Developing water efficiency in the horticultural market - identifying best practice and leveraging marketing advantage

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Smart Approved WaterMark

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Media Summary

This project sets out to improve water efficiency in the horticultural sector through the identification and promotion of industry best practice and water saving technologies.

In his 2013 World Water Day address Ban Ki-Moon identified the water/food/energy nexus as a key global issue and endorsed better use of water in food production, promoting 'more crop per drop'. With increasing costs for water and energy, making the best use of water remains an important issue for the horticulture industry

Smart Approved WaterMark is Australia's water conservation label and is a key demand management tool certifying water efficient products and services and promoting ways to get the best value from water.

The key outputs of this project are:

- Identifying the potential for marketing products produced using best value of water, and leveraging marketing advantage through water efficiency certification in international markets;
- Research into potential outdoor water conservation technologies and national industry survey on uptake of water conservation measures in the horticultural sector;
- Research into the water/energy nexus in rainwater harvesting;
- National industry survey on uptake of water conservation measures in the horticultural sector; and
- Independent Expert Panel assessment and certification of water efficient technologies and services.

Key recommendations for future research and development are:

- Further investigation to identify the barriers to adoption of water efficient certification, technologies and practices.
- Further research to identify and certify services enabling water efficiency in the nursery and garden, landscape and irrigation industries;
- Reinstating the annual Newspoll water saving consumer national omnibus survey to track water efficiency in the community;

Key recommendations for practical application to industry are:

- Development of a pilot project to identify issues in certification water efficiently grown and processed produce.
- Stronger linkages made between SAWM water efficiency research and the national 20:20:20 Vision campaign
- Development of a tool showing the water and energy costs and savings from different rainwater harvesting systems – specifically with a focus on energy efficiency of pumps.
- Development of international cross compliance between water efficiency certification and labelling schemes.

Technical summary

This research project sets out to identify new opportunities to leverage market advantage from water efficiency certification in the horticultural sector.

Smart Approved WaterMark (SAWM) is Australia's water conservation label identifying and certifying water efficient products and services. Originally set up to help households to save water around the home and garden during the millennium drought, SAWM has expanded to improve water efficiency in the horticulture and commercial irrigation sectors over the past two years.

This project looks at the expansion of water efficiency certification across the following four Australian research and development priority areas:

Productivity and Adding Value – research the opportunity to expand the scheme to identify and label products produced using water efficient practices and technologies;

Supply Chain and Markets – research the potential to leverage Smart WaterMark certification in international markets;

Natural Resources Management – identify and certify services improving water efficiency in the commercial horticulture industry; and

Climate Variability and Climate Change - research into the water/energy nexus and the impact of water efficiencies on greenhouse gas emissions in the nursery and garden industry.

The main focus of research is to seek opportunities to better leverage water efficiency certification in the horticulture sector to gain market advantage for produce grown and processed efficiently, and to promote the use of efficient technologies and practices within the horticulture sector.

To assess and certify water efficiency, an independent Technical Expert Panel reviews submissions against the following four criteria:

Water Saving - The primary purpose of the product is directly related to reducing actual water use where there is a direct correlation between the use of the product and water savings.

Fitness for Purpose - Supporting documentation (such as instructions and marketing material) helps ensure that users get the best water savings/efficiency from the product.

Meeting Regulations and Standards - The product is of high quality and meets industry standards, and customer and community expectations.

Environmentally Sustainable - The product, while satisfying the above three criteria, is environmentally sustainable, and that in making water savings the product will not adversely impact on the environment in other areas.

The key outputs of this project are:

- Identifying opportunities to certify and market products grown and processed using the best value of water,
- Leveraging marketing advantage through water efficiency certification in international markets;
- Identification and certification of the water efficient technologies and practices;
- National industry survey on uptake of water conservation measures in the horticultural sector and barriers to uptake;
- Improving awareness of the water/energy nexus in rainwater harvesting, highlighting the energy costs of pumps;

Key research findings from this project are:

- Water efficiency benchmarking and labelling is leading to market transformation, as industry better understands the costs benefits associated with efficiency savings.
- Efficiency certification offers businesses a platform to communicate their commitment to corporate social responsibility especially in industries that traditionally have high water-use.
- Despite a significant growth in 'green' labels internationally, there is only a small number of water efficiency certification programs, with Australia a world leader; the horticulture sector should leverage this advantage.
- Cost is seen as the biggest issue in water management in the horticulture sector ahead of both availability and water quality.
- Cost and time are identified as the barriers to uptake of water efficiency certification across the industry.
- Despite significant research undertaken in the water and energy nexus in rainwater harvesting there are few tools to allow growers to easily assess the costs and savings of different technologies.

Key recommendations for future research and development are:

- Further investigation to identify the barriers to adoption of water efficient certification, technologies and practices.
- Further research to identify and certify services enabling water efficiency in the nursery and garden, landscape and irrigation industries;
- Reinstating the annual Newspoll water saving consumer national omnibus survey to track water efficiency in the community;

Key recommendations for practical application to industry are:

- Development of a pilot project to identify issues in certification water efficiently grown and processed produce.
- Stronger linkages made between SAWM water efficiency research and the national 20:20:20 Vision campaign
- Development of a tool showing the water and energy costs and savings from different rainwater harvesting systems – specifically with a focus on energy efficiency of pumps.
- Development of international cross compliance between water efficiency certification and labelling schemes.

Introduction

Smart Approved WaterMark (SAWM) is Australia's water conservation label identifying and certifying water efficient products and services. The Smart WaterMark label is a voluntary quality mark and sister scheme to the indoor WELS rating scheme – both schemes are written into the National Water Initiative and supported by the States & Territories through the Environment Heritage Protection Council.

Previous Horticulture Australia Ltd. (HAL) funding has been utilised to research expansion of Smart WaterMark accreditation to cover products across the commercial irrigation, turf and nursery industry. This expansion has included undertaking baseline research, developing industry guidelines and running Expert Panel meetings to identify water-saving products and services in the horticulture industry.

SAWM is using match-funded income from industry fees with HAL funding to continue to drive forward the scheme both into new sectors and markets. Learning from the experience of the expansion of Smart WaterMark to date, research is needed to take the scheme forward. Specifically identifying the potential for leveraging marketing advantage for: certified products in international markets and products grown and processed efficiently i.e. with best use of water. In addition, a research gap has been identified in the impact of the water/energy nexus on water efficiency in the horticulture industry. This project will address this research gap initially looking at the water and energy costs in pumps used with rainwater harvesting and irrigation systems.

The Garnaut Climate Change Report highlighted the difficulty of predicting future rainfall patterns in a context of complex regional climate systems and wider climate change impacts. With the additional pressure on water resources from population growth in Australia, and growing awareness of the water-energy nexus, the importance of efficient use of water in all aspects of life remains paramount. The recent Australian Water Association and Water Services Association Australia position papers *The Case for Water Efficiency* and *Using Water Wisely* both highlight how important water efficiency is in how we use our most valuable resource, allowing more to be done with less – getting the best value for water.

Water efficiencies have been identified by Department of Agriculture and HAL as critical areas for the future growth of Australian Horticulture. The Horticulture Water Initiative identified key aspects that needed to be embraced to ensure that productivity gains from water use could be maintained and measured. The technologies being applied in this area need to be independently verified or growers will be wasting precious resources.

Smart WaterMark is an independent not-for-profit accreditation program set-up to identify and certify water-saving products and services, stimulate innovation in water conservation, and promote water efficiency. The label was developed to give consumer's confidence in water efficiency choices and as a certification to underpin residential demand management programs.

SAWM was launched in 2006 in response to the challenge of reducing per capita water consumption across Australia. The scheme was set up by AWA, Irrigation Australia (IAL), Nursery & Garden Industry Australia (NGIA) and WSAA with funding from the Australian Government's Water for the Future - Water Smart Australia Program. The program is overseen by a Steering Committee comprising the four founding associations and representation from the Australian Government, the States & Territories and water utilities.

At a time of uncertainty brought about by climate change, compounded by changing demographics, the importance of water conservation and water saving technologies is unparalleled. Smart WaterMark is a vital piece in the wider jigsaw of demand management programs to ensure effective use of water in Australia. The identification of water-saving products and services at a national level gives marketing advantage to water efficient technologies and processes, and helps link into government and utility demand management and rebate programs, and avoids duplication at the State level.

Water efficiency labelling has been identified as one of the most cost effective demand management tools. As such it is important that we evolve and maximise the efficacy of SAWM before the onset of the next drought.

The expansion of the Smart WaterMark scheme meets the following Government research and development priorities:

- *Productivity and Adding Value* – Identify water-saving products and services with the aim of improving water efficiency within the nursery industry, and research the opportunity to expand the scheme to identify and label products produced using water efficient practices and technologies.
- *Supply Chain and Markets* – research the potential to leverage Smart WaterMark certification in international markets;
- *Natural Resources Management* – identify and certify services improving water efficiency in the commercial horticulture industry; and
- *Climate Variability and Climate Change* - research into the water/energy nexus and the impact of water efficiencies on greenhouse gas emissions in the nursery and garden industry.

This project is aligned to the three principles outlined in the Nursery and Garden Industry Strategic Investment Plan:

- *Grow the market for plants and greenlife in the urban environment* – identifying opportunities to leverage marketing benefit from Smart WaterMark certification, including internationally;
- *Communicate the benefit of plants to all industry sectors, influencers at all levels of government and consumers* – providing certification for government and water utility permanent water conservation measures to promote efficient production and best value water use in the urban environment and consumer garden;
- *Ensure industry has processes in place re governance and biosecurity to enable businesses to operate effectively* – providing a platform to demonstrate responsible management of water across the horticulture industry.

The key outputs of this project are:

- Research into potential for marketing products produced using best value of water, and leverage marketing advantage through water efficiency certification in international markets;
- Research into potential outdoor water conservation technologies and national industry survey on uptake of water conservation measures in the horticultural sector;
- Research into the water/energy nexus in rainwater harvesting;
- Three Expert Panel rounds to assess products and services held and industry guidelines produced and published. Certified water efficient products and services listed on the Smart WaterMark consumer and stakeholder web sites; and
- Stakeholder Forum hosted and stakeholder newsletters disseminated.

Methods

To underpin the expansion of Smart WaterMark certification for the Australian horticultural market the following research was undertaken:

i. Desk-based research including interviews with industry specialists to identify:
   - the potential to certify and promote products produced using the best value of water
   - opportunities to leverage marketing advantage through water efficiency certification in international markets;

ii. Desk-based research into water efficient practices and technologies for the nursery industry, continuing to build on and refine legacy Institute for Sustainable Futures (ISF) research on outdoor water-saving products and services previously commissioned by Smart WaterMark;

iii. Qualitative structured interview survey national industry survey on attitudes to water efficiency and uptake of water conservation measures and technologies, including limitations to adoption of water efficiency labelling; and

iv. Research into the water and energy efficiency of rainwater harvesting, specifically the energy costs for running a range of common rainwater harvesting pump types and the embedded energy gains from water efficiencies

All sections of research were undertaken utilising different methodologies to ensure best value for money whilst still giving the most accurate results. Methodologies for the different research elements are outlined below:

i, Promoting water efficiency certification in international markets and marketing produce using the best value of water.

The research comprised interviews with water experts followed by the collection and analysis of marketing data and recent academic studies covering water efficiency labelling, environmental certification, and water-efficiency in horticulture at national and international levels. There were four stages in the research, which was undertaken between August and December 2013.

Stage 1 comprised discussions with experts from WSAA, NGIA and HAL to agree the scope of the research. In addition, unstructured telephone interviews were undertaken with industry experts from Smart Water Fund, water utilities and the National Business Water Efficiency Benchmarking Project to identify the best sources of information for Stage 2: data gathering.

Stage 2 involved undertaking desk based research identifying the latest academic studies and statistics about the consumer response to, and marketing advantage of, water efficiency labelling both at an international level with a focus on marketing horticultural produce. Also, the latest research on water efficiency benchmarking, water footprinting and water stewardship was collected. The research papers, benchmarks, standards and marketing information was collated into a databank.

In Stage 3 the databank was analysed and the current state of water efficiency labelling nationally and internationally identified. Additionally, current practices of companies and organisations in the horticulture and food processing industries were analysed and compared with the latest industry benchmarks.

The final stage of the research focussed on identifying specific opportunities for Smart WaterMark certification within the horticulture industry both at an international level and for the potential in certifying efficiently produced horticultural goods.

ii, Water Efficient Technologies.

This research was undertaken by Smart WaterMark over the length of the project. The research methodologies used built on previous work, by the Institute for Sustainable Futures, to ensure continuity; albeit widening the scope of the search into new markets, both geographical and sectoral.

The initial phase involved identifying and contacting water and horticulture industry experts to increase awareness of new technologies or practices worth further investigation. A database of potential technologies and services was updated to include new categories.

Once the categories had been confirmed, research into potential products and services was undertaken. The objective was to identify potential products and services that could be eligible for Smart Approved WaterMark in the horticulture industry. As such, the researchers conducted the search keeping the core criteria for the accreditation scheme in mind.

Research was conducted using several methods:

- Comprehensive web search: products and services were identified via trade association websites, online search engines, online bulletin boards, industry networks, and water industry websites;
- Telephone calls to industry experts to identify and discuss the efficacy of specific products;
- Ongoing review of trade publications and industry news feeds - including Twitter and Linkedin groups; and
- Visiting trade shows and industry expos to identify emerging technologies.

Products and services were added to the databank on an ongoing basis. Other information including manufacturers/suppliers' names, phone numbers, website and postal addresses were also included.

iii, Industry Survey.

SAWM has undertaken annual industry and consumer surveys since its inception in 2006. Year on year it has become increasingly difficult to engaging with industry and households to collect marketing intelligence. With the growth in use of metrics for web use, online questionnaires and customer feedback channels, people are showing increasing survey fatigue.

Initially an online survey was developed and trialled. However, despite a 40%+ open rate on the initial email, the conversion rate from open email to following a link and subsequently completing an online survey was too low.

A range of survey techniques has been used by SAWM; from telephone interviews to fax, online and postal surveys. Although many of these channels are bringing a lower proportion of responses, telephone interviews remain the most effective in terms of response rate and quality of data collected, and as such this approach was chosen.

Telephone interviews enable better targeting of relevant individuals in organisations than other survey methods and allow questions to be placed in context. The downside of telephone surveys is the greater administrative overhead in managing and undertaking the survey.

The survey was comprised of 11 qualitative questions distributed to thought-leaders across Australian water utilities, industry bodies, academia, and retailers working within the water efficiency industry. The survey questionnaire was structured based on a 2011 Industry Survey, allowing for an assessment of longitudinal trends.

The survey was initially conducted via short telephone interviews, to promote a higher response rate. The majority of respondents spent longer on the survey than required, and were happy to discuss in-depth their views on water efficiency within their industry. As a follow-up, organizations that could not be reached by telephone were also sent a link via email to complete the survey online.

iv, Water and Energy Nexus in Rainwater Harvesting.

Research into the water and energy efficiency of pumps for rainwater harvesting was undertaken in two phases. Firstly desk based research to collect and collate the latest knowledge and best practice on rainwater harvesting and the water/energy nexus. The initial aim was to identify the energy costs for running a range of common rainwater harvesting pump types (e.g. variable speed or immersed) compared against the embedded energy gains from water efficiencies i.e. the savings made from not

having to collect, distribute and treat town water replaced through rainwater harvesting. Relevant research papers were collated into a bibliography (attached to this report as an appendix). Information on the energy efficiency of 48 pumps was obtained from the E3 voluntary pump energy labelling program.

The second phase of research involved a number of interviews with industry experts on latest thinking in the subject. Experts represented the following sectors: research/academia; water utility; government; regulator; designer; installer; manufacturer and industry association. In addition to direct interviews information on the research was promoted through business social networks including the Smart WaterMark stakeholder communication channels and international water efficiency Linkedin network.

Once the bibliography and interviews were completed discussions were held with the WSAA industry research network and the Institute for Sustainable Futures (ISF) to discuss next steps; specifically identified research gaps and potential next steps.

v, Water Efficiency Certification

An independent Technical Expert Panel held three certification rounds over the year to assess applications to Smart WaterMark. Expert Panel members represent a range of industry sectors across horticulture including academia, industry R&D, consultancy, water utility and media.

The Terms of Reference for the Expert Panel are attached as an appendix to this Report.

Submissions to SAWM were assessed by the Panel against the following four criteria:

- Water Saving - The primary purpose of the product is directly related to reducing actual water use where there is a direct correlation between the use of the product and water savings.
- Fitness for Purpose - Supporting documentation (such as instructions and marketing material) helps ensure that users get the best water savings/efficiency from the product.
- Meeting Regulations and Standards - The product is of high quality and meets industry standards, and customer and community expectations.
- Environmentally Sustainable - The product, while satisfying the above three criteria, is environmentally sustainable, and that in making water savings the product will not adversely impact on the environment in other areas.

The Expert Panel also reviewed their Applicants Guidelines for industry. The Panel develops and published guidelines for industry including examples of testing methodologies to demonstrate water savings. A copy of the newly adopted Service Guidelines is attached as an appendix to this Report.

The final element of the project has been the dissemination of research and guidelines to industry through presentations and displays at industry events, conferences, and hosting a stakeholder forum. This face-to-face activity has been supported by electronic and printed newsletters published to industry stakeholders, a twitter feed and publishing of efficiency resources on the smartwatermark.info stakeholder web site. For further information on these activities see the Technology Transfer section below.

Results

i Promoting water efficiency certification in international markets and marketing produce using the best value of water.

