

# Managing irrigation during times of shortage

*MDBA total storage increased by 7 GL this week, with the active storage now 4,049 GL (48% capacity. This is roughly 1,900 GL or 22% less than this time last year or similar to the same time in 2003.*

MDBA Weekly Report 11<sup>th</sup> November 2015

Water Prices are already up.  
Anticipate allocations dropping.

# What are your goals?

These could include;

- Keep trees in good condition to protect future crops
- Maximise crop per ML or more so \$ per ML
- Take advantage of government funding for system improvements
- Meet contracted forward sales at least cost
- Build resilience so you can survive (and prosper) under future droughts

# What options are available?

Not in any particular order (and you can use a mixture)

A. Financial

B. Crop / soil management

C. Irrigation System improvements

# Financial

Option 1; Buy permanent water (entitlement) to ensure you have a buffer when allocations are reduced, sell unused allocations on temporary market.

Option 2; Buy water (allocations) on temporary market to meet season shortfall.

Things to consider; model cost of option 1 vs option 2, cost of money, return on \$, relative markets, time for trade administration, crystal ball talents 😊

# Management – Block selection

## 1. Block selection

- Are all blocks equal?
- New areas vs older varieties?
- Do you have same goals for every block?
- Do you have to consider best use of limited water?



# Management – Evaporation losses

2. Options to reduce evaporation losses include;
  - Changes to irrigation timing (eg night), need to consider system constraints,
  - Mulching (in particular cover the wetted area),
  - Matching infiltration rate (minimise wetted area, surface ponding).

# Mulching – need multiple benefits



# Management – deep drainage

3. Manage to reduce deep drainage – beyond the effective root zone.

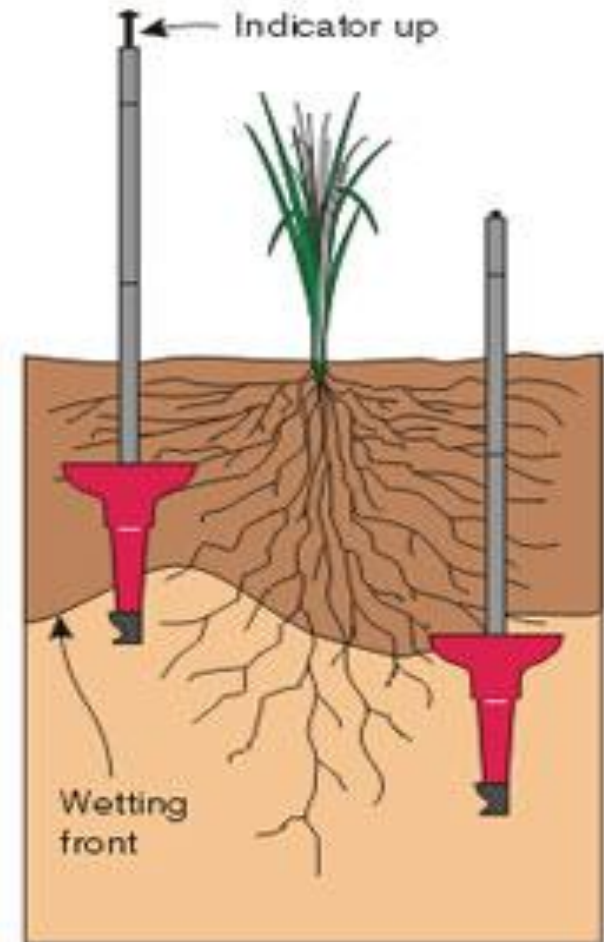
- Determine your effective root zone – for crop production not survival. They may be a desert plant but you aren't running a desert ...
- Manage to minimise deep drainage, ignore salt in short term?
- How variable are deep drainage losses across a block? A function of variability in soil and irrigation application.



# Manage deep drainage FullStop

The FullStop Wetting Front Detector helps you to "see" what is happening down in the root zone when you irrigate the soil. FullStops are buried in the root zone and pop up an indicator to show when the infiltrating water goes past.

<http://www.fullstop.com.au/>



# Management – regulated deficit irrigation

4. Manage crop irrigation to reduce ML/tonne

We know there are times when pistachios must NOT be under-irrigated; nut filling to hull slip; bloom to the end of shell expansion.

RDI can be effective however at other times; shell hardening; post-harvest.

Major challenges;

How best to measure/regulate stress and water availability? Dealing with block variability

# System improvement

Improvements in irrigation systems can reduce losses and allow you to do better crop management.

Interplay between infiltration rate, peak daily water requirements, and system constraints (including cost).

