RAMJO
Riverina & Murray Joint Organisation

RIVERINA AND MURRAY JOINT ORGANISATION

WATER POSITION PAPER

Water Security Sub Committee

May 2024

ALBURY CITY
BERRIGAN SHIRE
CARRATHOOL SHIRE
EDWARD RIVER
FEDERATION
GRIFFITH CITY
HAY SHIRE
LEETON SHIRE
MURRAY RIVER
MURRUMBIDGEE
NARRANDERA SHIRE

Disclaimer

Whilst every reasonable effort has been made to ensure the accuracy of the information presented, the Riverina and Murray Joint organisation and its employees, to the extent of the law, disclaim any liabilities to any person in respect to errors and omissions. We recognise that policies, programs and statistics may have changed since publishing this document.

RAMJO Board of Mayors at May 2024

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Federation Council

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Leeton Shire Council

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Murrumbidgee Council

Cr. Neville Kschenka
Narrandera Council

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Foreword by the RAMJO Water Security Sub-Committee Chair

Regional leaders from the Murray and Southern Riverina have observed the rapidly evolving debate over water in the Murray Darling Basin, and the confusion and frustration which comes with it. The RAMJO Water Security Sub-Committee, made up of Mayors, General Managers and expert Council staff from within RAMJO, have worked together over the last eighteen months to develop a series of recommendations for basin communities. The first version of this document was completed and published in 2019. It received a warm welcome as a considered, sensible set of recommendations with a pan-Basin approach. This revised and updated version incorporates much that we have learnt since, together with our perception of the challenges still to be adequately addressed. We continue to take a whole-of-basin, rather than a parochial regional approach.

We acknowledge that the range of solutions presented in this paper will not completely solve the water issues which are impacting in serious and permanent ways. We do, however, anticipate that a suite of recommendations such as these may usefully alleviate some of the crippling situations in our communities and others, and importantly could lay a foundation for a future built on innovation and adaptation. Both the short-term and longer-term options require the meaningful sustained support of Federal and State governments.

I want to thank the Water Security Sub-Committee for their perseverance in bringing forward their communities' concerns and cooperating to conceive recommendations for the greater good of the river system and the people who rely on it. They, together with the RAMJO Board, have recognised that as single voices, it's hard to be heard. Collectively we represent a large area of NSW, and a significant food producing area, feeding Australia as well as exporting for over 100 years.

I also thank the reader for taking the time to listen to our concerns and consider our recommendations. We welcome feedback, comments and input into working together towards a sustainable series of recommendations and changes to the water environment to enable all communities in the Basin to continue thriving for generations to come.

Former Mayor Chris Bilkey (Murray River Council)
Former Chair, RAMJO Water Security Sub Committee

We value your feedback

The Riverina and Murray Joint Organisation's intention of producing a Water Position Paper is to highlight our region's current and future concerns about water security within our member communities and industries. This document is publicly available on our website and initial enquires should be directed to Chair of the RAMJO Water Security Sub-Committee via contact details listed below.

www.ramjo.nsw.gov.au

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Executive Summary

The Riverina and Murray Joint Organisation (RAMJO) is a cooperative of Councils, working together to address the big issues facing our communities.

RAMJO supports the value, commitment and vision that can only be delivered via a nation-wide approach to the coordinated management of our natural lifeline, the Murray Darling Basin. RAMJO agrees that the Commonwealth Government's *Water Act 2007* and the Murray Darling Basin Plan (The Plan) is a mechanism for providing a coordinated approach to water use across the Murray Darling Basin's four states and the ACT. It is a major step forward in managing Australia's water resource, by setting water use at an environmentally sustainable level.

RAMJO believes while The Plan is a step in the right direction, the water space is an extraordinarily complex one and there are many factors which need to be reviewed and better understood. Any policy, plan or project requires an ability to review and determine whether it is delivering on its intended outcomes, and whether there are any unintended impacts or external influences which may require an adaptation to the implementation of The Plan.

This position paper updates our strategic overview of the issues RAMJO believes are hampering the delivery of an optimal water regime and suggests directions in which enhancements might be made to enable a more effective delivery of water resources. In doing so, we recognise that some corrective issues are easier to address than others, and that some lie outside the scope of a single Government entity.

Issues addressed herein include:

1. Water Market
2. Impact of Water Prices on Agricultural Diversity and Security
3. Environmental and Cultural Flows
4. Infrastructure – Now and for the Future
5. Conveyance Water and Losses
6. Drought
7. Climate Change
8. Agricultural Adaptation – Investment and Research

While advances in the evolution of the Murray Darling Basin Project (MDBP) have been achieved in recent years and are worthy of recognition and support, a number of aspects in the water space continue to show the need for improvement. Among these, RAMJO considers the following worthy of urgent attention:

1. Greater transparency and accessibility for producers of water trading structures and processes
2. Evaluation of mechanisms whereby water ownership is limited to those that have a valid use for such water, other than the realisation of profit through its purchase and sale
3. Recognition of an existing and growing need for robust planning for a transformation of agriculture in the Basin as water availability decreases and water prices rise
4. The emerging inequity between South Australia's minimum volume entitlement and the other Basin states' allocations
5. Basin wide enforceable consistent compliance and penalty regime
6. More comprehensive frameworks for measuring the value of water including, but not limited to, social benefit and spill events

All these and other issues have a common denominator: the necessity for greater leadership that is underpinned by timely, genuine and ongoing collaboration that contributes to the process and allows for informed decision making by communities and key stakeholders, for the achievement of a healthy, productive, sustainable Basin. For example, should water buybacks continue to be pursued under the Water Amendment (Restoring our Rivers) Act 2023, RAMJO notes that a strategic and community led approach to purchases is critical to ensuring structural adjustment mechanisms are supported in perpetuity, in contrast to previously had and failed, one-off scatter-gun approaches.

It is the view of RAMJO that the type of issues we have identified demand the regular, formalised engagement and leadership of Federal and State Ministers, and should be directed at a collaborative whole-of-Basin approach that recognises the challenges facing the Basin. Many of those challenges are addressed in this paper.

Our wish is to contribute to a solution that balances environmental, social and agricultural needs that will sustain future generations for decades to come.

> We seek a sustainable, apolitical, ethical, evidence based suite of solutions to ensure the optimal use of water across the Murray Darling Basin.

Key Recommendations

RAMJO Recommendation 1 – Water Market

RAMJO recommends a comprehensive review of the water market, which could include, but is not be limited to: ownership, water security, capturing true costs of water transfers, telemetric reporting, and floodplain harvesting. Regulatory reform across multiple areas is necessary to ensure a nation-wide plan goes hand in hand with an efficient water market.

RAMJO Recommendation 2 – Impact of Water Prices on Agricultural Diversity and Security

2a) RAMJO recommends that no one industry should be specifically protected. However, resources should be made available to develop an integrated and coordinated Agricultural Plan for the Murray Darling Basin (incorporating Valley Irrigation Plans) with a view to encouraging innovation, adaptation and an appropriate balance between permanent plantings and annual crops. The outcome of the plan should be to optimise productive yields, water use and economic return to communities and the nation. Recommendation 8 expands further on innovation.

2b) RAMJO recommends supporting all agricultural and horticultural industries as diversification of domestically grown produce is important for ensuring food security for our nation.

2c) RAMJO recommends Government develop criteria and mechanisms to enable flexible short-term emergency water management provisions where critical situations (e.g. drought, disease, pandemic) could result in major job losses, industry viability or national food security issues. (Recommendation 6 expands further on drought).

RAMJO Recommendation 3 – Environmental and Cultural Flows

3a) RAMJO recommends that the suite of measures including stakeholder communication, spill event efficiencies, dilution flow reviews, loss reduction mechanisms, and optimising the timing of water delivery of water requirements be pursued to increase the current availability of water, and recognise unrealised gains as it relates to water availability.

3b) RAMJO supports the recommendations related to improving reporting and communications by all regulatory bodies including Murray Darling Basin Authority, Commonwealth Environmental Water Holder, Department of Agriculture and Water Resources and Basin States from the 2019 'Basin Plan Monitoring, Evaluation and Reporting Capability Assessment'.

3c) RAMJO recommends a comprehensive review and implementation of an enhanced flow allocation for Indigenous cultural purposes that reflect the needs of these communities. RAMJO supports the inclusion of cultural flows as part of environmental allocations.

3d) RAMJO recommends urgent action to prevent the destruction of the Barmah Choke and its surrounds, and the consequences for downstream users including agriculture and the environment.

RAMJO Recommendation 4 – Infrastructure – Now and for the Future

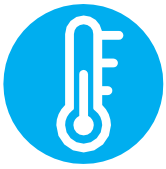
RAMJO urges the Federal Government to undertake to drive a national approach to water infrastructure investment, with a view to sustaining the Basin's productivity across all environmental, social and economic sectors now and for decades to come.

