

Water Scarcity: What Does it Mean for Agriculture

Dr Lauren Rickards

Introduction

The greatest impact any of us have on water resources is via the food we eat. Compared to the 11% that each household uses in washing, cleaning and gardening, approximately *half* of our “water footprint” is contained in the food we consume (Campbell 2008a: vii). And although many of us could no doubt reduce some of our food intake, and we could certainly reduce the 40% or so that gets thrown away, besides drinking water eating food is at the end of the day the least *optional* of our water-consuming activities.

Reducing this impact is a matter of engaging and supporting the agricultural sector in the tough, painful and altogether necessary process of change that has already begun.

The importance of agriculture

As you will have observed, in some readings of the water crisis agriculture is positioned as a greedy, backwards and unwelcome user of our water resources, competing unfairly with the environment and urban dwellers for a disproportionate share of the water available.

Well, there *is* some truth in this reading... In Australia, agriculture uses nearly 70% of the water consumed each year (NPSI, Draft, 2008a). But before we get angry at industry exploiting the environment and dehydrating cities, we need to consider what this particular industry uses the water for. It is not a use that can be easily dismissed. Indeed, it is one that is of heightening

importance. That is: feeding, and in some cases clothing millions of people around the world.

Now talk of “feeding the world” may seem naively altruistic and rather retro. It is undeniably the case that agriculture is a commercial activity in which some people reap large profits. But many farmers do what they do for comparably - and increasingly - little financial reward, which is one of the reasons the number of people choosing to do it is plummeting.

“Feeding the world” is also a phrase that does bring back echoes of alarmist warnings in the 70s about world hunger, not to mention images of Bob Geldof and friends singing BandAid hits in unison. But it is very much a *modern* issue. While some seem to believe hunger is now only a problem for a few war-torn African nations, the problem of *feeding* people is a serious issue for a growing number of countries.

Worsened by ongoing problems with the *distribution* of the food, overall food production is going to have to more than double in the next 40 years. Because by 2050, there will be 9.3 billion people living on the planet - consuming the equivalent of 13 billion people by today’s standards due to improvements in nutritional status and new dietary trends, namely meat consumption (Cribb 2008).

With this kind of pressure, lifting food production is going to be central to global stability. Since the 1990s two thirds of all conflicts around the world have been driven in part by a shortage of food, land or water (Cribb 2008).

If global food production slips further, the number of conflicts, not to mention the number of refugees, is set to increase dramatically.

Combined with costs and risks of importing food, including the concept of food miles, domestic food production and supply is a growing priority in many countries, including Australia. Already some developing countries are banning the export of key food products like rice in order to secure their domestic supply. Meanwhile, countries that can also continue to afford to export food - like Australia - are gaining an increasing role as food baskets for an ever-hungrier world.

The upshot of this global setting is that it is not rational for any of us to take an antagonistic approach to our agricultural industry, no matter how much it needs to improve.

Food isn't the only reason we should take an interest in agriculture and its role in the water crisis. Besides food producers, agriculturalists are land managers. Approximately 60% of Australia's land area is used for farming and pastoralism (ABS 2002). How this vast area of land is managed is of national importance. It affects our biodiversity, our climate, and - of course - our water. Well-managed agricultural land can play a critical role in good catchment management, with healthy soil and plants providing a vital water storage and filtering service. Likewise, poorly managed agricultural land can lead to a host of water problems, from salinisation, acidification, eutrophication and pollution, to over-extraction, leaching, riparian zone damage and erosion. The point is that whether done well or badly, agriculturalists are some of the nation's most influential water managers. For this reason alone, we need to provide them with support. To date, farmers are generally not financially compensated or rewarded for making the effort to manage their environmental resources above a minimum standard.

Agriculture under water scarcity

So far I have argued that - in contrast to the view that agriculture is an antiquated industry and an inappropriate use of resources - the sector is one that - at both a global and national level and from a food and land management perspective - deserves our support.

And support it certainly *needs*. For, vast and urgent improvements are required, none the least in the area of water management. Our current generation of farmers has inherited a legacy of degraded resources, which is challenging enough to overcome in prosperous times, let alone in the situation we have now.