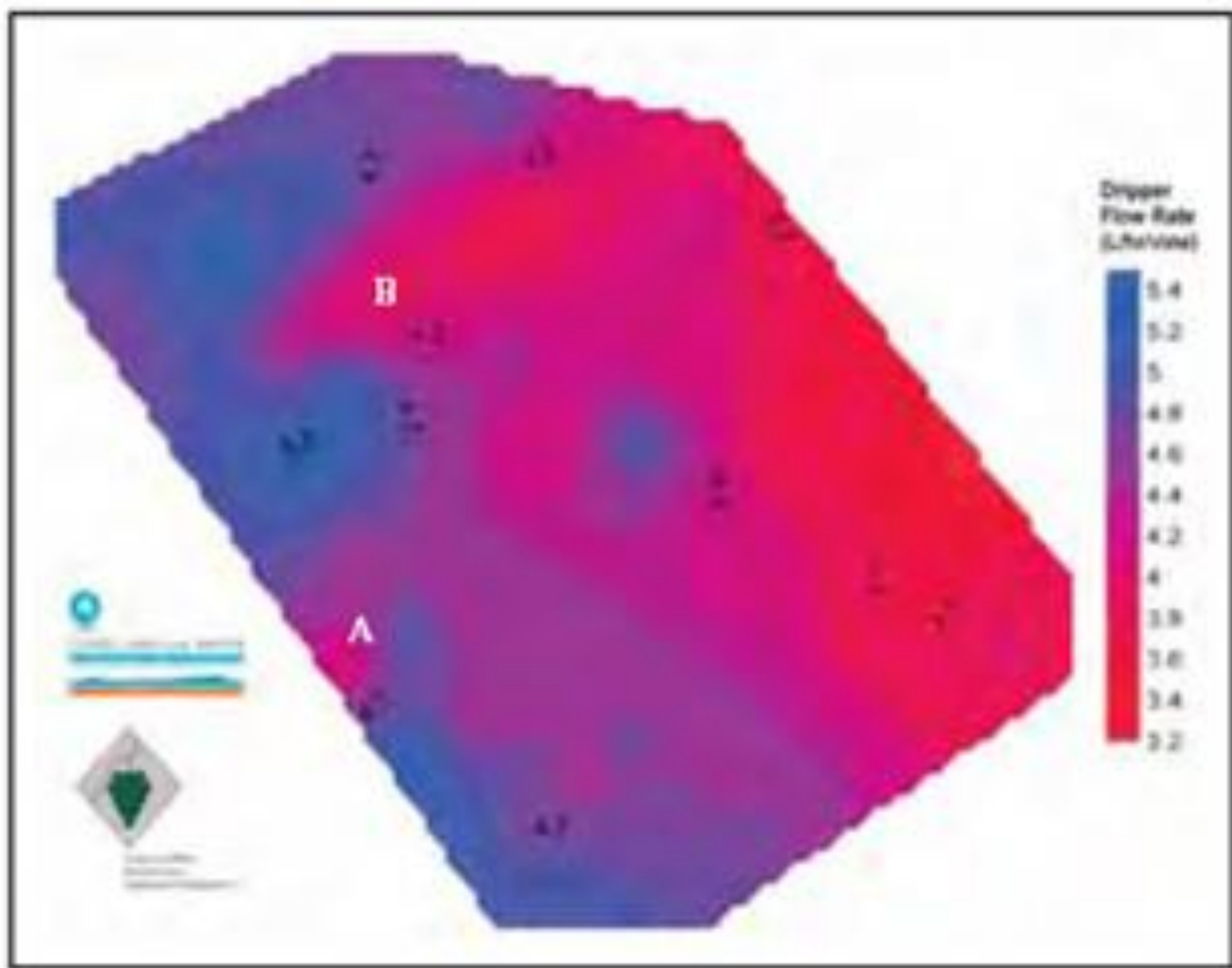
*Many examples of drip systems designed and installed to minimise capital cost but found inadequate when the pressure is really on (howling northerlies and 40plus degrees).*

The tighter you want to manage irrigation and outcomes the better your system performance needs to be – less margin for error.

R

Al  
fie

e



A1

Figure 2: Measured dripper flow rates across a 12 ha Shiraz block

# Measurement is critical

There are some classic analytical tools for assessing variability of irrigation inc. Cu % Du % but you can't use any of them without taking field measurements.

Collecting data not that hard – put some thought into how to collect it easily and quickly.



# Benefits of reducing variability

|                                       | Low quarter |          |           |                  | High quarter |          |          |           |
|---------------------------------------|-------------|----------|-----------|------------------|--------------|----------|----------|-----------|
| mm/hr                                 | 5           | 7.5      | 10        | 12.5             | 5            | 5        | 7.5      | 10        |
|                                       |             |          |           |                  |              |          |          |           |
|                                       |             |          |           |                  |              |          |          |           |
|                                       |             |          |           |                  |              |          |          |           |
|                                       | Average     | 8.75     | Sc        | 1.75             | Average      | 6.87     | Sc       | 1.4       |
| ML/ha used                            | 10          | 15       | 20        | 25               | 10           | 10       | 15       | 20        |
| <b>Lost to drainage</b>               | <b>0</b>    | <b>5</b> | <b>10</b> | <b>15</b>        | <b>0</b>     | <b>0</b> | <b>5</b> | <b>10</b> |
| Value @ \$250                         | \$ -        | \$ 1,250 | \$ 2,500  | \$ 3,750         | \$ -         | \$ -     | \$ 1,250 | \$ 2,500  |
|                                       |             |          |           |                  |              |          |          |           |
| Difference based on 100 Ha of orchard |             |          |           | <b>\$ 93,750</b> |              |          |          |           |

*Doesn't include cost of water supply inc. pumping!*

# In summary (no silver bullet)

- Determine your block specific goals
- Decide your strategy on water purchases
- Measure irrigation system performance
- Make any necessary changes to reduce variability, measure performance again to make sure it worked
- Install / maintain measurement tools inc FullStops that allow tighter control of irrigation
- Implement other management strategies after careful evaluation of your situation, skills and goals.

# Good luck



Ian Atkinson