

Rural Research and
Development for Profit
Keeping Australian farmers
at the cutting edge



Australian Government
Department of Agriculture



This project is supported by funding from Dairy Australia and the Australian Government Department of Agriculture and Water Resources as part of its Rural R&D for Profit programme.

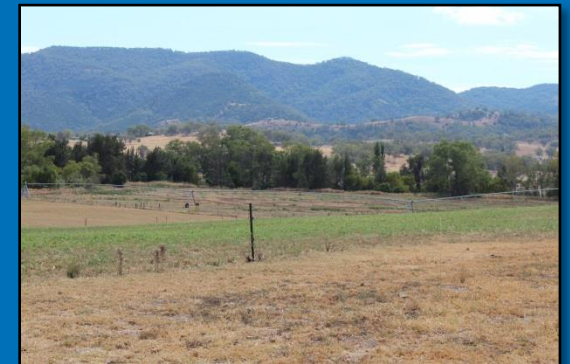


Smarter Irrigation for Profit

A national partnership project led by Cotton Research and Development Corporation (CRDC)

Welcome to the “Tamworth Optimised Dairy Irrigation Farm”

Property of Rex Tout, Limestone Park, Loomberah



Program for the day

Morning Session

Welcome & Project Introduction (Marguerite White, Project Manager)

Limestone Park Overview (Rex Tout, Farm Owner)

Limestone Park physical characterisation (George Truman, NWLLS)

Irrigation System Performance- potential savings, common issues (Peter Smith, Sapphire Irrigation Consulting)

Toilet/ coffee break (10 minutes)

Energy efficiency gains in the whole farm system (Colin McPherson, JMC Solutions)

12.30 Lunch (30 minutes)

Afternoon Session

Farm Walk

Forage/ Fodder & Nutrient Planning (Scott Woods), Irrigation System Performance (Brett Abrahams/ Peter Smith), Soil Moisture Monitoring & Water Use Decisions (Scott Woods/ Peter Smith), Monitoring Equipment

Smarter Irrigation for Profit

Three year partnership between the major irrigation industries of:

- Cotton
- Dairy
- Rice
- Sugar.

It will target 3000 irrigators to improve their individual enterprise profit by \$20,000-40,000 per annum & 10- 20% improvement in water efficiency.

The project consists of three components:

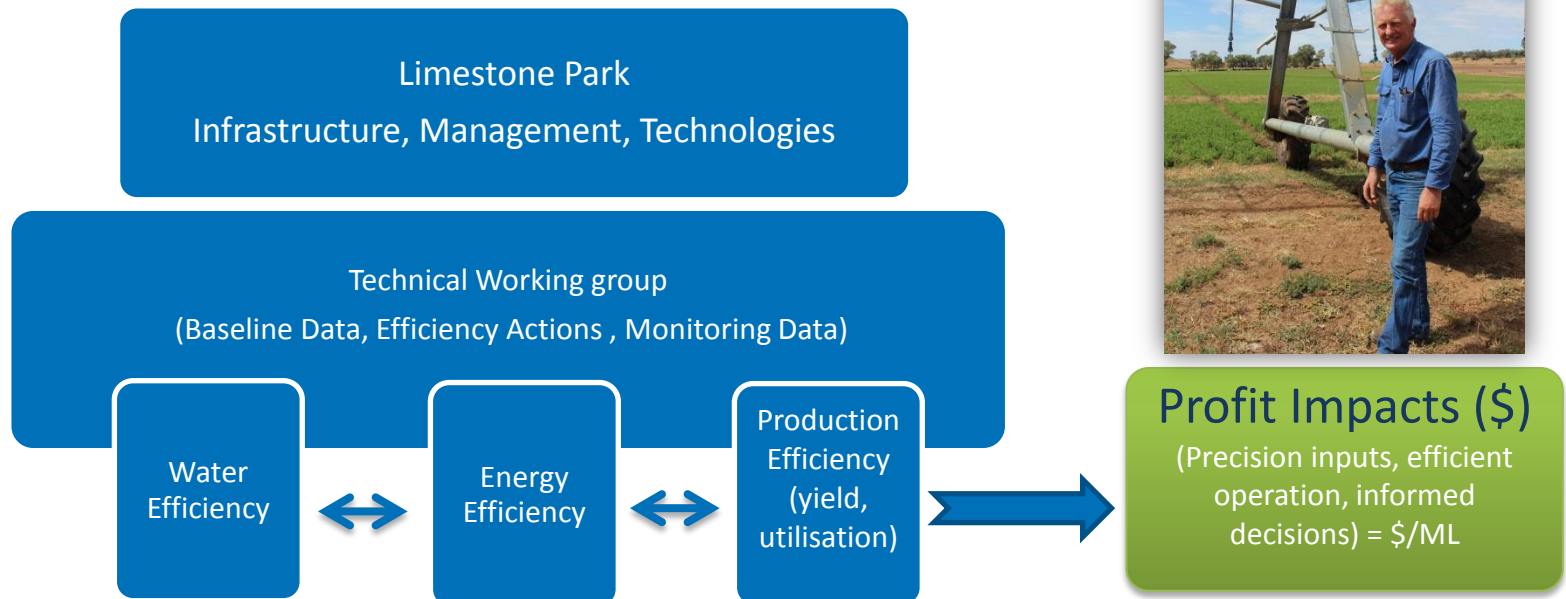
- Practical, reliable irrigation scheduling technologies
- Precise, low cost automated control systems for a range of irrigation systems
- A network of farmer managed learning sites located in major regions referred to as “optimised irrigation” farms.

