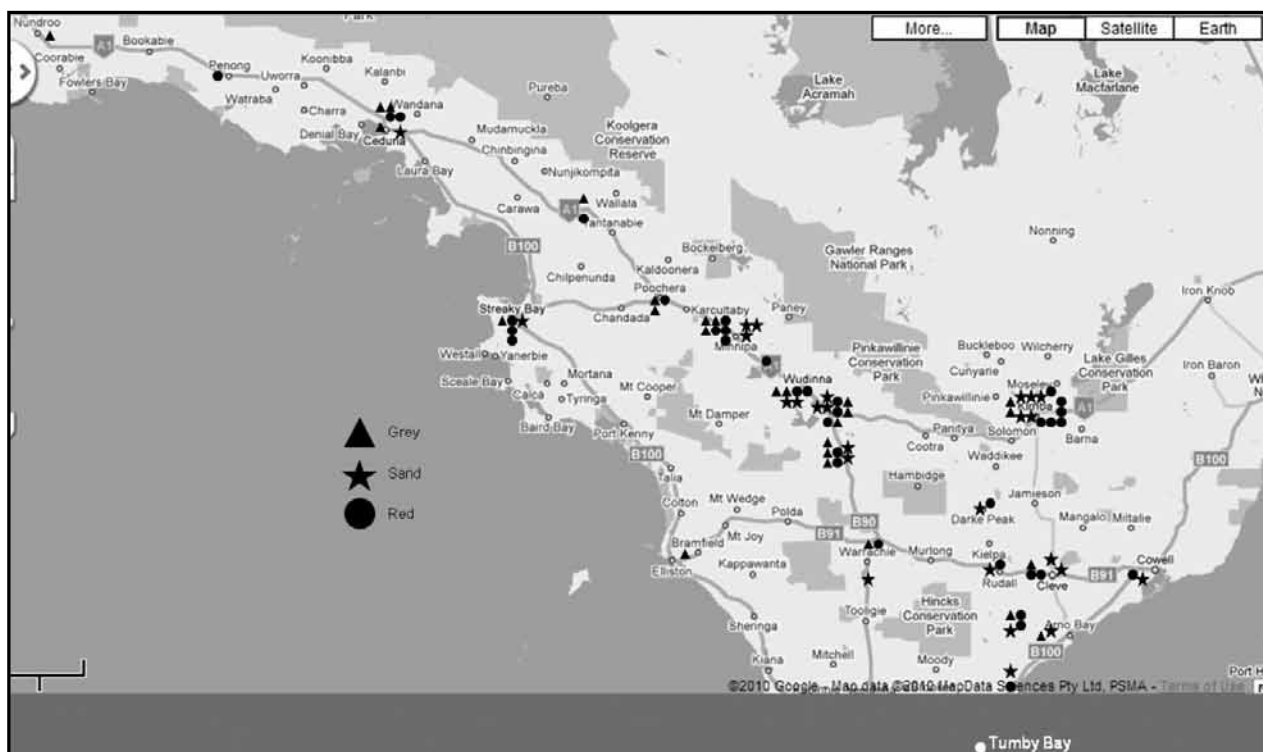
The survey was also conducted with farmers in other low rainfall regions across southern Australia; BCG (Vic), Upper North (SA), Mallee Sustainable Farming (SA/Vic) and Central West (NSW).

## What happened?

49 farmers out of 200 responded to the survey, giving a response rate of 25%. Many of the 49 farmers gave answers to more than one soil type, giving a total of 90 responses by soil type. Figure 1 shows the location (nearest town) of respondents, with different shapes indicating different soil type responses

## Demographics and enterprise mix

The average time respondents had been farming in their area was 29 years, with 2.5 family members and 1 in 3 with extra labour working on the farm. In 2009, wheat contributed to 65% of their income and most of the rest came from barley (13%) and sheep (16%). On average, farmers are cropping approximately 2,000 ha each year.



**Figure 1 Location (nearest town) and soil types represented**

### Managing risk

In order to manage risk, farmers said that they use only higher value, lower risk crops – wheat and barley, sow early, reduce expenditure on fertiliser and defer machinery purchases.

### Barriers to increasing WUE

In recent years, lack of moisture has prevented farmers from getting the best crop yields possible from the rainfall on the redder soils; farmers with sandy soils blame a shortage of nitrogen and non-wetting soils for not achieving optimum yields and those with grey calcareous soil stated that *Rhizoctonia* and Take-all were the main constraints to yield. In terms of livestock production, the top three constraints across all soil types were seen as medic pastures performing poorly in autumn (feed gap), lack of moisture (seasonal variation), and insufficient/inadequate fencing for animals.