By 2050, the amount of water available for agriculture will have dropped by a third as cities consume half of the world's fresh water (Cribb 2008). For farmers to double their production - as I mentioned they are being called upon to do - they will therefore need to lift their water use efficiency by 200%.

An alternative is to switch to dryland agriculture - that is, agriculture that is rainfed as opposed to irrigation fed. One of the reasons that Australian food production is of importance for the globe is that we are leaders in dryland agriculture. We are therefore prepared, to an extent, for the challenge of receiving a smaller proportion of the global water pie.

Yet, as we are well aware, the size of the pie is also shrinking, at least in southern Australia where we produce most of our food. As you will know, climate change is projected to decrease our annual rainfall by 2 to 5 per cent and increase temperatures by around 1oC (CSIRO & BoM 2008). Importantly, the projected rainfall declines are worst in the pasture- and crop-growing periods of winter and spring, and the rain that does fall will be in more intense less frequent bursts, making it less useful for plant growth. The frequency and intensity of droughts

and heatwaves is also predicted to increase (CSIRO & BoM, 2007). Overall, the result is that average productivity on many dryland farms will fall, and some farms and whole regions will no longer be able to produce the amount of food they currently do, let alone double their production. Some areas are already being closed down completely.

Let me pause and share with you some insights into what it is like for farming families to live with water shortages. Because they are the first to suffer from water scarcity, relative to use pampered urban dwellers. And such scarcity of course has far greater implications for them.

Over the last couple of years, I've been doing some work with the community farmer organisation the Birchip Cropping Group in the dryland cropping and grazing area, the Wimmera Southern Mallee region of north-west Victoria. We have conducted hundreds of hours of in-depth interviews with randomly selected farming families to better understand how drought is impacting them.

What the farmers and their families have been saying has brought home how difficult living and working with water shortage is, not only at a technical or business level, but at a personal, family, and community level. While there are of course farms and farming families that are doing well, a growing number are running out of financial, physical and personal reserves. Combined with the many other stresses farmers are under, from declining terms of trade and the economic crisis to increasing planning regulations and biosecurity protocols, for example, living with what has been 10-15 years of dryness for some areas is about a lot more than failed crops and skinny sheep.

It is also about losing your neighbours, your friends, your employees and your family to the mines, the city or foreclosure. It is about losing your local shops, services, schools and sports

clubs. It is about growing isolation, having no water in the house, and worrying about your children. It is about not being able to sleep, to talk, to move because of the uncertainty and stress. It is about hearing new ideas you know you should try but not having the money, the time, the energy, the know-how or the courage to do so.

As some interviewees said about their situations:

'I just feel that we were in deep enough before the drought hit, and the impact of the drought on top of that... well...' (Interviewee, Feb 07).

'Everything has caught up. Whereas in other years, it was bad, it was usually only one problem at a time' (Interviewee, Feb 07).

'If I believed in God I would just be praying. That's how it is... I find it very difficult to think about this coming year without feeling just absolute panic' (Interviewee, Feb 08).

It is clear that things need to change, and farmers above all know this. But the 'rules of thumb' that many have farmed by for years no longer seem to apply and there is confusion about what good farming actually now looks like. As an interviewee explained, they have *spent most of their farming life following a set of rules which now don't work anymore* (Interviewee, Feb 07). Combined with the fact that many families don't have the financial or personal resources to implement the substantial changes needed, information is badly needed on *how to manage a farm well under water scarcity in Australia.*

These stories are from dryland farming families who are for the most part 100% reliant on rainfall for their water. But what is it like for irrigators? – those farmers who receive 90% of the water resource that is consumed by agriculture?

Well, the story is equally bad, if not worse. Until recently, irrigation has been considered

something of a safety net. Akin to our situation in the cities, the rainfall on one's *property* might drop – indeed, it may never be at a viable level in the first place – but because one is able to access water from elsewhere, such local water shortage has never been a problem. But the current drought is a 'double drought' – its unprecedented geographic extent shocking irrigators by drying up not only their farm dams, but the distant water catchments on which their livelihood's depend.

