Submission to the Senate Inquiry into 'the management of the Murray-Darling Basin'

GANNAWARRA
SHIRE COUNCIL

15 December 2010

Table of Contents

Overview **5**

Background **5**

History and current status of the community 5

Council's Community Engagement Activities **7**

Concerns with the MDBA process **9**

Lack of a socio-economic impact assessment 9

Consultation 10

Environmental Science 11

Practicalities of implementing the Plan 12

Impacts of the MDBA Guide on Gannawarra **12**

Impact of the SDLs on the Gannawarra agricultural sector 12

Impact on the Gannawarra community 13

Our Ask – next steps **14**

References **15**

Appendix A– Gannawarra Shire: Socio-economic impact of the Basin Plan - Final Report **17**

Overview

Gannawarra Shire Council is heavily reliant on the Murray and Goulburn Rivers for irrigated agriculture, particularly dairying, the region's largest industry. Ensuring the sustainability of agriculture within our region is vital to its future. To do this successfully a balance between the environmental, social and economic needs for water is essential.

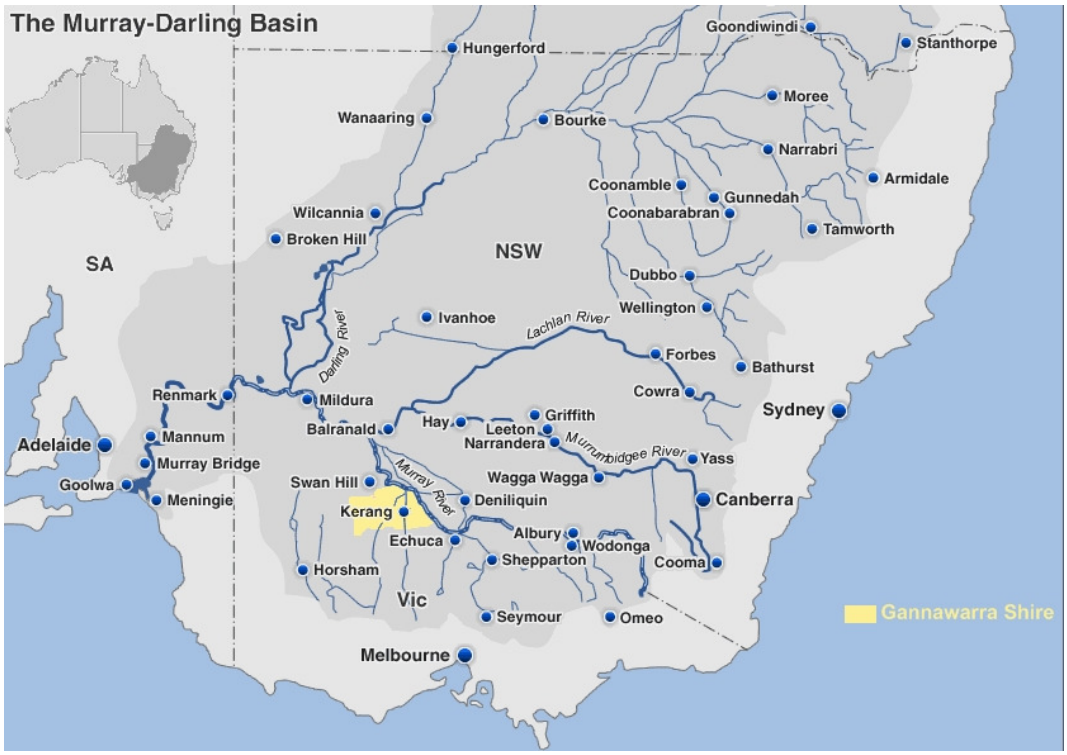
As the Murray Darling Basin Plan will impact on the future availability of water in the region, Gannawarra Shire Council would like to:

- work in partnership with all levels of government and the Murray Darling Basin Authority to minimise the socio-economic impacts of the Plan on our community at a local level,
- maintain a balanced return of water to the River for environmental flows.

Background

History and current status of the community

Gannawarra Shire is located on the Murray River in Victoria. The major towns in the municipality include Kerang, Cohuna, Koondrook, Murrabit, Leitchville and Quambatook. The population is currently around 11,000 people[1]. While employment in the manufacturing and services sectors has increased over recent years, agriculture is still the main employer, with around 30% of total employment directly in agriculture[2]. In 2006 the Gross Value of Agricultural Production (GVAP) for the Shire was $226 million, of which $116 million was from livestock products (51%)[3].



