

## **Learning to be drier: A case study of adult and community learning in the Australian Riverland**

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*This article explores the adult and community learning associated with 'learning to be drier' in the Riverland region of South Australia. Communities in the Riverland are currently adjusting and making changes to their understandings and practices as part of learning to live with less water. The analysis of adult and community learning derived from this research identified six different forms of learning. These are, learning to produce, learning to be efficient, learning to survive, learning to live with uncertainty, learning to be sustainable and learning to share. These forms of learning do not occur in isolation and separately from each other but to the contrary are occurring simultaneously with and alongside each other. Further, it is argued that the people and communities in the Riverland, through learning to live with the effects of climate change and less water, are at the forefront of learning to be drier.*

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## Introduction

This project focuses on the way that adults in the communities along the southern and lower Murray-Darling Basin are learning to adjust to the drier conditions that have been evident for the past decade. The project design elaborated in Paper 1 called for four pairs of researchers, one from each university conducting research in one of four locations in these Basin communities. This article is about adult and community learning in the Riverland site centred around Paringa, Renmark, Berri, Barmera and Waikerie. The researchers were curious to find out more about the learning that is occurring in the communities in this region, in the midst of what are widely believed to be changing climate conditions and learning to live with less water. The result is the identification and explanation of six different forms of adult and community learning that are integrally bound up with a particular community of people, living in a particular place and their inter-relationships at a particular point in time.

### The project

To collect data for the study, individual and small focus group interviews were conducted with participants considered to be water dependent stakeholders. The design of the study called for participants from within five categories. These are (1) farmers and growers, (2) water authorities and land managers, (3) representatives of community based organisations, (4) adult education and training providers, and (5) other water dependent businesses (as elaborated in Paper 1).

The researchers made two visits to the region to collect data and another to discuss and report back preliminary findings. The first visit was a reconnaissance to collect contextual information, to identify and confirm informants, and to set up the interviews. On the first day of the first visit the researchers were very fortunate to be able to sit in on, and speak at, a meeting of the local Murray Darling Association

which was meeting in Berri. The researchers outlined the project and were able to make useful contacts as a result of the suggestions of board members. Some suggested the names of others who they thought could make useful contributions.

On the second visit to the region the researchers conducted thirteen interviews with nineteen informants; some interviews were with individuals, some as pairs and some in groups of three. Six participants were female and thirteen male. The interviews went for between 19 and 58 minutes and generated 137 pages of transcription.

### The Riverland region

The Murray River is the centre-piece of the Riverland which is widely understood to extend from the South Australian side of the state borders with Victoria and New South Wales down to Lock 1 located at Blanchetown. It is estimated that there are approximately 30,000 people currently living across this region. The 375 kms of the Murray River that runs through the Riverland is in dry times described by some of the locals as a series of ponds. This is because the Riverland section of the Murray has flowed through a series of locks and weirs which were built in the 1920s and 1930s to maintain constant water levels for boat traffic and for the storage of water (Discover Murray 2009; MDBC 2006a; MDBC 2006b; Nicholson 2002).

The water resources in the Murray-Darling River system have long been a bane of contention between four Australian states and the federal government. Since as early as the 1880s, irrigation has been an accepted farming practice along the Murray in several states. Less clearly defined and agreed to, is the issue of who owns or has rights over this water. All four states have river frontage and stake their claims. As long ago as 1911 each of the states with territory in the lower basin appointed leading engineers to collaboratively address utilisation of the Murray River (Discover Murray 2009; MDBC 2006a). One of the key recommendations was regulation of the water

through storage. A decade later this led to the building of the six locks and weirs throughout the Riverland between Blanchetown and the NSW border, with Locks 7 to 11 located within the NSW and Victorian jurisdiction of the Murray (Discover Murray 2009; MDBC 2006a & 2006b).