Situational Analysis

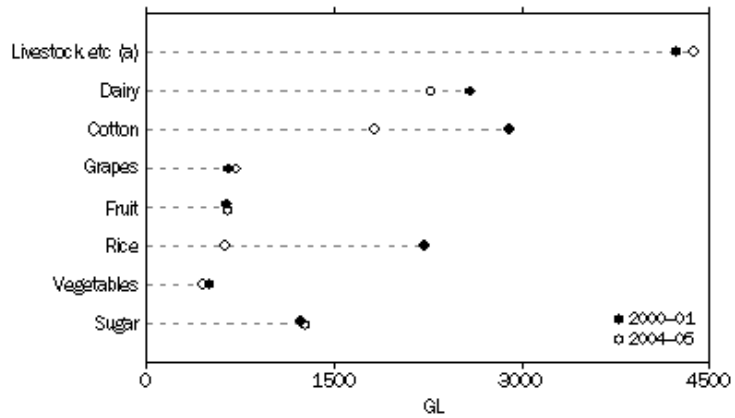
Awareness among food producers and consumers about food quality, safety, supply-chain and sustainability has increased over the past ten years[2]. In addition, the market penetration of sustainability and eco-label certification has grown rapidly. For example, the number of single-standard certification eco-labels expanded from 510 in 2005 to 13,650 by 2008[3]. The increase in sustainability certification and labelling reflects a change in drivers for consumer purchasing behaviour. Change has come about though a combination of suppliers and retailers responding to consumer demand, predominantly driven by health and food safety concerns, coupled with non-government organisations promoting sustainability and market transformation through sustainability branding[4].

The growing trend in sustainable living and purchasing has been defined in the market segment: Lifestyles of Health and Sustainability (LOHAS). In Australia the Mobium group has identified that 12% of the Australian public can be classified as LOHAS "leaders" [5]. This demographic shows strong concern about sustainability, community and corporate citizenship. They are early-adopters of eco-labels and will spend time researching issues and sourcing certified products. A further 40% of Australians have been defined as LOHAS "leaning" with moderate concerns about personal health and sustainability. With this second group purchasing decisions are often conflicted between supporting sustainability and maintaining current lifestyles.

Within the context of global fresh water scarcity and food security concerns, water has become a critical topic. Australia is the driest inhabited continent and agriculture accounts for around two-thirds (65%) of fresh water consumption[6]. As such, the importance of measuring, monitoring and reviewing embedded water in food production is recognised. Tools including water footprinting, water stewardship and water-use certification are emerging across agriculture and food sectors to help identify, manage and communicate this issue[7].

Water-use for growing and processing of produce is normally not transparent to the consumer at the point of purchase. To address this issue water-use labelling can provide an opportunity to raise awareness of efficient practices in growing and production. For example, water-use labelling for dairy products is of potential interest as dairy farming consumes 19% of agricultural water consumption in Australia ranking third after livestock and cotton (Figure 1). In addition, dairy product packaging allows easy labelling in the retail sector, as opposed to other high water-use products such as cotton and meat.

Figure 1 Agriculture Water Consumption by activity (Australian Bureau of Statistics, 2013)



Sustainability has become increasingly important in supply chains – particularly in highly competitive industries. Flint and Golocic (2009) found that companies within New Zealand wine supply chains are engaging in sustainability for competitive advantage[8]. Reasons for engaging in sustainability are increase in brand equity, brand awareness, first mover advantage and improvement of reputation and product image. In the globally competitive wine industry 94% of New Zealand vineyards are certified as sustainable[9], 6.8% certified organic and 0.2% certified biodynamic. Winegrowers have implemented environmental management systems and manage their supply chain relationships audited through Sustainable Winegrowers New Zealand. The use of third-party certification and auditing helps ensure believability in environmental claims with retailers and consumers. To differentiate their product within the market some wineries have adopted additional environmental related initiatives such as CarboNZero (See 6. Case Studies) to leverage extra sustainability marketing advantage. The New Zealand wine experience highlights the commercial potential for food and beverage producers engaging in environmentally sustainable growing practices and eco-labelling.

Since the 1970's it has been shown that consumers will buy products based on environmental labelling. However, not all labels are equal, with three main groups: self-certification; government mandatory environmental labelling; and eco-labels. Self-certification by producers and retailers generally is a marketing tool and has little environmental relevance and would have correspondingly little influence with LOHAS leaders. Government mandatory labelling tends to show environmental health or resource-use information such as energy-star rating. Eco-labels are seen as quality marks and are a seal of approval by not-for-profit organisations working to protect a resource[10].

It has been shown that eco-labels can improve sales as consumers use labels as tools for supporting decision making with environmentally significant products at point of purchase. Recent international studies identified that two-third of European consumers buy eco-labelled products more often and are willing to pay between 13-18% more. In Australia there has been a steady growth in the market for green products; between 2007-10 the LOHAS market almost doubled in value from $12bn pa to $21.5bn pa[5].

However, it should be noted that consumer decision-making based on eco-labelling includes a number of nuances. As an example, studies have shown that consumers are willing to pay more for coffees that are labelled Fairtrade than for Organic certified coffee[11]. For some consumers ethical trading benefits seem to be more highly regarded than the environmental and health benefits associated with Organic production of coffee. Mobium Group also identified that LOHAS leaders were more likely, than other consumers, to purchase green products where there was less direct 'personal' benefit such as Fairtrade and Organic[5].

In a recent study[12] it was shown that French consumers, who would not normally choose organic over conventional apples, would choose apples marked with a label promoting that they were grown with fewer pesticides than normal production. The 2012 research by Marette, Messean and Millet highlights the opportunities for 'light-green' sustainability labelling that falls between the more stringent organic certification and non-labelled produce. The new 'eco' label met consumer demand because of the higher food-safety offered than conventional apples and at a lower price than the organic certified apples - attracting new consumers to eco-purchasing, specifically the LOHAS 'leaning' market segment. Similar trends have been identified with egg marketing from organic through to free range. In this case, the ethical and animal welfare benefits free-range production is seen as a greater driver to the consumer purchasing than the sustainability and health benefits of organic production. Anecdotally it has been argued that LOHAS 'leaders' would choose a product with both ethical as well as environmental benefits and, in addition, would be aware of the ethical and animal welfare benefits embedded in organic egg certification.

The rapid expansion in the number of eco-labels and development of different kinds of environmental, sustainability and ethical certification highlights the choices that consumers have at point of purchase. Conversely this can also increases the difficulty consumers have in identifying and differentiating the relevance of environmental claims on products. The use of self-certification and greenwashing[13]

shows the market advantage suppliers and retailers perceive from eco-labels; ironically often undermining the value of environmental labelling. Recent research has shown that the increase in greenwashing in the agricultural sector, especially in conjunction with increasing in scale of operation in agricultural food production, is leading to a reduction in consumer confidence in agricultural product eco-labels[14].

Identifying and Benchmarking Water Efficiency

The production of food often requires the use of significant volumes of water. Agriculture accounts for around 65% of Australia's fresh water use and food processing around 30% of manufacturing water-use[6]. Horticultural crops use about 17% of total irrigation water and account for over 40% of Australia's irrigated production[15]. The ABS statistics for water use in crop production show the efficiency of horticultural production over agriculture generally.

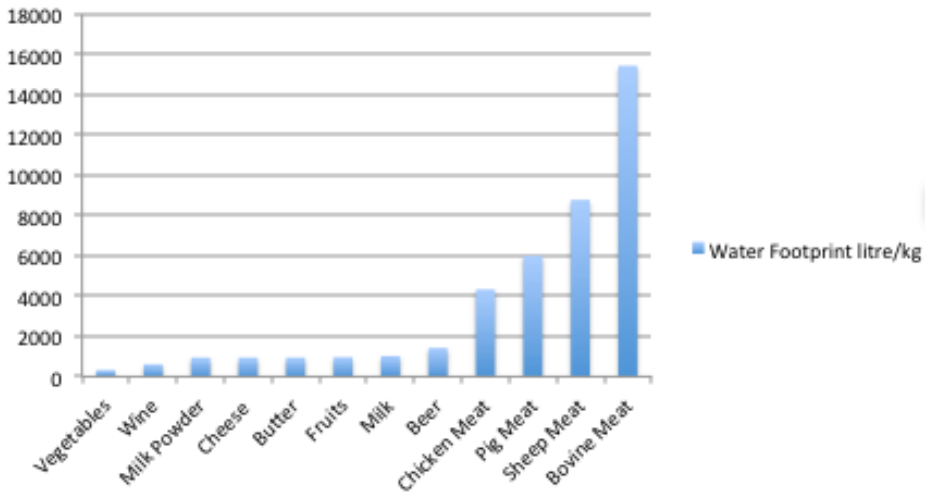
Identifying and benchmarking water efficiency in the horticulture industry is becoming more accurate with the introduction of next generation smart meters and sophisticated benchmarking tools. The amount of water-use varies across the industry, not only in irrigation and water techniques but also depending on the processes and equipment used. Major water consuming processes include washing/rinsing, cooling, refrigeration and steam generation. The horticulture industry has continued to increase the efficiency of water use through the adoption of new efficient technologies and better on-farm water management practices[16]. These developments are a good opportunity for the horticulture industry to promote its water efficiency credentials.

Three methodologies for identifying and benchmarking water efficiency in the horticulture sector are discussed below:

a) Water Footprint

A water footprint is an indicator of freshwater use that identifies direct water-use as well as indirect water-use associated with the production, processing and transport of a product, i.e. the water footprint of a product is the volume of freshwater used to produce the product, measured over the full supply chain[17]. Water Footprinting is emerging as a useful tool to identify the embedded water in food production and consumption, and can be used to benchmark the efficiency in growing and processing of horticultural products. The Footprint methodology can also show virtual water trade i.e. the embedded water traded in food and other commodities. Smart WaterMark is one of two Australian's partners of the global Water Footprint Network; CSIRO being the other partner. Per ton of product animal products have a larger water footprint than crop products; albeit, the size of the water footprint varies across animal types and production systems (Figure 2). Globally, the increase of production and consumption of animal products is putting pressure on freshwater resources.

Figure 2 Product Water Footprint. (based on data of WFN)



b) Water Efficiency Benchmarking

The Australian Water Industry through Water Services Association Australia and the Victorian Smart Water Fund has undertaken a program to benchmark water efficiency across non-residential sector. The National Business Water Efficiency Benchmarking (NBWEB) project identifies benchmarks in Australia for various industry sectors[18]. An online tool has been developed to allow companies to assess their water efficiency against national benchmarks generated for a broad cross-section of industry sectors. Benchmarks for food processing range between 0.73 kL per tonne and 14.23 kL per tonne dependant on processing activity. In addition to comparing water-use data, NBWEB also gives information to industry on how to benefit from best practice in water management and water-efficient technologies to reduce water-use and production costs.

NBWEB has identified that the dairy industry uses significant volumes of water both in farming practices and production processes. In dairy farming the water-intensive processes include stock drinking water, cleaning of the bulk tank/vat and milking machines, platform sprays, plate coolers, evaporative cooling and yard cleaning. Benchmarks in water-use rank from 0.033 kL to 0.553 kL. In addition, dairy processes such as cheese production require water-intensive processes including washing/rinsing, cooling & refrigeration, and steam generation. The water-use varies across the industry depending on processes and equipment used with industry benchmark between 0.07kL and 3.63kL of water used per ton (See Figure 3).

Figure 3 Industry Water Efficiency Benchmarks (Based on NBWEB data)

Performance measures	**Food processing**	**Dairy cattle farming**	**Cheese manufacturing**
Benchmark	kL per tonne	kL per tonne	kL per tonne
Minimum	0.73	0.0033	0.07
Mean	5.16	0.124	1.84
Maximum	14.23	0.553	3.63

c) Water Stewardship

Water Stewardship is a method to benchmark and create globally recognized standards and certification procedures in sustainable water use i.e. “using fresh water in ways that are both socially beneficial and environmentally sustainable” [19]. The aim is to provide a tool to manage the, often conflicting, growing demand for clean, fresh water to sustain healthy ecosystems, supply human populations and support economic activity. The Water Stewardship process helps mitigate risks from supply constraints and environmental impact, drives best practice, and can underpin shareholder, community and consumer goodwill. On a global level the Alliance for Water Stewardship develops Stewardship Standards which are influenced at a national level by Water Stewardship Australia to ensure local relevance. Smart WaterMark is a Supporter of Water Stewardship Australia.

An important element in the further development of the Water Stewardship methodology will be the continued incorporation of Water Footprinting and use of current certification such as Smart Watermark within the Standards.

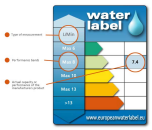
A principle and criteria of water stewardship is responsible water use of which water efficiency is a vital component. Important elements are sustainable water flow regime, equitable governance, good water quality and protected habitats. If these key elements meet the agreed performance levels, then catchment sustainability and the associated economic, cultural and environmental benefits can be achieved. The key benefits of Water Stewardship for industry include improved risk management, water-use efficiency, and recognition of Corporate Social Responsibility.

A field trial of the Australian Water Stewardship Standard in the Goulburn Broken Catchment[20] identified that industry best practice in water-use is already in place across parts of industry but that there were also opportunities to further improve performance. The benefits of looking at water-use by an industry across a whole catchment include reducing costs and efficiency gains, reducing operational, regulatory and reputational risks, generating intellectual and political capital and securing certain markets and accessing new ones.

Water Efficiency Labelling in an International Context

Water efficiency certification and labelling is still in its infancy with relatively few labels developed. The first national water-efficiency certification and labelling programs were the Australian WELS & Smart WaterMark schemes, evolving from the WSAA 5A's Program in 2005, and the US WaterSense program launched in 2006. Water efficiency labels tend to cover specific market segments and generally have had a national jurisdiction. Figure 4 below lists current national and international water efficiency certification labels.

Figure 4 Water efficiency labels.

Name	Label	Industry	Country
European Water label		Bathroom products	Europe
SWAT		Irrigation technologies	USA
Smart WaterMark		Products and services	Australia
Water Efficiency Labelling and Standards scheme		Plumbing & household products	Australia New Zealand
Water Efficiency Labelling Scheme		Plumbing & household products	Singapore
WaterSense		Plumbing & household products	USA
Water wise		Plumbing & household products	United Kingdom

Water-efficiency labels to-date have predominantly focussed on indoor plumbing and bathroom products and white goods. Certification of plumbing products tend to be based on water-use standards and are often used in conjunction with minimum efficiency benchmarks.

Outdoor products are generally more difficult to certify as they're often part of a wider system (such as a pump in a rainwater harvesting system) or have a number of external impacts on their efficacy (e.g. a soil ameliorant or wetting agent will only be effective with certain soil types and will be further impacted by aspect, slope, local climate etc.). In these more complicated scenarios certification via experts, using criteria and guidelines, is more effective than by using simple standards-based testing.

For example, the Australian Government undertook research into water-use star rating of domestic irrigation controllers in 2009 and came to the conclusion that such technologies were best certified through the Smart WaterMark Expert Panel rather than through a mandatory standards-based water-use rating scheme[21].

Within the horticulture industry there are several eco-label and sustainability certifications on an international level that have a water efficiency element, see figure 5 overleaf: A common element of these eco-labels is that water efficiency is predominately embedded as only one of several wider sustainability criteria[22].

Figure 5 Water labelling embedded in sustainability labelling across the horticulture industries.

Name	Logo	Industry	Requirements	Country
ABIO		Organic farming	Products, water and soil standards.	Brasil
American Grassfeed		Meat & dairy	AGA Grassfed Ruminant Standards	United States
Blue Angel		Multiple	Health, climate, water & resource criteria	Germany
Environment Tree **Umweltbaum**		Multiple	Power and water saving products	Germany
China Water Conservation Certification		Industrial, agricultural and residential	Water and energy efficiency.	China
Dairying for Tomorrow		Dairy products	Environmental management practices, water.	Australia
Fair Flowers Fair Plants		Horticulture	Sustainable production of flowers and plants.	Europe
Fairtrade		Food, Textiles, Cosmetics	Social, environmental and economic criteria including terms of trade.	Global
Flower Label Program		Horticulture	Social and environmentally responsibility in flower production.	Europe Ecuador USA SA
Florimark		Flowers and plants	Quality mark for suppliers of flowers and plants; criteria include quality, traceability and environment.	Netherlands

Name	Logo	Industry	Requirements	Country
Food Alliance Certified		Farming	Fair working conditions, humane treatment of animals, and careful stewardship of natural resources.	Canada US Mexico
LEAF		Farming	Environmental standards in food chain.	UK Eire
LEAF		Restaurant	Water use, organic products.	Canada
Mileukeur		Food, consumer products & services	Environmental quality standards.	Netherlands
Made in Green		Textiles	Environmental and health across the supply chain.	Belgium Spain UK
Processed Chlorine Free		Food, Paper, Packaging, Textiles	Water and energy use, chemistry, carbon gas releases.	Global
Protected Harvest		Farming	Farm management, soil and water management, and air quality management.	USA
Sustainable Agricultural Network		Farming	Farms (specific crops) according to environmental and social standards.	Global
Sustainable Wine Growing New Zealand		Wine	Environmental Management System & best practice model for sustainable grape and wine production.	New Zealand
Totally Chlorine Free		Food	Sustainability Index.	Global
USDA Organic		Food	National Standards.	USA
Veriflora		Cut Flowers & Potted plants	Environmental, sustainability and agricultural product quality.	Canada USA
LIVE (Low Input Viticulture and Enology)		Wine	Sustainable grape and wine production.	USA

Currently international water-efficiency labelling faces two major challenges. Firstly, for water-efficiency labels there is a lack of global standards for defining efficiency, with organisations measuring efficiency at a local (geographical or sectoral) rather than at an international level. Secondly, wider eco-labels that incorporate water efficiency as one of their sustainability inputs suffer from an even greater lack of consistency in measuring water-use or efficiency. For the consumer this lack of consistency is compounded by even poorer water-use information at point of purchase. To resolve these issues a more robust approach needs to be taken in identifying, measuring, certifying and reporting water efficiency in specific water-use labels and broader scoped eco-labels. As noted earlier Water Footprinting and Water Stewardship are starting to set international standards. However both methodologies are still at an early stage of adoption, with few agreed benchmarks or industry best practices identified.