RAMJO Recommendation 5 – Conveyance Water and Losses

RAMJO recommends a critical review of the accountability of conveyance losses including capturing true costs of buyer and seller trades, and intra/inter valley delivery costs, and below the Barmah Choke infrastructure impacts. Evaporation mitigation and seepage reduction initiatives should be explored.

RAMJO Recommendation 6 – Drought

RAMJO recommends that the Federal Government, in collaboration with the states, leads the development of a comprehensive National Adverse Events Management Plan (incorporating a Drought Management Plan for the Murray Darling Basin) to plan for, mitigate and manage impacts to the food bowl. This should include forecast risks such as a changing climate, reduced flows and unanticipated events that impact food security and local employment. Agreed actions in the plan should be resourced through a permanent fund and should facilitate relief and drive agricultural innovation.



RAMJO Recommendation 7 – Climate Change

RAMJO recommends that the Federal Government lead an evaluation of the impact of climate change on Basin inflows and losses to determine the feasibility of infrastructure and other interventions to stabilise and, if possible, enhance inflows and storage capacity into the Basin in the face of predicted future water scarcity.

RAMJO Recommendation 8 – Agricultural Adaptation – Investment and Research

8a) RAMJO recommends that the Commonwealth drive a research and innovation program directed at adaptive agriculture.

8b) RAMJO in addition recommends the further strengthening of support for local and regionally based models directed at research, innovation and adaptation to ensure the future sustainability of Australian agriculture.

8c) RAMJO recommends that the Commonwealth seek to encourage the investment by superannuation industry and other financial institutions in the Australian agricultural sector to further secure its ability to remain globally competitive.

About RAMJO

> We seek a sustainable, apolitical, ethical, evidence-based suite of solutions to ensure the optimal use of water across the Murray Darling Basin.
>
> *RAMJO Water Security Sub-Committee*

For many years, the management of water has been a matter of major concern in the communities we represent. Councils often find themselves at the frontline of community frustrations, industry pursuits and State and Federal regulatory environments.

RAMJO covers over 80,000 square kilometres of land and 152,909[1] people, and together we represent a large portion of the Basin's communities

152,909 **Population** **Median age 44 years**	**82,868** **Square kilometres**	**28,777** **People aged 0 – 14 years**
Steady Growth **In population, jobs and Gross Regional Product**	**2** **Regional centres and over 40 townships**	**33,186** **People aged over 65 years**

The Riverina and Murray Joint Organisation is a cooperation of eleven (11) Member Councils in southern NSW and operates under the NSW Local Government Act 1993. Member Councils include Albury City, Berrigan Shire, Carrathool Shire, Edward River, Federation Shire, Griffith City, Hay Shire, Leeton Shire, Murray River, Murrumbidgee Shire and Narrandera Shire.

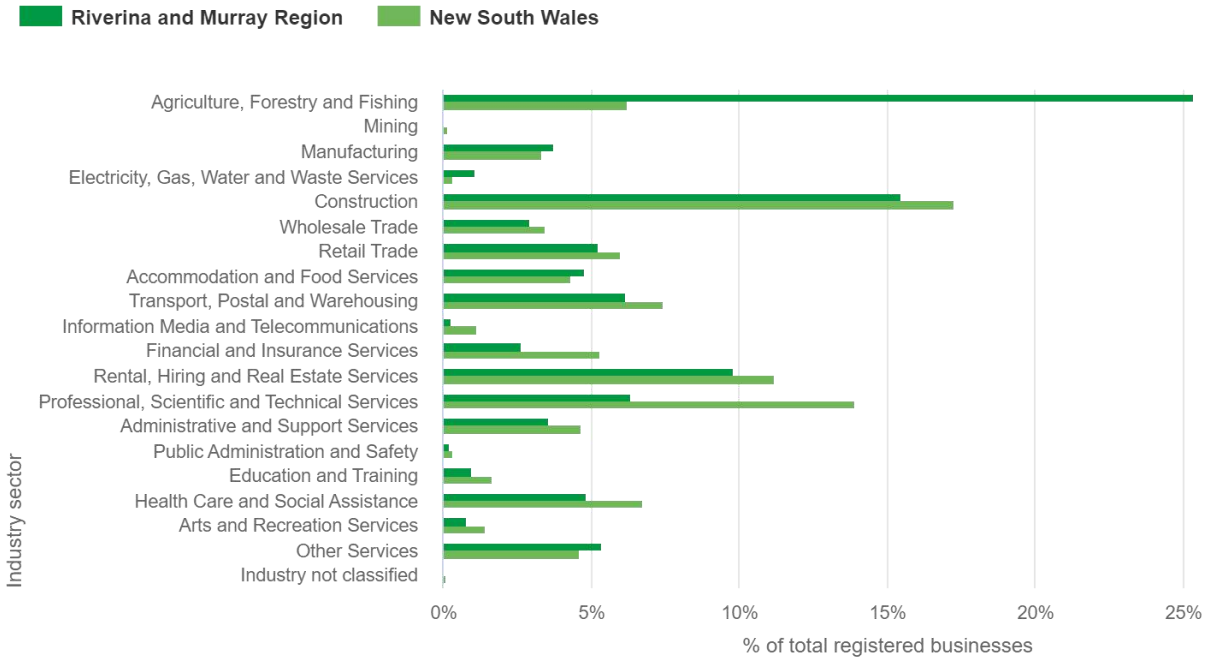
The southern part of the region extends along the Murray River, from Albury City Council at the eastern end across to the Councils bordering on the far west, including Murray River and Edward River. The northern part of our region extends generally from Griffith City Council across to the regional Shires of Carrathool and Hay to the west.

RAMJO has a mix of large regional centres, medium sized irrigation based towns and industries in urban shires, through to a number of predominantly dryland farming shire areas, large in size but with a low population base.

The major regional population centres of RAMJO are Albury City (~ 55,000) and Griffith City (~ 28,000). There are many and varied small, medium and large-scale business across the region, with many stemming from an agricultural base. The region is home to several university campuses and educational facilities, transportation hubs and manufacturing businesses whilst maintaining a vital and important role as a food and fibre resource zone for Australian consumption and international exports.

[1] Id Community Demographic Resources, 2023

Registered businesses by industry 2022



Source: Australian Bureau of Statistics / Id.Community Demographic Resources, 2023

Almost 30% of total registered businesses in RAMJO relate to agricultural pursuits[2]. Agriculture in the region varies, however a strong reliance on the irrigation infrastructure is evident. In 2018, the NSW Department of Primary Industries identified within the Riverina Murray Agricultural Profile that common agricultural industries include 'beef grazing, citrus and temperate fruit (apples, pears, cherries), through broad-acre cropping (cereal, oilseed and pulses), beef and sheep grazing, intensive poultry and pigs, irrigation cropping (cotton, rice, maize), to rangeland grazing in the west.' Specifically noted is that 'Irrigated agriculture (cotton, rice, horticulture – citrus, grape, nuts and dairy) is a key feature of the region[3].'

As recently as 2019, the NSW Government acknowledged the importance of planning for our region (and immediately adjacent regions) with the release of the Planning for Agriculture in the Riverina Murray. The draft strategy notes the region's agricultural industry also 'supports an extensive value chain including major livestock centres, food processing transport, logistics and inter-modal transport hubs, cotton gins, canneries, packing and associated processing'[4].

According to the Commonwealth of Australia 2015, 'In 2012– 13 irrigated agricultures accounted for 28 per cent of Gross Value of Agricultural Production (GVAP) but used less than one per cent of agricultural land[5]. (Note: 'GVAP - Gross value of agricultural production is the value at the point of sale i.e. where it passes out of the agriculture sector of the economy)[6].'

Furthermore, a quarter of irrigated agricultural produce grown in New South Wales is located within the RAMJO region[7]. GVIAP (Gross Value of Irrigated Agricultural Production) refers to the 'gross value of agricultural commodities that are produced with the assistance of irrigation. The gross value of commodities produced is the value placed on recorded production at the wholesale prices realised in the marketplace.' Notably, there was 20% increase in GVIAP to $8.6 billion for the Murray Darling Basin in 2017-18. Of significance is the cotton industry in the northern part of our region, where ABS calculated the GVIAP of cotton in 2017-18 to be $2.3 billion, up 52% on the previous year[8].

[2] Id.Community Demographic Resources, 2023
[3] Department of Primary Industries, 2018, p. 7
[4] NSW Planning and Environment, 2019, p. 6
[5] Commonwealth of Australia, 2015 p. 52
[6] NSW Planning and Environment, 2019, p. ii
[7] Australian Bureau of Statistics, 2019
[8] Australian Bureau of Statistics, 2019

Long-term inflow reduction and a distorted water market has severely impacted our region together with the commencement of the recovery of water for environmental purposes in 2008. In particular, the MDBA's) Community Profiles as part of the Basin Plan Evaluation undertaken in 2017 states that 'While the effects of Basin Plan water recovery at the Basin or regional scale appear modest, feedback from stakeholders and community members suggests that the Basin scale analysis fails to detect the sometimes significant impacts which are being felt by smaller, irrigation dependent communities[9].'