These early historic negotiations between the states eventually led to the River Murray Waters Agreement that was ratified through Acts of the various state and federal parliaments in 1915. This agreement established the River Murray Commission that was to later become the Murray Darling Basin Commission (MDBC) and what today is the Murray Darling Basin Authority (MDBA) (Discover Murray 2009; MDBC 2006a). Significantly, the fundamental function of the MDBA is 'to conserve water, and to share and supply three states, and with minimum wastage' (Discover Murray 2009). In the Riverland this occurs through storage and regulation of flows at the locks and weirs. While the locks are designed to allow the movement of boats to traverse the weir walls with the different water levels on each side of the weir, the main purpose of these weirs today is water storage and the regulation of flow.

The relatively constant water level can be very deceiving, what is most important are the actual flow rates. The river can look normal but live data on the flow rates at certain points are available on the MDBA websites and these tell a different story. Using figures supplied from this source on September 24<sup>th</sup> 2009 approximately 2,300 mega litres (ML) per day were flowing across the border into SA at the top end of the Riverland while at the same time approximately 1,180 mega litres (ML) was flowing through Lock 1 at the bottom end of the Riverland (MDBA 2009d). From these figures it can be seen that the volume of water that leaves the Riverland can be about half that which enters. It is estimated that water flowing across the border on Sept 24th will travel quite slowly at just over 4 kms each day and so take over two months to travel the distance from the border down to Lock 1.

Broadening from the Riverland to the Murray system it is interesting to note that at the end of July of 2009 the useable storage in the Murray system stood at 1,470 GL or 17% of capacity (MDBA 2009e). The current outlook being portrayed by the MCBA for the 2009–2010 water year remains poor and is similar to the previous two years. It is now about 8 years since the Murray River system experienced normal average rainfalls (MDBA 2009e).

### **The findings: A learning focus**

This study involved researching how the people in the Riverland communities were learning to live with less water. Australian educational researchers such as Kilpatrick & Falk (2001) have explained how people in rural settings are involved in making decisions, instigating changes and how these actions involve learning, knowledge sharing and knowledge production. This current study is focused on the learning that is occurring in this region at this time. This research study of the Riverland identifies six different forms of learning which are discussed throughout the remainder of this article. The first of these is learning to produce.

### **Learning to produce**

Part of understanding adult and community learning in the Riverland is in understanding its development as a region of production. The South Australian Department of Primary Industries and Resources (PIRSA) provided rough estimates on production for 2007–08. These estimates cover agricultural production that is measured in two ways. The first is at the farm gate, and the second is measured as finished food after processing. Both are measured in terms of dollars. PIRSA estimate that the gross value of production in the region to be around \$413m and with added value through processing this climbs to \$1,107m. Table 1 provides a breakdown of these totals by sector (Personal Communication, Sept 2009).

*Table 1: Estimated value of production (\$million) in the South Australian Riverland*

	<b>Production</b>	<b>Finished Food</b>
Field Crops	34.1	4
Livestock	14.4	2
Horticulture	134.5	231.3
Seafood	0.4	0.6
Wine	229.5	869.1
<b>Totals</b>	<b>412.8</b>	<b>1107.0</b>

These figures show that in terms of production and the market, the Riverland region needs to be considered as one of the food bowl and wine cellar regions of the country. Importantly, 56% of the total value of production and nearly 79% of the wholesale price of the processed food in the region is directly associated with growing grapes and turning them into wine.

One of the Growers interviewed for the study described the good times they had experienced producing grapes.

We have had a brilliant time with the grapes, I mean I wouldn't be sitting in this place if we hadn't had the early 2000s with the grapes. Some growers wouldn't accept \$1000 a ton and they were chasing the market and a lot of them were getting \$1400 a ton and now we are talking \$400. . . .

In addition to the work of the growers there is much flow on for work in other allied industries such as packaging, processing and transport. The manager of a packing shed explained the seasonal nature of the employment. In some months of the year the shed runs two shifts per day, during other months only a skeleton crew is required. He noted that not many locals work at the shed but rather there is a predominance of backpackers from overseas, earning money as they work their way around the country. These visitors also contribute to

the tourist economy in the region, although some operators told the researchers that their trade was down by as much as 40%.

Clearly the growers have learnt to use irrigation and produce crops as they have etched out their living and built up to current production levels. As the growers reach economic viability with their horticulture so too other allied and support industries are established and developed. Alongside learning to be productive is the second form of learning that was identified in the study, this is learning to be efficient.

