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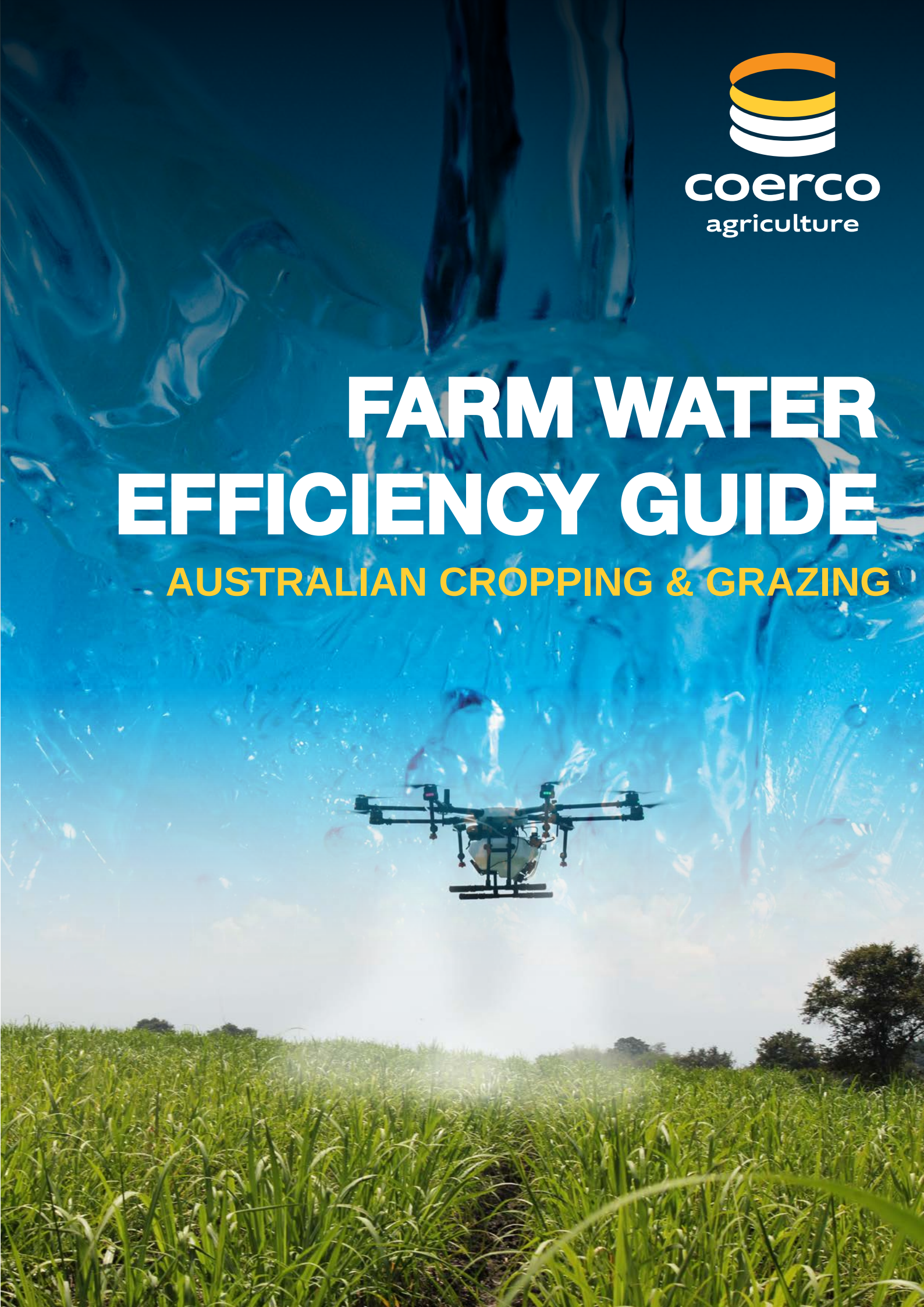
FARM WATER EFFICIENCY GUIDE

AUSTRALIAN CROPPING & GRAZING



Farm Water Efficiency Guide - Australian Cropping and Grazing

Thirty years ago, farming was a whole other beast. Today, technology has helped to tame that beast amid even more challenges which include loss of arable land, greater demand for water, and a shrinking water supply. One key aspect is water efficiency which ranges from improved delivery systems to improved water storage units. Keep reading to learn more about how to improve water efficiency on Australian farms.