Dairy Industry- “Optimised Farms”

The dairy sites will enable farmers and their advisors gain the knowledge, skills and confidence to make major water investment decisions and manage them effectively.

- 💧 Each site will be characterised via detailed mapping including elevation, contours, Electromagnetic conductivity (if appropriate) and soil description (bulk density, soil moisture retention curves at depths and associated texture).
- 💧 Each site will be deployed with appropriate monitoring equipment including weather, soil moisture and soil temperature.
- 💧 The water, energy and labour savings associated with adoption of innovative irrigation technologies and the associated management/skills requirements, maintenance costs and labour and lifestyle implications of each technology will also be quantified.
- 💧 50k over two irrigation season (Tamworth 2 x winter/summer growing seasons)
- 💧 3 field days, 2 workshops to focus on extension of technologies of interest to the wider community.

Tamworth Optimised Dairy Irrigation Farm



Technical Working Group

- Brett Abrahams (Irrigation technician, *AquaNorth Irrigation*)
- George Truman (Senior Mixed Farming Systems Officer, *North West LLS*)
- Rex Tout (Farm Owner)
- Scott Woods (Consulting Agronomist, *Hazell's Farm & Fertiliser*)
- Sally Balmain (Animal Officer/ Data, *North West LLS*)
- Peter Smith (Irrigation Consultant, *Sapphire Irrigation*)
- Marguerite White (Dairy Australia engaged Project Manager, *ICD Project Services*)



Local Land
Services
North West



Monitoring efficiency gains

Baseline investigations have determined the location of an “Indicator Monitor Area” under each of the three irrigators

What	Frequency	Tool	Who
Crop Coefficient (Kc)	Seasonal	Annual Forage & Fodder Plan	Scott
Nutrients (NPKS, rate, application, \$/ha)	Application Events	Nutrient Management Plan	Scott/ Rex
Eto, Temperature	Real Time	Tamworth BOM, Scheduling Irrigation Diary (SID)	Rex (Smartphone App)
Soil Moisture & rainfall	30 minutes	Tain Soil Moisture Probes/ tipping bucket	Rex (Smartphone App)
Crop Water Requirements (Etc) mm/ Refill Point- Irrigation Scheduling	Daily	Combination of above tools	Rex/ Scott/ Peter
Per Pivot Water Use (rate, application, total use, & hrs) = kgDM/ ML, <i>Energy Cost \$/ ML</i>	Daily	Irrigator Control Panels/ SID	Rex/ Brett/Peter
Per pivot biomass yield (tDM/ha) & growth rate (kgDM/ha/day) = <i>Energy & Water Use/ tDM, cost \$/ tDM</i>	Per grazing rotation or crop harvest	C-Dax Pasture Meter	Rex/ Scott
Energy Use (kWh/ L Milk, <i>Energy Cost \$/L Milk</i>)	Quarterly	Power Bills	Marguerite
Farm Data/ Milk Production (milkers, L, kg MS)= <i>Water Use ML/ L Milk</i>	Monthly	MG Milk Statements	Marguerite

Baseline Investigations

- 💧 Irrigation System Performance Report (Sapphire Irrigation Consulting)
- 💧 Irrigation System Performance Recommendations
- 💧 Water Meter Validation Report
- 💧 Preparation of the Forage & Fodder Plan, Nutrient Management Plan (soil fertility testing/analysis)
- 💧 Farm mapping (layout & infrastructure)
- 💧 EM 38 Mapping (electromagnetic mapping)
- 💧 Soil Description/ characterisation (soil coring & analysis)
- 💧 Soil Moisture Probe & tipping bucket rainfall gauge installation (Real Time logging capability)
- 💧 Scheduling Irrigation Diary (SID) integration of Tamworth BOM by USQ
- 💧 Collation of Historical Farm Energy, Water & Production Data



Usage/ Cost 2015

Irrigation & Stock water power meterage

*not including gst, on time discount & service to property fee

💧 **Energy Use-** 189kWh/ Day or 69 kWh/ 1000L Milk

💧 **Energy Cost***- \$49.40/ Day or \$18/ 1000L or 3.37% of total milk income or \$132/ ML Water Applied

Surface & Ground Water

Entitlement Surface= 249 ML (17%)
Usage= 9.7 ML (2015)

Entitlement Groundwater= 212ML (57%)
Usage= 126.9 ML (14/15)

💧 **Water Use-** 7355L Milk/ ML, 4.1tDM/ ML

💧 **Water Cost-** \$3.10/ 1000L Milk or \$5.70/ tDM or 0.6% of total milk income

Additional Sub-Projects

- 💧 *IrriSat proof of concept desktop study- Can IrriSat be used for dairy pastures?*
Scheduling and benchmarking tool that uses satellite data (aprox. every 8 days) to calculate crop coefficient (Kc) and uses local weather data with this Kc to determine the crop water use. Study will compare water use determined by IrriSat V water use determined by the soil moisture probes located on Limestone Park (partner DPI NSW).



Department of
Primary Industries

- 💧 *Fertigation- are there labour & production gains to be made?* Retrofitting of a 3 phase pump to an existing tank (partnership with Solar Injection Australia).



Limestone Park

Physical

Land area	112 ha
Leased Land	32 ha
Milking Platform	40 ha

Production

Cows milked	130 average
Calving Pattern	50/50 split autumn/spring
Total milk Solids	83,200 kg
MS/Cow	520 kg
MS/ha	2,080 kg
%Home Grown Feed	70%
tDM/ha consumed	14 t
Grain(Pellets)/cow	1.6 t

Business

Return on Asset (RoA)	13.8%
Return on Equity (RoE)	48%



