

Bearing the risk: Learning to be drier mid-river

Barry Golding
School of Education, University of Ballarat

Jennifer Angwin
School of Education, Deakin University

This paper investigates learning related to the phenomena of drying over the past decade in the southern Murray-Darling Basin in Australia, as perceived in a mid-river site within the western Riverina of New South Wales, Australia. The insights from audio-recorded interviews, with a wide range of adults across the water-dependent community, mostly relate to the catchment of the Murrumbidgee River in the Shire of Hay. Our overarching theme is about how people are learning about, understanding and bearing the risks, of what is widely regarded as a prolonged drought. For some, the learning is about how to cope with less water in the Basin, and particularly from the river, as predicted in the climate change literature. Our narrative-based, empirical research registers the felt experience of those located, in situ, as a severe 'irrigation drought' extends into 2009. The paper dramatises the many obstacles to learning how to think and act differently, in difficult and rapidly changing ecosocial circumstances.

Introduction

Method

The study reported here is based on 167 pages of transcripts from fourteen audio-recorded, on-site, focus group interviews with of 32 water-related, adult stakeholders conducted in the Shire of Hay over two days in June 2009. These stakeholders included farmers, irrigators, water brokers and distributors, contractors and agricultural advisers, as well as representatives of town businesses, tourism organisations, local government, community-based organisations and education and training sectors. Most interviews were conducted in small groups, though some were conducted individually. One third of the interviewees were women. The interviews focused on what adults from diverse sections of this water-dependent community knew about the availability of water, and how and what they had learned about living and working with considerably less water in the past decade. Learning was taken in its broadest sense, from learning informally about water by doing, by trial and error and experience, through learning via the media, internet, work, family and business, to learning through formal education and training.

Most of the informants in this site were interviewed in Hay on the Murrumbidgee River, though interviews were also conducted in Deniliquin (on the Edwards River to the south), and Booligal (on the Lachlan River to the north). The interview visit was preceded by a two-day site reconnaissance visit in March 2009 and a one-day follow-up visit in September 2009. This site was selected to represent 'mid-river' New South Wales perspectives, in contrast to Alpine and dryland site perspectives in Victoria and lower river perspectives in South Australia. Further details regarding the method, its presuppositions about learning, and the associated suite of research projects are contained in the introductory paper *Learning to be drier* (Golding & Campbell 2009). In summary, four two-person project teams used similar methods to investigate aspects of learning in this and three other sites in the southern Murray Darling Basin. As in our

other sites we deliberately and consistently used the terms ‘drier’, ‘dryness’ and ‘drying’ in our communication with informants, rather than presuppose causality.

There is no debate that the southern Basin had dried out, particularly in the past decade, post 1998. There had been record low rainfall on site and record low inflows into the Murrumbidgee and Lachlan catchments, resulting in an unprecedented irrigation drought and extremely low or zero water allocations to farmers and irrigators in both catchments. There was, however, debate about causality. At one extreme the term ‘drought’, while descriptive of the situation being experienced within the site post 1998, had connotations associated with a natural aberration. At the other extreme, terms such as ‘global warming’ and ‘climate change’ presupposed change associated with human impact, a supposition that was far from accepted in this site in 2009.

Structure of the paper

We have chosen to restrict ourselves, in this mid-river site paper, to three main accounts amongst many possibilities. First, ‘About the community’ introduces a pen picture of the present-day community and the main water-dependent stakeholders. Next, ‘Learning about the risk’ takes readers deeper into the complex and rapidly changing risk of living with (and increasingly without) irrigation water. It also opens up aspects of the complex debate about learning about drying and its causes, impacts and possible solutions. Our intention is to illustrate the way in which learning about the present and the future in the site is tightly interconnected. Finally, ‘Impacts on learning communities’ looks at community impact and responses in the broad learning domain of being drier. In particular, we look how drying is already impacting on learning in the community in ways that arguably further destabilizes a community already at great risk. Our paper title, *Bearing the risk*, alludes to the combined Australian government decision, under the Australian Water Initiative, that water users

should now bear the risk of long-term reductions in water availability, including lower allocations and higher prices.