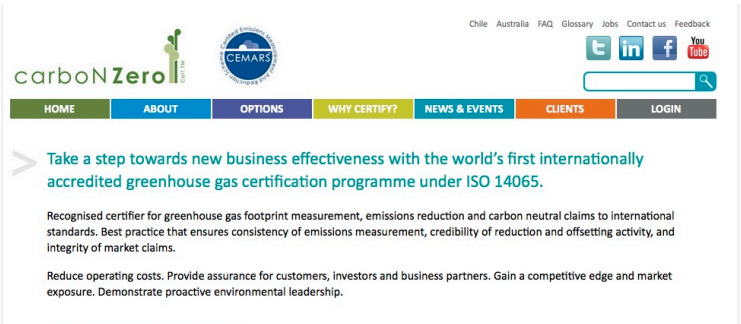
One approach would be for water-efficiency labels to be internationally certified to ensure the adoption of industry best-practice and standards. The global ISEAL alliance is setting benchmarks to strengthen sustainably standards and labelling and includes schemes such as Fairtrade, FSC and the Sustainable Agriculture Network. ISEAL's Codes of Good Practice have been set up as global references for developing credible standards[23]. However, to be of use in water-efficiency certification the ISEAL codes need to be expanded from just a standards-based approach to encompass a wider variety of certification processes including using an Expert Panel. For eco-labels using full product lifespan assessment the Global Ecolabelling Network (GEN) is providing a platform to set criteria for comparable products/services with the same functions[24]. GEN is a non-profit association of twenty-five third-party, environmental performance leadership labelling and certification organisations from around the world with the objective to promote and advance eco-labelling internationally.

In order for water–efficiency labels to be cross-compliant on an international level credibility, visibility and reliability are essential. In future, organisations such as GEN and iSEAL Alliance are essential for the improvement of international eco-labelling providing clear and internationally accepted standards.

Case Studies

Case Studies in the beverage sector

- Tree Hill is a winery in New Zealand that uses the CarboNZero eco label to leverage its brand and differentiate from other competitors. The company has put a lot of effort in minimising its adverse environmental impacts that lead to awards of its environmental management, waste management and energy conservation.



- Cascade Pure was launched as "Cascade Green" Carbon Neutral Beer in March 2008. It is a low carbohydrate, preservative free beer. Cascade use accredited schemes to offset production emissions, and use vegetable inks on the label and a lightweight bottle. The company did a lot of publicity for Cascade Pure and it won the Tasmanian Premier's Award for Climate Action.

  However the beer has recently been discontinued. The brewery's press release stating that 'unfortunately, Cascade Pure lost its way and it will no longer be available. It is sad to see it go, but at the end of the day it is consumers that delete products, not us."

Case Studies in the Dairy Farming sector

- Dairy Farmer Jervois reclaimed vacuum pump seal water into the pre/treatment raw water storage saving 5 ML a year. The cost of the pump and pipework was $1000 and paid for itself within three months.
- Tatura Milk Industries invested $ 98000 to reuse pump seal water, saving $ 48000 and 51 ML of water per year. Other initiatives reduced trade waste by 113 ML a year.
- Murray Goulbourn Koroit increased the volume of its CIP recycle tanks capturing caustic soda and water, that was overflowing into the wastewater system. It saves about $15000 in chemicals per year and has reduced water consumption by 6 ML.

ii, Water Efficient Technologies.

An additional 96 new products and services were identified as potentially fitting within Smart WaterMark's water-efficiency certification.

As with the previous year, the research was preliminarily focussed on technologies that directly use water efficiently or reduce the use of water across a system. However, in parallel with research on produce grown and processed efficiently, the scope of search was widened to include both horticultural processes and intensive water-using processing technologies.

The development of the Global Water Footprint Network and Alliance for Water Stewardship standards were both catalysts for identification of new technologies as industry best practice is promoted through these schemes (as identified in the *marketing produce using the best value of water* research above).

A number of challenges were identified during the research including:

- Identification of technologies repurposed from different industry sectors to horticulture;
- How to deal with the issues of embedded and virtual water in products.;
- Weighing the costs and benefits of water efficiency versus wider environmental issues - especially as the Expert Panel certification process does not involve product full lifecycle footprint assessment of products.
- Identification of new products and emerging technologies as they came to market; and
- Identification of prototype technologies and practices that showed great potential yet had barriers to commercialisation.

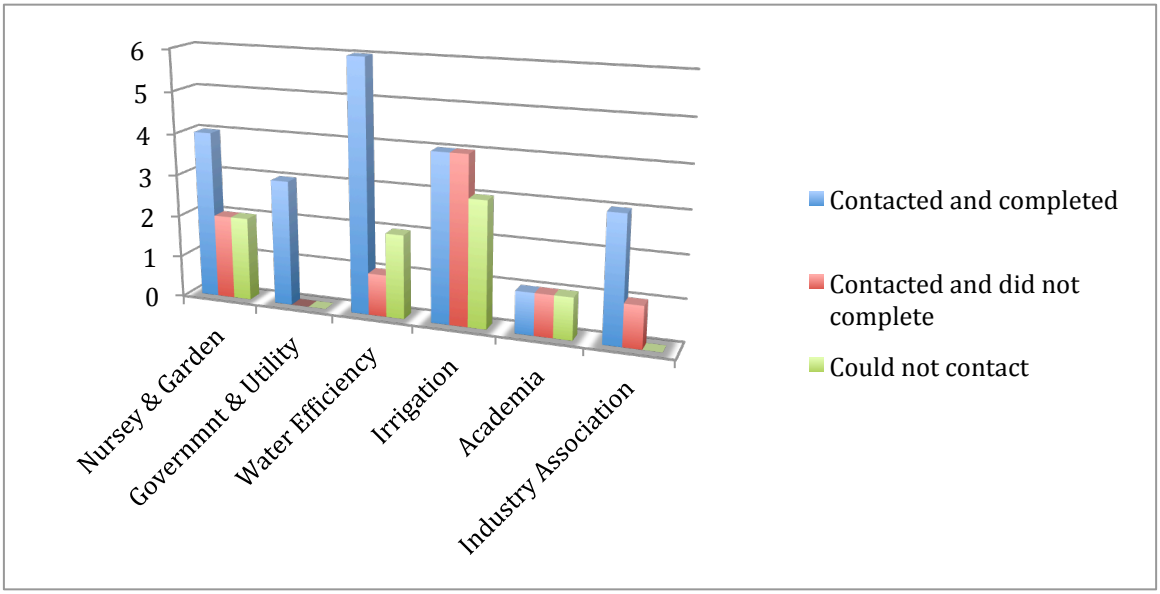
The database of potential water efficient products has comprehensive (albeit new technologies are always coming to market) coverage of products in the following sectors: rainwater harvesting; grey-water treatment systems; drip and spray irrigation systems; sprinklers; automatic irrigation systems and controllers; mulches; wetting agents and soil amendments.

Other sectors are still not as well researched and need further investigation including: peri-urban and broad-acre irrigation systems; processing technologies for agricultural produce; green roof and wall systems (especially re. water/energy use); and water sensitive urban architecture.

iv, Industry Survey.

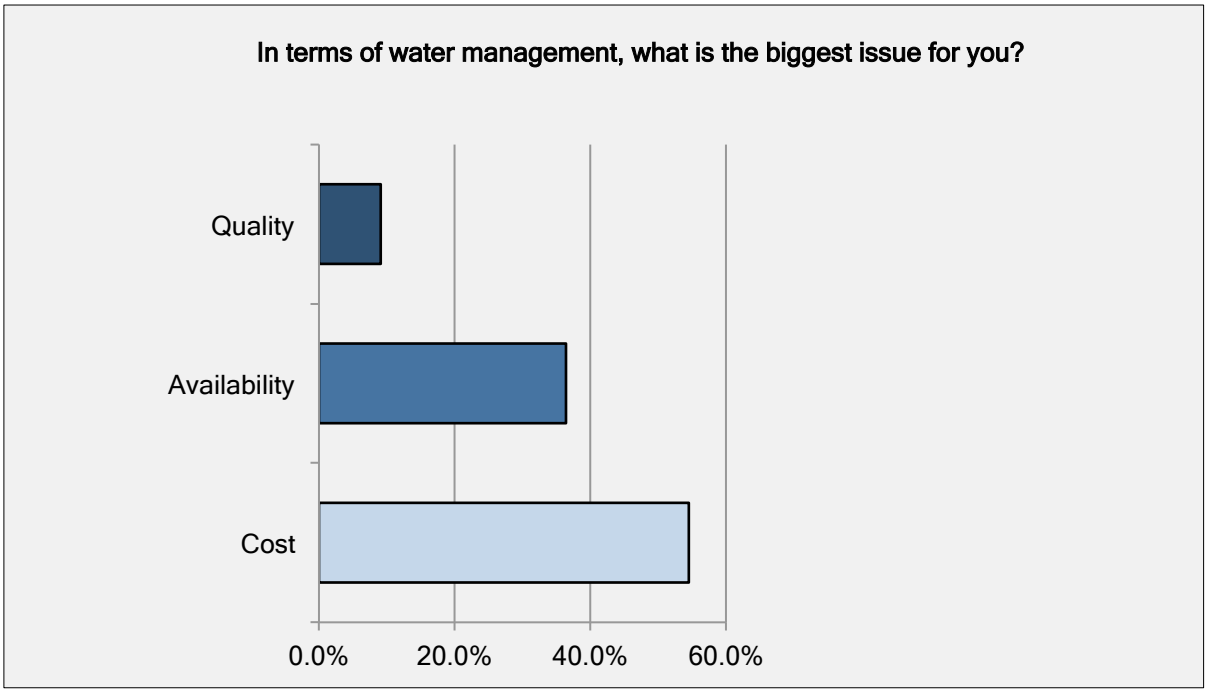
Water Management

38 organisations were contacted by telephone, of those 21 were reached directly, all of who proceeded to complete the survey. A link to the survey was then emailed to 17 organisations with one respondent completing the survey online.



Of the 22 respondents, 45% felt that water management had not changed as an issue within the last year, while 32% felt it had become less of an issue and only 23% felt that it had become more of an issue.

The majority of respondents felt that cost was the biggest issue in water management (55%), representing a marked increase from 2012. Conversely, fewer respondents felt that availability was the biggest issue (36%), down from the previous year. Very few respondents felt that quality was an issue (9%).

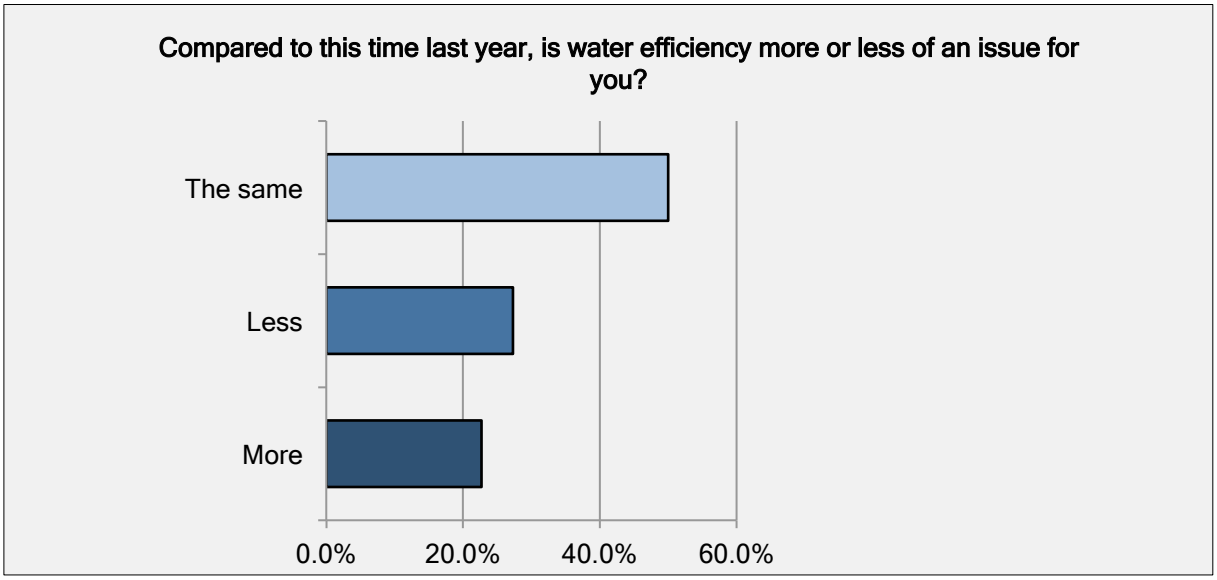


Water Efficiency

50% of respondents felt that water efficiency had not changed as an issue within the last year. Of those who did note a change, 23% felt that it had become more of an issue while 27% felt that it had become less of an issue. These findings highlight a divide amongst industry bodies regarding the status of water efficiency and water management.

Of those who felt that the issue of water efficiency had changed within the last year, climate was cited as the most popular reason (31%), with cost following closely behind (23%). An additional reason identified by several respondents was the changing political agenda, and the associated lack of current education.

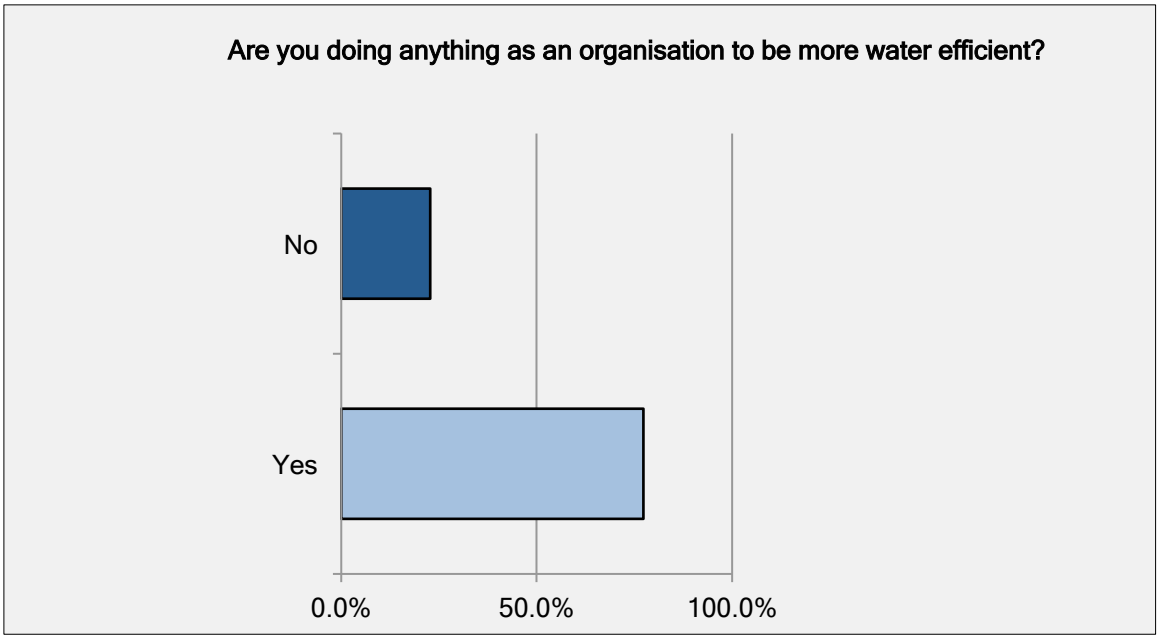
When asked what was stopping people from becoming more water efficient, 43% identified that it was too expensive and another 43% felt that people didn't see the benefit. Only 14% of respondents felt that becoming water efficient was too difficult. Some respondents also voiced concerns over misinformation and ignorance as additional barriers.



Water-Energy Nexus

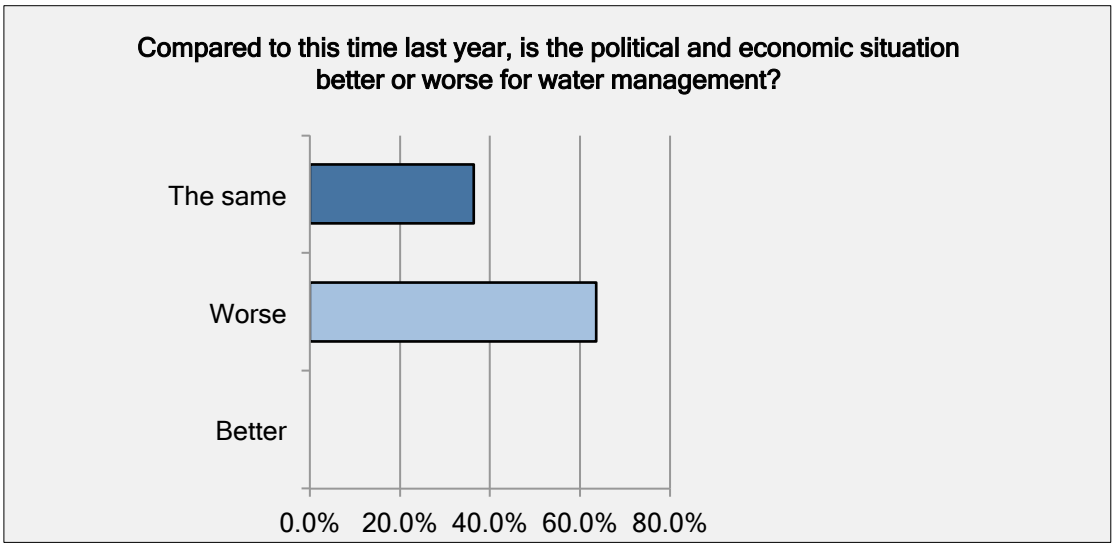
The links between water-saving and energy-saving measures appears to be increasing, with 68% pursuing measures to be more energy efficient and 77% pursuing measures to be more water efficient. These results mark a noted increase from the 50% of respondents in 2012 who engaged in both water-saving and every-saving measures.