### **Learning to be efficient**

People in the Riverland and South Australia generally, are very conscious that they are at the end of the pipe when it comes to the Murray Darling Basin system. When it comes to water flowing down the Darling and the Murray, South Australians see themselves to some extent as being at the mercy of the other states in the basin. For this reason South Australia, more than the other states, has put in place irrigation infrastructure and farming practices that are in many ways more efficient than those of their neighbours. One of the most cited claims made by interviewees across the five stakeholder groups in this study was that the producers in the Riverland were very 'efficient' users of water and their goal was to become even more efficient. South Australia has no open irrigation channels. Instead all their irrigation is run through pipes to eliminate the waste that occurs through evaporation. The enclosure of the irrigation water in pipes was completed in the Renmark Irrigation Trust area in 1974.

A number of the growers interviewed, described how they had changed their farming practices over the years and adopted new technologies in order to gain further water efficiencies.

It used to be all furrows and probably in the 60s we went to sprinklers, in the 70s a lot of us went to under tree sprinklers which is small sprinklers for the citrus under the tree...

Just putting the water out more evenly with the overhead sprinklers you have got a lot of overlaps and things like that and its just using water better I guess. Then in the 80s we went for drippers so we have had drippers for probably nearly 30 years in which you reduce your volumes of water again and you just put it in where you need it, and you are not flooding.

Another grower elaborated further on adopting new technologies:

I invested in an irrigation system and I put in a monitoring device which actually monitors the volume of water and I'm making sure that when I am applying water to plants it's to their needs. I made that commercial investment and I'm pleased I did that because I have got a 120 meg allocation. I used to use total allocation before sprinklers and since I converted to sprinklers I am down to 60 megs so I save 50% of my water allocation,...

The allocation of water is a primary focus of the growers. In recent times they have been on the receiving ends of cuts, to the point where growers, at the time of the interviews were only getting 18% of their entitlements. Cutbacks to water allocations have meant that the grower/irrigators have had to look for even more efficiencies. They are constantly assessing their irrigation practices and seeking better options. As one grower said:

We were wasting water and I am not too proud to admit that, because we were putting water on the vines ... when it showed a miniscule amount of stress . . . but now with pipeline and everything like that it is distributed evenly throughout the vineyard...

Between them, these informants explain the increasing efficiencies gained through the ongoing development of irrigation practices over a sixty year period. As a user group located towards the end of the river system, part of the learning that is occurring in the regional centres is about learning to use water in a more efficient manner. The training arm of the SA Murray Darling Natural Resources Management Board provides an array of one day workshops such as those that

help growers get the most from their drip irrigation systems. The workshops are geared towards making crop farming more water efficient. The installation of efficient irrigation infrastructure, the adoption of changing technology and farm practices and adapting to substantial decreases in water allocations support our finding of the occurrence of learning to be efficient.

### **Learning to survive**

A Drought Response Centre has been established to deal with a range of issues arising as a consequence of drought in the region. The researchers interviewed a staff member who explained that they saw their role as providing assistance and solutions to local people with as little red tape as possible. The centre is a direct response to the rise in the need for services to support people who are experiencing hardship and difficulties in their lives. This region has seen a sharp rise in the demand for emotional, relationship, financial and small business advice, support and services. The centre was established to provide community-based services to anyone in the region.

Direct drought assistance and advice are part of the services these community service workers provide as the drought progresses. As one counsellor at the centre explained:

At the end of last year you may be aware that the SA Government implemented 'the critical water program' which was about providing irrigators with enough water to keep their crop alive, not to produce fruit but to sustain the crop. That was managed through this building, so all the applications came through here. So [our role here] is about being a one stop shop and its about providing the service that is required at that point in time.

One of the most mentioned adjustments being made in this region is regarding irrigation practices due to decreased water availability and allocations. The total water entitlement that is meant to flow from the Murray River System into South Australia under normal conditions is

approx. 3,500 ML per day. But none of the South Australian farmers along the river has received their full entitlement now for about four years. At the time of data collection for this research project in mid June 2009, most were on 18% of their normal allocation with this due to be decreased further from July.