Acknowledgment of the difficulties

Lest we appear hard-hearted, we gratefully acknowledge the generosity, frankness and honesty of our informants. We are deeply concerned by the obvious extent of distress in these communities, faced by people at risk of losing their livelihood and way of life. On one level, we admired the widespread spirit of ‘defiant optimism’, identified also by DPRESP (2008: 14) in other rural communities across Australia affected by long term drying. On another level, however, this same spirit was accompanied by a sense of unreality, exacerbated by a lack of coherent information, knowledge of or denial of interconnectedness in a Basin with finite and diminishing water resources. There appeared to be very few opportunities and an understandable reluctance for adults in the community to come together and learn, even vocationally. This is one of many communities in the Basin that appear to be mentally and physically exhausted from a succession of difficult and dry seasons.

About the community

Hay, Hell and Booligal¹ and water
“Just now there is a howling drought
That pretty near has starved us out—
It never seems to rain at all.

The distinctive feature as you approach towns like Hay in the southern Riverina area is the stark contrast between the relatively fertile, naturally tree-lined watercourses trending east to west, and the almost complete lack of vegetation other than low saltbush on the extensive plains between them. This contrast is evident on the aptly

1 *Hay, Hell and Booligal* by A.B. “Banjo” Patterson, was published in *The Bulletin* in 1896, when Booligal, after years of drought, had suffered a rabbit plague followed by a grasshopper plague.

named One Tree Plain, between Hay and the tiny and isolated hamlet of Booligal on the Lachlan River towards the north of the Shire of Hay.

An even more stark contrast is the ubiquitous green lawns and nature strips with the public and private sprinklers still going strong. One of our interviewees explained that other visitors to the town were, like us, very surprised:

We do get a lot of travellers ... that pull up and they enjoy the environment we have created. But also they are quite upset that we can [water]. We are on the same river and [they think] “Why can we do this and they can’t?” To be honest, I don’t understand why. ... I think people are happy if they can turn their tap on and water comes out then that’s all they are concerned about. ... You can imagine if the powers to be said “There’s one day a week you can water” or “There’s no water”, then it would be like an alien landing for some people. It’s unrealistic for them to think that there could be a big problem.

The local defence that watering nature strips with ‘raw’ unfiltered water was ‘for sanity’ and for maintaining town pride for visitors was widespread. As one informant put it:

No matter how much the charge is for the raw water... my whole yard will have to die before I have my nature strip die. I consider it part of my yard and I couldn’t think of anything worse than to walk out the front yard and see your nice little green patch and then burrs and weed and dirt would be depressing, I think.

Hay Shire is huge: 11,348km (sq) with a population at the 2006 census of around 3,500, that is likely to have declined significantly since. With a long-term average annual rainfall of only 325 mm, without the water from the Murrumbidgee River, the area is effectively semi-arid. Being between five and seven hours respectively to Melbourne and Sydney and around six hours to Canberra and Adelaide by road, it is reasonably remote (Accessibility and Remoteness Index of Australia, ARIA+ of 5.49). Its strategic location

on several interstate highways connecting several of these state capitals means there is a lot of passing tourist traffic and trucks, and infrastructure and services to match.

Virtually the whole town of Hay is water-dependent, directly or indirectly. Apart from farmers and graziers, many of the local businesses such as earthmovers, irrigation suppliers, processors, retailers and carters of produce are highly dependent on farm businesses that take water from the Murrumbidgee River. All other retail, wholesale, service and manufacturing sectors rely heavily on the agricultural and pastoral sectors that also rely on rainfall. The Hay Private Irrigation District is the oldest in New South Wales and provides a network of largely pressurised and piped water to around 80 water users close to town. The Hay Water Users Association represents the interest of around 50 ‘licensed pumpers’ from the Murrumbidgee River. The area has previously supported a number of large, corporate farms with broad acre irrigated summer and winter crops and intensive vegetable growers (particularly lettuces). In the 1990s, everything seemed possible: rice was big and cotton was started late in the decade. One irrigator regarded 1998 as “a monstrous year for water”, though the allocations had already begun to diminish². In the decade since, everyone has had to learn to live with much less river water, and for pastoralists with land away from the river, significantly less annual rainfall.

Until recently, the term ‘average annual rainfall’ was understood to stand for something fixed. Older residents in Hay can recall the 1956 flood and several major prolonged periods of severe rainfall deficit, generally known as ‘droughts’. While most Hay residents lived in hope for a return to the ‘average’, no one challenges the reality that the past decade across the site and its catchments had become drier and hotter. As a consequence, the river flows and water allocations had drastically decreased or ceased, and incomes, particularly from

2 <http://waterinfo.nsw.gov.au/ac/alloc.xls> Accessed 12 October 2009.

the irrigated land and water-related businesses and services, had plummeted.

