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Inquiry into the impact of the Murray-Darling Basin Plan in Regional Australia

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I am a third generation irrigation farmer from the Murrumbidgee Irrigation Area (MIA) in southern New South Wales. My mother's parents took up one of the first horticultural blocks of land in 1912, and my father moved from dry-land wheat growing to buy a rice-farm near Leeton in 1949. I have been an irrigation farmer for 30 years, initially as a rice-farmer and more recently, having sub-divided and sold the larger part of the farm, as a beef cattle-breeder using irrigated pastures. I also work full-time as a TAFE teacher in the city of Griffith. Part of my studies while at the Australian National University looked at the history of the Murrumbidgee Irrigation Area. I thank the Committee for the opportunity to comment on the impact of the Proposed Basin Plan on regional communities.

The direct and indirect impact of the Proposed Basin Plan on regional communities, including agricultural industries, local business activity and community well-being.

One of the main failings of the Proposed Basin Plan is that it takes an incredibly narrow view of the economics of irrigation (dollar return per megalitre of water) and almost entirely ignores the social impacts. The Authority's claim that it had insufficient data on these impacts is in my view incorrect. I believe that, owing to a range of biases, myths and assumptions surrounding agriculture and the environment, the Authority appears to have either not read or not understood its own commissioned research.

The information contained in the reports by Marsden Jacob Associates in Appendix C of Volume 2 of the Plan gives a very good indication of the dependence on irrigation in various regions and the current state of reform, particularly over the last 20 years.

In the MIA, the town of Leeton and the city of Griffith are entirely a product of irrigation. They came into being as a result of the actions of the NSW Government following the Federation Drought of 1902-3. Having initially decided to build Burrinjuck Dam, the government later decreed that the economic benefit of that expense should go not just to the graziers along the river, but should be used to establish as many small farms as possible and so resumed land and established the MIA.

As indicated by Marsden Jacob the average farm size is still around 200 hectares and without intensive irrigation those farms and the communities which service them would be unviable. It was only in the late 1980s that land tenure was deregulated with the abolition of the 'home-maintenance area' which had restricted farm size, and forbid the sale of farms to companies, the holding of more than one property by one couple, and the sub-division of farms unless all portions were sold to existing farmers.

The MDBA appears to believe that the economic value and sustainability of irrigation can simply be measured by gross earnings per megalitre of water. This simple minded belief, ignores other important aspects of economic sustainability including individual farm profitability, the boom-bust cycle of rural production and, more broadly, the role of irrigation in 'drought-proofing' the economy at every level.

The MDBA ignores differences in capital investment in on-farm infrastructure required in different production systems, the reliability of water entitlement required to underpin them and the differences between state allocation systems. It also falls into the trap of picking winners.

The current high returns for drip-irrigated horticulture come with capital establishments costs of '$25 000 to $45 000/ha and several years until payback'. Even before the recent global recession the market for wine had reached saturation, with falling returns for wine grapes in all irrigation areas. In order to save huge long term capital investments irrigators in the SA Riverland had to pay up to $1000/ML for temporary trade water and in 2007-8 it was only the inter-state trade of 150GL of water which saved the area from complete economic disaster.

The diversity and flexibility of enterprises on the MIA has contributed to the regions ability to survive droughts and downturns over nearly one hundred years. During this drought the wine industry (which was able to expand rapidly in the 1990s because of deregulation of land tenure and new irrigation and harvesting technology) took a leading role in maintaining income and employment. In the 1982-3 drought the horticultural industry, with small flood irrigated farms geared to a failing canning industry was on its knees and rice production sustained the area. In that drought sheep became unsaleable and many had to be shot and buried whereas in this drought good returns for sheep meats sustained both dryland and irrigation mixed farms.

Industries with lower capital costs, and annual crops had to make flexible decisions reflecting environmental limits. However if they, and their communities, are to remain viable they need to maintain a minimum level of allocation security and the capacity to increase production and income in better years. While figures for the worst year of the drought (2007-8) were apparently unavailable for the Guide (vol 2 p33) and changes in commodity prices ignored, those available give some idea of the role of broad acre irrigation of annual crops in buffering the effects of the drought. From 2000-01 to 2006-7 gross returns for rice fell from $349.2 million to $55 million (over 80%) and cotton from $1110.6 million to $456.9 million (60%). Some of this loss was balanced by an increase in gross earnings from cereal grain, hay and livestock production where prices increased.