The range of water-saving activities pursued by organizations was diverse, including a range of activities such as: taking a cold shower, using underground water instead of sprinklers, installing a 33 000 L rainwater tank, moving to an entirely new water-efficient building, creating partnerships with garden industries and replacing high water-use gardens with pavement.



The Political and Economic Situation

The majority of respondents (64%) felt that the political and economic situation for water management had worsened over the last year, with the remaining 36% citing no significant change. No respondents felt that the political and economic situation had improved for water management.



The Climate Situation

Similarly 45% of respondents felt that the geographic climate had also worsened for water management over the past year, while another 45% felt that the situation had not changed. Only 10% of respondents felt that the situation had improved.

Barriers to Certification

Respondents were also asked to identify the biggest barrier to getting products and services certified by water efficiency labelling schemes, such as SAWM and WELS. The largest barrier identified was cost (23%) followed by time (14%). Only one respondent felt that complexity was the biggest issue. Additional barriers identified by respondents included: a lack of incentives, a lack of knowledge about the scheme, and apathy. A significant number of respondents also reported that they felt that there

were no significant barriers to certification. Overall, this signifies a market failure whereby water efficiency is not given enough of a level of importance outside of times of drought. This failure needs to be addressed by economic regulation and certification programs such as SAWM and WELS.

iv, Water and Energy Nexus in Rainwater Harvesting.

Over thirty different sources (articles, reports and power point presentations) of information on rainwater harvesting and the water energy nexus were collected into a databank and summarised in a bibliography (attached as an appendix to this report). The research fell into the following areas: pump studies, rainwater tanks energy consumption, economic evaluation of rainwater, water-energy nexus, costs and benefices of rainwater tanks, history of pump standards and rainwater pump modelling.

The bibliography contains a brief description of each of the research organized in chronological order (by year). A number of reports and studies were found to be extremely relevant, including data regarding different types of pumps, different brands and energy consumption/costs.

In addition to published research collected a number of relevant ongoing projects were identified the CSIRO/Smart Water Fund's Rainwater harvesting customer use and perception project (to be published later this year).

It became apparent throughout the research that there was only basic energy consumption information available for irrigation pumps used in the Australian horticulture sector. Internationally the situation was similar with irrigation pumps not included in the US EPA's Water Sense or the American Irrigation Industry's Smart Water Applied Technologies programs.

The energy data from the E3 program listed the energy efficiency of 48 pumps. However these were predominantly for use in the pool sector and as a voluntary rating scheme only included the best performing pumps. In addition, both the international Pacific Gas and Electric company's Advanced Pumping Efficiency Program and Food Service Technology Centre only list energy consumption for pool and heat pumps.

Of the organisations contacted through this research, the pump manufacturers were the only group not to fully engage in the research. However, pump data from most manufacturers is available including: dimensions, electrical data, operating/operation limits, materials of construction, hydraulic performance for pressure, water source and dual water source systems.

Water Efficiency Certification

The independent Technical Expert Panel holds three certification rounds over the year, in which 16 new technologies and services were submitted for assessment. Of these, four products and one service have been approved, further information has been requested in support of six further applications. At the June Panel meeting six new applications are to be assessed along with four submission of further information.

Over the year the Expert Panel also reviewed licenses for 61 products and services, of which eight were requested to supply further information prior to renewal. Smart WaterMark certification lasts for two years and renewal is conditional on the product or service still delivering best practice in water efficiency. This recognises continuing improvement in water-saving technologies and corresponding raising of benchmarks for Smart WaterMark certification.

A full listing of all SAWM certified products and services can be found on the smartwatermark.info web site and iSaveH2O app.

Guidelines

Industry Guidelines have been developed to give further information on the evidence required, testing methodologies and efficiency benchmarks required to meet Smart WaterMark certification. Guidelines published to-date relevant to the nursery, irrigation and turf industries include: Irrigation Equipment; Plant Pots; Mulches; and Soil Amendments for Increasing Soil Water Retention and Services.

Discussion

Awareness of water remains the most significant environmental issue with the Australian public despite the flood-drought cycle having a corresponding impact on interest in water conservation. In addition, businesses are utilising more efficient practices and technologies in their production and are looking to leverage market advantage from their efforts. As such, there is a significant opportunity for growers and processors to gain market advantage through water-efficiency labelling. To have maximum impact with consumers, retail and civil society a third party certified eco-label would be a more believable tool than self-certification by industry.

Water efficiency benchmarking and labelling is leading to market transformation, as industry better understands the costs benefits associated with efficiency savings. This is driving innovation and resulting in a steady improvement in the efficiency of technology across a range of industry sectors. Labelling also offers businesses a platform to communicate their commitment to corporate social responsibility especially in industries that traditionally have high water-use.

Successful stories such as the case study of Tree Hill show that there is a huge opportunity in eco-labelling in the food and beverage sector. However the recent demise of Cascade Pure is a timely warning to ensure sufficient market research is undertaken to understand drivers to why consumers purchase 'green' products and which consumers are buying labelled products. Both Tree Hill and Cascade used environmental labelling to leverage their brand, telling a story and target a niche market by carbon-efficient production processes. However in the Cascade case marketing effort did not convert into the expected uptake in sales.

In contrast, in the dairy industry case studies, farmers introduced sustainable water-saving innovations with economic benefits and promising long-term success without certification or promotion of their efforts. So whilst the dairy farmers have profited from increasing production efficiency they missed an opportunity to leverage marketing advantage through certification and promotion of their sustainability credentials.

There are two main areas where Smart WaterMark has an opportunity to support industry and promote the best use of water: labelling of 'water efficient' produce, and international expansion.

Labelling 'water efficient' produce

Smart WaterMark currently certifies products and services that use water efficiently or enable the use of water efficient technologies. Labelling horticultural produce that has been grown and processed using water efficient practices would be an expansion of the current scope of the label. To expand the current label there are three possibilities: expand the scope of the current label, creating a new associated label for water efficiently produced products; or collaborating with another eco-label to embed Smart WaterMark's criteria, guidelines and efficiency benchmarks as the water element within the wider eco-label.

There are pros and cons in each of the three options. Expanding the current label would have maximum impact from a brand recognition perspective but may cause confusion between the certification of water efficient technologies and sustainably grown/processed produce i.e what will help people save water as opposed to what has already saved water. Creating an associated label – such as using the same graphic but replacing the words - would be a better way of leveraging brand recognition and reducing this confusion at point of purchase. With water being only one of several environmental inputs in sustainable horticulture and farming the third option of collaborating with a wider "sustainability" label is an interesting opportunity. This third option could have least benefit for Smart WaterMark brand recognition, but is worth investigating if significant water efficiency savings can be made. This option should be investigated for produce where water efficiency labelling would have lesser impact than a wider sustainability label, or where there already exists a well-recognised eco-label that doesn't yet have a water efficiency element within its certification.

It is recommended that Smart WaterMark investigates the second option; developing an associated label for produce grown and processed using best practice in water efficiency and market testing to

gauge interest with consumers and industry stakeholders. In addition opportunities for embedding Smart WaterMark certification in wider eco-labels should be investigated where appropriate.

International water efficiency labelling.

Despite the rapid growth in the number of sustainability labels over the past ten years, there has been relatively few water efficiency labels developed, and these covering only a few countries. Internationally Australia is a market leader with the 'sister' schemes WELS and Smart WaterMark. The USA, Singapore and more recently mainland Europe and the UK have started to develop local efficiency labelling schemes alongside the development of minimum efficiency standards. However, the predominant focus with water efficiency labels has been on residential plumbing products. In horticulture and associated irrigation industry sectors there has been little activity apart from the Smart WaterMark label and the US WaterSense label and associated SWAT program.

Manufacturers with certified water-efficient technologies are already promoting the Smart WaterMark label in international markets, indicating a potential gap in the market. There is significant opportunity for international expansion of certification especially in outdoor and non-residential water use such as in the irrigation sector. There are two main models for internationalisation of Smart WaterMark's water-efficiency certification:

Firstly the development of cross compliance and agreed standards between national water efficiency labels and schemes. This could allow manufacturers to have certification from one country recognised within the efficiency-labelling scheme of a second company. The key issue in this approach is that the divergent models developed for each labelling program will not easily allow for simple comparison. For example the US WaterSense program and Smart WaterMark have developed quite different approaches to certification and governance; the WaterSense program being run through the US Federal Government utilising water efficiency standards and benchmarks whilst Smart WaterMark is a not-for-profit industry/government partnership using Expert Panel assessment against a set of criteria and efficiency guidelines.

The second opportunity is to expand the jurisdiction of Smart WaterMark certification to new countries. This expansion could help raise awareness of the label internationally and would give currently certified technologies access to new markets. There would also be wider industry benefit to manufacturers, distributors and retailers using a single internationally recognised label. If this approach were to be taken it is recommended that the current Expert Panel process would continue with co-option of national industry experts to advise on regional issues. This would ensure quality control of the certification process whilst expanding the knowledge of the Expert Panel.

It is recommended that Smart WaterMark engages with international stakeholders to investigate opportunities and interest in collaboration to expand coverage of certification.

There was a 6% rise in residential water consumption in 2012/13[1]; the first time there has been a significant increase in Australia since 2007. To ensure better tracking of water efficiency in the community the annual Newspoll water saving consumer national omnibus survey (2006-2011) needs to be reinstated. In addition, with the recent announcement of the closing of the National Water Commission, the future of a key national water use datatset: *the National Performance Report* (NPR) is in jeopardy[2]. The NPR allows comparison of water data between utilities, at State and at a national level and has comparative longitudinal data back over 10 years (originally published as *WSAA Facts*). With the current budget restrictions and deregulation agenda, it is vital that core tools and datasets are protected to ensure future water management is underpinned by sound scientific data.

1 http://www.nwc.gov.au/publications/topic/nprs/npr-2013-urban/4-water-resources

2 https://au.news.yahoo.com/a/23770095/concern-small-cuts-to-federal-government-agencies-and-programs-could-have-larger-effects/

Technology transfer

A key element of the project has been to ensure industry has been involved in the development and dissemination of research. Industry leaders were consulted at the formulation stage of all pieces of research to ensure relevance to industry.

Dissemination of the research and guidelines has been through stakeholder forums, displays at industry events, presentations to industry groups, supported with production and distribution of research reports, newsletters and electronic communications.

Communication activities[3] to raise awareness of the project are listed below:

- Hosting an Industry Stakeholder Forum at *Green Expo Sydney*. The event was chaired by NGIA CEO Robert Prince and included a presentation on international water efficiency certification by Smart WaterMark CEO, Julian Gray;
- Presentations of the HAL/Smart WaterMark project to industry stakeholders at Eco Expo (including a panel session with David Suzuki), Irrigation Australia Conference, , Water Services Association of Australia Board and WSAA Customer & Industry Policy Network; and Green Expo Sydney;
- Displays, posters and promotion of the project at industry events including: National Water Week; Sustainable House Day; OzWater '14; Green Cities; Eco Expo; Irrigation Australia Conference; Landscape Australia Expo; TAFE Sustainability Fair; and Green Expo Sydney;
- Hosting the presentation of the Smart WaterMark *Product of the Year Awards* including the non-residential water efficient *Product of the Year* category;
- International extension of the program to the International Water Association, US Alliance for Water Efficiency and Waterwise UK;
- Promoting the program in seven certificate holder, stakeholder and consumer eNews over the year (over 1,700 recipients), Irrigation Australia's *Backwash* eNews (11 editions July-June);
- Disseminating information about the program in industry media – sample clippings of articles from the Irrigation Journal and Australian Water Management Review attached in the Appendix to this Report;
- Promotion of certified water efficient technologies through the Smart WaterMark consumer and industry web sites and iSaveH2o app and through the WA Waterwise Approved program; and
- Promoting the program through Twitter, Facebook and YouTube and Linkedin water efficiency networks.

[3] Copies of communication materials and research summaries are attached as appendices to this report

Recommendations

Key recommendations for future research and development are:

- Further investigation to identify of the barriers to adoption of water efficient certification, technologies and practices.
- Further research to identify and certify services enabling water efficiency in the nursery and garden, landscape and irrigation industries;
- Reinstating the annual Newspoll water saving consumer national omnibus survey to track water efficiency in the community;

Key recommendations for practical application to industry are:

- Development of a pilot project to identify issues in certification water efficiently grown and processed produce.
- Stronger linkages made between SAWM water efficiency research and the national 20:20:20 Vision campaign
- Development of a tool showing the water and energy costs and savings from different rainwater harvesting systems – specifically with a focus on energy efficiency of pumps.
- Development of international cross compliance between water efficiency certification and labelling schemes.

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Rainwater Harvesting and the Water Energy Nexus: A Bibliography

February 2014

This bibliography was undertaken for Smart WaterMark as part of a wider research project: Developing water efficiency in the horticultural market - identifying best practice and leveraging marketing advantage.

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Title: Life Cycle Assessment and Life Cycle Costing of Water Tanks as a Supplement to Mains Water Supply

Author: Mark Hallmann, Tim Grant and Nicholas Alsop

Year: 2003

Objective: The goal of this study is to provide YVW with reliable information on the possible environmental and economic benefits in the use of water tanks in its region, and in particular: the environmental and economic benefits and costs of 600L and 2250L water tanks used for garden watering and toilet flushing applications, to provide advice to reduce the environmental impacts of water tank production and use while maximising water saving benefits, and to understand the implications of increased use in water tanks, in particular to the water production and distribution infrastructure and stormwater management infrastructure.

Conclusion/findings: The overall additional annual impacts of having a water tank installed (for energy and greenhouse impacts), are roughly equivalent to 20km of car driving and 60km of car driving for the 600L and 2250L tanks respectively. This suggests that the absolute impacts of the water tank are not large in proportion to other impacts.

The energy and greenhouse impact of the tank scenarios Pumps currently being used for small domestic water tank applications may be oversized and inefficient given the task required. Neither the 600L nor the 2250L tank pay back within the 30 years under current water prices and the assumed life of the tank and its component. If water prices were approximately 25% higher, the 2250L tank would pay back in 30 year.

There are a range of improvements and optimisation which can reduce the overall impacts of the water tank and bring it closer, in energy and greenhouse terms, to the impacts of reticulated water supply.

Further work comparing the energy efficiency of water tanks, as a water conservation measure, compared with other strategies, would be of value.

Title: Residential Water Use Efficiency Savings
Research and Investigation of Water Saving Measures

Author: Queensland government- department of natural resources and mine

Year: 2005

Objective: The objective of this project is to verify and report on the real water savings and life cycle costs associated with domestic water saving measures

Conclusion/Findings: This research has incorporated papers and publications from Australia, the United Kingdom and the United States of America. Whilst it is acknowledged that all these reports and studies contribute to the confirmation that there are definite savings to be achieved by installing these water efficiency devices, the evidence is not conclusive.

Title: Choosing a Pump for Rainwater Harvesting

Author: Matthew P. Jones, E.I. and William F. Hunt, P.E., Ph.D. Biological and Agricultural Engineering North Carolina State University

Year: 2006

Objectives: The article talks about of how pumps operate and how they are selected will ensure that an efficient and appropriate pump is included in the water-harvesting system design.

Title: The cost-effectiveness of rainwater tanks in urban Australia

Author: Marsden Jacob Associates

Year: 2007

Rainwater Harvesting and the Water Energy Nexus: A Bibliography

Objective: The National Water Commission has commissioned Marsden Jacob Associates to evaluate the cost-effectiveness of domestic rainwater tanks in urban Australia, assisted by discussion with industry, researchers and State Government agencies.

Conclusions/Findings: Cost efficiency is only one factor affecting an individual's decision to install a rainwater tank. Others include avoidance of water restrictions, concern for the environment, improved taste and community-mindedness. The yield and cost efficiency of tanks varies substantially between individual properties and locations. In the five cities examined, the single most influential variable in determining the cost efficiency of a tank was the size of the connected roof area. Other variables that influence cost efficiency include the size of the tank, the areas into which the tank is plumbed, the local climatic conditions and the volume of household water use.

Title: Energy use in the provision and consumption of urban water in Australia and New Zealand

Author: SJ Kenway, A Priestley, S Cook, S Seo, M Inman, A Gregory and M Hall. - CSIRO Australia and Water Services Association of Australia

Year: 2008

Objective:

- provide a first national snapshot of energy use through the urban water system including an estimate of "whole of system" energy use from bulk water providers through to retail distribution;
- to create context for the energy dialogue by expressing utility energy use within the "total urban system" and residential energy use for water heating;
- to estimate how future water management choices may influence energy demand; and
- to undertake preliminary analysis of related areas of energy-related greenhouse gas emissions and embodied energy use in water sector based on available data.

Conclusion/Findings: Efforts to minimise fuel-related greenhouse gas emissions from water service operations need to focus attention on minimising the use of imported electricity. Internal energy sources, such as biogas, can reduce the use of the more greenhouse-intensive coal-based electricity.

Generally little information is available regarding the energy use of decentralised systems (e.g. rainwater tanks, backyard bores).

Future water strategies that consider water efficiency as well as the energy implications of water use will offer far greater scope for reductions in greenhouse gas emissions than consideration of energy use by utilities alone.