Another grower explained that they were now taking on extra costs associated with buying water in order to grow a crop, as the value of the grapes has slumped. The growers are currently receiving approx. \$150 a tonne for white grapes and \$250 a tonne for red grapes but the cost to the grower to produce a tonne of grapes can be somewhere around \$350 a tonne and closer to \$400 if they need to buy in extra water. This kind of balance sheet is not the basis for a viable business.

Growers are faced with hard decisions and need to weigh up their options. Do they buy in water to get a crop and then hope that they will get enough return to cover the extra expense? Falling commodity prices for their crops make this a less viable option. Some growers spoke of ploughing their crop into the ground rather than selling it and taking on the further expenses of getting the crop packed, transported or processed. Yet another option is to go out of production and mark time for a season or more. With this option comes the notion of 'critical water'. One grower took us through the concept and explained that this is the amount of water that has been estimated as necessary to keep vines, trees or plants alive (without producing a crop) until water once more becomes available. Different crops need different amounts of water; estimates of what constitutes critical water have been formulated by government for each different crop.

Growers, some tourist operators and others who work and earn their living in and alongside water-dependent industries are feeling the effects of less water. There is a rise in the community's demand for professional, emotional and financial support services. The strategy of critical water is at best a temporary survival strategy for growers. It is

in these ways that learning to survive has become an important aspect of learning in the region.

### **Learning to deal with uncertainty**

Primary producers are used to living with levels of uncertainty. Farmers and growers are well aware that their sustainability is affected by weather cycles and that these are far from even. Accordingly they have learnt to manage the unevenness. Many budget for good and bad times using the profits from the good times to get them through the bad. However present conditions are exceptional, with the NSW Office of Water (2009) declaring their experience across the border from the Riverland as 'what continues to be the worst drought ever experienced'. Such prolonged difficulties mean that reserves built up over many years are now being used up.

Growers need water security but ongoing drought and climate change mean that this is not possible. Allocations have been cut to the minimum with further talk of no allocation being possible at all next year. This means that there is a need for strategies beyond the current notion of 'critical water'. Yet interestingly it is expected that water for irrigation will still be available on the water market to those who can afford to buy it. However when water is purchased, growers need to consider whether the commodity price of the crop they receive will support the outlay of buying in water.

Uncertainty is prevalent on many levels and exacerbated by governments sending mixed messages. In the last two years the government gave out up to \$20,000 as irrigation grants to individuals so that growers could install the latest drip technology and put drippers throughout their properties. This year they are offering exit packages that, for some blockies on around 15 hectares of land, are worth around \$150,000. However in order to get this money the exiting grower must pull up all their crops, trees and vines. A blockie can get a further \$20,000 added to the exit package if they

also remove their sprinkler systems. However, rubbing salt into the wound, in most cases, this is the same sprinkler system which was put in using previous government grants two years earlier. In some cases the sprinklers to be pulled out are brand new and yet to have water run through them.

Commodity prices are falling with some interviewees reporting a reduction in price for their crops of 40%. Some processors are not renewing contracts. In such cases growers need to wait and see how much produce the processors are willing to take and what price they will get. Current prices being offered are estimated to be as low as 25% of production costs. Some growers describe further difficulties when they tell of being dependant on large import and export markets and of getting paid their money at the end of the process, receiving what is left after the costs have all been deducted.

I have been in the dried fruit industry, the canning industry and the citrus industry, we have seen the canning and dried fruit industry virtually disappear because of the imports, the cheap imports and I think the citrus industry has had cheap imports from Brazil. I think in some ways the wine industry might be heading the same way. . . . most people at work have the guarantee that they have got so many holidays a year, they have got a guarantee of a certain minimum wage, they have got a lot of things to protect them but the grower doesn't have any of that certainty, you get what is left over.

Other businesses in the area are also affected, with some going bankrupt. Some of these were large well funded businesses that were expected to bring stability to the region. In some instances their insolvency prevented payment for produce they had already received. This left growers and their families further out of pocket.