Farmers with intensive irrigation only on the Hay floodplain who grow vegetables, particularly lettuces, were totally irrigation-dependent. Large irrigation farmers who have previously relied on broad acre grain, pulse and oilseed crops in summer or winter without dryland country as a buffer (or bore water) had been severely affected, as river water allocations as a percentage of theoretical water entitlements had steadily dropped to less than 10 per cent³. The lack of water in reserve in the Murrumbidgee during 2009 can be seen, in retrospect, as a consequence of three factors: successive record-low rainfall years in the upper catchments, a massive surge in utilisation of irrigation for new purposes in the 1990s, and optimism that there would be a return to 'normal seasons'. By mid 2009, the many water-dependent stakeholders in Hay were re-evaluating and urgently learning about all three factors.

What reports say

Given the speed with which this part of the Basin had become noticeably drier, even to a casual observer, it is unsurprising that there had been a flurry of technical, scientific and 'expert' reports to try to identify the symptoms and extent of the change, some likely causes, and importantly, some possible future adaptation plans, if the change was indeed permanent. Aside from the perceived first national priority about what plans were appropriate to ensure water security for 'Australia's major cities and urban complexes — 'home to' most Australians' (PMSEIC 2007: 3), the second, major priority was 'The Murray Darling Basin—Australia's food-bowl'. This report, based on 2006 data, acknowledged 'pressure on natural resources in terms of water resources'. The report begins with 'Our climate is changing' (p.5), and states that 'Australia has a climate-sensitive

³ As of 1 October 2009, the general allocation in the Murrumbidgee System was three per cent.

economy' (p.8). It predicts that 'temperatures across the Basin will increase' and asserts that 'urgent attention needs to be paid to how the activities associated with the basin will adapt to a new climate' (p.27).

Our field visits revealed the insidious nature of this slow and prolonged period of drying. Very few people we spoke to in the site had either read or accepted what was in these reports. The Drought Policy Review Expert Social Panel (DPRESP 2008), for example, gave first-hand accounts from 'more than 1000 people ... living with dryness over recent years' (p.3), and concluded that 'Australia will face prolonged periods of dryness in the future ... [with] an adverse impact on the social wellbeing of farm families, rural businesses and communities.' It effectively bit the federal government's hand that fed, it by urging 'a new national approach to *living with dryness* ... rather than *dealing with drought*' (p.5).

Learning about the risk

Government information programs

There is evidence of government actions and education programs in the three decades prior to 1998 that had assisted local water users to learn about and adapt to changes associated with 'natural' and recurring droughts. These changes had affected farming businesses for over a century, as one farmer elaborated:

There was an embargo on new licenses on the Murrumbidgee in 1977 initiated by water users. ... Throughout the 1980s and 1990s programs were available to help farmers to handle changes including deterioration in terms of trade, cost-price issues, succession and environmental issues. There was conversion of licences to volumetric in 1982 that forced education about the resource, management of the rivers and planning of farming decisions. There was education associated with regulation of rice growing in the 1980s as well as with the NSW government water reforms and the Murray Darling Basin Commission

cap on extractions in the 1990s. There were extensive public meetings and publicity programs at the end of the 1990s related to changes in water availability and the need for environmental flows.

There is therefore a long history of government education about the risks of and responses to living with drought. However, in the decade since 1998, there is evidence of a reluctance or inability on the part of governments to give water users appropriate and accessible information about the rapidly changing situation, particularly about climate change, on which to base their water management decisions. There is evidence that as the risk and likelihood of the Murrumbidgee and Lachlan catchments being permanently drier have increased, denial of change and its implications has increased.

Learning about the risk, and denial of risk

In 2007, the CSIRO prepared a series of papers that outlined the causes, extent and risk of climate change in the Lower Murray-Darling catchments (CSIRO 2007). It made it clear that, while the climate had changed before, 'we are now living in a climate of our own making' (p.1). Based on the research, they predicted that '... [c]hanges in rainfall and higher evaporation rates are likely to lead to less water for the rivers' (p.5) in the lower Murray-Darling communities in New South Wales. The CSIRO (2007) report advised water users that all Australian governments had agreed, under the National Water Initiative, that the water users themselves:

... should bear the risk of such reductions in water availability. As a consequence, water users in the catchment may face long-term reductions in allocations and higher process for water. (p.6)