Title: Rainwater Tank Design and Installation Handbook

Author: Australian Rainwater Industry Development Group, Master Plumbers And Mechanical Services Association Of Australia And National Water Commission

Year: 2008

Objectives: to provide practical information for the collection, storage and use of rainwater within private, multi-unit, community and commercial properties for the uses specified. It draws extensively on information from state, territory and national guidelines and standards across Australia (Section 21 – Appendix), for the management and use of rainwater to provide technical solutions that meet these guidelines and standards.

Title: Analysis of Water and Energy Conservation of Rainwater Capture System on a Single Family Home

Author: Caitlin Grady and Tamim Younos - Virginia Polytechnic Institute And State University Blacksburg

Year: 2008

Objectives: to analyse and compare the efficiency of two decentralized water systems, i.e., groundwater and rainwater harvesting systems that are implemented in a single household.
Specific research objectives are:

- Determine energy efficiencies of groundwater and rainwater harvesting systems
- Determine the specific energy required to run the dual system, i.e., the rainwater capture as well as the groundwater system
- Compare costs of each system including installation, maintenance, and daily usage.

Conclusion/Findings: the only unit responsible for the energy efficiency of both the groundwater and the rainwater systems is the pump. In comparing the energy efficiencies of the two systems, because the major factor in determining energy was solely based on the pump unit, the efficiency could have easily been changed with a different or more efficient pump. In theory, a rainwater harvesting system would be more energy efficient because water capture and storage requires no energy whereas to withdraw water up from a well is thought to be much more energy intensive.

Title: Water-energy futures for Melbourne: the effect of water strategies, water use and urban form

Author: Kenway, S.J., Turner, G.M., Cook, S. and Baynes, T - Water for a Healthy Country Flagship Report

Year: 2008

Objective: A key objective of this work was to improve the understanding of the complex interrelationships between urban water and energy and improve debate on this topic which is often focussed on very specific options. An important sub-objective was the desire to describe the influence of relevant policy levers (particularly water policy) in context with the total energy and water throughput of Melbourne: or Melbourne's metabolism.

Conclusions/ Findings: Urban form was identified as a major influence on water demand and it also influences stormwater flows. A more compact urban form led to savings of around 100 GL in water compared to continued urban sprawl of Melbourne. This is due primarily to the reduction in outdoor water consumption.

Water services strategies differed substantially with regard to their total impact on energy use. When all new demand is met by desalination, energy use for water services approximately triples above current levels. This is some 3-4 PJ more energy than if other water options (including demand management) were employed to meet the demand. However, when this increase is placed in context with the total energy consumption for Melbourne the increase is less than 1% of total urban energy use. Desalination provides the obvious benefit of a reliable water source that is not dependant on rainfall. This is especially pertinent given the projected decreases in catchment in flows due to climate change. The increased energy intensity of desalination could potentially be offset through a shift to end-use demand management strategies and solar hot water systems. Wastewater reuse would also demonstrate similar benefits potentially at lower energy intensity; however, a 20% reuse scenario was the maximum level of reuse simulated in this analysis.

Title: The cost effectiveness of residential rainwater tanks in Perth

Author: Marsden Jacob Associates (the report was prepared for Water Corporation and the Department of Water).

Year: 2009

Objective: is to provide information on rainwater tanks for a range of uses and users, including both water industry professionals and the wider community.

Conclusion/Findings: three factors have a significant impact on rainwater tank yields in Perth:

- roof size used to capture the rain;
- water usage regime (in particular, the level of internal water use); and
- the size of the tank installed.

-The water from rainwater tanks is relatively expensive in comparison to alternative sources for supplying the IWSS.

-We note that the volume of water available from rainwater tanks in the short term is relatively small compared with many of the larger scale water supply options currently being considered. However, in the longer term (2030), as the number of installations cumulatively increase, rainwater tanks could contribute a total volume of between 2% and 12% of the supply-demand gap of 120 GL.

Title: The Water Energy Nexus: Investigation into the Energy Implications of Household Rainwater Systems

Authors: Monique Retamal, John Glassmire, Kumi Abeysuriya, Andrea Turner and Stuart White.

Year: 2009

Objective: The research was initially broad in nature but due to the current major policy decisions being made, significant data gaps found and preliminary research observations, it was decided to focus primarily on the energy intensity of rainwater tank configurations at the lot scale within the broader water-energy nexus context. It is intended that this research assist much-needed further investigation in this field and provide background information for policy makers, researchers and practitioners involved in planning and managing future water service provision, which involves distributed urban water efficiency and source substitution.

Conclusion/findings: A major conclusion of this research is that there are very large potential efficiency gains that can be made in the design and operation of small pumps, with a factor of more than 20 between the theoretical minimum and the average energy intensity. The identification of the most cost-effective opportunities to reduce the energy intensity represents the most important next steps in this research. The results of this research project have significant implications for the future of distributed water supply systems.

Title: Recycling – at what cost? Treatment standards vs. Risk, Carbon and Energy. Presentation at the 2010 Australian National Water Recycling & Technology Conference

Author: Guenter Hauber-Davidson - Water Conservation Group Pty Ltd.

Year: 2010

Overview: This presentation shows rainwater harvesting within the context of the wider water cycle and the asks the following questions:

- Alternative water sources – why are we doing it?
- Is recycling inherently “sustainable”?
- What other impacts are there? How great are they?
- Why treating to the required standard instead of what is technologically possible is important?
- How this jacks up the carbon content of reuse water.
- How to select the most sustainable option.

Conclusion/Findings: Through a number of practical examples the presentation identifies some of the complexities in the water energy nexus, and that there are no simple solutions to choosing the most sustainable option:

- Need to think more holistically, think in systems
- Trading off water efficiency vs. energy efficiency/savings
- A cost in everything we do
- Using recycled water is not necessarily “better”
- Find a solution that fits the needs rather than what is technologically possible choose carefully.

Unpacking the energy implications of distributed water infrastructure: how are rainwater systems performing?

Authors: Monique Retamal and Andrea Turner.

Date: 2010

Abstract: Drought and concern over climate change has led to the increased use of distributed water systems in Australia to supplement centralised supply systems. A literature review carried out by the Institute for Sustainable Futures (ISF) into the energy consumption of water infrastructure found that very little data on energy consumption exists, particularly for distributed systems. This paper reviews the findings of the literature review and presents results from a preliminary monitoring study on the energy implications of household rainwater systems. Typical household systems that are currently being installed in houses cross Australia use approximately 1.5 kWh/kL.

Title: Life cycle water analysis of a residential building and its occupants

Author: Robert H. Crawford & Stephen Pullen.

Year: 2011

Objective: The research described in this paper estimates total water consumption arising from conventional urban living using an Australian residential building and its occupants as a basic unit of the built environment

Conclusion/Findings: This study has shown that direct water consumption is a small proportion (6.4%) of life cycle water usage of a residential building and its occupants. The indirect water embodied in the materials used to construct, maintain and refurbish the dwelling over 50 years was 9.7% of the total. However, this is far exceeded by the water embodied in goods and services consumed on a regular basis, especially food, at 46% of the total life cycle water demand of the residential building and its occupants.

Title: Rainwater tank study of new homes - Energy and Water: How much and why

Author: Andre Boerema – Smart Approved Watermark, Stakeholder Forum.

Year: 2011

Objective: An overview the impact of NSW BASIX planning requirements on rainwater harvesting and efficacy of implementation across a number of households in Sydney

Conclusion/findings:

- Rainwater tanks were shown to successfully save water to expected levels when installed properly.
- Significant issues arising from poor design, implementation and maintainance of systems.
- There are easy steps to improve the sustainability of urban tanks.
- Tanks and pumps need to operate well or customers' may not use the tank.
- Selecting pumps that operate efficiently at flow rates between 5 and 10 L/min the most critical factor for reducing energy demand when plumbed for use in toilets.
- Pressure tanks have been shown to be an effective way to lower pump energy costs where there is mixed use of rainwater, such as irrigations versus indoor use.

Title: Dissecting Rainwater Pump Energy Use in Urban Households

Author: Tjandraatmadja, G, Pollard, C., Sharma, A. and Gardner, T. – CSIRO

Year: 2011

Objective: This study investigated the water flow characteristics and the operation of pumps used for rainwater supply in a controlled residential environment (a model house) to understand the factors impacting on the energy footprint for rainwater supply in urban areas.

Conclusion/Findings: Pumps commonly installed in urban households for rainwater supply operate more efficiently for high flow applications (>15 L/min). However, typical end uses for mandated rainwater supply,

such as toilet flushing and washing machine cold water tap, often operate at flows much less than 15 L/min. This in turn causes pumps to operate in their low energy efficiency range resulting in a high specific energy compared with traditional potable water supply, e.g. 0.68 kWh/kL for Brisbane (Kenway et al., 2008). Better matching end uses needs and pump size can improve energy efficiency significantly to less than 1.5 kWh/kL, resulting in a lower energy footprint than sea water desalination (3.6 kWh/kL (SEWL, 2009)) or Indirect Potable Reuse (2.8-3.8 kWh/kL (in NSW, 2006)), the common alternatives to supplement dam sourced potable water. Other devices such as pressures vessels can also contribute to reduce energy requirements if adequately sized.

Title: Initial Investigation into Governance and Management Models for Rainwater Tank Systems Urban Water Security Research Alliance Technical Report No. 50

Author: Magnus Moglia, Grace Tjandraatmadja and Ashok Sharma

Year: 2011

Objective: This report aims to explore the issues of management of rainwater tanks in SEQ urban areas by addressing the following research questions:

- · What is the current institutional context of rainwater tanks in SEQ?
- · What is known about the condition of rainwater tanks?
- · Is there a need for a new governance mechanism for rainwater tanks in SEQ?
- · What are the possible mechanisms for governance of rainwater tanks in SEQ?

Conclusions/Findings: It is clear on the basis of this research that there is a real concern about rainwater tanks and their O&M amongst a fairly large group of people. If the perceptions of how often rainwater tanks fail are anything to go by, then inspections and regular maintenance are critical to ensure that a decent. Some initial concepts and ideas of suggested governance arrangements have been laid out, but there is a real need to go from these rough sketches towards detailed and practical solutions. This, however, requires the cooperation of a number of stakeholders as well as legitimisation of options by further deliberation and selection. proportion of tanks are in good condition and providing adequate benefit to the community

Title: Rainwater tank monitoring report A 12-month one-minute interval data study of rainwater tank water savings and energy use for 52 real life installations

Author: Matthew Ferguson – Sydney Water

Year: 2011

Objective: The study's principal objectives were to confirm that rainwater tanks in real life installations save water as expected and if they were not, to identify opportunities to further increase water savings and reduce their pumping energy use.
Conclusion/ findings: To improve energy performance, monitoring has shown that correct rainwater pump selection is critical. The monitoring shows that the while rainwater tanks are already successfully achieving water savings, there are a number of easy practical steps that installers/builders can take to improve the overall

sustainability of rainwater tank use A sustainable tank system is one that is easy for householders to use and maintain if properly configured. It needs to be configured to maximise the potential for rainwater use by connecting as many end uses as possible and connecting as much roof area as possible. The tank needs to be sized

according to these outcomes. Using pumps that are energy efficient at low flow rates, possibly complemented with pressure tanks, can reduce energy use. Simple information needs to be available to customers to reduce the risk of easy losses (eg alarms about leaks that increase energy use). This type of system would increase average water savings and reduce rainwater tank pump's energy intensity to better than surface water supplies in some cases. Even with these improvements, rainwater tank installations would remain a relatively expensive water source with their levelised cost typically between $4 a kL and $8 a kL.

Title: Climate, Energy and Water Nexus Project

Author: The Australian National University and the United States Studies Centre

Year: 2011

Objective: the energy water nexus is a key example of the challenges and opportunities for better cross-sectoral management by business and government, if we are to develop more sustainable communities. AUSCEW focuses on identifying examples of good practices from industry and synthesizing this information to better inform decision-makers in business and government. Ultimately, we will identify and communicate tools to avoid perverse impacts and promote co-benefits across sectors in decision-making for a more sustainable society.

Conclusions/ Findings: Responding to climate change and sustaining freshwater resources are two of the greatest challenges facing society. To different degrees all forms of energy draw on water in their production, and so climate change policy choices between different sources of energy have considerable implications for water. The Australia – United States Climate Synergy and Water Nexus (AUSCEW) project aims to identify the links below climate, energy and water policies to identify how to avoid perverse impacts and favour mutually beneficial solutions.

Title: Optimisation of Energy Use in Household Rainwater Supply Systems
Urban Water Security Research Alliance Technical Report No. 89

Author:_ Grace Tjandraatmadja, Chris Pollard, Ashok Sharma and Ted Gardner - The Urban Water Security Research Alliance (UWSRA).

Year: 2012

Conclusions/ Findings: The research highlights that there is a large variation in the energy usage associated with rainwater supply for urban dwellings. Design of the rainwater pumping system with proper selection of ancillary components has potential to reduce the energy usage in rainwater pumping systems. To achieve optimal energy use for rainwater supply, it is necessary to first understand the operational aspects and limitations of the various system components.

Overall, increasing the access to information on how system components operate and water requirements of various appliances in urban dwellings is the most effective tool to improve design for energy efficiency. The research can also encourage pump and other accessories manufacturers to come up with energy efficient products for rainwater supply systems.

Title: Investigation and Monitoring of Twenty Homes to Understand Mains Water Savings from Mandated Rainwater Tanks in South East Queensland
Urban Water Security Research Alliance Technical Report No.63

Author: Shivanita Umapathi, Meng Nan Chong1 and Ashok Sharma

Year: 2012

Objective: As the implementation of plumbed rainwater tanks is still relatively in its infancy, an in-depth understanding of the effectiveness of rainwater tanks through actual monitoring or process validation of their contribution towards mains water savings is important for water professionals and policy makers. Hence, this study aimed to provide an improved insight into the real world performance of plumbed rainwater tanks in SEQ.

Conclusions/Findings: Examination of the energy consumption characteristics of the rainwater pumps showed that the average energy consumption for the 20 households of 71.2 kWh/hh/yr. The mean energy consumption in nine 'trickle top-up' homes was 86.3 kWh/yr compared to 64 kWh/yr for the 11 'automatic switching device' homes. The reason for this considerable difference is that trickle top-up systems route all water (rainwater + mains water top-up) through the tank and pump system, whilst the automatic switching devices bypass the tank when supplying "back up" mains water. The median specific energy for the pumping systems at 19 homes was 1.52 kWh/kL with the median SE for homes with trickle top-up systems

(1.59 kWh/kL), being slightly higher than those with automatic switching devices (1.46 kWh/kL). However, further research is required to compare the energy demand of rainwater tank systems with dam water, dual reticulation recycled water and desalinated sea water.

Title: Proposed Strategy Portfolio for the Management of Rainwater Tanks: the South East Queensland Case

Author: Magnus Moglia, Grace Tjandraatmadja1, Andrea Walton, Ashok Sharma, Shiv Umapathi and John Gardner

Year:2012

Objectives: A key charter in this study is to develop an action strategy for the management of rainwater tanks in a way that involves stakeholders (defined as per Nandalal and Simonovic, 2003) in an active manner.

Conclusions/findings: It is important to ensure that the investment in rainwater tanks is properly used to deliver desired outcomes in terms of mains water savings without posing any serious health risk. There is a growing body of evidence to indicate that the risks of such events need to be managed. This research highlights the need for a three-part approach involving good tank design, installation and maintenance. The research findings indicate that all three of these areas can be improved to deliver an outcome that supports satisfactory maintenance of rainwater tanks in the future.

Title: Rainwater Tanks in SEQ – Urban Water Security Research Alliance

Author: Ashok Sharma

Year: 2012

Objectives: It's a fact sheet reporting briefly Alliance researches on rainwater tanks.

Conclusions/findings: The research indicated that correct pump sizing and informed selection of system components could significantly improve energy efficiency to less than 1.5 kilowatt hours per kilolitre of water. Furthermore, households with automatic switching devices use about 25 percent less energy than those with trickle top-up. The best results are achieved when the intended end use of the water is matched to the pump size and system configuration.

Title: 5 years of Urban Water Research in South East Queensland 2007-2012

Author: Urban Water Security Research Alliance

Year: 2012

Objective: research program to look more closely at three areas:

- Reducing water grid demand.
- Ensuring water quality.
- Planning for efficiency and sustainability.

A growing population and healthy economy will ensure SEQ faces increasing pressure on its water resources in coming years. While the precise nature of future rainfall change remains uncertain, predicted climate change is likely to bring

more extreme flood and drought events, which will add to the challenges to water security created by urban growth.

Conclusion/ Findings: Correct pump sizing and informed selection of other components in residential rainwater tank pump systems ensure domestic rainwater delivers a smaller energy footprint than desalination and recycled water.The overall impact on energy consumed of a number of rainwater system variables (eg, pump size, header tanks, pressure vessels and infrastructure pipe size) to determine the potential to increase the energy efficiency of rainwater tank systems for a single storey dwelling.

Title: Economics of Scale Analysis of Communal Rainwater Tanks
Urban Water Security Research Alliance Technical Report No. 67

Author: Thulo Ram Gurung, Ashok Sharma and Shivanita Umapathi

Year: 2012

Objective: The aim of this study is to conduct an economic assessment of an individual rainwater tank and also the economics of scale of a communal rainwater harvesting system, on the basis of cost per dwelling. To achieve this goal, a desktop study was conducted to quantify the whole-of-life costs of both these systems using the net present value (NPV) method of life cycle costing.

Conclusions/findings: The total NPV for an individual 5 kL rainwater tank system was estimated to be $8,568 with capital costs making up the highest proportion followed by maintenance and replacement costs. Operation costs contributed the least to the overall cost per household, which was in agreement with a life cycle cost assessment study carried out by Stewart (2011). Sensitivity analysis on discount rates showed that final results are affected more by lower than higher rates, with the replacement cost component being the most sensitive to this parameter. Optimal housing scale for communal rainwater tank provision was observed to be between 192 and 288 households with the minimum for this study occurring around 200 dwellings and total NPV per household at $10,150. Capital cost was the most influential component of total costs, with pipe costs affecting households on larger scale developments. Treatment costs were most influential for developments with less than 96 households. Ongoing costs were not as influential on final cost values.