Families and a broader range of community services are thus affected by aspects of the falling regional economy. Financial, emotional and family pressures from what might seem like numerous uncertainties

are taking their toll and some people were finding it difficult to see their future in the region. Much of what is described here requires individuals and communities to learn about these uncertainties and learn to manage them as best they can. For people to commit to a future in the Riverland they need to find a way of learning to live with these uncertainties.

### **Learning to be sustainable**

It is interesting to note the native flora of the area and how this stands as a reminder of what this landscape would be naturally without any irrigation. The vegetation in this region is mallee. Close to the river are the large river red gums and as you move away from the river the mallee trees become thin. In the many clearings saltbush is found. Another bush found all over is the sharp prickly spinifex. In some ways this natural vegetation stands as a reminder to what grows naturally in this region. The soil is relatively good quality and with added water supports agriculture and horticulture. The river flats and plains have historically been subjected to flooding, one environmentalist interviewed explained that the historic and public records for the natural environment indicate that prior to European settlement the river broke its bank and flooded out onto the flats as much as every second year. Current records suggest that since European settlement this now occurs about one year in every eight.

One of the local environmental activists, a recently-retired outdoor educator, involved in community-based natural resource management explained to us that the river was really:

A series of lakes, that's all the river is, and it's potentially held up by the weirs and being a canoeist I was very much aware that there was very little flow in the backwaters . . . it was obvious that we weren't getting anywhere near the flows that we were previously.

The same interviewee also explained how he and his associates had been trying to get others in the community to take notice of the state of the river and in particular what they perceived as the over-allocation of water.

I know there is a great demand... on the river for a number of years over allocation of water and we have been screaming, we being local environmentalists, have been screaming for many years... it was deteriorating and it was lack of floods and the reason we were having lack of flow in the river and lack of these floods was the fact that too much water was being taken out....

He went onto explain environmental strategies and projects that were currently being developed to try and save some of the environment. He explained that the river red gums that were on the flood plains inland from the river are the ones in most danger of dying off. He spoke about rising salinity and of a project to divert water from the locks out onto the plains, through the creeks and backwaters, by flooding over the banks. He also explained about plans to try to bring back fish stocks in certain parts of the river. It is estimated that stocks are currently at about 10 per cent of pre-European settlement and the aim is to use funding from the national fish strategy to try to bring this back up to 60 per cent by 2050 (Lintermans 2009; MDBA 2003)). Some native fish such as the Murray hardy head that are currently found in the river in this region are considered endangered or rare and efforts are being made to save them (Lintermans 2009). It seems turtles and frogs also require strategies if they are to return to healthy numbers. Similarly he explained about bird life in the area. He spoke in particular of the mallee fowls and the parrots. For many years he has been involved in surveying the mounds that the mallee fowl build to breed. Bird observers use grids to divide up areas to conduct bird surveys. This informant explained that in the mid 90s where they used to find 10 or so mounds or nests across the grid, they now find none. While they still find some tracks, they see no evidence of breeding.

Yet another way of thinking about sustainability is about viability of the future in more general terms. One strategy that some people in the region are using to build their own futures is through turning to education and training. Some people are choosing to learn through attendance at one of the many day-long programs developed by the MDBA that are aimed at improving on farm efficiency. Another approach has been through utilising Recognition of Prior Learning (RPL). There is increasing interest in RPL, some of which is driven by uncertainty and insecurity as some of the irrigators in the region try to gain recognition and credentials for what they already know and can do. Most people we interviewed mentioned the need to develop sustainability in some form but especially in terms of seeking some kind of environmental balance.

### **Learning to share**

In the Riverland region, competing demands are being placed on the water in the Murray. Growers need it for irrigation to grow their produce and to make their living; others are closely aligned to their requirements such as sellers of irrigation equipment, transporters and food processors. But environmentalists have long argued that the water is over-allocated both locally in the region but also throughout the system. Less water is travelling down the river and flowing into the region. Not only do irrigators need access to more water but the landscape, flora and fauna of the region needs floods. Fish stocks are in serious decline and floods are needed for breeding of fish and mallee fowl alike. There is a serious salinity problem and only fresh water will wash it away. For the past 50 years the salinity levels of Lake Alexandrina at Milang, downstream from the Riverland, has been measured at between 500 and 1800 EC but in April 2009 it increased to 6,000 EC and is currently at 5,500 EC. At Goolwa the salinity levels are currently at 20,000 EC, (sea water salinity is 50,000 EC), (MDBA 2009e).