The October 2008 glossy tourist brochure that introduces *Hay NSW: real people, real experiences* has an air of unreality one year on. The *Agriculture—primary importance* section (p.14) claims that '[r]eliable irrigation, good soils and an abundance of sunshine enables

a wide range of crops to be grown.' At its peak, 'before the drought', there were 35 rice growers in the Hay district. In 2009 only two rice crops were grown. As one agricultural adviser said, as a consequence of drying, water over-allocation and water trading, a lot of:

... water has virtually gone out of this area ... and it probably means doom and gloom as far as a lot of rice growing areas [are concerned] ... The writing might be on the wall. Similarly with cotton... Cotton was 16,000 hectares five years ago. This year it was 2,900 hectares.

Similarly, the *Education and Community Services* section in the 2008 tourist brochure showcased many of the educational facilities that had closed or were under threat in 2009. Learning about why change so rapidly occurred is difficult for an outsider to comprehend. Unsurprisingly, many rural Australians in similar situations feel a sense of unreality, 'isolated, alienated and disconnected from the rest of the country' (DPRESP 2008: 14). We came to understand that creating the impression 'that through government assistance the community can be returned to 'normal' economic and climatic stability' (DPRESP 2008: 12) when the drought and exceptional circumstances (EC) funding finishes may in fact be delaying sustainable solutions to the myriad of problems. We came to realize that it was relatively easy to identify 'downstream', community and social effects of there being less rainfall, higher temperatures, and less water in the river. What was particularly hard for adults in this site was learning about what to do in response that was sustainable, other than the unthinkable of walking away from irrigation, from the land, or from the town altogether.

People in Hay learned much about 'water debate' and its many facets from the local and regional press. The week we interviewed, the *Riverine Grazier* ('The heartbeat of Hay') on 3 June 2009 ran the headline 'Hay to suffer future job losses as Twynam signs \$303M water deal' on page one, whilst the *Weekly Times* reported

FREE FLOW in 3 cm screaming headlines, dubbed the 'biggest water buy-back in Australia's history'. In the *Deniliquin Pastoral Times*, it was 'PRESSURE REMAINS: 1.6 bil. still in buy-back account'. There was a growing realisation, as *The Age* editorialised (19 August 2009, p.16) that '[l]ong-term averages may no longer be a guide to sustainable [water] allocations ... if climate change has taken hold', and that federal and state governments may:

... need to go back and review all licenses and rewrite the rules of the current highly compromised national water plan to a system capable of sustaining the environment and agricultural venture for years to come.

Learning and narratives about the allocation of water

There was evidence from the interviews that all water users had been forced, by a combination of economic necessity and government incentives, to learn to make their allocated use of water significantly more efficient, only to have their allocations further reduced:

The Government has encouraged [irrigators] to build up this infrastructure to establish all the recycling systems, the more efficient pump systems, better lined channels, [ensure] farmed country doesn't have seepage problems ... and now to find out that water may be taken away from you.

One irrigator summed up what had been learned on the land in the previous six years. While 'selling the water out of the district' worked in the short term, it raised important questions about 'why you are where you are':

At the end of the day we have to be a viable entity or we are going to go bankrupt, so we have to be able to make the best use of that water which may have meant that we just spell it for the last few years. Because with the little water that we have had [allocated] and the crops that we grow you just can't get a return. They have been selling the water out of the district. I guess long term there's that challenge whether we are going to stay as we are at the moment. We may have to change things totally because you

can't just keep selling your water every year, because that's why you are where you are. ... Six years ago we were highly geared and we had a reasonable amount of employees and we grew quite a lot of crop and we were major summer croppers and more minor winter croppers. Now we have de-staffed basically.

Considerations of the long-term sustainability of either the environment or water-related agriculture were almost completely absent in the Hay transcripts. 'Allocation' was mentioned 125 times, 'upstream' only three times, and 'downstream' only twice. There was no serious concern for water users or the environment downstream, other than the euphemism 'frogs', mentioned eight times, referring disparagingly to federal Environment Minister Peter Garrett's perceived lop-sided concerns for environmental flows for the wetlands downstream. While the term 'climate change' was used spontaneously by a few informants, and believed by some as a reality, the notion of 'drought' or 'dry cycles' was preferred, as it implied that a return to wetter times was possible.