One can also infer the role played in preventing an even larger sell-off of core breeding livestock during the drought by looking at the gross value of irrigated hay production in the basin which rose from $79.9 million in 2000-01 to $175.7 in 2006-7.

Given a world and Australian population four times what it was one hundred years ago, predictions of world population peaking at seven billion by 2050, and a rapidly increasing affluent middle class in China and India, it is already becoming apparent that cereal and meat production are likely to increase significantly in importance and profitability.

In NSW in particular, the large towns relying on irrigation support the provision of services such as health and education and have helped to provide other infrastructure and employment for the dry-land communities around them.

The role of governments, the agricultural industry and the research sector in developing and delivering infrastructure and technologies aimed at supporting water efficiency within the Murray-Darling Basin.

Previous relevant reform and structural adjustment programs and the impact on communities and regions.

The current Proposed Plan appears to be based on the false belief that the history of European use of the Basin has been one long accumulation of unthinking exploitation and that only now have we the ‘science’ to set things right. It is much more accurate to say that the history of irrigation has seen many mistakes made (by city-based experts, this time around ‘green’) and many lessons learnt (by farmers and agricultural scientists).

The Murrumbidgee Irrigation Area is one of the oldest in the basin. It nearly failed in its first years because farm sizes were too small and little attention was paid by government to markets for the produce and the effect of soil type on irrigation (One hundred years on the MDBA has the same problems).

Lucerne for dairy farming failed on the heavy, poorly drained clays and it was only the introduction of rice from California that saved the scheme. However the unqualified expansion of rice growing was soon seen to have problems as rising water-tables after a series of wet years destroyed the previously prosperous orchards of the area. As a result the state water authorities undertook a survey of the soils and restricted rice growing to certain soils and subsoils which hold water and limited the amount of rice which could be grown on each farm. Permanent horticulture was similarly restricted to the lighter free-draining soils, surface drainage improved and later tile drainage introduced.

Restrictions on rice-growing remained in place until the 1970s when the state government, faced with a massive blow-out of its wages budget due to rampant inflation, farmers struggling to deal with the same pressures and a seemingly abundant supply of water decided to dispense with these limits. By the late 1980s rising water tables saw Murrumbidgee Irrigation (now privatised) re-introduce similar restrictions which remain in place.

The use of new technologies in the last thirty years has seen the MIA use less water and produce more per hectare than at any previous time in its nearly hundred year history. Government has been notoriously bad at picking winners and has mainly facilitated massive increases in delivery and irrigation efficiency by privatising water distribution. It has contributed enormously to breeding plants for local irrigation (rice, cotton, cereals, pastures and horticulture) and to walk away from the competitive advantage that that has given us as a nation seems like absolute lunacy. Unfortunately in a world where ever more 'science' is being produced, governments appear to be walking away from the independent extension services which have in the past help deliver that science to irrigators to use.

Most innovation and improvements in efficiency have been driven by farmers themselves and involve a complex amalgam of technologies some as humble and seemingly unrelated to agriculture as the four wheel motorbike, well-designed pre-caste concrete structures, the transport to move them, computers, laser-levelling and large earthmoving equipment.

What constitutes water efficiency?

Almost all permanent horticulture requires free-draining permeable soil. Without it the trees fail to thrive and in wet years they die in large numbers. They also need to be frequently watered during long dry summers. If this soil type is flood irrigated much of the water moves below the root zone of the plants and is wasted and may mobilise the salt that often underlies this soil type. Similarly, channels in this type of soil leak large volumes of water. Prior to the introduction of drip and micro irrigation, lined channels and pipes, some horticulture operations used the same amount (or more) of water than rice-growing. It remains the case that a mature orange orchard (which has to be watered all year) can use more water per hectare than does rice.