Drought forces cooperation and early last century legislation was put in place for a shared governance model for the water in the Murray Darling Basin. The shared governance model has had mixed success. In times of difficulty it seems that state interests tend to prevail, however each state has its own agenda and they do not necessarily work in tri-partisan agreement. Many participants indicated a belief there was a need to get the representatives of the people looking to take a broader view of the issues and solutions.

At the federal government level the exit package requirements to pull up irrigation equipment that was previously subsidised is an example of government needing to be more efficient with monetary support. Karlene Maywald is the local state member for Chaffey, (an electorate that takes in the Riverland including the northern Mallee). Although she is leader of the National Party in South Australia she is the Minister for Water Security and Minister for the River Murray in the state Labor government. According to the SA Government website, the issues that Maywald has been driving include 'ways of improving the management of river water in South Australia, managing salinity and, returning additional water to the river for environmental flows', (Ministers in SA Government, 2009).

At local government level, there is little evidence of Riverland cooperation. Amalgamations have seen the Paringa and Renmark shires come together and form a single municipal council. Likewise, Berri and Barmera are one council area. As Renmark and Berri are less than 25kms apart, many in the area think that the four towns should do more to come together

The Living Murray project shows promise as a response to learning to share the water resource. The Living Murray project spans all states and authorities across the basins and is working at permanent cost-effective recovery of water for the environment especially for six iconic sites. As the MDBA fact sheet on this project explains, 'a key part of The Living Murray is to find a balance between social, cultural

and environmental needs, as well as national interests, to ensure there is equity in the way that environmental water is delivered' (MDBA 2009b:2).

It would seem that a case could be put that more could be made of individuals and groups sharing their knowledge, understandings and learning with others across the community. One professional group who seem to collect inputs of knowledge and learning across the region from a wide group of people are the agronomists. The agronomists offer information, knowledge and advice as a professional service. However it is worth noting that the agronomists' knowledge base and understanding grows as they receive specific and detailed information, and share in depth discussions with those who are paying for their services.

## **Discussion**

Community learning is a social form of learning and occurs as a result of groups of people who are learning through shared experience and engagement with similar situations and circumstances. Individual participants in this study were categorised as being actors within at least one of the five stakeholder groups of (1) farmers and growers, (2) water authorities and land managers, (3) representatives of community-based organisations, (4) adult education and training providers, and (5) other water dependent businesses. All are contributors in their communities, all are pursuing goal-directed activities, most are instigating changes in their lives around decreasing availability of water and therefore we would argue that all are involved in learning.

Individual participants talked about the way that they, as individuals learn. Some reflected on their own practice, others paid for advice from professionals; others attended community learning experiences such as field trips and field days, where they could look, touch and discuss with others what they saw. While there appears to be limited

cohesiveness in the way that local, state and federal governments coordinate a response to less water, there also appears to be limited cohesiveness in the way that learning among individuals is shared in the wider community. The theme of fractured relationships has carried over into the way that water is shared and the lack of it is addressed. Learning within the Riverland community could be enhanced by a greater use of networking between individuals, community resources and government initiatives.

Six different forms of adult and community learning were found in the data collected for this project. The first was learning to be productive. It is suggested that in order to understand the adult and community learning in the Riverland at the moment it is important to understand how these communities came into existence and what drives their development. Learning to produce involves the development of livelihoods, which in turn, contributes to the building of the region's economy.

The second form of learning identified in the study is learning to be efficient. The growers explained how their irrigation and on farm watering has become more efficient with changes to their irrigation practices. Some of these have occurred through the adoption of new technologies such as drip watering and the use of condition monitoring. The informants gave examples of these changes and efficiencies which spanned a sixty year period. It seems that most people throughout this region show awareness of the dryness and provide examples that demonstrate improvements to water efficiency.