This is further supported by detailed statistics for our smaller irrigation dependent communities. For example, the townships of Finley, Berrigan, Deniliquin and Wakool have had a significant decrease in agricultural related employment of between 40-75% since 2001[10], and Wakool has seen a decline in almost half of its community members.

While this decline can be attributed to a range of factors broader than water recovery and pricing, we recognise that the future success of these communities will require sustained cooperation of all three levels of Government.

> 'While there is no irrigated production or water recovery from within the township of Deniliquin, there will be flow on effects to the township from the water recovery in the surrounding irrigation districts.'[11]
>
> *Murray Darling Basin Authority, 2018*

These effects are being felt with further recent job losses in the areas of dairy and rice, with the sole exporter of Australian rice based in the Deniliquin and Leeton communities losing 230 jobs out of a total of 600 in the last 18 months[12].

Additionally, RAMJO believes the current water market distorts the drivers for investment into agricultural pursuits preventing variety and encouraging mass permanent plantations. RAMJO is concerned that further loss of in the production of staple products is a risk for the agricultural independence of our nation. By placing importance on our region's ability to provide sustenance for an increasing

population, and implementing protections against potential pest and disease that could decimate one or more of our industry sectors, we will be able to continue to play our part in Australia's food security.

RAMJO holds a unique position, in that the majority of Member Council communities have economies which are based on irrigated agriculture, or the secondary and tertiary businesses which support these industries.

Working together our Joint Organisation comprises the majority of irrigated agriculture in NSW. This means we are well placed to advise on current and future impacts on irrigated agricultural industries and our communities.

[9] Murray Darling Basin Authority, 2018a
[10] Murray Darling Basin Authority, 2018a
[11] Murray Darling Basin Authority, 2018a
[12] Grain Central, 2019

In 2021, the Riverina Murray Region produced around

49.6%

of the State's

nuts,

a total value of over

$78 million

Over 82,000 km^2 of land area

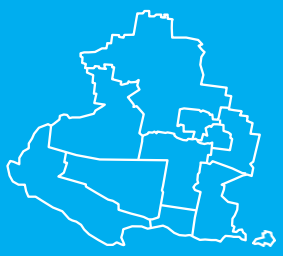
The Agriculture, Forestry and Fishing industry had the largest number of total registered businesses in Riverina and Murray Region, comprising 25.4% of all total registered businesses, compared to 6.3% in New South Wales.

Pig production is focused in the Federation, Narrandera, Edward River and Murray River LGA's and in 2021 contributed

$150 million or 60%

of the State's value of

pig production



152,909 people

across the RAMJO region

Sheep production for meat and wool is spread across the region, and in 2021, contributed 13.3% to the State value of sheep meat production and 13.4% to the State value of wool production.

The Riverina and Murray Joint Organisation's

Gross Regional Product is estimated at $10.06 billion

which represents 1.52% of the state's GSP (Gross State Product).

Information from resources referenced within this document including RAMJO Community Profile ID

The Riverina and Murray Joint Organisation's Statement of Strategic Regional Priorities can be found at www.ramjo.nsw.gov.au

Issues and Recommendations

1. Water Market

Description of Issue

The creation of an open water market is one of the foundations on which The Plan is predicated, specifically the principle that water finds its way to the highest value use ('Chapter 12 – Water Trading Rules')[13]. This principle has been common to the preceding Australian water reform steps including the Council of Australian Governments (COAG) Water Reform Framework (1994)[14], the National Water Initiative and Blueprint (2004)[15], and now the Commonwealth Water Act (2007)[16] and The Plan.

In practice, the commoditisation of water through "unbundling" from land use has led to unforeseen problematic outcomes, including corporate entities whose ownership of water is directed solely at profit-making through speculative trades. Of note, the media reported in February 2020 that 'A Canadian Government-owned pension fund could become one of the largest private owners of water entitlements in the Murray-Darling Basin from today, owning roughly 2 per cent of all its available water rights.'[17]

The former Federal Water Minister, The Hon David Littleproud, raised this issue in May 2019 stating 'Fourteen per cent of those trades every year are from corporates and individuals who don't own land, so we've got to understand, is the market fit for future? Has it evolved into something that isn't equitable? Where is the market power? [And] Is it disproportionate?'[18]

In addition, the trading of water along the river systems, particularly in the Goulburn, Murray and Murrumbidgee valleys, has produced enormous demands on delivery mechanisms for that water, placing constraint areas such as the Barmah Choke under unsustainable pressure. In June 2019, the MDBA acknowledged to ABC's Landline that the bank erosion (from too much water) needs to be considered to protect the upstream river environment of the Murray and the Goulburn rivers[19].

RAMJO believes the intention of the water market, and the ability for primary producers to on-sell their water allocation, was a move in the right direction for those in the agricultural industry to create flexibility and opportunities for supplementary farm income. These unintended consequences have distorted the market and have decreased the accessibility of water for producers and threatened their livelihood[20]. The Water Market Outlook released in August 2019 when water prices in most Murray Darling Basin (MDB) southern regions were 'trading in excess of $600 per ML' states that the 'high water allocation prices are likely to continue.'[21]

With this in mind, RAMJO strongly supports the ACCC 'Murray-Darling Basin water markets inquiry'[22] recommendation that "a robust regulatory framework is required to establish protections for water market intermediaries and their clients, in the form of clear obligations on intermediaries, including irrigation infrastructure operators (IIOs) who provide intermediary services".

[13] Commonwealth of Australia, 2012 a
[14] Environment Australia, marine and Water Division, 1994
[15] Department of Agriculture, Water and The Environment, 2004
[16] Commonwealth of Australia, 2007
[17] Jasper, 2020
[18] Sullivan, 2019a
[19] Jasper, 2019
[20] Sullivan, 2019a
[21] Department of Agriculture - Australian Government, 2019, p. 4
[22] ACCC - Australian Competition and Consumer Commission, 2019

RAMJO Recommendation: 1 – Water Market

RAMJO recommends a comprehensive review of the water market, which could include (but it not be limited to): ownership, water security, capturing true costs of water transfers, telemetric reporting, and floodplain harvesting. Regulatory reform across multiple areas is necessary to ensure a nation-wide plan goes hand in hand with an efficient water market.

DISCUSSION AND REVIEW

The RAMJO Water Sub-Committee have considered the following concepts and options which might address key elements of the **Water Market** that are sub-optimal as they relate to our communities and industries.

1. Water Market Options

1.1 a) Ownership: Evaluate possible mechanisms whereby water ownership is limited to those that have a valid use for such water, other than the realisation of profit through its purchase and sale. For example, water should only be able to be sold to and purchased by primary producers, industry, towns, Indigenous cultural flows or for environmental use. This could be tracked and monitored via an ABN, licence linked to a physical water supply work, licence condition to hold allocation or some other identifying registration or number.

b) Ownership: Alternatively, water holders who are not attached to land or primary production could have a levy placed on the deliverable and infrastructure charges to generate revenue from temporary trade of that investment.

c) Ownership: That water licenses currently owned by non-primary producers should be slowly recovered year-on-year, to prevent a collapse in water prices, which would negatively impact career farmers.

1.2 Capture True Costs of Water Transfers: Introduce price signals to incentivise efficient water transfers (noting that every transaction has a conveyance cost that shouldn't necessarily be socialised). Implement a requirement whereby downstream transfers of water incur a cost to the buyer equivalent to the cost of transmission losses. (For example, a system not dissimilar to metropolitan transportation ticket zoning could be considered to determine cost of transmission losses). As a corollary, upstream transfers should attract an incentive to the buyer reflecting the "avoided" transmission losses.

1.3 Inter-Valley Transfers: Identify a percentage limit or absolute volume limit on inter-valley transfers to stabilise opportunistic trading, and a premium on those transfers once the limit is exceeded.

1.4 Measurement and Compliance: Accelerate the completion of telemetric monitoring of all extractors across the Basin including ground water. Removal of unlicensed floodplain harvesting infrastructure and ground water extraction across the northern Basin. This should be supported by a uniform and effective compliance and penalty regimes managed through the office of the Inspector General and relevant State agencies.

1.5 Consistency: Introduce a mechanism for basin wide consistency on the regulatory environment for state water sharing plans and a potential three-year timeline for interstate consistency on general carry-over water.

2. Impact of Water Prices on Agricultural Diversity and Security

Description of Issue

Permanent plantings, especially of nuts, have proliferated in the Murray and Murrumbidgee valleys in recent years. The viability of these plantings is based on the value of their product per megalitre of water consumed, which is significantly higher than traditional crops such as rice, and much higher than pasture-dependent agriculture such as dairying. The capacity of these permanent plantings to pay peak prices such as those seen towards the end of 2019 of $800 to $1,000 per megalitre for general security water has had an undoubted impact on the price of water. In current drought conditions that places the price of water beyond the reach of those growing annual crops[23].