There was no recognition that the local, free access (to 2009) to unlimited, unfiltered 'raw' water was something of an aberration in the broader Basin. Most people interviewed also insisted on maintaining their inalienable riparian right to take unlimited water from the rivers, as long as it was extracted through nothing bigger than a 'two inch pipe'. For balance, there is a local argument that "the cost of metering and monitoring these pipes is far greater than the value of the water".

Most of the narratives were about entitlement, with little concern for the many users downstream. While people in the site were aware that things might have to change, the fundamental interest was in what water they were entitled to, what water should be allocated, or how much they ought to be compensated for the loss of entitlement or sale of their water rights. Most people still held out hope that a decade of

adverse and exceptional circumstances was not climate change and would eventually reverse. For example:

It's a cycle thing. Australia is a land of extremes, there's no doubt about that and it has been happening way back ... My wife is into historical things and if you look back to the 1800s there have been a lot of droughts and a lot of heat waves and a lot of rain, it's just in a cycle.

This belief was still being officially reinforced on 1 October 2009 by the optimism of New South Wales Office of Water. In a News Release from the NSW Water Commissioner headed 'September rains bring first security allocations to the Murray and Murrumbidgee and Murray Valleys', general security users in the Murray Valley were given an initial water allocation of one per cent and Murrumbidgee users three per cent, with a final sentence warning that 'water supplies for 2010/11 have not yet been secured', and asking 'all water users to be as conservative as possible with their use in what continues to be *the worst drought ever experienced*' (italics added). At worst, there was admission that some of it might be climate change superimposed on a natural drought cycle, and widespread hope that the big floods of the past would return. As a 64 year old farmer recollected, "I can't remember [19]'44, but I can remember the floods we had in [19]'74 and [19]'56 ... '56 was unbelievable".

Learning about water trading

Given the political sensitivity of the issues and speed with which the Basin has dried out, it is necessary to provide some background to the temporary and permanent 'water trading' that many farmers were actively engaged in during our field visits to this site in 2009. Only a few independent researchers such as Quiggan (2008) have critically interrogated government policy responses to the increasingly limited options for governments who made the policies. Unsurprisingly, such trading was seen to be attractive to some farmers that had land with an *entitlement* to water, but with minimal or no recent

water *allocation*. As one such farmer said, in response to a question about how water trading had changed things:

[O]ne of the big changes is that we used to value our property as a whole. Now it is not worth anything without the water, so if you haven't got the water it is worth very little. We have spent a lot of money on infrastructure. I am trying to build up the soil and really all that money we have spent isn't worth anything if you can't utilize the water, if you can't turn the pumps on. I guess that is one of the big things that has changed, the whole emphasis has gone off the actual land and onto the water.

While water trading provided immediate and sometimes desperately needed capital, it temporarily or permanently broke the link between land and the right to water it.

Quiggan (2008) noted that National Competition Policy reforms in 1994 converted 'existing water licences [previously] attached to particular parcels of land into tradable property rights', vested unwarranted 'faith in the markets'. The assumption underlying these reforms was that water trading would lead to water being allocated 'to its most valuable use, thereby ensuring a range of socially optimal outcomes' (p.5). Quiggan particularly identified a problem with the hasty conversion of 'sleeper' water licences that had never been used or 'dozer' licences that had 'some history of use, but were inactive at the time of the water reforms.' In Quiggan's words:

A limited right conditional ... on the development of irrigation infrastructure was turned into an unconditional claim on scarce water. The effect was to increase the severity of the over allocation problem that was already well known.

Impacts on learning communities

Impacts on schools

The Drought Policy Review Expert Social Panel report (DPRESP 2008: 47), *It's about people: changing perspectives on dryness*,

recently observed that '[e]ducation is essential to social and economic wellbeing, as well as to the resilience and future adaptive capacities of communities.' It noted that one of the strongest messages the panel heard was that 'the social wellbeing of children and teenagers is suffering because of dryness' (p.47). The continued period of dryness was impacting on the social wellbeing of the township of Hay with long periods of less work and reduced incomes:

From Hay's perspective the town looks like it is still thriving and I guess ... people see our green nature strips [and think] things are OK. I think the town is worse [off] than what that population might think it is.

The effects of dryness on participation in and outcomes from compulsory education and training for young people, while documented in other reports (DPRESP 2008: 43–53), are particularly evident. At schools the student numbers were dropping, resulting in a nervous wait each year to see how many teachers would be required, and who might be forced to move on to another rural town. Young teachers were reluctant to apply to a school in a town where numbers were dropping, to relocate and then have to relocate again. In the past few years the primary school had lost about 100 children, and subsequently lost the allocation of four full time teachers.