The third form of learning is learning to survive. The community now needs support services to assist those who are experiencing emotional, relationship, financial and business concerns. It seems nearly all businesses across the region whether irrigator, growers, tourist operators, transport workers or processors are experiencing the effects of the drier conditions. The notion of 'critical water' has been introduced in an attempt to get through another season but even

'critical water' does not have any long term prospect. Accordingly, learning to survive has now become an important element of community learning in this region.

The fourth form of learning is learning to live with uncertainty. Decreasing availability and security of water has started to negatively affect the economy. Interestingly additional water is available on the water market, though as the cyclical reserves run down, so does the capacity to buy water. In order to get to the future the people of the Riverland will need to find strategies and learn to live with the many uncertainties.

The fifth form of learning is learning to be sustainable. Sustainability is a way of raising and addressing environmental concerns and river and land care. Most environmentalists and land managers in the Riverland and beyond have argued against an attitude of 'Australia unlimited' (Cathcart 2009) believing that there has been an over allocation of water for far too many years and therefore too much has been taken out for irrigation. Growers admitted that, compared to their more recently developed irrigation practices and usage of water, they have wasted and put too much water onto their crops. Further those with responsibilities for land and water resource management and environmentalists would argue that this has been at the expense of the life of the river and the environment generally. The eucalyptus trees that are back from the river and those on the flood plains are stressed and some are dying. Similarly the fish, turtles, frogs and birds are being effected and decreasing in numbers. Some strategies are being put in place, though some might say 'too little and too late' while others are left wondering where the water is going to come from to start fixing the health of the river and flood plains.

The sixth form of learning is learning to share. This form of learning appears to hold out many challenges yet there are also some impressive precedents. It is considered unique in the Westminster system of government to have a leader of a party that is in opposition

to the elected government recognised and incorporated into the government of the day as a Minister. Another example is the apparent cooperation of the states to instigate the Living Murray project ((MDBA 2009b). Similarly the instigation of a strategy to develop a new basin plan (MDBA 2009c), each, and together, these stand as examples of growing tendencies towards co-operation and an increasing acknowledgement of the need and willingness to share. Some evidence of community members learning to share is offered here, though more important is the need to have this form of learning continue, and be developed further in the future.

Decisions are being made and changes are being instigated by individuals and communities alike. National, state, and regional strategies are being developed and with these go changes. With these decisions and changes go learning, knowledge sharing and production. But these decisions and this learning are complex and important, and accordingly the people involved in making these decisions need to be informed and supported by those around them. Interestingly, the US government recognises the need for support in making decisions on climate change and has funded research into the development of a framework and a set of strategies and methods for organising and evaluating decision support activities which are related to climate change, (Panel on Strategies and Methods for Climate-Related Decision Support, 2009). Some of this work may be applicable to us in Australia and more so to those living in the community of the Riverland. Therefore this work may be worth reviewing further with applicability and relevance to the Riverland region in mind.

The concept of political economy is about making decisions regarding the allocation of resources when there are competing demands. Competing demands are being placed on the water and it is very difficult to negotiate and prioritise the allocation of quantities of a diminished resource to the satisfaction of all. Accordingly there is a

theme within this study that is in part about the lived experience of the political economy of water in this region. Clearly there is much learning that has occurred, is occurring, and needs to continue to occur around living with less water, increasing dryness and climate change in this region and more broadly.

## Conclusions

This research has identified and described six overlapping and inter-related forms of learning. Learning to produce and learning to be efficient are aligned with the future because they are about modifying and improving existing practice. Learning to survive and learning to live with uncertainty are happening now and are about the seriousness of the present. Learning to be sustainable and learning to share are about changing past and present practices so that future approaches are able to cope with a changing water climate.

This study shows that the people and communities in the Riverland are at the forefront of serious engagement with learning to be drier. They are considering evidence, ideas, and options. They are making decisions and they are developing and implementing strategies. People will continue to need information in order to make decisions that suit their circumstances and enable them to adapt to changing water supplies. Clearly though, they are all in the process of learning to live with less water and climate change. In short, they are learning to be drier.

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