When wet, the right type and depth of clay underlying rice soils acts much like concrete in holding water. Open channels constructed with this clay lose water to evaporation (as do natural wetlands), but very little water is lost through the soil. (Those doubting this should check on the construction method of the Snowy Mountains dams with their relatively narrow clay core.)

The clays of the ancient floodplains are rich in nutrients, which means the NSW rice industry produces the highest yields in the world, providing one meal of rice a day for forty million people. As we are entering an era where artificial fertilizers are becoming more costly and difficult to access, the ability to rotate cereals with legumes (pasture or crop) to provide nitrogen together with soil nutrients (often leached from where rice is grown in the tropics) will become increasingly important.

The breeding of cereal varieties for irrigation over many years and new technologies to improve surface drainage, such as laser-levelling, raised beds, and the refurbishment of channels, has seen the expansion of cereal growing and greater pasture productivity. During the drought particularly, wheat has been sown into the moisture remaining from rice crops, producing a second crop with little or no additional irrigation required in the spring. It is also common practice to fatten lambs on the banks of rice crops.

On my own property where I grow annual pasture for cattle (on land not suitable for rice-growing), the first autumn flood irrigation takes water equivalent to 150-160mm of rain, and subsequent irrigations (0-3 in the autumn and possibly one in the spring) take the equivalent of 115mm each. My total ideal irrigation usage added to rainfall equals average rainfall of approximately 800 mm. (The term ‘annual’ is slightly misleading in that the plants are annual, but with sufficient water to set seed in spring my best pasture has remained highly productive for 15 years without the need to re-sow.)

My first response to the recent drought was to take out of production permanent pastures on bad layouts and take the opportunity to landform these paddocks. After 8 years of experience grazing cattle on annual pastures I know that they take only 40 percent of the water required for perennial pastures and produce very nearly the same dry matter. Management is more difficult with no pasture growth from November to February, and you need to find somewhere to put the cattle while watering the pasture in February and March, however *my experience leads me to believe that the Authority has totally failed to realise the capacity for the Goulburn-Murray dairy industry to maintain production with significantly less water than in the past. Volume 2 Appendix C of the Plan indicates that cuts of 20 percent are not only achievable but if not made would lead to an increase in irrigation.*

What are the environmental costs and benefits of irrigation?

I believe that some of the returns to the river could be made in terms of environmental credits, similar to proposed carbon credits.

The Guide fails to acknowledge the role irrigation infrastructure and farms play in providing habitat for frogs, reptiles and waterbirds within the Basin. While pipes and drip irrigation, frequently accompanied by bare earth under trees and vines provide little of broader value to the environment, this is not the case for the much maligned open channels and flood irrigation which partially replicate natural floods.

Murrumbidgee Irrigation alone has approximately 2 500 kilometres of channels and over 2000km of drains which provide permanent habitat for frogs, turtles, snakes and many waterbirds as well as drought refuge for some species. During the first years of the recent drought (2002-2006) as in earlier droughts there were pelicans on these channels for much of that period.

The Ramsar listed Fivebough and Tuckerbil Swamps are part of the MIA drainage system and prior to irrigation were ephemeral wetlands which only had water in them after local heavy rain events, perhaps one in ten to twenty years. The lower Mirrool Creek, terminating at Barren Box Swamp is also part of the drainage system and in recent years the swamp has been partitioned by Murrumbidgee Irrigation in order to restore most of it as a wetland.

As well as the key nesting sites, a lot of the waterbird research talks about the importance of a mosaic of ephemeral wetlands in providing foraging for the birds to grow and survive. Irrigated pastures and cereal crops have long been used by many birds for this purpose.

In my own experience as a farmer over the last 30 years, every autumn irrigation (from mid-February to May) sees mobs of 500 to 1-2000 birds (mainly straw neck ibis, but including white ibis, glossy ibis and other wading birds) forming a thick dark line across the paddock every day as they feed on the frogs, mice and insects driven from the cracks in the ground by the advancing water. Even larger numbers were sometimes evident during the drought until all the birds disappeared in 2007 (apparently to breed where they had had rain). Happily the first mob of 100 young straw neck ibis has returned to my paddocks to graze this spring and many more will follow. If each farm on the MIA supported on average 100 birds, this would total around half a million birds possibly dependant on this area alone for a key part of the year.