It is starting to impact. The schools are starting to lose numbers and the families have to leave the area to get jobs elsewhere and things like that.

The high school is a key feature of the town, housing the War Memorial museum and memorabilia. As the public face of Hay, the front of the school is also surrounded by green lawn. However there was concern that the school could no longer afford to pay for the water required to maintain the school 'farm' as the site for agricultural and vocational courses. The indirect impact of dryness on learning options was obvious. It was a relatively small high school, and as enrolments declined, the school was unable to offer a wide

range of curriculum options. This was most concerning in the post-compulsory years, as increasingly families were choosing to send their children out of the town for senior secondary schooling:

There seems to be an increase recently in the number of Year 10 students leaving and not going on to Year 11 and 12. I have been at my wits end trying to explain that. ... I wonder whether there is pressure from families for those kids to go out to get work because the family income has declined so much.

In the recent past, Hay had a Catholic secondary school and hostel for rural children from remoter districts to stay in town during the week. Both of these had closed. Young people from the district could no longer stay in town, unless the family could afford private boarding, or the mother could move into the town for the school week. Each Monday morning in 2009, buses left Hay to take young people to secondary schools up to two hours away in Leeton, Yanco, Finley and Deniliquin where some students boarded for the week, making the long journey home at weekends.

The high school had a number of initiatives with which they are trying to address the trends of increasing numbers moving to other towns:

We are looking at curriculum structures that ... increase curriculum choice. We are also looking at connected classrooms in combination with other schools to increase our electives that we offer so that we can maintain students here. One of the reasons they go away is they say "We can do this subject" or "We can't do that subject" and it's a valid argument and we are trying to overcome that. In terms of the education they get here, our results indicate that ... the average results last year were above a like school.

Post-compulsory impacts

Families with more resources were still able to provide options for their young people to complete Year 12, and many understood the importance of 'getting kids away' to university or TAFE [technical

and further education], typically to then stay away to work. If young people of post-compulsory age chose to remain in town and go to TAFE, they had to travel to Deniliquin, 120 km south, for most courses. The rise in petrol costs and wear-and-tear on vehicles, were all cited in interviews as barriers to such travel and to continuing or second-chance vocational training or retraining for adults.

It became apparent that the traditional school-based modes of education and training were no longer relevant to the ongoing lifelong and lifewide learning needs of this community. In a situation where almost everything was changing so rapidly, there was great concern for the impact on young people. However there was also no public place for adults to go and learn collectively and collaboratively. In this context, the learning and wellbeing that occurs through the many community-based organisations in Hay becomes critically important. In isolated communities such as Booligal this adult learning function was essentially located in the only remaining adult public place, the hotel.

TAFE offered mandatory certificates such as the safe handling of chemicals, yet most of the learning done by the farmers was from each other, from the media, through community and industry-based associations and/or the internet. Some farmers were of the view that the money 'being poured' into some government programs for learning about dryness was a total waste. Field days, the traditional way farmers got together and learned from each other, were no longer drawing the numbers of previous times, due in part to the cost of travel and the generally depressed economic climate, but also because of the use of new information and communication technologies (ICTs). We heard about the "... extremely significant role internet access now has on learning. Most farmers ... are connected now with broadband or satellite." We also heard about the critical importance of strengthening social networks. Some agencies were now providing family fun days, including food and drink as a means of getting people

together, principally to enhance community and social wellbeing. People were now more openly talking about and providing services for depression and 'looking out for each other' as a consequence of 'the drought'.

Change is needed. Whilst the differing sectors of education and training remained in their separate 'silos', they were unable to provide the type of lifelong learning that was clearly needed in order to adapt and change and survive. As one education leader said:

TAFE and schools [are now] almost the one entity. There is more flexibility in delivering adult education in a school environment. I think education institutions have probably stood still too long and are not adapting to the education needs of the community as they should be. We are stuck in this traditional mould where kids go to school and parents don't. We have these set classes in years and they follow through ... I would like to break down some of that and create ... schools ... as places not just for education for students, but an education place for the community, especially in an isolated area like this ... in a community like this or smaller, that model I don't believe fits the bill.