The Problems that Australian Farmers Face

- Growing Population - Not only do Australian farmers have to feed more people – we can grow more or import more food – but also we have to compete with more people for less water.
- Loss of Arable Land - In 1994, Australia and the Pacific were estimated to have 54% of its arable land degraded in dry regions. Degradation occurs due to wind and water erosion and chemical and physical degradation. [1], [10], [11]
- Loss of Usable Water - Drought, shrinking groundwater supplies, contamination via chemical run-off and erosion, and the shrinkage or drying of the Murray-Darling river system – a system that supports more than 40 percent of Australian crops. [2], [3]
- Technology - Ever has technology been a double-edged sword. New technology, while popular with younger farmers is often not employed by traditional and older farmers. A good example of why this is important is shown by wheat farmers who have spent the last 30 years improving how they use water, and the payoff is a 100 percent increase in water efficiency. [4]
- Aging Farmers - The picture painted by the 2015-2016 by the Australian Bureau of Statistics shows a two-year increase in the average age of farmers from 54 to 56 years of age. In contrast, Australian farmers are nearly 20 years older than the average Australian worker of age 39. This is important because of the need to use technology to help improve the efficiency of growing and raising livestock, an opportunity that goes beyond water efficiency to dictate the basic costs of farming.
- Changing Crop Demands - Australian farmers must compete with other types of crops for limited water supplies. Banana production grew by 43% in 2016, almonds by 30%, and olives by 55%. In a time when arable land is shrinking, groundwater levels are dissipating, and rainfall is at an all-time low, wheat farmers are facing increased pressure for water from crops that require more water. Almonds require on average 1,929 gallons of water to produce one pound of nuts. Olives are not as bad but still require 361 gallons of water to produce one pound of olives. [5] There is also the changes in pricing for commodities such as wool, which has led to a "two-legged economy" where farmers are mixing crops and grazing to create a more diversified business. [7] Wheat is the second-most profitable crop in Australia; wool and lamb meat are much lower on the list of "most" economical crops.

Across a continent where usable water is shrinking, farmers must find alternative ways to meet yield demands while reducing water usage and boosting water efficiency. In short, you must do more with less. That challenge comes down to many things from improved inputs to when farmers plant their crops. Regardless, one pivotal aspect remains water efficiency.

Efficiency in Cropping and Grazing

Efficiency is about reducing the cost of growing or grazing and it is a reflection of farmer's bottom lines. A good example of efficiency and its misconception is big farm equipment. Yes, a larger tractor with larger additions costs more money to buy. However, there are plenty of solid arguments about why such a setup is actually cheaper - and they are. The reason being is that you can do more with a larger tractor towing larger or wider add-ons than you can with a smaller version of the same. Also technology is providing significant reductions in water and chemical use when using weed sensing technology. This means you are saving time, energy, and often planting a larger area within your planting or harvesting window. If you are able to plant more in less time, using less energy, less chemical, and less labour, then you are saving money because the overall cost of what you grow just decreased. Add to this the opportunity to plant more than you normally would be able to, and your bottom line gets fatter. You have more yield to sell which reduces the cost further.

How Does Efficiency Address Water Usage by Farmers and Graziers?

That question is not isolated. It is being asked by Parliament of Australia which is looking into the adequacy and efficacy of current programs regarding irrigation water efficiencies. [6] A problem faced in cropping and grazing are not an isolated problem. They are, in fact, a problem that the entire nation must face – and for many reasons. Those include:

- Less dependency on foreign countries for food
- Increasing food security issues throughout the nation
- Combating the cost of living both for the civil sector and the massive tourism industry
- Management of natural resources including water so that they are sustainable and enjoyable for generations

- Future investments in programs and technology that enable farmers and graziers to produce adequate yields
- Planning for future generations and population expansion even with limited resources such as water

Water and Farming

You need water to farm or graze. That is no secret. However, with limited water as a result of drought, shrinking groundwater reserves, drying rivers, and inefficient farming methods, what can Australia's farmers and graziers do?

We began this conversation talking about water efficiency. So, let's continue that discussion by addressing some of the tools available to farmers and graziers when it comes to improving agricultural water usage.

Whether you are on an agricultural, horticultural or viticultural farm there is actually a long list of little things that help make a farm more water efficient.

For horticulture and viticulture one of the big options is to look at how you irrigate and then modify that process so as to use less water. A good example of this is drip irrigation which waters only the crop and not the weeds or space where crops do not grow. This is in contrast to flood irrigation where you open the gates and let the water cover the field. Not only does drip irrigation help deliver water to the plants, it also helps to reduce water lost to evaporation. Other water efficiency options include:

- Crop Choice - We touched briefly on some of the newer trends where farmers were replacing traditional crops with high-water demand crops such as olives and almonds. Can you decrease water usage by switching crops? **[5]** There is a new concept in action where **Wheatbelt famers are making a transition** from wheat and sheep towards intensive horticulture which offers rapid financial returns, maximises use of natural resources and can build community around it's diversified activities. This intensive horticulture is using a water-secure greenhouse technology which is a proven practice for low-risk, improved productivity.