### Practices to increase WUE

Farmers thought the following three practices are the most important practices for increasing water use efficiency of crops:

- Seed early if season allows – before mid May
- Keeping ground free of weeds

over summer to store moisture

- Use no till methods

Farmers think the most important practices for increasing WUE of livestock enterprises are dry sowing feed crops, improved grazing management e.g. reducing early season grazing pressure and pasture improvement. The conflict between fencing requirements for stock grazing efficiency and cropping efficiency has been one of the main things in recent years that has prevented farmers from getting the best livestock production possible from the rainfall received. Other commonly listed barriers included seasonal variation and poor performance of pure medic pastures in autumn resulting in a feed gap.

### Summer weeds

The main reasons farmers controlled their summer weeds were to conserve moisture to allow earlier sowing (rather than providing a better moisture buffer in spring), avoid livestock poisoning and prevent seed set of problem weeds. None of the respondents selected disease control (removing summer 'green bridge') in their top 3 reasons to control summer weeds. All farmers except one control summer weeds, but the level of control varies from

20% controlling weeds on less than 50% of their land, and 80% controlling weeds on more than 50% of their land over summer. Herbicides and livestock used in combination were the most common method of summer weed control. In balancing WUE and cost risk the majority of farmers would normally spray summer weeds which germinated on a rain before 1 February.

### Break crops

Medic pasture was the preferred break crop option overall (50% of respondents), and the main reasons for using break crops were cited as grass clean up, root disease management and increasing nitrogen to subsequent crops. Peas were the next preferred option for farmers with redder soils, while lupins were used by farmers with sand over clay soils. All farmers with grey calcareous soils said medic pastures were the preferred option.

## Sowing

Canola (long growing season) and wheat (for the potential return) were normally sown first. About half of the respondents sowed their best paddocks first, and just over half matched sowing date to variety to reduce frost risk and cope with a dry finish. Sowing systems were dominated by no till (no pre-drilling, no cultivation, narrow point opener) and reduced till (one/two cultivations pre-sowing). Generally the only time any paddock is worked is to manage a weed problem that has escaped and needs working to allow sowing.

## Varieties

Yield (26%), disease (26%), quality (19%) and drought tolerance (7%) were the main factors determining the choice of a new variety, with other factors listed including CCN resistance, boron tolerance, matching one's system, sprouting resistance and early vigour.

## Nutrition

75 per cent of respondents reduced their phosphorus rates between 2007-09 by an average of 30%, as a result of the sharp increase in phosphorus fertiliser prices. Extra nitrogen application was limited on red soils, more common on grey soils at seeding

and mid season, and common practice on sands mid season.

## Disease

Cultivation and rotation were the most cited methods of managing root disease, with nutrition, grass free medic, summer weed control, autumn weed control and varieties also commonly used. Using fungicide sprays, different varieties and rotations were used to manage leaf diseases.

## Rotations

Cereal on cereal is believed to be fine on red soils and sands for at least 3 years by many, but on grey soils most respondents said only one year was suitable for cereals. The majority of farmers do not use two break crops (from cereals) in a row.

## Precision agriculture technology

Nearly half the farmers surveyed manage their paddocks by zones, but mostly do this manually. Guidance is not uncommon but the use of yield mapping and variable rate are rare.

## Wheat yields

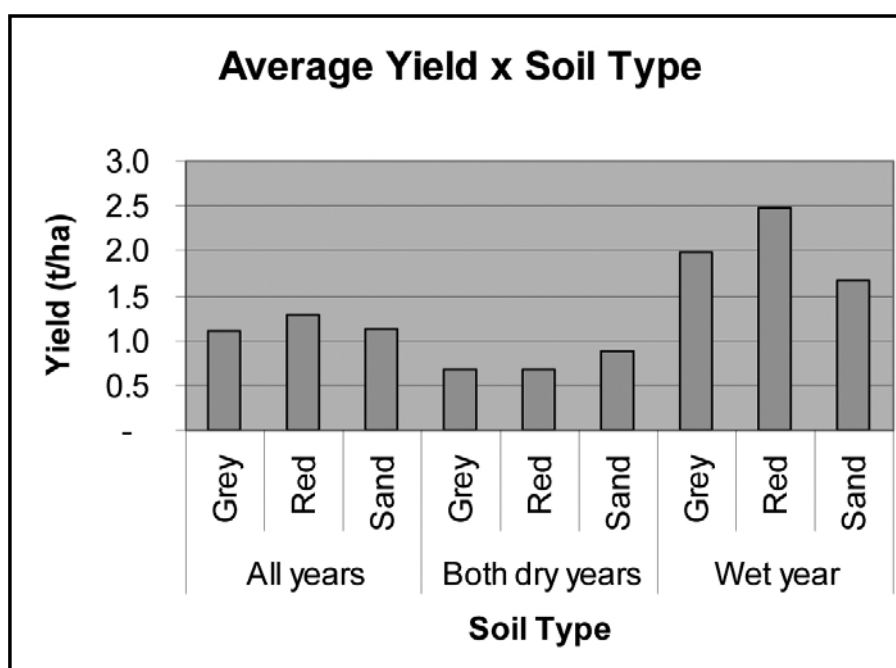
The survey asked farmers to provide their average wheat yields on their different soil types in 2007, 2008 and 2009. 2007 and 2008 had