That said, these permanent plantings are not the only, or indeed the major, driver of current water costs. As in all free markets, it is an issue of supply and demand. No doubt these buyers are adding to the demand side of the equation, but the lack of supply is the major driver of price. The water is simply not available.

Permanent plantings have been a feature of the valleys listed above since the early 1900s. The Sunraysia region, in particular, has been a major long-term consumer of water for this purpose. Throughout that time, annual cropping and pasture production have been viable, albeit constrained by drought conditions when they occur.

When water does become more readily available, resumption of annual cropping will occur. It will be subject to the same price pressures that have always applied, including the price of water. There is concern the presence of these additional plantings will contribute somewhat to a higher price for that water.

In 2019, independent water policy advisors Aither stated 'It will be harder for non-permanent irrigation industries to access affordable water' and that 'the recovery of additional environmental water from the consumptive pool would further reduce supply for all water users in the southern Murray- Darling Basin. This will both exacerbate the likelihood of permanent horticulture water demand exceeding available supply and also reduce the volume of water available for all irrigation industries in all future years.[24]'

Further exacerbating this scenario is the recent investment in permanent nut plantings, which return a higher profit per hectare yield, which could make it unviable for other agricultural industries to compete for water. 'The boom in permanent plantation nut crops is driving water demand so high in the southern Murray Darling Basin that the price of water may become unaffordable for rice, dairy or even cotton irrigators.[25]'

> The Australian agricultural irrigated sector in the Murray Darling Basin is at risk of restricting industry diversity and compromising Australia's domestic food security based on water price alone.
>
> *RAMJO Water Security Sub-Committee*

The Climate Council 2015 report on Australia's food security states '*Water scarcity, heat stress and increased climatic variability in our most productive agricultural regions, such as the Murray Darling Basin, are key risks for our food security, economy, and dependent industries and communities'*[26].

[23] Jasper, 2019a
[24] Aither, 2019
[25] Foley, 2019
[26] Climate Council, 2015

Traditionally, most of the water that is used for annual cropping within RAMJO's 82,000km2 footprint is sourced from above the Barmah Choke, via the MIL (Murray Irrigation Limited) or the Murray system, whereas the bulk of permanent plantings have been irrigated from below the Choke. Strain on the Choke to deliver on current demands is likely to hamper the further development of permanent plantings, unless a solution to the Choke issue is found and pursued. If future expansion of the permanent plantings can be achieved above the Choke, the pressure on the Choke could be stabilised and ultimately reduced.

RAMJO would also like to acknowledge that our Member Councils want to work strategically and collaboratively with stakeholders towards the vision of Australia's agricultural industry reaching the $100-Billion-dollar farm gate output target outlined in the National Farmers Federation (NFF) 2030 Roadmap[27]. Key points addressed that align with RAMJO's Regional Strategic Priorities include increasing irrigated agriculture water use efficiency, increase workforce capacity and improving the psychological wellbeing of farmers and our entire communities. With sustainability in mind, RAMJO welcomes the recommendations of the Governmental inquiry 'Making agriculture a $100 billion industry' released in December 2020.

Mulwala Canal, December 2019. Photo commissioned by Berrigan Shire Council

Case Study: Innovation in the Rice Industry

Most of Australia's rice is grown within the footprint of the Riverina and Murray Joint Organisation. As an annual crop, rice is only grown when there is enough water available to be allocated from the Murrumbidgee River and Murray River systems in accordance to the Murray Darling Basin Plan. According to the Department of Agriculture, Water and the Environment, the Australian rice industry leads the world in water use efficiency. "From paddock to plate, Australian grown rice uses 50% less water than the global average. Water use per hectare continues to decline because of the industry's commitment to developing high yielding rice varieties that use less water, and the use of world's best management practices."

For more information about the rice industry, innovation and projects currently underway visit:

Rice Growers Association https://www.rga.org.au

Department of Agriculture, Water and the Environment https://www.agriculture.gov.au/ag-farm-food/crops/rice

[27] National Farmers Federation (NFF), 2019

RAMJO Recommendation: 2 – Impact of Water Prices on Agricultural Diversity and Security

2a) RAMJO recommends that no one industry should be specifically protected. However, resources should be made available to develop an integrated and coordinated Agricultural Plan for the Murray Darling Basin (incorporating Valley Irrigation Plans) with a view to encouraging innovation, adaptation and an appropriate balance between permanent plantings and annual crops to optimise productive yields, water use and economic return to communities. (Recommendation 8 expands further on innovation).

2b) RAMJO recommends supporting all agricultural and horticultural industries as diversification of domestically grown produce is important for the security of our nation's food production.

2c) RAMJO recommends Government develop criteria and mechanisms to enable flexible short-term emergency water management provisions where critical situations (e.g. drought, disease, pandemic) could result in major job losses, industry viability or national food security issues. (Recommendation 6 expands further on drought).

DISCUSSION AND REVIEW

The RAMJO Water Security Sub-Committee have considered the following concepts and options which might address key elements of the Impact of **Water Prices on Agricultural Diversity** and Security that are sub-optimal as they relate to our communities and industries.

2. Impact of Water Prices on Agricultural Diversity and Security Options

2.1 Strategy: That Commonwealth Government consider an 'Agricultural Plan for the Murray Darling Basin (incorporating Valley Irrigation Plans)' complementing The Plan around water value, cost seepage and evaporation and treating water as a national resource, which must be managed as efficiently as possible

2.2 Farmer's Right to Farm: RAMJO supports the freedom for each farmer to grow the produce they choose, with no preference or protection given to any industry. However, within that context, consideration should be given to a broader evaluation of the community value afforded by the various uses to which water is put; that is, the extent to which a community value is delivered beyond the farm gate price for the product.

2.3 Protect National Food Security: Realise the real threat of some domestic food industries becoming unviable in the face of low water security, an unregulated water trading market and lack of long-term policy support of our agricultural sectors.

2.4 Emergency Water Management: Government should develop criteria and mechanisms to enable flexible short-term emergency water management provisions where critical situations (e.g. drought, disease, pandemic) could result in major job losses, industry viability or national food security issues.

3. Environmental and Cultural Flows

Description of Issue

RAMJO has identified a number of issues impacting the environment and our communities. Options for how these may be addressed are wide ranging and require thorough investigation.

Flows: RAMJO agrees with prioritisation within The Plan for the environmental health of the Basin rivers. Nonetheless, the delivery of water for the environment has been marked by inefficiencies and inadvertent damage to the environment due to poor timing of flows. RAMJO believes the environmental flows should mimic natural environmental conditions, for example; when the region is in a period of severe drought less environmental water should be allocated rather than a target volume.

Barmah Choke: The ongoing damage being incurred at the Barmah Choke is an example of inadvertent damage to infrastructure due to poor timing of flows. The Choke's current capacity of 7,000ML/day[28] has been steadily diminished (historically 10,400ML/day[29] by high sustained flows, causing erosion and bank slumping. The reduction in the Choke has resulted in overbank flows and unseasonal flooding events that incur greater conveyance losses and push volumes of water through other waterways or overland. This has ultimately given rise to irreversible environmental degradation nearby.

The Barmah Forest (approx. 28,000ha) is one of 66 Australian 'Wetlands of International Importance' recognised under the 1982 Ramsar Convention[30]. Whilst the significance and preservation of the site and its flora and fauna is important to acknowledge on an international stage, it is the Yorta Yorta Nation Aboriginal Corporation (YYNAC), the Yorta Yorta Peoples and indeed all First Nations peoples with connection to culture across the Murray and Goulburn river regions that must also be considered in improving the current mismanagement of the Barmah Choke. Acknowledged in the YYNAC 2018-19 Annual Report are the concerns of Elders that poor timing of flooding has lead to the degradation and loss of grasses used for cultural practice of weaving[31].

The damage to this area and impact on our communities appears to be in conflict with the Basin Plan's Principle 7 - Working effectively with local communities (Section 8.39) – where *'Environmental watering should be undertaken having regard to the views of: a) local communities, including bodies established by a Basin State that express community views in relation to environmental watering; and b) persons materially affected by the management of environmental water[32].'*

Downstream Volume Commitments: The capacity of the Darling catchment to deliver any environmental flows has been decimated by the drought. Even so, over-extraction in the northern reaches of the Darling and Barwon through poor metering,

[28] Murray Darling Basin Authority, 2019a
[29] Natural Resources Commission, 2009
[30] Ramsar, 2008
[31] Yorta Yorta Nation Aboriginal Corporations, 2019
[32] Commonwealth of Australia, 2012a, p. 78

illegal extraction and flood plain harvesting have significantly exacerbated this problem. In addition, mismanagement and delays of the Menindee Lakes water releases which resulted in the 2017 fish kills is an example that highlights poor decisions which further exacerbate the problems faced in the Murray Darling Basin[33].