Title: Water – Energy – Carbon links in households and cities: a new paradigm

Author: The University of Queensland, the Smart Water Fund, Melbourne's water utilities and relevant Victorian Government agencies.

Year: 2012

Objectives:

- Understand water and energy connections in individual households.
- Characterise "household types". This will develop an understanding of different households and build a dataset of relevance to city-scale simulation.
- Understand city-scale water-related energy use and greenhouse gas emissions by using detailed household data and other city-scale information.
- Identify opportunities to reduce water-related energy. This will quantify the water and greenhouse gas reduction potential of a range of options including technological, behavioural and policy changes.

Conclusions/Findings: Anticipated outcomes from this project are:

- • Understanding of the interconnection of water and energy in individual households, groups of households and at city-scale.
- • Identification of variables that have the greatest impact on water and energy use.
- • Evaluation of technical, behavioural and preliminary policy scenarios for water-energy at household and at city scale.
- • Information relevant to finding least-cost solutions for communities.
- • Informed future analysis of the water-energy-carbon linkages in the industrial sector is a possible extension of this project with further considerable scope to influence urban water and energy use.
- • High quality research publications.

Title: EU Pump Regulation

Author: Niels Bidstrup, Associate Member ASHRAE

Year: 2012

Objective: The eco-impact evaluation (done by AEA Technology2) revealed that the environmental impact of a circulator is dominated by use-phase electricity consumption. As a result, the ecodesign requirements (set out in commission regulation 641/2009/EC) focus on energy efficiency requirements.

Conclusions/findings: The ecodesign requirements for water pumps will imply that 40% of the worst water pumps in terms of efficiency will be prohibited from the EU market. The savings of 3.3 TWh (1 million MMBtu) per year will not prevent an increase in energy consumption in 2020. A new methodology for water pumps is under development by Europump. The Methodology, the Extended Product Approach, will be based on an EEI similar to that for circulators. It

Title: What Is The Energy-Water-Carbon Nexus?

Author: Steven Kenway – Smart Water Fund

Year: 2013

Conclusions/findings: The energy-water-carbon nexus represents the 'interconnections' or 'cause-and-effect' relationships between these three elements. When there is a connection, a change in one leads to a change in another. For example, more water supply requires more energy for pumping and treatment. It also means more wastewater pumping and treatment. More energy use typically produces more carbon and also consumes more water, for example for cooling power plants.

Title: Performance Analysis of a Communal Residential Rainwater System for Potable Supply: A Case Study in Brisbane, Australia

Author: Stephen Cook & Ashok Sharma & Meng Chong

Year: 2013

Objective: this paper reports on a communal approach to rainwater harvesting, where the water is treated for potable use. A communal approach to rainwater harvesting can offer benefits, such as: economies of scale for capital costs, reduced land footprint, centralised disinfection and flexibility in matching supply and demand for different households.

Conclusion/Findings: communal approach could provide a reliable potable water source to a small urban development. However, there was an energy penalty associated with this water source compared to centralised systems that could be addressed through more appropriate pump sizing. The outputs from this monitoring and modelling study demonstrated rainwater harvesting can be expanded beyond the current mainstream practices of household systems for non-potable use in certain development contexts. The analysis contained in this paper can be used for the improved planning and design of communal approaches to rainwater harvesting.

Title: Energy Audit – Jackie's Wholesale Nursery

Author: M. Scobie, A.D. McHugh - National Centre for Engineering in Agriculture (NCEA) University of Southern Queensland

Year: 2013

Objectives: At the request of NGIQ under their Farm Management System program an energy investigation was to be conducted on Nursery plant production in SE Qld. The primary aim of this energy audit program was to develop a methodology to conduct audits. To date, this has not been done or documented specifically for the nursery.

Conclusions/Findings: Energy saving opportunities can be broadly categorised into two groups: those that require management changes and those that require infrastructure changes.

The payback period for this investment would be 6.0 years, assuming:

- · A current pump efficiency of irrigation industry standard (40%)
- · An improved efficiency of 60%
- · A replacement life of 10 years
- · Electricity costs will increase by 4% per year

Title: Role of Standards in Pump System Energy Reduction

Author: David G. McKinstry Colfax Fluid Handling

Year:2013

Objectives: This paper identifies organizations involved in the process, it highlights the current universe of standards and importantly suggests where Power Drive System standards are necessary to fill the pump industry's 2015 and beyond needs.

Conclusions/findings: Clearly pump standards developing organizations have moved beyond their historic scope of application, dimensions and test to embrace energy reduction. It appears that arena will not be theirs alone as energy reduction requirements will flow from government regulations or certification programs. In this broadened world of standards we will likely see development of blended multi technology standards covering motors / drives / pumps and labelling. And since the current core work is being developed on a regional basis there will be growing demands for globalization.

Title: Review of Rainwater Tank Cost- effectiveness in South Queensland

Author: Murray R. Hall

Year: 2013

Objectives: This report provides an estimate of the cost-effectiveness of rainwater tanks in a number of Local Government Areas (LGAs) of South East Queensland (SEQ). The estimates drew upon recent research in the Urban Water Security Research Alliance which provided data about variables of cost and yield for rainwater tanks in the region. Probability distributions for the input variables were used to generate probability distributions for the levelised cost. The levelised cost is a measure of cost-effectiveness commonly used in the water and energy sector allowing an appropriate comparison of cost-effectiveness across a range of alternative investment options. This approach considers the physical flow of water as a revenue stream and assumes that the unit cost of water (the levelised cost) as well as the discount rate is constant over the period of analysis. Benefits such as deferred augmentation of the water supply for water authorities, reduced impact of water restrictions for the household and water sensitive urban design benefits for receiving waters were not included.

Conclusions/findings: The results of the analysis were not directly comparable to the results in Marsden Jacobs Associates (2007) The cost-effectiveness of rainwater tanks in urban Australia (MJA 2007). The MJA 2007 report considered the avoided cost to the household for purchasing water from the centralised water supply. This approach does not allow comparison of the cost-effectiveness of rainwater tanks with centralised supplies because the later is also included in the calculation of the former.

The 'Basic Scenario' had a 50-year period of analysis, a 3% discount rate based on government bond rates and maintenance based upon current practice. The rainwater tank cost-effectiveness in SEQ for this scenario was an average levelised cost of $9.22/kL with lower and upper limits of a 95% confidence of $6.73 and $12.77/kL. In comparison, the 'Alternative Scenario' had a 6% discount rate, a time frame for infrastructure appraisal of 25 years as well as maintenance according to recommended practice. The SEQ average levelised cost for this scenario was $14.11/kL with lower and upper 95% confidence limits of $10.27 and $19.62/kL.

The variation in rainfall across the SEQ region also had an effect on the cost-effectiveness of rainwater tanks. In addition, the relatively poor performance of the least cost-effective rainwater tanks may have been underestimated in this study by using a triangular distribution which truncated the upper and lower range of

the tail. Additional sampling is required to determine the likelihood of very large values, which are currently considered as outliers, and to develop a more appropriate distribution. This in turn may suggest the need for quality control on the set-up of rainwater tanks to ensure expected performance in a location. Finally, some variables may not be independent and the current calculation of cost-effectiveness may require further analysis

Smart Approved WaterMark Expert Panel Terms of Reference

The Smart Approved WaterMark Expert Panel has been set up to independently assess the applications of products and services wanting to receive the Smart WaterMark accreditation. It comprises six members who are appointed by the Smart Approved WaterMark Steering Committee. The term of appointment is two years with a change over of no more than three Expert Panel members within any 12-month period. One Expert Panel member is appointed by the Steering Committee as an Independent Chair of the Expert Panel.

Expert Panel members receive a sitting fee[1] and are reimbursed for out-of-pocket expenses incurred in executing their duties. Membership of the Expert Panel may be terminated by the Steering Committee or Expert Panel member with one month's written notice by either party.

Role & Responsibilities:

The role and responsibilities of the Expert Panel include:

- Consider applications from product manufacturers and service providers seeking to receive the Smart Approved WaterMark accreditation.
- To take decisions by consensus.
- Apply the criteria of the scheme to all applications and recommend any changes to the criteria to the Steering Committee as appropriate.
- To request further information from applicants – if there is insufficient information available upon which to make a decision.
- Ensure products and services awarded the Smart Approved WaterMark reflect the core values of the brand.
- Where warranted by the Expert Panel – reject or withdraw any approval, ensuring that the reasons for any such decision are shared with applicants or participating companies.
- Where practicable, attend meetings of the Expert Panel, either in person, teleconference or by email (estimated at four meetings per year).
- Other than the actual decision about an application, to treat all other matters discussed within the meetings of the Expert Panel as confidential.
- To register in the Smart Approved WaterMark Register of Interests any private interest[2] which might influence their judgement or which could be perceived (by a reasonable member of the public) to do so.
- To declare any potential conflict of interests and abstain from the decision-making process before the panel discusses such an item.
- To review and modify accreditation criteria as required, and implement, subject to the approval of the Steering Committee.

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[1] Presently $6,000 per annum for members and $12,000 per annum for the Chair. However, to be reviewed by the Steering Group on an annual basis.

[2] Relevant personal direct and indirect pecuniary interests, and personal non–pecuniary interests, including those which arise from membership of clubs and other organisations.

Selection Criteria for Expert Panel Members

The selection criteria for Expert Panel members include:

- Demonstrated extensive experience in one of more of the following areas:

  nursery/horticultural industry;

  irrigation/landscape industry;

  plumbing industry;

  related education industry (i.e. TAFE, College and/or University); or

  other water industry experience (e.g. water engineer).

- A degree of recognition at a state and/or national level for expertise in one of the above areas.
- Experience in dealing with application-based schemes would be advantageous.
- A demonstrated commitment to water conservation.
- A sound understanding of the issues facing the water industry in Australia, along with industry, retail and consumer needs.

Selection Process

The selection process for the Expert Panel shall consist of:

- Identification of possible nominees by the Steering Committee.
- Identification of a possible independent Chair for the Expert Panel.
- The appointment of a small Selection Panel to oversee the selection process.
- If it is considered that there are insufficient names available from the Steering Committee, to advertise nationally calling for applications.
- The Selection Panel will recommend the appointment of members to the Expert Panel subject to approval by the Steering Committee.
- Members of the Expert Panel will be appointed for a period of two years.

Guidelines for Applicants

This is one of a series of guidelines to help applicants to the Smart Approved WaterMark, Australia's water conservation label. A core activity of Smart WaterMark is to identify and certify products and services that help households and businesses get the best value from water.

Applications to the Smart WaterMark are assessed by an Independent Technical Expert Panel against the following four criteria:

1. **Water Saving -** The primary purpose of the service is directly related to getting best value from water use where there is a direct correlation between the use of the product and water efficiency.
2. **Fitness for Purpose -** Supporting documentation (such as technical specifications, instructions and marketing material) helps ensure that users get the best efficiency benefits from the service.
3. **Meeting Regulations and Standards -** The service is of high quality and meets industry standards, and customer and community expectations.
4. **Environmentally Sustainable -** The service, while satisfying the above three criteria, is environmentally sustainable, and that in making water efficiencies the service will not adversely impact on the environment in other areas.

The Expert Panel needs verifiable independent evidence that the service achieves the water savings claimed in the application, specifically through independent testing, case studies or comparative reports. Please note, unsubstantiated marketing claims are not regarded as evidence of water saving.

The Smart WaterMark stakeholder web site has further information on the application process including timetables, fees and online application forms at: www.smartwatermark.info

If you have any questions about these guidelines or your application please contact the Smart WaterMark national office.

Email: info@smartwatermark.info

Landline: +61 (0) 2 9223 3322

Smart WaterMark Expert Panel, GPO Box 915, Sydney, 2001

Skype: Smart_WaterMark

Guideline 9. Services

Services certified by the Smart WaterMark Expert Panel generally fall into three main categories, with organisations offering one or a combination of the activities listed below:

- Design services – developing designs and plans for water efficient systems.
  Example: Hydro-Plan's Independent Irrigation Design Consultancy.
- Implementation services – installing new and/or retrofitting water efficient systems into households, businesses and on-farm.
  Example: Water Group's Water Management Consultancy.
- Training services – providing training courses and materials leading to best practice in water efficiency.
  Example: Irrigation Australia's Irrigation Efficiency Training Course.
- Certification services – certifying industry best practice and use of water efficiency technologies and processes, and undertaking audits of business practices.
  Example: Nursery & Garden Industry Australia's EcoHort certification.
- Water efficient services – providing a service, which through technology and processes uses significantly less water than other similar services.
  Example: Mulholland Painting a painting service that recycles all waste water.
- Communication services – implementing social marketing and communication campaigns to help households or businesses make more effective use of water.
  Example: Queensland Water Commission's Efficient Irrigation for Water Conservation Guideline.

Evidence needed for Smart WaterMark Expert Panel

As part of the application process the Expert Panel request the following evidence from services:

- If the service involve demonstrations, information, advice and/or educate about ways to reduce potential water wastage and/or use water more efficiently please provide case studies, verifiable testimonials or third party testing which demonstrate how implementation of the service has resulted in water savings.
- Does the service involve demonstrations, information, advice and/or educate about ways to design and install water efficient products to reduce potential water wastage and/or use water more efficiently?
- Does the service involve on-site auditing or reviewing current water using behavior and appliances?
- Does the service provide on-site design, usage and/or maintenance advice to ensure water use is efficient and minimize wastage?
- Is the service promoted?
- Does the service have a complaints resolution process?

The WaterMark

Smart Approved WaterMark

smartwatermark.info

Australia's label identifying and certifying products and services that use water efficiently

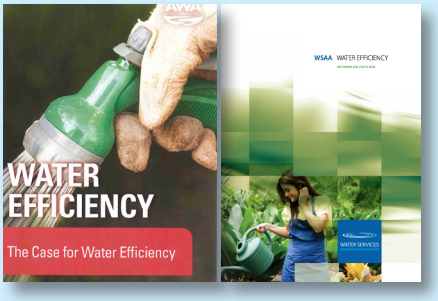
Our vision is of an Australian public that is aware of and actively engaged in water efficiency.

Efficient Water Use

The importance of water efficiency in the management of water across Australia is highlighted in position papers from Australian Water Association and Water Services Association Australia.

A key issue identified is the difficulty of predicting future rainfall patterns in a context of complex regional systems and wider climate impacts; recently re-affirmed by the forecasted strengthening of El Nino weather patterns.

With additional pressure on water supply from population growth in Australia, the debate about water-use has moved from crisis management during drought to framing water efficiency within a wider sustainability context. Water efficiency labelling remains one of the most cost effective demand management tools.



Stakeholder Forum

We're excited to hold our Stakeholder Forum at the 2014 Green Expo Sydney.

The Forum is an opportunity for you to hear about the scheme's latest developments, ask questions and express your views about the future development of Australia's water conservation label, Smart WaterMark.

GES Green Expo Sydney

Awarding Excellence

The winner of the latest Smart WaterMark *Consumer Product of the Year Award,* AquaTrip, is a permanent leak detection system for the home. JETS, a vacuum-based toilet system distributed by Vacuum Toilets Australia, won the *Commercial Product of the Year Award*.

This is the sixth year of the Awards. Products are judged by an independent Technical Expert Panel who look at innovation, design, marketability and sustainability.

Smart Approved WaterMark 2013 Product of the Year WINNER


JETS


AquaTrip

202020 VISION

20% MORE GREEN SPACES IN URBAN AREAS BY 2020

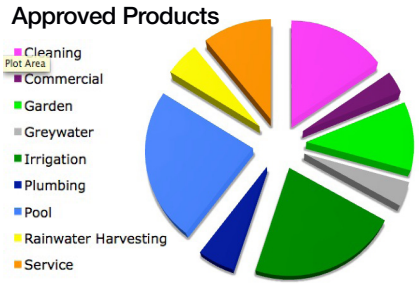
Smart WaterMark is proud to be a partner in the 202020 Vision campaign to increase green space by 20% across Australia's cities by 2020.

Visit 202020vision.com.au for more.

Supporting Innovation

Australia's water conservation label continues to grow with the independent Technical Expert Panel assessing over 650 products and services over the past six years. Around 50% of products assessed are certified as water efficient.

Gardening and Irrigation continues to account for the greatest proportion of certified products. Technologies approved to date range from mulches and wetting agents through to irrigation systems.



Over the last two years the number of applications from commercial products was greater than for household products. This reflects the scheme's expansion into the non-residential sector with a focus on commercial and industrial products in the nursery, irrigation and turf industries.

HAL Horticulture Australia

This project is funded by HAL using voluntary contributions from industry and matched funds from the Australian Government.

AWA australian water association · IRRIGATION AUSTRALIA · Nursery & Garden Industry Australia · WSAA WATER SERVICES ASSOCIATION OF AUSTRALIA

twitter @SmartWaterMark

Australia Leads in Water Efficiency Certification

DID YOU KNOW? Australian water efficiency labelling began in Melbourne in the 1980's, branding shower heads and dishwashers with an A or AA rating. In 1999 the voluntary AAA's water efficiency labelling program expanded, with management of the program by Water Services Association of Australia.

The 5A's program was split into two in 2005 creating the mandatory Water Efficiency Labelling and Standards (WELS) scheme and voluntary Smart Approved WaterMark program.

The efficient use of water is vital for the irrigation and horticulture industries with the production of food often requiring significant volumes of water; agriculture accounts for around 65% of Australia's fresh water use and food processing around 30% of manufacturing water-use.