The Plan fails to provide a catchment by catchment, regional response.

The scientific theory that underpins the Plan is that in order to be healthy 2/3 of the 'natural' flow needs to be 'returned' to the river. This theory has been reified (elevated to the status of fact), and then apparently abandoned in favour of a religious mantra that assumes that even more water would make the environment even better. Nowhere has anybody bothered to explain the theory or ask questions about upper or lower limits. Given that extensive land clearing and grazing added significantly to run-off prior to irrigation and that no-one is denying high and un-seasonal irrigation flows have degraded parts of the river, why has it not been asked – is it possible to send too much water down the river?

One of the useful achievements of the Proposed Plan is to identify the separation between the northern and southern basins. In the southern basin, once it is separated out, it becomes apparent that currently the Murray (Victoria, New South Wales and South Australia) and its Victorian tributaries (at approximately 42% of natural flow) are significantly more overdeveloped than is the Murrumbidgee (56%). Storage on the Murray (over 10 000GL) is significantly greater than the Murrumbidgee (2700GL) and Dartmouth is jointly owned. Improvements in irrigation efficiency are also significantly more advanced on the Murrumbidgee than in Victoria which means we have less capacity to make additional cuts than does Victoria at both the distribution and farm level.

The Authority in its own words has done nothing to address the disparity in current diversion limits:

> *'For the Murray…all connected tributaries in the southern system* ***were reduced by an equal percentage based on current diversion limits****, unless a greater reduction was needed to meet internal catchment needs. …In the southern Basin, the Goulburn, Murrumbidgee, and Murray will contribute over 90% of the total additional environmental water.*
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> *'Those rivers that contribute water to meet downstream requirements would themselves experience benefits to key environmental assets and ecosystem functions as the water flows through.'(Vol 1 p135)*

As a General Security irrigator on the Murrumbidgee, having just survived four years of severe drought followed by four years of extreme drought, with an average allocation of 32%, it has angered me to find that most areas of Victoria and the South Australian Murray only experienced cuts for the last 2 years of that drought. I am not at all comforted by the idea that my business and my community may well cease to exist because we **might** get some additional benefits 'as the water flows through'.

In order to provide equity between catchments and states, the plan would need to take as a starting point, the 4000GL Scenario for the Goulburn and Murray rivers with cuts of 37% and then halve the 3000GL cuts for the Murrumbidgee to 16% producing for all rivers environmental flows of approximately 65-66% and cuts or approximately 3500 GL. However, I believe that this level of cuts is unsustainable and unnecessary and that cuts of about half this level would achieve both economic and environmental sustainability. Given that we have no environmental data from previous droughts and the capacity of the environment to recover is unknown we could use this first step to assess what is basically untested scientific theory.

Additional Observations on the 'Science'

The Myth that the 'without development' flows of the basin are the same thing as the 'natural' flow

The assumption that the Murray-Darling (particularly in the Riverina) was in a natural state prior to the first irrigation development and the measurement of flows in the mid 1890s is fundamentally flawed. The accounts of early explorers and settlers make it clear that from the 1830's onwards waves of development and clearing have all added flows to the river.

When the first Europeans came down the Murrumbidgee to Narrandera in the 1830s much of it was thickly forested with a far greater diversity of trees than the now dominant Red Gum. Leaving the last of the slopes, the river frequently ran dry, filling its course with sediment so that it, and its distributary creeks, became perched above the plains and in flood time water spread widely across the plains. (Gammage)

By the 1870s the landscape and river were changed substantially. Clearing and grazing of the slopes and river frontage sent far greater volumes of water down the river, causing it to cut into its bed, cutting off many of the swamps and creeks which would have previously filled. The extensive reed beds along the south side of the river upstream from Darlington Point also disappeared as herds of cattle were fattened on their way to the gold fields.