below average growing season rainfall and 2009 had above average growing season rainfall across upper Eyre Peninsula. Redder soils performed slightly better averaged across 'all years' due to their high performance in the wet year of 2009, whereas sandy soils were better in the dry years (Figure 2).

The average yields for the three years was 1.2 t/ha and there was not much difference between soil types in yield in the 2 dry years of 2007 and 2008. The red soil yielded the highest and the sandy soil yielded the lowest in the wet year of 2009.

## Changes to farming systems

Some of the main changes farmers had made to their farming programs over the past 5 years were to fine tune tillage practices, utilise liquid fertilisers, pay more attention to sheep management, intensify livestock and cropping programs, grow cross bred lambs, refine agronomic practices, increase feedlotting, move towards precision sowing and reduce fertiliser inputs.



**Figure 2** Average yield (t/ha) across different soil types (grey, red and sand) across different years. All years = 2007, 2008, 2009. Both dry years = 2007, 2008. Wet year = 2009.

In 5 years time (2014), 44% of farmers expected their farm business to be similar in mix of enterprises and farm size, to the present; 42% expected to have more sheep, the majority of whom do not want to reduce their cropping area and so would increase intensity of the sheep enterprise; 38% would have more sown pasture; 38% would have purchased more land and 14% hoped to have sold or leased their farms.

### **Future challenges**

Farmers considered the main challenges of their current farming systems as being location and social and community structure. Other challenges listed included mining, climate change, work-life balance, reduced investment into agricultural research and development, and “getting it all to come together for the best overall outcome for the farm, in short and long term”.

### **What does this mean?**

The information gained from this survey also provides a ‘test’ of the relevance of the work being carried out by Minnipa Agricultural Centre and highlights potential areas of research in the future.

The survey shows that farmers are looking to focus more on their sheep enterprises without sacrificing cropping, but sheep infrastructure is generally dilapidated and paddocks are too large for efficiency – the GRDC funded Eyre Peninsula Grain & Graze project is addressing these issues by working with 4 Sheep Groups across EP to make livestock in mixed farming systems easier.

Issues are arising with cereal on cereal rotations (weeds, disease, pests, etc.). The survey shows that 2 year break phases are uncommon on EP. The GRDC funded Crop Sequencing project is investigating the agronomic and economic impacts of 2 year break phases compared to continuous cropping and 1 year break phases.

Zone management is widespread but implemented manually – it may be that farmers find precision agriculture too complicated, or that people are satisfied that what they are doing manually is adequate. The use of guidance is common but yield mapping and variable rate are rare – the advantages are yet to be proven economically over a range of seasons; the GRDC funded EP Farming Systems project is

quantifying the costs and benefits of variable rate technology. The project is also investigating the impacts of the conservative approach to fertilisers being used as a result of poor years and the increase in fertiliser prices - how long can you run down reserves before impacting yield?

A follow up survey will be undertaken in 2013 with the farmers that participated initially, to see if there have been improvements in water use efficiency over time. Meanwhile, research into farming systems to improve water use efficiency continues to be carried out on the three focus sites across EP, at Mudamuckla, Minnipa Agricultural Centre and Wharminda.

### **Acknowledgements**

Thanks very much to the farmers that took the time to fill in the survey, your efforts are vital to the success of this project. Thanks to Nigel Wilhelm, Chris Dyson, Anthony Whitbread and Geoff Thomas and Michael Moodie for survey design and analysis. The Low Rainfall Collaboration project, GRDC and EP Farming Systems 3 (UA00107) have provided support for this evaluation.



EPARF  
Eyre Peninsula  
Agricultural Research Foundation Inc.



**LOW RAINFALL  
COLLABORATION GROUP**



**Grains Research &  
Development Corporation**