One of the problems for irrigators is that the soil in our water catchments is now so dry that a large proportion of the rain that does fall is taken up in saturating the soil. It doesn't convert to free-flowing water we can use. Due in part to this and in part to the necessary corrections that are taking place to previous over-allocation of water, it is predicted that in the Murray Darling Basin - which is where 40% of Australia's agricultural produce is grown (ABS 2007) - the value of irrigated agriculture will drop by 92% by the year 2100 (Quiggin et al. 2008).

Some updates on the region from the Horticulture Water Initiative gives insight into what is happening:

Harvest has been disappointingly low in many tree and vine crops...

The general feeling in the districts is one of anxiety. Growers are starting to see areas of vacant land as vines and trees are cleared.

Hope is diminishing and the stress and anger in the irrigation community is immense (HWI 2008).

The situation is similar among the Basin's irrigated *dairy* farmers, who, in the face of low water allocations, are struggling to hold onto the dairy herds and infrastructure that many have spent years if not decades building up.

It is important to note that we are talking about some of the world's leading irrigators. Australian irrigators are already extremely efficient at turning water into food and fibre. Not only does this mean we have a vital leadership role to play in helping countries with less sophisticated techniques, but it means we face a real challenge in further improving and strengthening our irrigation industries – as we obviously must. The low hanging fruit has already been picked. Now we need some serious innovation and rethinking.

Fortunately, there are some ingenious and inspiring examples of such change already occurring. Both in dryland and irrigated agriculture, incremental improvements and radical restructures are underway. Groups like Birchip Cropping Group, the CRC for Sustainable Irrigation Futures and Dairy Australia are working hard to help farmers envisage and plan for more sustainable, low water futures.

But, the point I want to emphasise is that serious *barriers* to change exist and require our encouragement and support to overcome. Because not only is food central to our wellbeing, but we – as consumers and fellow citizens - are central to farming families' wellbeing and their associated ability to improve the way they use water to produce the food we consume and to manage environmental resources on our behalf.

What can we do?

- Think about what you eat, what you drink – what embedded water are you consuming? How much water was taken to produce it, to store it, to transport it? What message are you sending to the market?
- Be prepared to *pay* for food products that come with strong environmental benefits and call on the government to reward farmers for the ecosystem services that their farm management provides – or could provide with the right support.

- Buy Australian and support agriculture in your local area.
- Do what you can to support the rural communities that underpin our farming population. They desperately need dollars injected into their local economies as they manage with the restructuring underway. Have your next holiday in Horsham.
- Harvest your own water and support water recycling in order to free up water for alternative uses, including agriculture. Don't fall into the trap of relying only on some distant and seemingly bottomless water catchment.
- Call on the government to fund more research, development and extension in agriculture and water management. Call on them to be open to new and perhaps radical ideas, including those developed by farmers themselves.
- Call on the government to develop a population policy for Australia, to help developing countries manage their population growth, and to work with groups around the world to progress sustainable agriculture.
- Above all, recognise the increasing *importance* of agriculture, the serious challenges our farming families face in water management, and the voter and consumer support the sector needs in order to change as it must.

Whether we like it or not, agriculture is and will remain a large part of our water footprint. But with a spirit of collaboration, we can help to reduce its size.

Bibliography

ABS (2002) Year Book 2002. <http://www.yprl.vic.gov.au/cdroms/yearbook2002/cd/wcd00002/wcd002c9.htm>

Alston, M. and Witney-Soanes, K. (2008) *Social Impacts of Drought and Declining Water Avail-*

ability in the Murray Darling Basin. Report by the Institute of Land, Water and Society, Charles Sturt University, for the Dept. of Infrastructure, Transport, Regional Development and Local Government, Australian Government.

Campbell, A. (2008a) *Managing Australia's Soils: a policy discussion paper*. A report for the National Committee on Soil and Terrain, Department of Agriculture, Fisheries and Forestry, Australian Government, Canberra.

Campbell, A. (2008b) *Paddock to Plate: food, farming and Victoria's progress to sustainability*. Future Food and Farm Project Background Paper. Australian Conservation Foundation, Melbourne.