The Free Selection Acts of the 1870s lead to further clearing of the catchments, and from the late 1860s teams of Chinese labourers cleared the squatting runs around Narrandera. After that came the rabbits, and a further, smaller wave of clearing in the 1970s and early 1980s again increased run off, mobilising salts held in the soils by the cover of trees.

Whilst the Guide flags the risks to the river of 'afforestation' it largely ignores the impact of deforestation. Only slight reference is made to the role of the various catchment authorities in managing the mobilisation of salt through identification and remediation of recharge and discharge sites after the wet years and clearing of the 1970s.

It would seem highly probable that the 'natural' flow of the Murrumbidgee in some ways resembled that of the Lachlan, and that end of system flows into the lower Murray may have been much smaller than modelled and have occurred less frequently than modelled. It is also likely that the current weirs and diversions for flood irrigation at the top of the flood plain in some ways mimic the 'natural flow' of the river and that returning more than 2/3 of current flow to the river would cause environmental damage rather than cure it.

The myth that the ecological health of the system depends on the Murray mouth being open nearly permanently in order to flush salt from the river

This has to be the most ridiculous assertion in the whole Guide. Quite obviously the Lake Eyre and Paroo ecosystems, which we are told are among the healthiest in the nation, do not require the export of salt from the system (at all in the case of Lake Eyre and only intermittently for the Paroo).

As stated above I believe that the bias in modelling disguises the fact that the mouth of the Murray would have been open much less, and often not for long periods prior to European land clearing. Further evidence of this can be seen from the fact that the soils of the lower Murray floodplain are the most saline in the basin and that large floods over the years have mobilised large quantities of salt from the lower Murray flood plains (Guide vol 2). Clearly the flows of the past have not transported salt to the sea.

The natural ecosystem at the mouth of a semi-arid river system clearly had the ability to cope with highly variable flows, periods of little or no flow and fluctuating levels of salinity. It is the requirement for high quality drinking water for one million people in South Australia, the flooding of swamps for online storage (Lake Victoria) and the draining of swamps for farming below Lock 1 which have reduced the capacity of the mouth to sustain severe drought.

Perceptions of Drought

Human activities have served to distort our perceptions of 'natural' and we have minimised the effect of past droughts and are in danger of doing the same with this drought. Until I went in search of rainfall data now available on the Bureau of Meteorology web-site I believed the standard description of the Federation drought in history books which talked about the drought of 1902-3 which came after a 'series of dry years in the late 1890s'. The drought of the 1940s has also been minimised as a series of dry years, possibly because the mind of the nation was concentrated on World War II and large numbers of farmers were away at the war. While we have some photos of dry river-beds, there is of course no environmental data on the effects of long severe droughts. What we do know is that there have been three such droughts in the last 110 years, and that native flora and fauna must be adapted to survive such events, and may even need them.

To some extent farmers (both dryland and irrigation) may have become victims of their own success. The development of more flexible and adaptable farming responses to drought over the last hundred years has meant that an increasingly urbanised Australia has been largely unaware of the true scale and severity of this drought. We have seen no horror stories of starving livestock, no large scale tree and vine deaths, and no shortages of food in the supermarkets coming through the media.

General security irrigators in NSW have managed to produce half an income on a quarter of their normal allocations, thus when the draft guide tells us that only 28% of the Murray Red Gums are in good condition much of the farming community perceives this to be in proportion to natural rainfall conditions. We may not like them, but blue-green algae, dry riverbeds and saline wetlands, black snakes and dust-storms are a natural part of the environment too.

In part the current debate is driven by people who may believe they understand the natural environment, but who are still basing their view of a healthy environment on European rivers and the unusually wet years of the 1950s and 1970s. The desire to maintain the Lower Lakes for fresh water recreation provides habitat for a relatively small range of waterbirds when a return to fluctuating periods of salinity would be of more benefit to a more diverse range of species.

We are told in the guide that over exploitation of the river has lead to an 80% decline in waterbird numbers when in fact the data presented compares numbers in the early 1980s (just after the end of the 10 wettest years on record) to the last years of this drought (the driest 10 years on record). To attribute all, or even most of the decline to irrigation is at best silly and at worst dishonest.

References

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