

## AN AUSTRALIAN FRAMEWORK OF TERMS AND DEFINITIONS FOR WATER USE EFFICIENCY

# Establishing a standard approach

### BACKGROUND

Until this project was initiated there was no generally accepted version of an Australian framework of terms and definitions for water use efficiency. As a result, people used different measures for water use efficiency e.g. one person could measure crop water use to describe water use efficiency while another could use irrigation water use. While the answers were correct as far as the particular measures are concerned, there was no way of actually comparing them because they were calculated using different base criteria.

With pressure on Australia's irrigation industry, both agricultural and urban, to use water more efficiently, defining and agreeing on ways of evaluating and monitoring irrigation systems so that the performance of different crops and regions can be compared is crucial. To do this it is first necessary to agree on a framework of terms and definitions for water use efficiency.

This project took the results of a workshop held in 1999 to develop a framework of terms and definitions for water use efficiency and consulted stakeholders in the irrigation industry around Australia to produce agreement on them.

### KEY FINDINGS

**Water use efficiency framework.** Rather than use the term "water use efficiency" to describe the performance of an irrigation system, the report recommended using the term as a generic label for any performance indicator used to describe water use in crop production (including turf). For example, the performance of an irrigation system or region could be evaluated with respect to water, energy or labour use or crop production, amongst other indicators.

This means that the framework can be considered like a label on a toolbox, inside which are numerous specific performance indicators and water use indices. Under this framework, water use efficiency can be a label to discuss specific water use indices and irrigation system efficiencies.

**Defining the index.** The performance of an irrigation system or region can be described by using a number of specific indices and efficiencies that are clearly defined and dimensionally correct. As well as indices being clearly defined, units used must also be specified, for example boxes of fruit produced per megalitre of irrigation water supplied to the farm gate is one way of deriving a water use efficiency measure. This measure may be different from the boxes of fruit produced per megalitre of irrigation water applied in a particular field. Both are valid measures of water use efficiency. What's important is that the indices are clearly defined so that valid comparisons can be made.

A performance index can also vary between regions without relation to irrigation efficiency. For example, the Upper Condamine River Region in Queensland can produce more cotton per megalitre of irrigation water applied than the St George district on the same river system downstream. St George can have a lower irrigation water use index

$$= \frac{\text{Total product (bales of cotton)}}{\text{Irrigation water applied (ML)}}$$

because it has less effective rainfall and higher evapotranspiration and only slighter higher

crop yields. Therefore, even though a system in the Upper Condamine district may be operating at a similar irrigation efficiency as another system at St George, it can have a significantly higher irrigation water use index.

It is also important that the spatial extent of an area being described e.g. paddock or a region, as well as the timeframe used e.g. a single irrigation or a full season irrigation, be clearly defined.

**Internationally accepted terminology.** The United Nations' Food and Agriculture Organisation (FAO) has developed definitions and terminology for irrigation efficiencies that are accepted internationally. These definitions were strongly endorsed by stakeholders in the project feedback process.

A benefit of adopting the FAO terminology is that it will facilitate accurate international comparison.

## **IMPLICATIONS**

**Formal adoption.** The project has produced agreement in the irrigation industry on an Australian framework of terms and definitions for water use efficiency. To recognise this achievement and to allow for consistency, a next step is the formal adoption of the framework by government to allow for consistent evaluation and monitoring of irrigation systems throughout Australia.

**Standard terminology.** All irrigation systems, from those that are part of a large group scheme like Goulburn-Murray Water in Victoria servicing 500,000 ha to a single farm taking water from a regulated stream or bore in Queensland, fit into this framework. What is necessary now in some cases is to change terminology to fit the definitions. In particular, the large group irrigation schemes in Victoria and southern NSW presently call the distribution system (the scheme works) from the headworks to the farm gate (the point of supply). There is a need for terminology change from these organisations from distribution to conveyance to fit into the adopted FAO framework.

The distribution system should include the complete system from the headworks to the field inlet as detailed by FAO and some local terminology should be changed to suit the recognised and adopted FAO definitions.

## **ABOUT THE PROJECT**

### **Research aims**

This factsheet summarises Stage 2 of a four-stage project, *Determining a Framework, Terms and Definitions for Water Use Efficiency in Irrigation*, initiated through the National Program for Irrigation Research and Development (NPIRD) in 1999, to progress the development of consistent irrigation standards throughout Australia. The four stages were:

- Stage 1.** Determining a framework, terms and definitions for water use efficiency in irrigation (completed September 1999).
- Stage 2.** Gaining acceptance of the framework, terms and definitions determined in Stage 1 (completed May 2003).
- Stage 3.** Developing and gaining acceptance of measurement protocols (to be done).
- Stage 4.** Developing suitable methods for data interpretation and presentation (to be done).

The specific aim of Stage 2 was to promote and seek national acceptance of the water use efficiency framework, terms and definitions developed in Stage 1.

## **METHODOLOGY**

The methodology for Stage 2 centred on consultation with stakeholders to gain consensus on the framework, terms and definitions for water use efficiency and produce a document that incorporated feedback and suggestions.

The process for doing this was as follows:

- Summarise the 1999 Stage 1 report.
- Develop a comprehensive distribution list of stakeholders and interested parties throughout Australia to comment on the proposed framework, terms and definitions developed as part of Stage 1.
- Promote the summary document, e.g. by posting it on the NPIRD website with links to related websites like the Irrigation Association of Australia (IAA), Australian National Committee on Irrigation and Drainage (ANCID), Murray Darling Basin Committee (MDBC) and the National Irrigation Science Network (NISN), and through the irrigation industry media and chat groups requesting comments.
- Review comments and feedback and incorporate these into the summary document and full report, and make these documents available to anyone who provided comments.
- Post updated documents to the above websites and promote them.

## **RESEARCHERS**

The project was lead by Jim Purcell from Aquatech Consulting Pty Ltd, with assistance from Anne Currey, Naturally Resourceful Pty Ltd.

Copies of the full and short report can be downloaded from website  
< [www.lwa.gov.au/irrigation/reports.asp](http://www.lwa.gov.au/irrigation/reports.asp) >

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The project was begun in October 2002 and the final report completed in September 2003.

## **NATIONAL PROGRAM FOR SUSTAINABLE IRRIGATION**

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