https://www.youtube.com/watch?time_continue=23&v=kUxFukDXafk

- Water Timing - Technology can help farmers deliver water to their crops when their crops need it. Though advancements in soil moisture sensors, your crop can demand water when it needs it rather than just on a set schedule. Such tech helps farmers reduce over watering and under watering, and the increased consistency of soil moisture helps plants produce a more even yield. The same is true for graziers. By using tech, graziers can reduce water evaporation by delivering water when their stock needs it rather than making water available to stock all the time.
- Farming methods - There is more than one way to grow a crop, and one that emerged out of the California drought is dry farming. This is a system that uses California's Mediterranean climate to the farmer's advantage. This method of farming is more complex and the crop yields are often smaller, but the trade-off here is that crop flavour is vastly improved. Not every crop can be grown using the dry method, but it is an option. There are other options, too, if farmers want to adjust how they farm. **[8]**, **[9]** Dry farming is not to be confused with rainfed agriculture. Rainfed agriculture is crop production that occurs during a rainy season. Dry farming, on the other hand, refers to crop production during a dry season, utilizing the residual moisture in the soil from the rainy season, usually in a region that receives 500mm or more of annual rainfall. Dry farming works to conserve soil moisture during long dry periods primarily through a system of tillage, surface protection, and the use of drought-resistant varieties.
- Grazing and Regrowth Management - For graziers, how a **plot of land is prepared and used** dictates much in terms of how fast that plot of land regenerates so that grazing can occur more frequently. Soil management is another key component for grazing management, and it ranges from the management of soil ecosystems and moisture to the use of cover crops that replenish soil nutrients quickly. With faster recovery and more stringent soil management practices, soil moisture remains higher. This draws less on available water sources and saves water.
- Tilling Practices - No-till and conservation tillage are two forms of tilling that help reduce wasted water. The past crop becomes a mulch or compost that helps protect soil moisture levels and breaks down to provide new plants with needed nutrients. Can changing how you till help improve your farm's water efficiency?

- Water Storage and Water Capturing - In the drier parts of Australia and in areas that are affected by drought, water storage and water capturing methods help to improve water efficiency. Evaporation reduces stored water in dams significantly. How you store water is equally important to how you deliver water to your drop or your stock.

Water Storage and Collection

The rainwater tanks WA farming community depend on to collect water when it is available are a tremendous tool. When the rainy season is here, there can be an excess of water. It runs across the ground, saturates the soil, and then is lost either because gravity pushes it down or because the sun causes it to evaporate. Rainwater tanks including poly water tanks help to capture and contain rain so that it is available throughout the drier times of the year.

The focus on collecting and protecting stored water is important. Poly water tanks help farmers surrounding Perth and the wider WA regional community protect their stored water from evaporating. To put this into perspective, the amount of water that is evaporated from the equator during the hotter months of the year is enough to fuel every storm, cyclone, hurricane, and afternoon drizzle that occurs around the world. Evaporation is a large contributor to water loss. Water rights dictate how much water farmers receive and governmental regulations are beginning to dictate how farmers use water. Those regulations are going to get worse as the Parliament concludes its examination of water efficiency and water efficiency systems.

Questions to Ask Yourself

How are you currently storing water? If you have a dam, you should ask yourself how much water is the pond losing to evaporation? The answer is in direct relationship to how much water you can save if you switched to poly water tanks, which reduce evaporation. Factors that increase evaporation:

- Humidity levels - The lower the humidity, the higher the rate of evaporation
- Excessively hot days - More heat means water more easily converts to gas and evaporates
- Windy Days - Winds, especially high winds, increase the rate water evaporates

These are all situations that an open pond faces, including large reservoirs. Following the California drought, the government there is looking at how to create tunnels to transport water rather than continue to use the open levee system that is currently in use. Not only will tunnels help to protect California's water from evaporation, but also from loss due to levee breaks.

As Australia continues to face water shortage issues, it becomes even more critical that farmers and graziers utilize all of the resources available to them to conserve water.

The question is what is the best method for conserving water and improving a farmer or grazier's water efficiency. The truth of the matter is that there is not a one-size-fits-all answer. Every farm is different. Each face unique struggles when it comes to water usage. One common problem is evaporation. Can adaptation and improved water storage help? Yes. Can rainwater tanks help farmers and graziers to reduce their dependency on groundwater and river water? Yes. Those two options are a perfect place to start the process, especially if the farm has standing water reservoirs/dams.

We mentioned that the agriculture and grazing community is a national concern. Being able to feed the nation is the role of the farmers and graziers. Learn more about how water efficiency is easier to achieve by reaching out to the professionals at Coerco.

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Deeper Understanding

[1] **Land Degradation: An Overview** - US Department of Agriculture

[2] **Water** - Social Environmentalism Australis

[3] **Declining groundwater is a big problem for Australia** - ABC News

[4] **National Data shows wheat farmers have improved water use efficiency by up to 100 percent over three decades** - ABC News - AU.

[5] **This is How Much Water It Takes To Make Your Favorite Foods** - HuffPost

[6] **Terms of Reference** - Parliament of Australia

[7] **Australian farming and agriculture - grazing and cropping** - Australian Government

[8] **Dry Farming** - California Ag Water Stewardship Initiative

[9] **Dry farming vegetables: One Farmer's approach to building soil, conserving water, and producing great tasting tomatoes** - Oregon State University

[10] **Australian Actions to Combat Desertification and Land Degradation** - Australian Government - Department of Environment and Energy

[11] **Statistics - Land Degradation** - Australian Bureau of Statistics

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