Water efficiency certification is still in its infancy with few labels developed internationally. Despite global water scarcity concerns, water use certification has not experienced the same level of growth as other sustainability issues

The majority of international labels have a household plumbing focus with only Smart WaterMark and the US Smart Water Application Technologies and WaterSense Program covering efficient irrigation technologies. Smart WaterMark is a quality mark identifying technologies and practices that help get the best value out of water.

Name	Sector	Scope
European Water label	Bathroom products	EU
SWAT	Irrigation products	USA
Smart Approved WaterMark	Products & services	AUS
Water Efficiency Labelling & Standards scheme	Plumbing & household products	AUS & NZ
Water Efficiency Labelling Scheme	Plumbing & household products	SNG
Water Sense	Plumbing & household products	USA
Waterwise Marque	Plumbing & household products	UK

Working in Partnership

Smart WaterMark works closely with industry, government, water utilities and community organisations, embedding the label into wider demand management programs.

The label is utilised as the certification for a range of rebate programs including; the Living Victoria Water Rebate Program, and South Australia's H2ome home rebates.

In NSW priority is given to high WELS star rated and Smart WaterMark products through the government's Sustainability Policy.

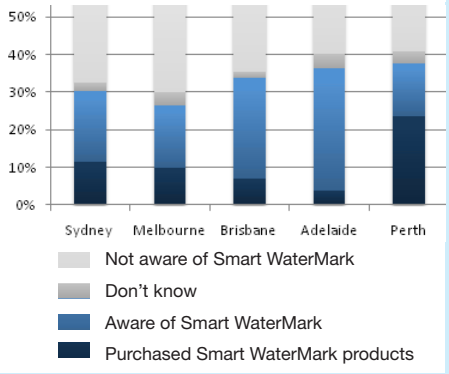
Smart WaterMark is written into WA's State Water Plan, with our certification is being used to underpin the Water Corporation's Waterwise Approved scheme.

Consumer Awareness

Awareness of Smart WaterMark remains high, despite governments and water utilities across many jurisdictions scaling back rebates for efficient products, and broader water efficiency programs.

Perth continues to be the city with the highest level of awareness and purchasing Smart WaterMark certified products remains Perth, reflecting the ongoing drought in the area and the use of Smart WaterMark certification to underpin the local West Australia WaterWise Approved program.

Awareness of Smart WaterMark and purchasing of certified products by city



"Households who buy Smart WaterMark products undertake twice as many water saving activities"

Householders who were aware of Smart WaterMark undertook more activities to save water around the home and garden than those who were not aware. 58% of people who had purchased Smart WaterMark products are undertaking five or more water saving activities, this drops to 47% of those people who are aware of the scheme but haven't purchased certified products, and only 31% of people who hadn't heard of the label.

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info@smartwatermark.info

Printed on FSC approved recycled paper

working with utilities
Smart WaterMark

Smart Approved WaterMark

smartwatermark.info

Australia's label identifying and certifying products and services that use water efficiently.

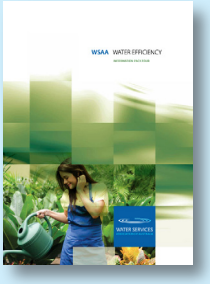
Our vision is of an Australian public that is aware of and actively engaged in water efficiency.

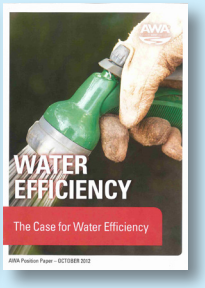
Efficient Water Use

The importance of water efficiency in the management of water across Australia is highlighted in position papers from Water Services Association Australia and Australian Water Association.

A key issue identified is the difficulty of predicting future rainfall patterns in a context of complex regional systems and wider climate impacts; recently re-affirmed by the forecasted strengthening of El Nino weather patterns.

With additional pressure on water supply from population growth in Australia, the debate about water-use has moved from crisis management during drought to framing water efficiency within a wider sustainability context. Water efficiency labelling remains one of the most cost effective demand management tools.

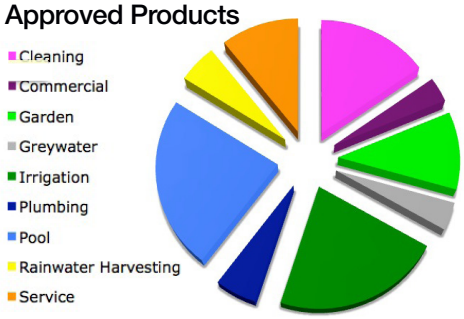




Smart Approved WaterMark Certification

Smart WaterMark is a not-for-profit program; a partnership between industry and government with a steering committee comprising representatives from Federal & State governments, water utilities and the founding industry Associations: Australian Water Association, Irrigation Australia, Nursery & Garden Industry Australia & Water Services Association Australia.

The scheme was set up with a Funding Deed with the Australian Government through the Water for the Future - Water Smart Australia Program and has been funded through a combination of application and license fees, direct funding and in-kind support from Industry Associations.



In 2011 a number of Australian water utilties invested in Smart WaterMark to expand the scheme into the non-residential sector resulting in 50% of aplications to the scheme now coming from this sector.

In addition to utility investment, we have diversified our funding base with support from States & Territories, Horticulture Australia and consultancy fees.

Since the scheme's inception, over 650 products and services have been appraised by an independent Technical Expert Panel, with over 320 of these approved to use the Smart WaterMark label. Technologies certified by the scheme range from garden products and irrigation equipment though to greywater and rainwater harvesting systems.

The benefits of Smart WaterMark to Australia's water utilities are:

- As a trusted brand, Smart WaterMark assists utility customers to select water efficient products and services, allowing them to achieve water efficiency goals in a manner of their own choosing.
- The scheme provides a common national approach to water conservation labelling for water utilities, as well as government, industry and retail.
- A national approach removes the need for individual utilities to duplicate the scheme's Expert Panel certification process making it the most cost-effective way of achieving water efficiency certification. For example, SAWM certification is used by the Water Corporation to identify products within the Waterwise Approved Program.
- The label provides water-saving accreditation to water utility efficiency programs and is a vehicle to assess and identify innovative water-saving products to drive market transformation.
- Helps customers manage and reduce water use and bills; especially residential outdoor use.
- Efficiency labelling has been shown to be the most cost-effective demand management measure.
- Smart WaterMark provides a national platform for water efficiency research including hosted web server for water efficiency information.
- The scheme has designed cutting edge water efficiency tools such as the iSaveH2O app, which can be used by utility customers.

202020™ VISION
20% MORE GREEN SPACES IN URBAN AREAS BY 2020

Smart WaterMark is proud to be a partner in the 202020 Vision campaign

Visit 202020vision.com.au

AWA australian water association
IRRIGATION AUSTRALIA
Nursery & Garden Industry Australia
WSAA WATER SERVICES ASSOCIATION OF AUSTRALIA

twitter @SmartWaterMark

Working in Partnership

Smart WaterMark works closely with government departments and water utilities, embedding the label as a co-brand into wider demand management programs. We are written into the NSW Government's Sustainability Policy and used as a key criteria in water rebate and demand management programs across the States & Territories.

We have been utilised as the certification for a range of rebate programs including; the Living Victoria Water Rebate Program, and South Australia's H2ome home rebates. We are also written into WA's State Water Plan and Smart WaterMark is being used to certify the Water Corporation's Waterwise Approved scheme.

Expert Panel Certification

An independent Technical Expert Panel reviews applications to the scheme. Panel members have a wide range of experience covering water conservation, horticulture, water utilities, irrigation, plumbing, education and retail.

Three application rounds are held each year year with products and services assessed against the following four criteria:

- **Water Saving:** The primary purpose of the product is directly related to reducing actual water use and/or using water more efficiently, where there is a direct correlation between the use of the product and water savings.
- **Fitness for Purpose:** Supporting documentation (such as instructions and marketing material) helps ensure that users get the best water savings/ efficiency from the product.
- **Meeting Regulations & Standards:** The product is of high quality and meets industry standards, and customer & community expectations.
- **Environmentally Sustainable:** The product, while satisfying the above three criteria, is environmentally sustainable, and that in making water savings the product will not adversely impact on the environment in other areas such as increased greenhouse gas emissions.

Leading in Water Efficiency Certification

Smart WaterMark is one of only a few water efficiency labels internationally.

Water efficiency certification is still in its infancy with few labels developed internationally. Despite global water scarcity concerns, water use certification has not experienced the same level of growth as other sustainability issues such as energy or carbon.

The majority of international labels have a household plumbing focus with only Smart WaterMark and the US Smart Water Application Technologies and WaterSense Program covering efficient irrigation technologies.

Smart WaterMark is a member of the global Water Footprint Network ensuring we have access to the latest research in this important and evolving field. In addition, we're a member of Water Stewardship Australia, promoting water efficiency within the emerging standards.

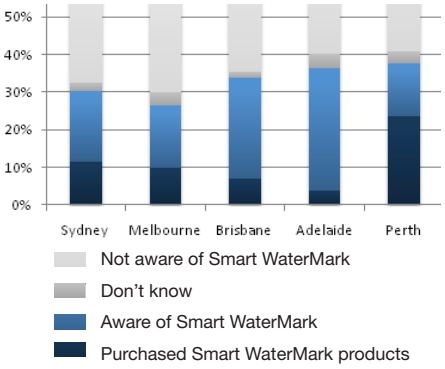
Name	Sector	Scope
European Water label	Bathroom products	EU
SWAT	Irrigation products	USA
Smart Approved WaterMark	Products & services	AUS
Water Efficiency Labelling & Standards scheme	Plumbing & household products	AUS & NZ
Water Efficiency Labelling Scheme	Plumbing & household products	SNG
Water Sense	Plumbing & household products	USA
Waterwise Marque	Plumbing & household products	UK

Consumer Awareness

Awareness of Smart WaterMark remains high, despite the lower profile of water efficiency programs.

Perth continues to be the city with the highest level of awareness and purchasing Smart WaterMark certified products.

Awareness of Smart WaterMark and purchasing of certified products by city



Householders who were aware of Smart WaterMark undertook more activities to save water around the home and garden than those who were not aware. 58% of people who had purchased Smart WaterMark products are undertaking five or more water saving activities, this drops to 47% of those people who are aware of the scheme but haven't purchased certified products, and only 31% of people who hadn't heard of the label. For more information and copies of all Smart WaterMark research visit smartwatermark.info

SAWM and WELS

Both Smart WaterMark and WELS evolved from the WSAA 5A's program. The two schemes are mutually exclusive and work well together, each covering different market segments.

The WELS star rating label is mandatory, used across a limited number product ranges which can easily be compared on their water consumption, such as tap-ware and domestic appliances.

Smart WaterMark is a quality mark using an independent Technical Expert Panel to identify only the most water efficient products and services. Certification is for a two year period, allowing for continuous improvement and raising of benchmarks.

As a voluntary program applications can come from any industry sector. Combined the schemes deliver the National Water Initiative commitments (91.i and ii)

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info@smartwatermark.info

benefit your business
Smart WaterMark

Smart Approved WaterMark

smartwatermark.info

Australia's label identifying and certifying products and services that use water efficiently.

Who We Are

Smart Approved WaterMark is Australia's water efficiency label. We are not-for-profit.

Our vision is of an Australia that is aware of, and actively engaged in, water conservation.

What We Do

- Identify and certify water efficient products and services.
- Provide consumers with an unbiased, independent resource so they may make informed choices.
- Underpin government and Utilities' water efficiency programs including rebates.
- Raise awareness of the importance of using water wisely.
- Promote innovation in water conservation.

The distinctive blue waterdrop label is promoted by water utilities and governments helping raise awareness of water efficiency with the Australian public.

Growing Business

Smart WaterMark provides you with a platform to promote your water saving credentials.

The Smart WaterMark stamp of approval on your product or service gives consumers confidence that water saving claims have been independently verified.

Being certified gives you access to rebate programs and other demand management activities.

You can also leverage your approval to ensure your product is being promoted through relevant government and utility schemes.

Some organisations use certification to help communicate their corporate social responsibility to stakeholders.

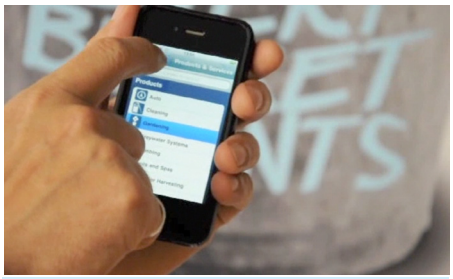
Helping You

Our online presence includes two websites, product and service lists, and Australia's first free online raintank calculator and iApp – iSaveH2O. We promote approvals and innovations through public relations and advertising campaigns.

We attend consumer and industry events across Australia and have events packs for License Holders and partners.

Our favourable relationship with various media outlets and publications allows for discounts and marketing deals for approved products and services.

Marketing collateral – there are many ways to promote your certification including postcards, brochures, point-of-purchase banners, business cards, stickers, creative use of the logo on your own website, business cards and product and pull-up banners for events.



Smart WaterMark's iSaveH20 app has a live listing of certified products and services in addition to being Australia's first raintank app

Australian Innovation

Since the scheme's inception, over 600 products and services have been appraised by an independent Technical Expert Panel, with over 300 approved to use the Smart WaterMark label.

Technologies certified by the scheme range from garden products and irrigation equipment though to grey water and rainwater harvesting systems.

Australian products approved by Smart WaterMark are now being promoted internationally across Asia, Europe and the US.

AWA australian water association
IRRIGATION AUSTRALIA
Nursery & Garden Industry Australia
WSAA WATER SERVICES ASSOCIATION OF AUSTRALIA

HAL Horticulture Australia

* This project is funded by HAL using voluntary contributions from industry and matched funds from the Australian Government.

How to Apply

An Independent Technical Expert Panel assesses applications to Smart WaterMark against four key criteria: water savings; fitness for purpose; meeting standards and regulations; and sustainability.

The stakeholder web site contains all the information you need to apply including guidelines for applicants and an online application form.

Costs

Smart WaterMark's schedule of fees has been designed to be affordable with a rising scale based on size of organisation:

Small Business < 5 employees	$385
Not-for-profit; Educational; & Medium Enterprises 6-20 employees	$770
Government & Corporate > 20 employees	$1,540
All figures include GST	

Our fees are excellent value for money when benchmarked against a range of environmental certification and ecolabels in Australia and internationally.

Application fees are one-off. Regardless of the number of times your application and further information is reviewed, we will only charge you the initial fee once.

If your product or service is approved, a two-year Licensing fee is incurred. Application, License and Renewal fees are all the same.

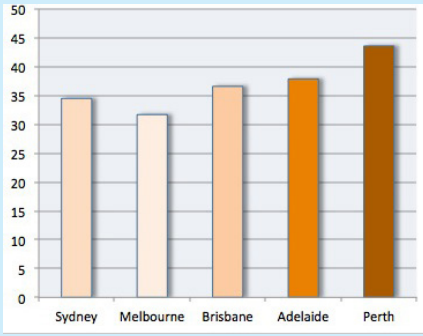
The smartwatermark.org consumer facing web site is interactive with online calculators and advice to helps consumers understand how to use water wisely around the home.

Growing Awareness

With seven products approved with the Smart Approved WaterMark scheme, Toro are striving for recognition with consumers of their products' water saving capabilities –and succeeding!

"Sales of both our Irritrol Rainsensors and our Irritrol Soil Moisture Sensors have grown significantly in the last 12 months, compared to the previous 12 months". States Marjoleine Lloyd, Product and Marketing Services Coordinator at Toro.

"We feel this can be attributed for a large part to Smart WaterMark. Promotion of the label is on the increase, and awareness amongst consumers about the label, and the approved products and services, is growing".



Consumer awareness of the Smart WaterMark label has grown to around 40% across Australia*

Covering Rebates

Smart WaterMark has certified over 35 pool covers. A minimum efficiency benchmark of 80% savings from evaporation has to be met in addition to stringent fitness for purpose guidelines set with industry. Because of this, Smart WaterMark certification is used to identify the most efficient covers to be included in rebate schemes such as the Victorian H2OME program.

Efficient Service

Both products and services can be approved by Smart WaterMark and sometimes the approval of a product can be leveraged by a service. The environmentally friendly and Smart WaterMark certified Dulux Envirowash tool-wash is used by Paul Mulholland's painting service as part of his efforts to use water efficiently, helping his service to also become certified.

** 2011 Newspoll telephone omnibus & online surveys.*

Waterwise Approved

We are proud to work in partnership with all major water utilities across Australia. In Western Australia Smart WaterMark is written into the State Water Plan and underpins the Water Corporation's Waterwise Approved program. This identifies water saving products specifically helpful to the WA environment. Only Smart WaterMark certified products are included in this program

Drink Beer, Save Water!

Commercial recirculation glass washers were identified in a Sydney Water study as an emerging technology with significant potential water savings – with over $1000 savings per annum per unit, compared to traditional 'wash and dump' units. Working with industry we set a minimum efficiency benchmark and now all key manufacturers have certified water efficient models.

Awarding Excellence

Home leak detection and vacuum toilet systems win the 2013 Product of the Year Awards.

Two innovative technologies have been celebrated with the Smart WaterMark Product of the Year Award this year. The Consumer Product Award has been given to Aquatrip leak detection system and Jets Vacuum Toilets system wins the Commercial Product Award.

2013 Product of the Year WINNER

Smart Approved WaterMark

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@SmartWaterMark

PRODUCT OF THE YEAR AWARDS

The shortlist for the annual Smart WaterMark Product of the Year awards have been announced as part of Australia's National Water Week.

Shortlisted products for Smart WaterMark's Product of the Year awards have been announced as part of Water Week.

Four consumer and four non-residential products were identified from water efficient technologies certified by Smart WaterMark over the previous year. Smart WaterMark's Independent Expert Panel judged the awards, reviewing certified water-efficient products for their innovation, marketability, sustainability and good design.