Commissioner, Environmental Sustainability Victoria (2008) *State of Environment Victoria 2008: Key Findings and Recommendations*. Victorian Government, Melbourne.

Cribb, J. (2008) *The Coming Famine: constraints to global food production in an overpopulated, affluent and resource-scarce world: the scientific challenge of the era*. Julian Cribb and Associates Discussion Paper.

Environmental Defenders Office (2008) *Land and Biodiversity – A Call to Action: an analysis of submissions to the State Government's consultation paper 'Land and Biodiversity at a Time of Climate Change'*. Environmental Defenders Office (Vic) Ltd, Melbourne.

Eshel, G. and Martin, P. (2006) Diet, energy and global warming. *Earth Interactions* 10: 1-17.

Flannery, T. (2008) *Now or Never: A sustainable future for Australia*. Quarterly Essay, Issue 31. Black Inc, Melbourne.

Hatfield-Dodds, S. and Proctor, W. (2008) *Delivering on the Promise of Stewardship: issues in realising the full potential of environmental stewardship payments for landholders and the land*. Report for the Australian Conservation Foundation, July 2008. CSIRO Sustainable Ecosystems, Canberra.

Herrera, E., Byron, I., Kancans, R. and Stenekes, N. (2008) *Water 2010: Assessing dependence on water for agriculture and social resilience*. Report for the National Assessment of Community Dependence on Water and Social Resilience. Bureau of Rural Sciences, Australian Government, Canberra.

Horticulture Water Initiative (2008) Full Updates, November 2008.

Larsen, K., Ryan, C. and Abraham, A. (2008) *Sustainable and Secure Food Systems for Victoria: What do we know? What do we need to know?* Victorian Eco-Innovation Lab Research Report No. 1, April 2008. VELL, Australian Centre for Science, Innovation and Society, University of Melbourne, Melbourne.

Liu, J. and Savenije, H. (2008) Food consumption patterns and their effect on water requirement in China. *Hydrology and Earth Systems Science*, 12: 887-98.

McMichael, Anthony (2008) Sustaining Australia's Health. In: D. Lindenmayer, S. Dovers, M. Harris-Olson and S. Morton (Eds) *Ten Commitments: Reshaping the Lucky Country's Environment*. CSIRO Publishing, Melbourne. Pp. 179-85.

National Program for Sustainable Irrigation (2008a) Irrigation in Australia – facts and figures. Editors Note. Draft

National Program for Sustainable Irrigation (2008b) Vital Role for Australia's Irrigation. Editors Note. Draft

Price, R. (2008) Grazing. In: D. Lindenmayer, S. Dovers, M. Harris-Olson and S. Morton (Eds) *Ten Commitments: Reshaping the Lucky Country's Environment*. CSIRO Publishing, Melbourne. Pp. 119-24.

Public Health Association (2009) *A Future for Food: addressing public health, sustainability and equity from paddock to plate*. February 2009.

Reijnders, L. and Soret, S. (2003) Quantification of the environmental impact of different dietary protein choices, *American Journal of Clinical Nutrition*, 78 (supplement): 664s-8s.

Standing Committee on Rural and Regional Affairs and Transport (2008) *Climate Change and the Australian Agricultural Sector: Final Report*. December 2008. The Senate, Australian Government, Canberra.

Weber, C. and Matthews, H.S. (2008) Food-miles and the relative climate impacts of food choices in the United States, *Environmental Science and Technology*, 42: 3508-13.

Williams, J. and McKenzie, F. (2008) Agriculture. In: D. Lindenmayer, S. Dovers, M. Harris-Olson and S. Morton (Eds) *Ten Commitments: Reshaping the Lucky Country's Environment*. CSIRO Publishing, Melbourne. Pp. 105-12.

Dr Lauren Rickards

Lauren Rickards is an Associate Partner at RMCG and Honorary Fellow at The University of Melbourne. She is a Rhodes Scholar with a background in ecology and environmental management. She has a wide experience on the impacts of drought on rural communities.