Community impacts and responses

The Hay township sits on a relatively narrow ribbon of riverine floodplain at the intersection of five radiating bitumen roads, sandwiched between two vast, flat saltbush plains. Hay in some senses is somewhat like an 'island', resulting sometimes in island-like perceptions in terms of work and education:

You get depressed thinking it is only in *your* town and you are personally doing something wrong. And then you go to these other centres where you have got hundreds of guys in the same employment and the same industry with the same problems.

Time and again the people interviewed in Hay commented on the long-term effects of dryness on the town itself. From the focus on 'green nature strips' as a way of keeping them sane, to the ongoing

loss of business to the town, everyone was concerned for the future of the town itself. These ranged from the closure of businesses, the loss of casual jobs in town, the loss of skilled tradespeople as work dried up, and consequently the loss of opportunities for apprenticeships in town (in this case, in nearby Deniliquin):

This is not just affecting the farming community. What it is affecting is the low skilled people who live in this town, whose jobs, the unskilled labour has gone from this district. There is no abattoir work, there is no rice workers, there's no taxi driving on a regular basis, there's none of that erratic work that they used to pick up.

As other infrastructure shut down in Hay and adjacent towns, the people in the district were being forced to travel further for services and work that used to be on their doorstep. For example, with the downgrading of the local hospital, people now had to travel over 100 km to a bigger town for treatment, and whilst there, will tended to shop, at cheaper prices, thus further reducing the income stream to businesses in Hay. Work for nurses remained in the geriatric centre, but had become erratic. Some nurses were flown in from overseas for a month at a time, resulting in a lack of continuity of care for the elderly residents and their families.

The loss of income, whether from farming, contracting or other work in town, has had a marked impact on women in the district. Most women were major partners in the economic survival of the family. Some were working in town, in business, managing a property, or, increasingly, running the farm whilst the husband worked elsewhere, either in the town or far way, in contracting work or for some in distant 'fly-in-fly-out' mines.

A concern for women working alone out on farms was fear of accidents, as in the past, there were far more workers around to complete tasks safely. Mobile phone coverage was erratic, and several women expressed anxiety when they were undertaking heavy work

alone. Whilst the men were away, the women commented on the increased workload and exhaustion. This comment was made by both women running the farm and working in town; when the children got home from school, they too had to take on more farm work caring for stock and water as well as managing the home and family:

He has to work away a lot which makes it harder on the family, because we have to feed the stock and do the water if we have got it.

Whilst several of the women commented that they had not been able to continue in formal education as long as they had wanted, all were determined that their children would have as much education as possible. There was general concern as to the federal changes in tertiary allowances, as many country young people recently chose to take a gap year to earn enough to be come eligible for youth allowance, only to have the allowance removed.

Discussion

Managing the risks

This Western Riverina case study, in a highly water- and climate-dependent site, community and economy raises two important questions. The first question, 'How do adults learn about and respond to the risks associated with drying?' was embedded in the research design. The importance of a second question, 'How do adult learn about, respond to the risks that climate change is associated with drying' only became clearer through the narratives. By 2009, most of the economically feasible responses and adaptations had already been made by the agricultural community. Many of the realistic technological and cropping adaptations in irrigation areas, including increasing water efficiencies, recycling and minimizing transmission losses, had begun at the 'start of the drought'. The most recent response was water trading and water substitution. As an agricultural

adviser said, “If growers are not trading water or using bore water, they’re using it to the highest value crop.”

The scope for further, local adaptation by farmers was therefore very limited. For some with water allocations, it was possible to ‘get by’ by trading their water or subsisting on exceptional circumstances (EC) funding. The social and psychological adaptations required for many individuals were huge. To accept that this was a drought would, for many, involve a loss of face in the community and an admission of defeat:

Some people just don’t want to accept that we are moving into a drier climate. ... [While] farmers stay on their properties they can maintain an image of semi-prosperity ... and live as cheaply as they can out on the farm, [or else] they will move away, because they won’t want to move into town and appear to have lost.

In one optimistic narrative, favoured by the New South Wales government, people in sites like Hay are ‘facing the worst drought ever experienced’, in which case they expect the rainfall and river to eventually return to its history of long-term average reliability, particularly for irrigation. In the other narrative, predicted by the scientific community and only very recently embraced by the national government, they are facing the possibility and risk that the climate has shifted and become drier, perhaps as a consequence of and caused by human activity elsewhere. Most adults we spoke to optimistically clung to the first narrative. A few entertained the possibility of both narratives superimposing and reinforcing. While some people accepted *a risk* that the current shortage of irrigation was related to climate change, to accept it as a permanent reality was too difficult, depressing, and like an admission of failure.