Where the majority of upstream water flows come from either the Darling and/or the Murray systems, it seems unreasonable for one system to meet the downstream demands when the majority of the MDB is suffering with drought. RAMJO believes the fixed downstream minimum commitment of 1850GL be maintained, however in years of significant drought declaration, each river system should be allocated a percentage to deliver. This would ensure that should drought affect the Upper Murray, the lower Murray system is not put under pressure to solely meet the downstream demands, and vice versa.

Salinity: Water Quality Australia defines secondary salinity as *'additional salt transported to the soil surface or waterways, increased due to altered land use such as vegetation clearance, poor land management, irrigation and industrial practices*[34] This issue has been a focus of managing the environmental health of the Murray Darling Basin since the commencement of the Salinity and Drainage Strategy of 1988-2000[35]. Since that time, many regional and on-farm mitigation efforts and interventions relating to irrigation- induced salinity have been successful in managing salt levels. Salinity Management efforts include the use of more efficient farming, irrigation and drainage techniques, and redesigning the timing, volumes and locations of irrigation[36].

Additionally, the salt interception schemes (SIS), such as the one at Buronga, have been successful in managing the year-on-year variability in salinity which is an inevitable characteristic of a dynamic river system and an ever changing climate.

The Basin Salinity Management Strategy 2030[37] (commenced in 2000 with a review in 2015) identifies the following practices to manage salinity levels in the Murray Darling Basin:

- flushing out salt with adequate water flows
- modifying land management practices
- acquiring water entitlements with the objective of returning more water to the environment.

'The results of managing salinity appear to be returning very low salt levels, therefore an opportunity may exist to review the strategy and the dilution flows in conjunction with downstream volume commitments. Given the variable nature of the river system, some flexibility relating to the use of these volumes must be considered.'

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Storage: The storage of environmental water in dams generally does not damage the interests of irrigators. When spill events occur, and environmental needs have been met, consideration should be given to reducing environmental allocations immediately following the spill to permit more space for irrigators to secure water for the following years.

Reporting and Communication: The management of environmental water allocation is undeniably complex. Most observers don't understand it, and it remains a substantial challenge for those tasked with its delivery. The broader acceptance of the value of the environmental flows would be enhanced if there were an increase of layman reporting of its results, and the extent to which it is delivering on intended targets.

There is a widespread view within RAMJO communities that the bulk of the environmental flows are directed at maintaining the Lower Lakes and the Murray mouth in South Australia. Even if this is not true, improved communication regularity, simplicity and accessibility regarding Basin plan outcomes would alleviate some of these concerns. Furthermore, recommendations related to improving reporting and communications by all regulatory bodies including MDBA, CEWH, Department of Agriculture

[33] Foley, 2019a
[34] Water Quality Australia, Australian government Initiative, 2020
[35] Murray Darling Basin Authority, 2019
[36] Murray Darling Basin Authority, 2019
[37] Murray Darling Basin Authority, 2019

and Water Resources and Basin States from the 2019 'Basin Plan Monitoring, Evaluation and Reporting Capability Assessment' should be implemented[38].

Environmental Water Buybacks: RAMJO believes the further buyback of water for environmental use is incompatible with agricultural practices, and that more efficient use of the available environmental pool will lead to improved outcomes. Furthermore, a review of combining multiple allocations of water into one to deliver all intended outcomes should be considered (salinity, environmental and downstream).

RAMJO is of the opinion that better water management processes could be adopted by consulting with First Nations historical knowledge and practices of the river systems. Professor Sue Jackson of the MDBA's Advisory Committee on Social, Economic and Environmental Sciences (ACSEES) suggests that 'Management of environmental water in partnership with other parties presents Aboriginal people with an opportunity to access water and restore environments, as well as reaffirm and rebuild socio-ecological relationships and water-dependent livelihoods[39].' The 2018 Yanco Billabong Colombo Integrated Hydrological Flow Plan and subsequent engagement with communities presents as an example of the local water management collaboration required in our region[40].

Indigenous Cultural Flows : RAMJO supports the need for enhanced access to water for First Nations / Aboriginal peoples' cultural, spiritual and economic use. To achieve this requires widespread and meaningful engagement with Indigenous peoples to ensure outcomes that best support their objectives. Such engagement is consistent with the 2007 Echuca Declaration which defines cultural flows as 'water entitlements that are legally and beneficially owned by the Nations of a sufficient and adequate quantity and quality to improve the spiritual, cultural, natural, environmental, social and economic conditions of those Nations'. As an example, the Yorta Yorta Nation Aboriginal Corporate Whole of Country Plan 2021-2030 calls for:

"Water policies and operational flows that:

(a) achieve healthier Country and better ecosystems, and native plants and animals; and
(b) recognise and deliver legal water entitlements that meet broader Yorta Yorta cultural, social and economic needs."

[38] Alluvium, 2019, pp. 3-5
[39] Jackson & Nias, 2019
[40] Yanco Creek and Tributaries Advisory Council, 2018

RAMJO Recommendation 3 – Environmental and Cultural Flows

3a) RAMJO recommends that the suite of measures including stakeholder communication, spill event efficiencies, dilution flow reviews, loss reduction mechanisms, and optimising the delivery of water requirements be pursued to increase the current availability of water, and recognise unrealised gains as it relates to water availability.

3b) RAMJO further recommends that the recommendations related to improving reporting and communications by all regulatory bodies including Murray Darling Basin Authority, Commonwealth Environmental Water Holder, Department of Agriculture and Water Resources and Basin States from the 2019 'Basin Plan Monitoring, Evaluation and Reporting Capability Assessment' should be implemented.

3c) RAMJO recommends a comprehensive review and implementation of an enhanced flow allocation for Indigenous cultural purposes that reflects the needs of these communities.

3d) The ongoing reduction in the capacity of the Barmah Choke to deliver downstream requirements for agriculture and the environment make it an urgent threat to water delivery. RAMJO recommends the highest priority be given to action being undertaken to effectively resolve the deteriorating condition of the Barmah Choke, given the consequences of failing to do so.

3e) RAMJO recommends that proposed voluntary buybacks to reclaim an additional 450GL/y (26 GL/y has been recovered) of water for environmental use not produced through efficiency measures, be removed.

3f) RAMJO recommends that the MDBA, Commonwealth and State governments consider the various alternatives to buybacks that can be more effective in achieving long-term efficient water use, without disrupting local economies.

DISCUSSION AND REVIEW

The RAMJO Water Security Sub-Committee have considered the following concepts and options which might address key elements of the **Environmental and Cultural Flows** that are sub-optimal as they relate to our communities and industries.

3. Environmental Flows Options

3.1 The Barmah Choke: An urgent cooperative approach between State and Federal departments be undertaken to provide early and effective resolution of the growing problems presented by the deterioration of the Barmah Choke's delivery capacity.

3.2 MDB Stakeholder Communication: That MDBA, Commonwealth Environmental Water Holder and State Government Departments provide a suite of transparency measures to demonstrate the effectiveness of its environmental water allocations and timing of flows across the Basin.

3.3 Spill Event: Allocate a percentage of spill event flows from the environmental entitlement holders to productive use. (Awaiting further info).

3.4 Dilution Flows: Undertake a trial of reduced or eliminated dilution flows to evaluate the effect of such reductions on salt levels. RAMJO recommends a trial reduction to 300GL per year for three years to assess the impact on the maintenance of salinity within agreed target levels.

3.5 Loss Reduction: That allocation of funds (other than buying water) into reducing evaporative, seepage and overbank losses would be a more efficient and collaborative mechanism for delivering downstream requirements (see Section 6).

3.6 Evaluation: That consideration be given to a truly credible and independent evaluation of the most efficient way to deliver the environmental and downstream needs, given the massive evaporative losses incurred with that current system and the impacts of drought in NSW. This could include optimising the current irrigation infrastructure and systems which are already in place, such as piping and channels, or allocating a percentage to both the Darling and the Murray to deliver, allowing for flexibility in times of low inflows (such as drought).

3.7 **Integrated Water Approach**: Consider where opportunities could exist to deliver multiple outcomes from one allocation of water (i.e. dilution water also fulfilling the need of downstream entitlements or environmental flows).

3.8 **Sustainable Diversion Limits**: That the recovery of the remaining 58GL of Sustainable Diversion Limits be put on hold until such time as all findings from relevant water-related enquiries and investigations are handed down.

3.9 **Alternatives to Water Buybacks:** Alternatives to water buybacks include, but are not limited to:

- Improving water infrastructure
- Implementing efficient water management practices
- Fostering ongoing and open collaboration among water users, that address underlying issues to water scarcity and help ensure more long-term solutions.

4. Infrastructure – Now and for the Future

Description of Issue

Major opportunities exist within the Basin to enhance The Plan's viability through properly planned infrastructure investment and development. The focus of this paper so far has the inability to meet current water requirements, however serious consideration is essential to address future needs of our nation.

