



ADAPTIVE MANAGEMENT FOR DRY TIMES - FARMING TECHNIQUES IN CONSERVING MOISTURE AND OPPORTUNISTICALLY CROPPING

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Key Messages:

- Decisions made this year affect next year
- Crop choice and sequence has big influence on available water
- Fallows in rotation allow flexibility to go to crop of choice if water is available
- Starting moisture is critical for success in dryland systems
- Residue/stubble = increased moisture storage and capacity to plant
- Residue provides the best storage tank available and allows for timely sowing
- Rotations provide opportunity, solve husbandry issues and provide flexibility and set up the next crop
- When you've got water, use it for your irrigated crops
- When you don't have water, use your land to still make money
- Don't be tempted to plant a cash crop if all the "boxes aren't ticked" (e.g. you do not have a full profile)
- Take advantage of times when water is available (e.g. spraying a healthy dryland crop to but in your irrigated crops)
- Sometimes less is more – if you can "tick all the boxes" on a smaller project, this can be more profitable than going with a bigger project when not all the "boxes are ticked".

Tools to consider for conserving moisture:

Residue/stubble	Long Fallow	Choice of crops
Rotation	Disease control	

Our country is heavy black self-mulching clay that holds 250-300mm of available moisture. We grow dryland crops on 60-70% stored moisture. 70% of our rainfall occurs in summer. Cotton has been the stable performer in irrigation and in dryland farming, a Durum wheat, chickpea, faba bean or bread wheat followed by dryland cotton rotation has been the norm. In the last 7 years we haven't had much water for irrigation, however, we have been able to produce dryland crops off below average rainfall years, I feel due to the management practices we have adopted.

The Lessons:

The Dryland Journey started in the family business 15 years ago. The system at the time was wheat-on-wheat and an occasional summer crop. In a normal year we burnt the stubble to get rid of disease and trash flow issues, followed by 1 or 2 primary trash workings. Each time it rained we cultivated, so as to kill weeds and preserve moisture. This system worked for a long time but I knew that improving efficiency through scale would increase profitability. This required getting up-to-date farming equipment.

Gross margins were poor because of things such as expensive in-crop chemicals to control black oats, buck wheat etc (in the mono crop culture system). I needed a summer crop option to control expensive in-crop weeds with roundup in the fallow period. Considering my options, cotton showed the best gross margin

The first year I planted cotton into a bare fallow, it got sand blasted. So I decided to keep the previous wheat stubble the next year to stop the sand blasting. I noticed an increase in moisture conservation in my stubble on the bare fallow and tried sowing cereals into cereal stubble. There was about a 15-20% yield increase.

For more information about the "Farmfit" sessions near you, go to www.rga.org.au or contact the RGA on (02) 6953 0433. We look forward to seeing you at one of these sessions.



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The next year I tried mulching stubble. That worked but I didn't get the same increase in moisture conservation and therefore yield. Mulching was also expensive and slow.

I then tried heavy stubble to bale hay and rid the land of weeds and diseases etc. After practising this for a while, I wondered how much nutrient I was carting away so had some analysed. 1 tonne /ha straw back then had \$160/t nutrients. Today there would be \$320/t in nutrients that would sell for \$180/t. We also used to drive all over my paddock, compacting it so as to let less moisture in. I took that lesson on-board and moved onto a new idea.

I came to the conclusion I had to leave stubble standing and again looked at buying new farming machinery. At this stage I was in a 4 year/ 3 crop rotation of wheat / wheat / cotton. Trump card – crown rot takes me out with 50-60% yield loss. Luckily dryland cotton was the king so as to finance my learning.

I continued to find huge increases in moisture conservation. I have read and do believe that 70% of fallow rainfall is lost on bare dirt compared to a good stubble. A big lesson for me was more gear doesn't mean a better farmer and machinery is neither a good asset nor a necessary evil.

What we are doing now

Before planting every paddock, I go through a list and "tick the boxes" because the weakest link breaks the chain in my system. My checklist includes:

✓ stubble retention	✓ weed control
✓ nutrition	✓ machinery
✓ rotation	✓ controlled traffic

1. Ground cover/stubble retention: An absolute must! Several times in the last 10 years, I have seen that the thicker the stubble, the more moisture it holds, the better germination I get and the better yields I get.

One negative to having dryland cotton in rotation is the lack of ground cover after a cotton crop. To address this, 5 years ago I tried planting a millet crop in early spring, growing it for 55-60 days and then spraying it out. This, whilst using 60-70 mm of moisture in the fallow period. The increase in infiltration rate and moisture conservation had a net positive effect.

Results from the yield data from headers showed a 600kg/ha average increase over the bare fallow, which at \$320/t shows a \$145/ha increase in profit after costs. I even noticed a difference in the following crop of chickpeas. I got a more even germination and they hung on longer in a tough year. As a result, I have continued to use this method.

Last week, a paddock of failed patchy wheat, which we had intended to fallow through to cotton next year after this year's wheat crop, was sprayed out and planted to millet. We made this decision as it was not going to be profitable and, more importantly, was not going to give me suitable stubble to enable me to tick all the boxes. This is a hard decision in times of poor cash flow but the paddock is not set up with good stubble cover or moisture profile i.e. the boxes are not ticked.

2. Strict Rotation: We need crop rotation. Having tested many options, today we grow – Wheat/Pulse/Wheat/Cotton.

3. Weed control: Be vigilant on size - every mm lost is 15-18 kgs of grain lost at \$330/t . That equates to \$5.00/mm - it adds up quickly. Summer grasses can suck out 5-10mm/day so timing is crucial. I use a weed-seeker now to minimize chemical usage but, as with everything, balance is the key and this is just another tool.

4. Nutrition: Make sure you have sufficient nutrition so that moisture is the limiting factor. Each year we do soil tests and compare them with yield/protein history to work out rates and fertilizer needs. We then apply this through a variable rate controller in an attempt to limit our inputs without sacrificing yield.

5. Moisture: Don't plant unless you have enough moisture to provide a 70% guarantee of a profitable result. Save the paddock until you can have a profitable planting

6. Machinery: Have the right gear to handle conditions. Existing machinery can be modified at a reasonable cost rather than buying first-hand. I now contract in someone to do all my spraying to cut down on machinery and labour costs.

I needed to get a sowing rig to handle stubble. Disc or tyne were my options and I decided on a parallelogram tyne that I can slide a double disc unit into to apply urea in a no-till system. We use inter-row sowing to reduce crown rot and to get a better germination. There are many ways to do this – offset a beeline or L-shaped tow bar, with a linkage gear moving the hitch.

7. Control Traffic: After much deliberation I settled on 18m track