Irrigation is represented in the consumer award by Landscape Technologies' Acclima soil moisture sensor and controller.

Landscape Technologies' Acclima soil moisture sensor and controller has been shortlisted for the Smart Water Mark Consumer Product of the Year Award.

Other consumer award finalists are the AquaTrip home leak detection system; Waterco's MultiCyclone Plus Ultra pool filtration system and Healthy Building Systems carpet cleaner.

The non-residential award finalists are: Vacuum Toilets Australia's Jets vacuum system for commercial buildings; Defender, a commercial pool filter by Neptune Benson Australia; Dulux Group's EnviroSolutions Brush Washer; and CMAX by Hudson Resources Limited & ECOFIX a commercial filtration media used to treat wastewater.

FOLLOW US ON TWITTER

For the latest industry news about water efficiency and Smart WaterMark follow us on twitter @smartwatermark.

EXPERT PANEL MEETS IN FEBRUARY

Do you have an irrigation product or service that uses water efficiently? The independent Technical Expert Panel reviews new applications for Smart WaterMark certification in February 2014, and the closing date for submissions is 7 February.

Guidelines for irrigation products including: controllers; sensors; sprinklers and sprayers; drip emitters; and trigger nozzles have been developed with the irrigation industry and are free to download.

For more information, including application forms and guidelines, visit www.smartwatermark.info or call (02) 9223 3322.

Smart Approved WaterMark

VISION 202020

202020 VISION 20% MORE GREEN SPACES IN URBAN AREAS BY 2020

Smart WaterMark is proud to be involved in the NGIA's Vision 202020 campaign.

Why do we need a 202020 Vision?

Green spaces are vital to sustainable urban living, and as our populations continue to grow, the role of trees and gardens will become increasingly important. Not only do they look great, they're good for our health and productivity. They help reduce pollution, create oxygen and their shade protects us from sun damage and heat stress. The 202020 Vision is to see 20% more green space in urban areas by 2020, and you can help. By joining the cause you can make sure green spaces aren't overlooked in favour of concrete and bitumen.

HOW TO GET INVOLVED

Share your project with us. We seek all levels of projects that demonstrate green space leadership and embody a commitment to improving the way green spaces are valued and enjoyed. It can be anything from a small park tree planting project to a city high rise green wall initiative. Whatever the project is, we will map it and lend support to help create best practice in green urban areas.

Be an advocate. We are looking for people who lead by example - spokespeople for green spaces, who inspire and inform their industry and connections to join the cause and create change.

Become our partner. We seek partner organisations from government, construction, design, health, sustainability and academia. If you share the vision, share the badge.

Become one of our visionaries. Anyone can be a visionary. You just need to believe in our cause and help spread the word. Becoming a visionary is as easy as adding yourself through your Linkedin account.

AUSTRALIA LEADS THE WAY IN WATER EFFICIENCY CERTIFICATION

There has been a significant growth in sustainability certification globally with the number of eco-labels rising from 500 to over 13,000 over the last decade. These figures are from the Ecolabel Index, a global directory of sustainability certification, which tracks eco-labels in 197 countries across 25 industry sectors.

The increase in certification reflects a change in drivers for purchasing behaviour; a combination of suppliers and retailers responding to consumer demand. This is mainly driven by health and food safety concerns, coupled with non-government organisations promoting sustainability and market transformation through sustainability branding.

Despite global water scarcity concerns, water use labelling has not experienced the same level of growth or reach as other sustainability issues with water efficiency certification is still in its infancy with few labels developed internationally.

As the driest inhabited continent on the planet Australia has a long history of water conservation and the regulation of water-using products dating back to the 1920s. Historically, State and regional water authorities regulated plumbing products leading to the development of a national voluntary 5A's program managed by Water Services of Australia's (WSAA) in 1999.

The 5A's program was split into two in 2005 creating the mandatory Water Efficiency Labelling and Standards (WELS) scheme and voluntary Smart Approved WaterMark program. The WELS star rating shows water-use in household plumbing and white goods while Smart WaterMark is a quality mark identifying technologies and practices that help get the best value out of water.

Eco-labelling has grown hugely around the world in the last decade.

Name	Sector	Scope
European Water label	Bathroom products	EU
SWAT	Irrigation products	USA
Smart Approved WaterMark	Products & services	AUS
Water Efficiency Labelling & Standards scheme	Plumbing & household products	AUS & NZ
Water Efficiency Labelling Scheme	Plumbing & household products	SNG
Water Sense	Plumbing & household products	USA
Waterwise Marque	Plumbing & household products	UK

Despite the growth in eco-labelling, water use certification and labelling is still in its infancy.

Label	Name	Sector	Requirements	Range
abio	ABIO	Farming	Organic standards including water and soil.	BRA
	American Grassfed	Meat & dairy	AGA Grassfed Ruminant Standards	USA
	Blue Angel	Multiple	Health, climate, water & resource criteria	DEU
CSC	China Water Conservation Certification	Multiple	Water efficiency	CHN
	Dairying for Tomorrow	Dairy	Environmental management practices, water.	AUS
	Environment Tree Umweltbaum	Multiple	Health, climate, water & resource criteria	DEU
	Fair Flowers Fair Plants	Horticulture	Sustainable production of flowers and plants	EU
	Fairtrade	Food, Textiles, Cosmetics	Social, environmental and economic criteria including terms of trade.	Global
	Food Alliance Certified	Farming	Fair working conditions, animal welfare, sustainability & water resources.	CAN, USA, MEX
	Flower Label Program	Horticulture	Social and environmentally responsibility in flower production.	EU, ECU
	LEAF Linking Environment And Farming	Farming	Environmental standards in food chain	UK, IRL
	Milieukeur	Multiple	Environmental quality standards	NLD
made in Green	Made in Green	Textiles	Environmental and health across the supply chain	BEL, ESP, UK
	Processed Chlorine Free	Multiple	Water and energy use, chemistry, carbon gas releases.	Global
	Protected Harvest	Farming	Farm management, soil and water management, and air quality management	USA
	Sustainable Agricultural Network	Farming	Specific crops with to environmental and social standards.	Global
	Sustainable Wine Growing New Zealand	Wine	Environmental Management System & best practice	NZ
	Totally Chlorine Free	Food	Sustainability Index	Global
USDA	USDA Organic	Food	National Standards.	USA
	Veriflora	Cut Flowers & Potted plants	Environmental, sustainability and agricultural product quality.	CAN, USA
	LIVE (Low Input Viticulture and Enology)	Wine	Sustainable grape and wine production.	USA

Some of the internationally recognised eco-labels that include a significant water element and are relevant to horticulture and irrigation industries.

Most international labels have a household plumbing focus with only Smart WaterMark and the US Smart Water Application Technologies and WaterSense Program covering efficient irrigation technologies.

There are several eco-labels, however, where water efficiency is embedded alongside other sustainability issues. The photo above shows examples of internationally recognised eco-labels that include a significant water element and are relevant to horticulture and irrigation industries.

The efficient use of water is important for the irrigation and horticulture industries with the production of food often requiring significant volumes of water; agriculture accounts for around 65% of Australia's fresh water use and food processing around 30% of manufacturing water use. Of note is the fact that horticultural crops only use about 17% of total irrigation water yet account for over 40% of Australia's irrigated production, indicating the water efficiency in horticultural production over agriculture generally.

Horticulture Australia is funding research identifying the opportunities in widening the range of Smart WaterMark certification to international markets using voluntary contributions from industry and matched funds from the Australian Government.

To discuss water efficiency labelling or get a summary of the research please contact Smart WaterMark at: info@smartwatermark.info or call (02) 9223 3322.

Follow us on Twitter

For the latest industry news about water efficiency and Smart WaterMark follow us on twitter @ smartwatermark.

JULIAN GRAY, SMART WATERMARK, SYDNEY

APPLY FOR THE MARK

Do you have an irrigation product or service that uses water efficiently? The independent Technical Expert Panel reviews new applications for Smart WaterMark certification throughout the year. For more information, including application forms and guidelines, visit www.smartwatermark.info or call (02) 9223 3322.

SMART WATERMARK CRITERIA AND GUIDELINES

Smart WaterMark is Australia's water conservation label, set up to address the challenge of using outdoor water more efficiently. The scheme was devised by Irrigation Australia in partnership with Australian Water Association, Nursery & Garden Industry Australia and Water Services Association Australia. The purpose of Smart WaterMark is to identity and certify water efficient technologies and practices. The voluntary label is a quality mark used to promote only the most efficient products and services.

A key founding block of Smart WaterMark is the use of an independent technical expert panel to assess the efficacy of water-saving claims made by manufacturers and service providers. Panel members cover a range of expertise including: irrigation consultancies; universities; water utilities; retail; industry research and development and gardening. An independent chair ensures all the experts have a voice and all certification decisions are made by consensus.

Applications to the Smart WaterMark are assessed by the expert panel against the following four criteria:

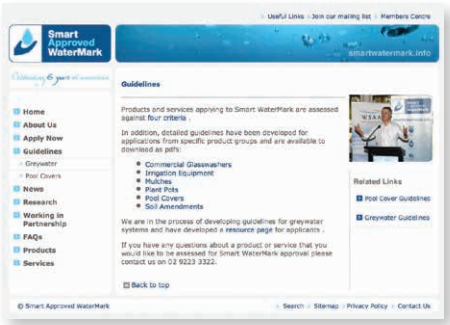
- **Water saving.** The primary purpose of the product is directly related to reducing actual water use where there is a direct correlation between the use of the product and water savings.
- **Fitness for purpose.** Supporting documentation (such as instructions and marketing material) helps ensure that users get the best water savings/efficiency from the product.
- **Meeting regulations and standards.** The product is of high quality and meets industry standards, and customer and community expectations.
- **Sustainability.** The product, while satisfying the above three criteria, is environmentally sustainable, i.e. that in making water savings the product will not adversely impact on the environment in other areas.

Applications to the Smart Water Mark are assessed on the basis of independent, verifiable evidence to justify claimed water savings submitted with each application. Applications that are not supported by this information will not be considered by the panel.

Specific guidelines for different technologies have been developed to advise applicants on the sorts of testing and evidence that could be used to verify water efficiency claims. Guidelines published to-date include: irrigation equipment; mulches; soil amendments and smart plant pots.

SUBMITTING AN APPLICATION FOR IRRIGATION EQUIPMENT

The *Irrigation Equipment Guidelines* cover a range of technologies including: electronic controllers, tap mounted controllers, sensors, sprinklers, sprayers, drip emitters, trigger nozzles, and hand held devices. For further information and free downloads of all the guidelines visit the Smart WaterMark stakeholder website at: www.smartwatermark.info



Download the guidelines for applying for the mark for irrigation equipment from the SAWM website.

A water efficient irrigation system comprises equipment that is fit for purpose and operates efficiently. The major potential sources of water waste in an irrigation system are:

- leakage through equipment made to a poor standard
- distribution of water from the equipment outside or not on the target area
- overwatering because a component has not closed or opened correctly
- errors in scheduling or watering times and durations because of poor quality equipment.

Previous successful applications to the Smart Water Mark scheme for irrigation equipment have described how the use of the particular piece of equipment has led to water savings. The reasons have included various equipment features such as pressure regulation, improved watering uniformity and reduced leakage. Some other possible ways of demonstrating water saving are outlined in more detail within the guidelines.

For all irrigation devices case studies showing a reduction in water use following the installation of a device are an excellent way to demonstrate the water saving potential of a product.

Consultancies offering water-efficient design, evaluation and operation of irrigation systems can submit an application to the Smart Water Mark scheme as a service.

The next expert panel assessment round will be held in June with a closing date of 6 June for applications.

For industry news and latest updates follow @ SmartWaterMark on twitter.

APPLY FOR THE MARK

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AUSTRALIA LEADS THE WAY IN WATER EFFICIENCY CERTIFICATION AND LABELLING

Julian Gray, CEO, Smart Approved WaterMark

As the driest inhabited continent Australia has a long history of water conservation and the regulation of water-using products, dating back to the 1920s. Historically state and regional water authorities regulated water efficiency with a primary focus on plumbing products.

Australian water efficiency labelling began in the 1980s by the then Melbourne Metropolitan Board of Works, branding shower heads and dishwashers with an A or AA rating. In 1999 the voluntary AAA's water efficiency labelling program had expanded to have national reach and management of the program was handed to Water Services Association of Australia (WSAA). By 2001 the scheme had expanded to cover shower-heads, toilets, taps, clothes washers, dishwashers, urinal flushing devices and flow regulators. At this time there were five efficiency level ratings with test requirements and label designs specified in the Australian and New Zealand Standard AS/NZS 6400.

The 5A's program was split into two in 2005 creating the mandatory Water Efficiency Labelling and Standards (WELS) scheme and voluntary Smart Approved WaterMark program. The WELS star rating applies national mandatory water efficiency labelling and minimum performance standards to water-using products in household plumbing and white goods. Smart WaterMark is a quality mark identifying technologies and practices that help get the best value out of water and uses an Expert Panel, criteria guidelines with water efficiency benchmarks. Both labels written into the National Water Initiative and supported by the States & Territories through an Environment Heritage Protection Council communiqué

Global growth in sustainability branding.

There has been a significant growth in sustainability certification globally with the number of eco-labels rising from 500 to over 13,000 over the last decade. The Ecolabel Index, a global directory of sustainability certification, currently tracks eco-labels in 197 countries across 25 industry sectors. The increase in certification reflects a change in drivers for purchasing behaviour; a combination of suppliers and retailers responding to consumer demand. This is predominantly driven by health and food safety concerns, coupled with non-government organisations promoting sustainability and market transformation through sustainability branding.

Despite global water scarcity concerns, water use labelling had not experienced the same level of growth or reach as other sustainability issues with water efficiency certification is still in its infancy with few labels developed internationally.

The majority of international labels have a household plumbing focus with only Smart WaterMark and the US Smart Water Application Technologies and WaterSense Program covering efficient irrigation technologies.

However, there are several eco-labels where water efficiency is embedded alongside other sustainability issues. Figure 3 gives examples of internationally recognised eco-labels relevant to the horticulture and irrigation industries which include a significant water element.

The efficient use of water is important for the irrigation and horticulture industries with the production of food often requiring significant volumes of water; Agriculture accounts for around 65% of Australia's fresh water use and food processing around 30% of manufacturing water-use. Of note is horticultural crops only use about 17% of total irrigation water yet account for over 40% of Australia's irrigated production, indicating the water efficiency in horticultural production over agriculture generally.

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Further information

For more information about water efficiency labelling visit www.smartwatermark.info follow @smartwatermark on Twitter or call (02) 9223 3322.

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	Environment Tree Umweltbaum	Multiple	Health, climate, water & resource criteria	DEU
	Fair Flowers Fair Plants	Horticulture	Sustainable production of flowers and plants	EU
	Fairtrade	Food, Textiles, Cosmetics	Social, environmental and economic criteria including terms of trade.	Global
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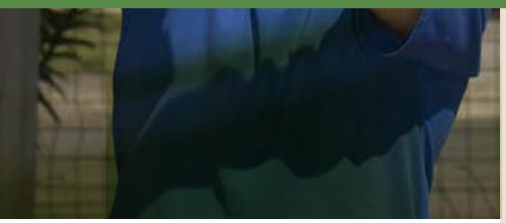
	LIVE (Low Input Viticulture and Enology)	Wine	Sustainable grape and wine production.	USA

CASE STUDY SIX – PROMOTING INNOVATION IN WATER EFFICIENCY



Smart WaterMark is Australia's water conservation label, identifying and certifying water-efficient products and services. Over 300 technologies and practices have been certified to use the Smart WaterMark label following rigorous assessment by an independent Technical Expert Panel. Set up by industry and government as a not-for-profit partnership, Smart WaterMarkdelivers water efficiency by:

- Assisting households and businesses to select water efficient products and services, allowing them to achieve water efficiency goals in a manner of their own choosing.
- Providing a common national approach to water efficiency labelling for government, water utilities, industry and retail.
- Providing water-saving accreditation to water utility efficiency programs (such as the WA Waterwise Approved Program) and is a vehicle to assess and identify innovative water-saving products, driving market transformation.
- Developing a national platform for water efficiency research including hosted web server for water efficiency information and product update service, which is actively used by sustainability departments.
- Removing the need for individual organisations to duplicate the Expert Panel certification process the scheme is the most cost-effective way of achieving water efficiency certification.
- Developing cutting edge water conversation tools such as the *"Every Bucket Counts"* online calculators and the *iSaveH2O* efficiency app.

Both small and large utilities servicing cities and regions are either trialling or planning the roll out of meters to about 60% of Australia's population. As smart meters gather significant data, combining this with the power of social media could transform customer services and water use behaviour.

For example, householders in Perth engaged in the Water Corporation's H2Ome Smart program have access to a web-based dashboard showing their water use in real time and that of others in the program. Participants are saying this information is making them work hard to improve their position on the leader board. They are also using the real time data to compete with family members.

Another innovative program is the Smart Approved Watermark, which is Australia's water conservation quality mark label for efficient products and services.

CONCLUSION

Using water wisely will always be part of the water security equation in Australia. Utilities will continue to evaluate and offer options to customers to help them make choices about their own water efficient targets. Programs such as Smart Approved Watermark, the Water Efficiency Labelling and Standards Scheme, and BASIX in NSW are now well established programs that will continue. Permanent water savings rules are a common sense approach and can be compared to the 'Do the Right Thing' litter campaigns of the 70s and 80s, these programs have 'hard wired' savings for the future.

An added bonus is that using water wisely improves our industry's productivity by delaying investment in future capital projects. For helping a customer to reduce their water use can indeed be considered as much of a 'service' as supplying a customer with water.