The establishment 100 years ago of the extensive irrigation systems that have nurtured our Basin's productivity was a truly nation-building enterprise. In the hundred years since, the productivity and water efficiency of the basin's agriculture has been able to keep pace with our needs. We have reached a point now where the impacts of the growing population and the constraints of drought and climate change demand a new investment to sustain that agricultural base.

RAMJO supports the recommendation by the Australian Government's own Infrastructure Australia Audit on future demand, specifically the need for long term planning to address intricate issues as below:

- the implications of demographic change for Australian society generally and government finances;
- the scope and direction of technological change;
- changes in the global economy;
- the future of work, e.g. where people work, incomes, and part- time work; and
- the prospect of climate change, and uncertainty as to how the international community will respond[41].

The unhealthy state of the Darling is an example and is primarily a result of drought, climatic changes and poor water management. However, infrastructure initiatives involving dam development in its northern tributaries, and longer term, realistic consideration of river redirection could make its flows longer lasting and more frequent. Similarly, the winding back of flood plain harvesting would further enhance flows, particularly if supported by downstream dam infrastructure.

Darling does not deliver for the environment and for South Australia's requirements needs to be supplied through the Murray and its other tributaries. Therefore, while it is recognised that significant investment into dams and the water infrastructure in the southern MDB has already been undertaken, the upper catchments which feed into the Darling would benefit from greater investment into water management systems, including dams. While this would not necessarily directly benefit the RAMJO communities, it would reduce the pressure placed on the lower basin to meet downstream requirements where the Darling has been unable to due to drought.

Urgent consideration should also be given to the infrastructure investment required for resolving constraint issues, especially the Barmah Choke.

RAMJO is supportive of improvement to any of the four main categories of water infrastructure to increase the efficiency of water use in the Murray Darling Basin:

- Improvements directed at water retention and greater water reliability, such as dams and evaporation reduction techniques
- Improvements directed at the more efficient transmission of water within the system
- Improvements directed at increasing total inflows into the Basin
- Improvements in delivery of system flows where they are compromised by constraints such as the Barmah Choke

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[41] Australian government, 2015, p. 13

RAMJO Recommendation 4 – Infrastructure – Now and the Future

RAMJO urges the Federal Government to undertake to drive a national approach to water infrastructure investment, with a view to sustaining the Basin's productivity across all environmental, social and economic sectors now and for decades to come.

DISCUSSION AND REVIEW

The RAMJO Water Security Sub-Committee have considered the following concepts and options which might address key elements of **Infrastructure – Now and the Future** that are sub-optimal as they relate to our communities and industries.

4. Infrastructure – Now and the Future Options

4.1 National Approach: Approach the Murray Darling Basin as a national piece of infrastructure, and undertake investment and asset maintenance as such.

4.2 Infrastructure Evaluation: That the Federal Government , in consultation with the Basin States, undertakes a comprehensive evaluation of future infrastructure investment requirements which secure both the environmental and productive requirements of the Murray Darling Basin for decades to come.

4.3 Alternative Arrangements: Evaluate alternative management options for South Australian flows, including the replacement of current fixed minimum volume agreement via a lower fixed minimum volume plus a percentage of further flows. In addition, consideration should be given to a trial for reduced dilution flows to South Australia to determine its effectiveness in controlling salt levels.

4.4 Upper Murray Darling Infrastructure: Significant investment in infrastructure such as dams to improve total water availability in the MDB and reduce increasing reliance on lower basin rivers for downstream requirements.

4.5 Constraints Investment: That urgent action be undertaken to assign an appropriate level of capital investment to ensure the delivery of water beyond constraints. This may involve the use of other rivers, such as the Wakool and Edward, and through existing irrigation networks, such as Murray Irrigation Limited (MIL). It should also involve an investment in preventing further deterioration of existing constraints through bank rehabilitation, channel volume maintenance and the timing and intensity of environmental flows.

5. Conveyance and Water Losses

Description of Issue

There is a lack of transparency in how conveyance losses are calculated and where the financial liability for these losses should be accrued. Furthermore, the transfer of water allocations from upstream to downstream sites has placed significant strain on river systems to deliver the water, particularly with respect to areas of constraint, such as the Barmah Choke.

Released by the MDBA in March 2019, the report 'Losses in the River Murray System 2018–19' states 'The conveyance sharing arrangements mean that in some years, when there is a high discrepancy between Victorian and New South Wales water availability (such as 2018–19), the states cover half the conveyance losses despite one state receiving a larger proportion of the water being delivered. Under the Murray– Darling Basin Agreement both states have a responsibility to supply water to South Australia[42].'

[42] Murray Darling Basin Authority, 2019a

RAMJO Recommendation 5 – Conveyance Water and Losses

RAMJO recommends a critical review of the accounting of conveyance losses including capturing true costs of buyer and seller trades, and intra/inter valley delivery costs, and below the Barmah Choke infrastructure impacts. Evaporation mitigation and seepage reduction initiatives should be explored.

DISCUSSION AND REVIEW

The RAMJO Water Security Sub-Committee have considered the following concepts and options which might address key elements of **Conveyance Water and Losses** that are sub-optimal as they relate to our communities and industries.

5. Conveyance Water and Losses Options

5.1 Capture True Costs of Water Transfers: Introduce price signals to incentivise efficient water transfers (noting that every transaction has a conveyance cost that shouldn't necessarily be socialised). Implement a requirement whereby downstream transfers of water incur a cost to the buyer equivalent to the cost of transmission losses. (For example, a system not dissimilar to metropolitan transportation ticket zoning could be considered to determine cost of transmission losses).

5.2 Downstream Transfers: Where water is sold downstream, the downstream licence holder should be liable for all or part of the conveyance losses during the transfer process.

5.3 Incentivise: Consideration might be given to incentivising upstream transfers, particularly when it involves a transfer from below a constraint to above a constraint. In circumstance where the establishment of adaptive agriculture in upstream areas is inhibited by the cost of land, incentivisation could stimulate such investments while reducing conveyance losses.

5.4 Reduce Losses: Evaluate the cost/benefit ratio of investment in the further reduction of conveyance losses via channel lining, utilisation of routes around constraints and evaporation mitigation.

5.5 Transparency: Improvement of conveyance losses reporting and calculations would greatly reduce frustrations regarding the current water management arrangements.

5.6 Sustained Future Flows: Undertake an evaluation of means to add to inflows (e.g. water redirection), retain inflows (e.g. further dam construction) and reduce system losses via efficiency options.

6. Drought

Description of Issue

Despite recent flooding events droughts are a part of the Australian landscape, and an integral part of the challenge faced by communities and the agricultural sector. Nonetheless, the severity and duration of recent droughts is without precedent and is consistent with the scientific consensus that climate change is, at least in part, contributing to these conditions. According to the Bureau of Meteorology 'Rainfall for the 22 months from January 2018 to October 2019, and for the 34 months for January 2017 to October 2019, has been the lowest on record for the Murray– Darling Basin and for New South Wales.'[43] Undoubtedly, droughts will continue to be a feature of the climatic conditions in the Basin." Despite the last two years of good rainfall in the Basin, the above statement is as true as it ever was.

Drought conditions over the last 20 years have served to complicate the debate around the efficacy of The Plan. During the Millennium Drought there were extended periods of low rainfall not dissimilar to the current conditions[44]. The perceived inadequacies of The Plan and the impact of drought conditions are often conflated. Much of the modelling by the MDBA has been based on 'average' or historical inflows, which bear little resemblance to the inflows in recent years, or to those predicted by MDBA in the next 10 years. The NSW Office of Environment and Heritage's Murray Murrumbidgee Climate Change Snapshot predicts an increase in maximum temperatures in the near future by 0.4 to 1.0 degrees Celsius[45]. With a one-degree increase the average annual inflow in the Southern Basin could decrease by up to 22 percent[46].

Clearly, drought affects dryland farming and irrigated agriculture alike, increasing RAMJO communities and our risk of bushfire and the devastating impacts[47]. While recognising the devastating impact of drought on dryland agriculture, the focus of this document is on irrigated agriculture and associated industries. As mentioned in Section 3, RAMJO believes that environmental flows should mimic natural environmental conditions, including when a region is in a period of severe drought.

The effect of drought on irrigated agriculture is twofold. The reduction of rainfall combined with the scarcity or non- availability of water for irrigation renders much traditional agriculture impossible or unsustainable. Farming dependent on irrigated pasture (such as dairying) is the most vulnerable, and is evidenced by the almost total disappearance of dairying from within the RAMJO footprint. Those remaining are doing so while incurring year-on-year losses. Other high- value annual crops such as rice and cotton are also heavily constrained by drought, low or zero water allocations and high water prices. These crops become a year-by-year proposition, and the infrastructure supporting their processing is under growing economic pressure, with kick-on impacts on the communities in which they are situated[48].