There was a strong sense in the site that, in the meantime, people could and should take from the rivers whatever they were legally entitled, to or be compensated for its loss. While the water for

greening the town may have used only a small fraction of the water used for irrigation, the attitude towards retaining this historic but now anomalous water use in the Basin was fiercely defended. There was very little interest or concern about the water needs of people downstream and indeed, a widespread, almost cynical disregard of environmental issues downstream. Given the still unresolved and competing uses of water by different states across the Basin, people in the site tended to retreat to the argument that water was a ‘states-rights’ issue and expressed concern that any national solution would treat them inequitably and leave them worse off than at present.

Very few adults articulated another likelihood: that the water resource across the Murray-Darling Basin, even before 1998, had been significantly over-allocated to irrigation use, even if the first narrative were accurate. In both cases, aside from learning to be more efficient and responsible with the continued reduction of water ‘allocated’ from their maximum ‘entitlements’, people in the site to 2009 were increasingly required by governments to bear the difficult, continuing and debilitating social and economic risks of worsening dryness.

Impacts on learning across the community

A number of other research reports have found that pressure on families, whether with men working away, women running the farm or working in town, or children responding to family stress over money, are now having an impact on both family break-up and young people’s horizons for future education, training or work choices (DRESP 2008; Alston 2006). There is clear evidence that the support structures for families living in dryness in sites like this one in the Western Riverina, such as education and training and health and welfare provisions, are still working in the old model of discrete ‘silos’, under different government systems and processes, whilst working with a declining small population. Indeed, research is showing that institutional structures remain barriers to ‘joined’ up thinking in relation to change and creative approaches to new problems (Nilsson & Swartling 2009).

Conclusion

This case study highlights the limitations of learning through previous experience in the context of rapid ecosocial change. Despite widespread denial of the probability, this mid-river community is very likely faced by an arguably new and 'tricky' phenomenon of climate change (expanded in our 'Wicked learning' paper: Golding, Brown, Foley, Smith, Campbell, Angwin & Schulz 2009). The predicted, early effects of drying in this site are obvious, but the causes and solutions, if this is climate change are not yet clear.

Climate change challenges the theory of uniformitarianism. This theory, developed originally in the earth sciences, argues that processes that are observable today in the natural environment help explain the past, and will be repeated in the future. Several aspects of this theory pervade thinking about the river, agriculture, the environment and climate in this site. In the past century, changes in water availability in the Basin have been seen as normal, natural and cyclic. Local people have come to learn from experience that, while there would always be droughts and floods, with very dry and very wet years, there would be a return to the long-term average that had ensured ample water for irrigation for over a century. Departing from this expectation, including learning about, understanding and accepting either the risk or reality of climate change was a very difficult mind shift. In the case of the southern Murray-Darling Basin, predictions of permanently drier times and much less water from the rivers, required new and different understandings about inter-connectedness and a paradigm shift away from uniformitarianism.

In a rapidly changing context, at best adults in this mid-river site can learn about being drier through existing communities of practice. There is no local adult learning organization in the site with programs or forums that are at the cutting-edge of change. The learning that takes place is restricted amongst water users to what they may (or may not) learn through the various industry, government and

community-based organizations and in the popular media. With parallel, nationally politicized contestation about climate change, global emission and causality, no national Basin plan or agreement, and a state government water agency still in apparent denial about climate change in its communication with water users, there appears to be an urgent need for new information and dialogue about likely future scenarios and management options for water users across the site. There appears to be a desperate need for new *boundary* and *bridging* organizations that are able to bring together different communities of practice inclusive of water-dependent stakeholders. Such organizations would seek to create trust and collaboration opportunities and serve as arenas for scientists and decision makers to reach and communicate common understanding of the complex and rapidly changing issues (Hahn et al. 2006; Guston 2001) to people in the site.

Water-dependent communities, in this and similar sites across the Riverina are already located towards the 'pointiest' and most risky end of drying and the further risk of likely climate change. However adults are currently relatively poorly prepared by governments to learn about and bear these risks. There is a particular and urgent need for better and more accessible information and understanding about the likelihood of risks, on which future community, business, family and water management decisions might ideally be based.

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