

Can Short Term Climate Forecasting Improve Irrigation Efficiency?

Some introductory comments

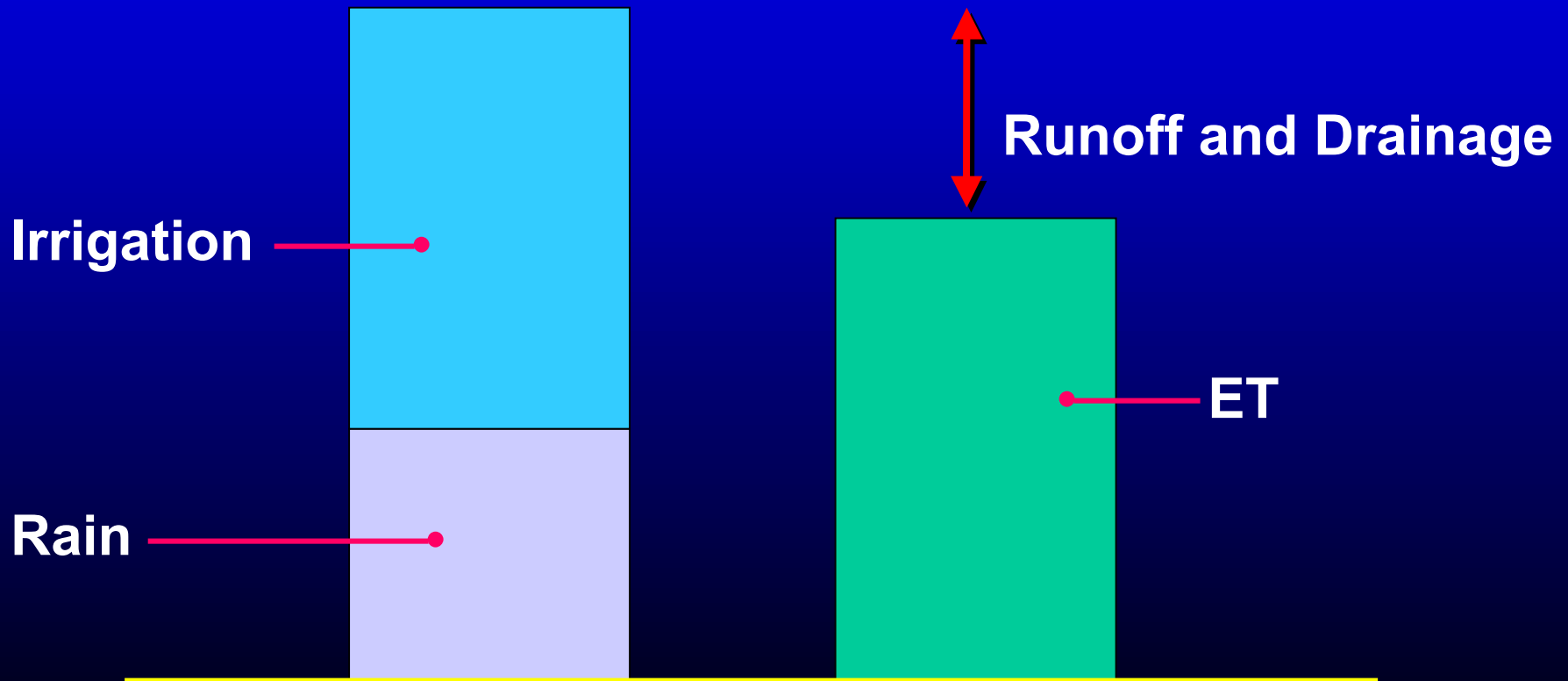
Ted Gardner – Natural Resources & Mines

Talk Outline

- Problem Definition & Opportunities
- Research Proposal
- Drivers
- Role of Workshop

Problem Definition

Effective Rainfall Reduces with Increasing Irrigation Applications



Effective Rainfall

Effective Rainfall =

Total Rainfall - R/O - D.D.

Post irrigation rainfall for irrigated cotton at Dalby simulated using PERFECT

% of Irrigation*		Rainfall in 7 days post irrigation	
34		0 mm	
27		1-9	
	12	} 38%	10-19
	10		20-29
	11		30-50
	5		50-75

* 320 simulated irrigation over 40 years

Effective rainfall in sugar growing areas

	Rain (mm)	Effective Rainfall Dryland (%)	Effective Rainfall Irrigation (%)
Cairns	2080	50	37
Ingham	2050	51	37
Ayr	1060	64	48
Mackay	1675	58	42
Bundaberg	1105	81	56
Grafton	975	84	60

Effect of soil type and irrigation amount on Effective rainfall at Bundaberg – sugar cane

Soil Type	Dryland	4ML/ha	Full irrigation
Clay loam	82% (860mm)	80%	58%
Sandy loam	77% (800mm)	72%	49%

Water Balance Models

- We have models to explain what *happened* but not to predict what *will happen*.
- Climate forecasting has usually been at the seasonal time scale.
- Can we combine crop growth models with short term climate forecasting to predict the water efficiency gains from changed irrigation roles?

Because probabilistic type predictions cannot readily be proven using experimentation, models are needed to stretch our empirical knowledge over the long term climate record.

Research Proposal

Short Term Climate Forecasting to
Improve Irrigation Scheduling and
Water Use Efficiency

Project Scientist: Peter Timmers

Project Leaders:

Ian Gordon and Ted Gardner NR&M

Project Concept

- Using short term climate forecasting to improve irrigation scheduling
- Increase effective rainfall by reducing runoff and deep drainage from rainfall
- Establish irrigation scheduling treatments at industry WUE demonstration sites
- Quantify crop and hydrology responses using computer models (e.g. PERFECT)
- Develop decision tools and training modules for irrigators

Outcomes

- Increase WUE by increasing effective rainfall
- Reduce off site losses of water and contaminants
- Risk Assessment simulation model for irrigation management including deficit irrigation
- Decision tools for farmers

Drivers for the Project

RWUE (NR&M)

- \$23M program

Industry focused initiative - 180,000 ML savings target

Cotton

10% increase in WUE (70% farmer adoption by 2003)

Sugar

6% increase in WUE (70% farmer adoption by 2003)

Dairy / Lucerne

11% increase in WUE

Horticulture

11% increase in WUE

NPIRD (L&WC)

- WUE (30%)
- Environmental Issues (20%)
- Irrigation knowledge & use (20%)

Why are we holding the workshop?

- Project milestone - will the scoping study pass the "laugh test".
- Opportunities to discuss the potential of short term climate forecasting to the irrigation industry.
- Identify key R&D needs to progress the application of short term climate forecasting to irrigation scheduling.
- To discuss industry support for the use of models in helping achieve (or prove) WUE gains.
- Bringing together a broad range of industry experts - opportunities for synergies, networking and "left field" ideas.

Some key questions to be considered at the workshop

- How good is short term climate forecasting?
- How good are the soil water - crop growth models?
- Can climate forecasting proof of concept be translated into farm practice?
- Are there non irrigation farm benefits from short term climate forecasting?