Horticulture, represented by permanent plantings such as nuts and annual high value crops such as tomatoes, is the most resilient sector based on economic return. However, this sector presents its own challenges in terms of water and food delivery, constraints and land use as discussed throughout this paper. An example includes a company bordering the RAMJO region that successfully produces almost 50% of the processed tomatoes consumed in Australia[49]. Whilst a thriving industry that RAMJO supports, we are concerned about the proliferation of high intensity water crops downstream and the impact this may have on water pricing and infrastructure.

[43] Bureau of Meteorology, 2019, p. 4
[44] NSW Office of Environment and Heritage, 2014
[45] NSW Office of Environment and Heritage, 2014
[46] Murray Darling Basin Authority, 2018a
[47] NSW Office of Environment and Heritage, 2014
[48] Grain Central, 2019
[49] Sampson, 2016

RAMJO Recommendation 6 – Drought

RAMJO recommends that the Federal Government, in collaboration with the States, leads the development of a comprehensive National Adverse Events Management Plan (incorporating a Drought Management Plan for the Murray Darling Basin) to plan for, mitigate and manage impacts to the food bowl. This should include forecast risks such as a changing climate, reduced flows and unanticipated events that impact food security and local employment. Agreed actions in the plan should be resourced through a permanent fund and should facilitate relief and drive agricultural innovation.

DISCUSSION AND REVIEW

The RAMJO Water Security Sub-Committee have considered the following concepts and options which might address key elements of **Drought** that are sub-optimal as they relate to our communities and industries.

6. Drought Options

6.1 National Adverse Events Management Plan: That the Federal government, in collaboration with the states, lead the development of a comprehensive National Adverse Events Management Plan (incorporating a Drought Management Plan for the Murray Darling Basin) to plan for, mitigate and manage impacts to the food bowl. This should include forecast risks such as a changing climate, reduced flows and unanticipated events that impact food security and local employment.

6.2 Recognition: That the Federal government acknowledge the critical role played by Murray Darling agricultural production and its contribution to Australia's GDP and food security.

6.3 National Leadership: That the Federal government provides meaningful and lasting leadership through the funding of innovative agricultural practices that will be sustainable in a water-scarce environment. See Recommendation 8.

7. Climate Change

Description of Issue

In unity with the Commonwealth of Australia[50] position, it is RAMJO's view that the overwhelming scientific evidence for climate change as a real phenomenon now is undeniable, and that its impact will continue to worsen into the foreseeable future. For the Murray Darling Basin, it will be manifested by increased average temperatures, more severe weather events, increased risk for disasters, shifts in seasonal rainfall patterns and progressively reduced inflows into the Basin[51].

> 'The dry conditions experienced over the past two years (2017-18) were exacerbated by record-high temperatures. Unusually warm temperatures have dominated Australia's climate in recent years, and particularly so in the drought affected regions.'
>
> *Bureau of Meteorology, Australian Government*[52]

The MDBA has forecast a reduction of inflows in the Murray Darling Basin catchments by 2030[53]. The impact of this reduction is further exacerbated by the predicted increase in demand on water by 2031 across the Nation[54]. This reality alone makes the issue of optimal use of water within the Basin of critical importance and underlines the need to evaluate future measures to supplement inflows and reduce system losses.

Infrastructure projects such as dams, flow redirection and modifications in the lower Murray lie outside the scope of The Plan's brief however constitute a challenge that must be addressed in a coordinated approach by State and Federal governments. The Bureau of Meteorology has acknowledged at the 2018- 19 summer was the warmest on record. Their modelling reveals that the period April to August 2018 was the highest on record for potential evaporation across the Murray Darling Basin[55] and this may continue. According to the MDBA 'The atmosphere is warming, rainfall patterns are shifting, and extreme weather events such as storms, droughts and floods are becoming more frequent and intense[56].'

Furthermore, the current water storage infrastructure does not allow for predicted decreases in inflows due to changing weather patterns and periods of drought. The combination of decreased inflows into the MDB, combined with population increases[57] and demand for water, paints a clear picture that critical intervention relating to water capture, storage, management and quality will need to be addressed to ensure all who rely on the MBD network can see a future where water security is guaranteed.

[50] Commonwealth of Australia, 2017
[51] NSW Office of Environment and Heritage, 2014
[52] Bureau of Meteorology, 2019, p. 11
[53] Murray Darling Basin Authority, 2019c
[54] Australian Government, 2015
[55] Bureau of Meteorology, 2019
[56] Murray Darling Basin Authority, 2019c
[57] Australian Bureau of Statistics, 2008

RAMJO Recommendation 7 – Climate Change

RAMJO recommends that the Federal Government lead an evaluation of the impact of climate change on Basin inflows and losses to determine the feasibility of infrastructure and other interventions to stabilise and, if possible, enhance inflows and storage capacity into the Basin in the face of predicted future water scarcity.

DISCUSSION AND REVIEW

The RAMJO Water Security Sub-Committee have considered the following concepts and options which might address key elements of **Climate Change** that are sub-optimal as they relate to our communities and industries.

7. Climate Change Options

7.1. Changing Patterns: Undertake a science-driven comprehensive long-term evaluation of the likely impact of climate change on Basin inflows and drought frequency and severity to assess water availability in the decades to come.

7.2 Water Storage: Additions to the number and capacity of dam storages across the Basin to address water scarcity now and into the future.

7.3 Flow Redirection: Investigation of mechanisms to redirect flow from northern river systems into the Murray Darling catchment.

7.4 Agricultural Adaption: That the Federal Government drive agricultural research, innovation and adaptation to ensure the sustainability of industry in a more water scarce environment.

8. Agricultural Adaptation – Investment and Research

Description of Issue

The introduction of the MDBA and its reclamation of operational water for environmental purposes, together with the effects of drought and climate change, have changed the farming landscape in the Basin permanently. As addressed in Section 7, the impact of climate change will ensure that the environmental change will continue to occur and as a result adaption to our agricultural practices will be necessary. There will undoubtedly be good years and bad years, but the long-term trend will, without major infrastructure investment, continue towards a future of slowly declining water inflows and subsequent reduced availability of water in our region.

Adaption: According to the Australian Department of Agriculture, Water and the Environment 'Changes in climate are expected to impact on Australia's $22 billion crop industry in a number of ways. Increased temperatures may change the locations where crops can be grown, and elevated CO2 levels could affect crop growth and grain yield. Research is underway across the country to develop crop varieties as well as cropping practices for the future58.'

Many opportunities exist to improve the efficiency and equity of the current Plan, some of which have been addressed in this document. Nonetheless to be competitive, agricultural practice in the Basin, and particularly within the irrigated agricultural sector, will need to adapt to increased productivity with the same or less resources. The decline of the irrigation-dependent dairying sector in the Goulburn and Murray valleys is a harbinger of the agricultural landscape. The impact of this change is not localised, with consequences seen right across the region we represent and beyond albeit varying in nature from one place to another.

> 'The stark reality is that the availability of water will decline, and as a consequence, its price will rise as seen already in the current market. In such circumstances the inevitable question must be asked 'How can my business generate additional revenue to offset this rising input cost?'
> *RAMJO Water Security Sub-Committee*

Innovation: There are green shoots of innovation occurring in many places across the footprint. The growing of higher value irrigated specialty crops such as teff is being attempted. There are numerous examples of horticultural enterprises being used to add value to water use. In addition, there are instances of local value adding to traditional crops.

However, these attempts at innovation are sporadic, uncoordinated and lack scientific and financial support. In the face of this inevitable change, the protection of our productivity and livelihoods, and ultimately of Australia's food security, demand a more comprehensive targeted investment to secure that future. Agencies such as the CSIRO, Commonwealth and State departments of agriculture, regional universities and agricultural colleges, the Federal government and One Basin CRC, in concert with local farmers, major industries and entrepreneurs could collectively nurture an innovation-led adaptation to a more water-scarce agricultural future.

Investment: A 2014 Parliamentary report into foreign investment in Australian agriculture stated that 'There is a widespread acknowledgement among researchers and policy makers that in the decades ahead, the demand for Australian food products from the emerging economies will grow substantially. Accordingly there is a sense of urgency that Australia needs to be ready to accommodate higher trade and higher investment in domestic agriculture, to make it highly successful and globally competitive'[59]. With this in mind, foreign interest in agricultural land in Australia equates to approximately 13.5%. According to the Australian Tax Office's Register of Foreign Ownership of Agricultural Land the 'The total area of agricultural land in Australia with a level of foreign ownership has risen from 50.5 million hectares at 30 June 2017 to 52.6 million hectares at 30 June 2018[60].' Furthermore, 2017 ABS figures show that 'The volume of water entitlements owned by businesses with some level of foreign ownership was 12.5% of the total volume of water entitlements for agricultural purposes in Australia[61].'

[58] Department of Agriculture, Water and the Environment, 2019
[59] Kali Sanyal Economics 2014
[60] Australian Taxation Office, 2018
[61] Australian Bureau of Statistics, 2017

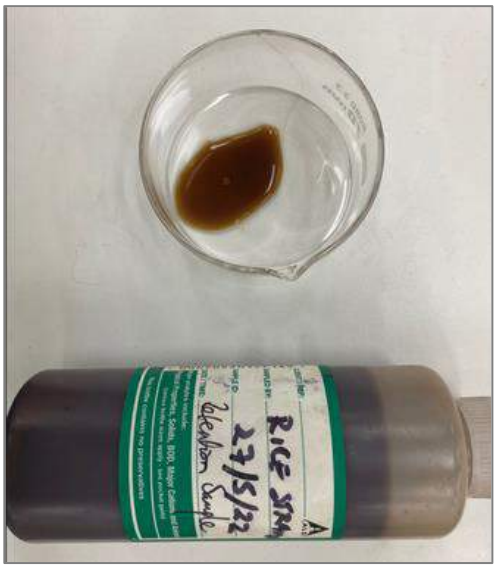
Case Study – Rice Straw to Biochar

Opportunity

In a full irrigation water allocation year, several hundred thousand tonnes of rice straw is generated in the region. The degradation of rice crop residue causes significant release of CH4 as a greenhouse gas, as well as the release of other various air pollutants including particulate matter (PM2.5 and PM10) when burnt.

In addition, there is a current stockpile of @100k/tn of rice hulls generated post rice milling that need a repurposing solution.

This proposal investigates the use of rice straw as a feedstock for biochar, wood vinegar and bioenergy production as a waste utilisation and value-add opportunity. Converting crop residue to biochar also improves environmental outcomes by improving air quality and reducing greenhouse gas emissions.



Solutions

There are many unknowns about the conversion of rice straw to biochar via pyrolysis, and concerns have been raised about the composition of rice straw for use in biochar production, in particular its apparent high silica content. As such Western Murray Land Improvement Group (WMLIG} is sending rice straw to be trialled by Earth Systems using their pyrolysis unit (Charmaker) via funding from the Federal Government's Murray Darling Basin Economic Development Program, and a co-contribution from Murray Local Land Services.

This initial trial will be used as a steppingstone to further explore options for organic waste conversion to biochar in the region, and it is envisioned that a consortia of industry, researchers, government and community group members will join the established biochar cluster group for knowledge sharing and further scope a range of use options in the future.

Results

The following outcomes will be achieved by the trial:

- Basic case study report on conversion efficiency of feedstock to biochar and lessons learned,
- Chemical analysis of biochar emission from stack, feedstock handling, and wood vinegar,
- Basic cost/ benefit analysis of producing biochar from rice straw and other by-product options,
- Provide MLLS an opportunity to participate in a Biochar steering committee to be initiated by WMLIG.

Case Study – Biochar Cluster Group

Opportunity

Biochar is a form of solid residual black carbon derived from the thermo-chemical decomposition of renewable biomass feedstock such as wood, crop residues, manures or leaves, heated in a closed container at relatively lower temperature (<700 degrees C) under oxygen limited condition and specifically prepared for soil amelioration and Carbon (C) sequestration.

Biochar can be added to soil as a soil conditioner, and as a livestock feed additive improving feed conversion efficiency, production and reducing methane emissions. The nutrient retention capacity of biochar leads to reduction in fertiliser use, so it indirectly results in reduced environmental costs associated with the production of chemical fertilisers and energy for supply and distribution and land application.

Solutions

An initial trial will be used as a stepping-stone to further explore options for organic waste conversion to biochar in the region, and it is envisioned that a consortia of industry, researchers, government and community groups will join the established biochar cluster group for technical consultation and knowledge sharing and to further scope a range of use options in the future.

Results

This can result in a range of benefits and opportunities by:

- Supporting a regionally-based innovation solution to a waste problem that generates products and inputs that can be used for the benefit of agriculture, food and fibre manufacturing, and contribute to regional economic growth and climate change goals. Every regional community generates waste products and needs innovative solutions to improve resource use efficiency and reduce reliance on external farm inputs.
- Delivering the capacity for community, government and industries to respond to emerging climate, water and related changes in business and planning decisions.
- Assist producers here and in other regions to use waste organics such as bio-fertilisers to improve soil health and water holding potential, reduce dependence on imported chemicals, and help the community become more self-reliant.
- Provide an opportunity for primary producers to value-add waste organic products (e.g. rice straw and wood waste) via a new value-add income stream providing a buffer against commodity price cycles and climate related issues such as drought.
- Conduct land remediation and rehabilitation, sustainable and profitable regenerative agriculture, rural and regional employment, including substantial multiplier effects in upstream (biomass supply etc) and downstream (markets) industries for businesses in the new carbon economy.
- Opportunities for Indigenous employment as part of land management solutions also present themselves.

Industrial Hemp Pre-Feasibility Study

Opportunity

The establishment of an Industrial Hemp Cluster Group and field trial was funded by the Australian Government's (AG) Murray Darling Basin Economic Development Program (see separate Case Studies).

A Pre-feasibility Study (PFS) was completed by the Wedge Group to investigate opportunities for establishing an industrial hemp industry in the Western Murray Region (WMR) which was funded by the AG and Murray River Council.

Solutions

The pre-feasibility study found that hemp production offers Western Murray farmers:

- Potential to generate more revenue per unit area compared to many other traditional crops.
- Potential to augment existing farm revenues or to establish a new base of operations
- Support the development of a local supply & value chain
- Diversify the types of crops grown, provide positive weed break, farmer
- opportunities for carbon sequestration
- Strong consumer demand for hemp-fossil fuel replacement products, such as bioplastics and building products

Impacts

- The pre-feasibility study found that hemp production offers Western Murray farmers:
- Potential to generate more revenue per unit area compared to many other traditional crops.
- Potential to augment existing farm revenues or to establish a new base of operations
- Support the development of a local supply & value chain
- Diversify the types of crops grown, provide positive weed break, farmer opportunities for carbon sequestration
- Strong consumer demand for hemp-fossil fuel replacement products, such as bioplastics and building products
- Business Case funding has been submitted to the NSW Government.

Key Facts

- An Industrial Hemp Cluster group has been established
- Competitive return to the grower of approx. $1,156/ha or $193/ML water (based on 10tn/ha production and farm gate price of $400/tn)
- Prefeasibility study indicated a potential gross return via one decortication plant of $6.8M servicing 416 Ha and create 4-6 direct ongoing manufacturing jobs
- Success of a cohesive industry requires strong collaboration and cooperation throughout the entire value chain
- Business Case development funding has been submitted to the NSW Government to further refine cost / benefit economics and risk analysis of decortication
- Several businesses have indicated strong interest in establishing local value adding businesses, such as prefabricated building material, bricks and bioplastics.

RAMJO Recommendation 8 – Agricultural Adaptation – Investment and Research

8a) RAMJO recommends that the Commonwealth drive a research and innovation program directed at adaptive agriculture.

8b) RAMJO in addition recommends the further strengthening of support for local and regionally based models directed at research, innovation and adaptation to ensure the future sustainability of Australian agriculture.

8c) RAMJO recommends that the Commonwealth seek to encourage the investment by superannuation industry and other financial institutions in the Australian agricultural sector to further secure its ability to remain globally competitive.

DISCUSSION AND REVIEW

The RAMJO Water Security Sub-Committee have considered the following concepts and options which might address key elements of **Agricultural Adaption – Investment and Research** that are sub-optimal as they relate to our communities and industries.

8. Agricultural Adaptation – Investment and Research Options

8.1 Support Further Domestic Investment: As per the recommendations of Super Charging Australian Agriculture, changes in both the superannuation and financial sectors to encourage investment into the agricultural sector is required to ensure its future success and ability to remain globally competitive.

8.2 Sovereign Water Fund: Evaluate the establishment of a sovereign water fund to provide a permanent source of funding for drought relief, infrastructure development, system maintenance and adaptation. Utilise Sovereign Water funding for initiation of research, innovation and adaptation programs, directed at sustainable water use and long-term agricultural viability.

8.3 Visionary Leadership in Adaptation: Collaborate with State and Federal organisations to create and maintain research and development hubs across the Basin, directed at region specific adaptation and innovation for a sustainable agricultural future. Seek the engagement of tertiary institutions, industry bodies, financial institutions and communities to create centres of excellence.

Final Word

RAMJO presents themselves as a collective of Local Government representatives with one voice and a solution- focused approach to engaging with state and federal Government bodies. We seek to build a mutually beneficial relationship with these bodies to act as a 'sounding board' on matters and recommendations listed in this document, and to create the opportunities for the important issues of our communities to be heard and understood.

Our vision of having 'a thriving region abundant in sustainable communities' is only possible with collaboration with likeminded organisations and industry stakeholders that are prepared to advocate for real and meaningful change to drive improved solutions for the major issues in our regions.

We wish to contribute to solutions that balance environmental, social and agricultural needs that will sustain future generations for decades to come.

We want to see our communities thriving and with a future they can work towards and build upon.

RAMJO Water Security Sub-Committee

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