[1] Australian Bureau of Statistics. *ABS Census of Population and Housing, 2006*
[2] Australian Bureau of Statistics. *ABS Census of Population and Housing, 2006*
[3] Australian Bureau of Statistics. *ABS Catalogue 7125.0 Agricultural Commodities: Small Area Data, Australia, 2006-07*

It is clear from these statistics that the removal of large amounts of irrigation water as a result of the Murray Darling Basin Plan Sustainable Diversion Limit (SDL) recommendations, would have an instant and permanent effect on the economic future of the region and therefore on the population levels and future of settlements in our Shire.

Over recent years the Shire has been severely impacted by drought, the significant reduction in the redgum timber industry due to the State governments' decisions to create Red Gum National Parks and the downturn in the dairy industry particularly in Northern Victoria. Notwithstanding the proven resilience of our farmers and our communities, the MDBA Plan to mandate new SDLs has further exacerbated stress levels of farmers and reduced or delayed investment levels as people await some indication of certainty re: water resource availability.

Council recognises the need to come to grips with the many changes that have occurred and to plan for a positive future. Council is currently developing a new four year Economic Development Strategy and Gannawarra 2025, a comprehensive community plan that will set the overall strategic direction for the municipality for the next fifteen years. It is important, therefore, that the likely impacts of the MDBA Plan, are factored in and areas for diversification and possible structural assistance identified. Local solutions are critical but we will need help from the Government to ensure any negative community impacts are minimised.

Council's Community Engagement Activities

Gannawarra Shire Council coordinated two community information sessions, one in Kerang with 110 attendees and another in Cohuna with 104 attendees. The strongest representation at both meetings of people came from an agricultural and farming background, but many of these also believed they had an environment and conservation focus, as their sustainability was dependent on looking after their land. There was also a strong level of interest from non-agricultural and farming background, with 25% of attendees at the Cohuna session from a non-agricultural business background.

A list of the wide ranging concerns and questions raised by attendees at the Forum as shown below:-

Concerns raised in Community Forums by members of the community

Social Impacts

- If the MDBA were to include the community "eco-system" as part of the (environmental) structure, would/should it be considered for inclusion as part of the environment?
- Consideration should be given to the flow-on effects of water losses to communities eg schools, hospitals and other services. Towns that rely on farmers will be affected as farms close down, particularly family farms.
- Multiplier effect to economy ie cost of taking that much water at an estimated cost of ($7,000/ML) out of the economy. This multiplier effect is what is currently provided employment and sustainability in rural communities.

Economic issues

- Decisions to reduce the capacity of communities to continue should look at the debt levels of those communities that have often maintained output by borrowing money. More reductions in water supply will equate to more borrowings and less production.
- The reality is that there has been a loss of a third of irrigation entitlements already, want to take another third, with only one third left behind after Plan – this will effect everyone in the community and everyone who has invested in modernisation.
- Substantial SDLs will mean that on-farm investment will be affected. This will have flow on effects on the security of other local businesses such as transport operators and motor mechanics.
- The ABARE data used in the Guide to the Basin Plan was based on industry wide analysis with the real figures relevant to particular regions being skewed. This information must be reassessed and put into the context of how it affects each region.

Planning

- Those who kept and maintained their irrigation assets with little or no compensation may be disadvantaged under this Plan. At the moment those people who have continued to change and revise their farm businesses are excluded from the decision making process.
- There should be recognition that the storages and weirs were built for irrigation purposes. If there were no storages, the river would have been dry in most years during the drought. There are complementary uses of the rivers that must be considered.
- There are engineering solutions to minimise environmental water requirements that can be implemented to achieve good environmental outcomes, instead of just purchasing water out of the system.

Water savings

- There needs to be clear accounting of figures regarding environmental flows and losses to the system eg Barmah Forest given that there is multiple use of the water.

- What happened to the 40% sales several years ago? Refer to the buyback by Commonwealth government already - will that be taken into account or are the suggested SDLs "over and above" what has already been purchased?
- Savings of over 1,000GL can be made just by opening up the Lake Alexandrina estuary and returning it to more natural tidal flows.

Environmental assets

- There must be a challenge to the science of how much water the environment actually needs to be sustained.
- Need to question the science - it is fundamentally flawed. It is bigger than the MRGC. Need to get all Murray Darling Basin councils together. Do international treaties override Australian Constitution? This will affect every Australian. Water Authorities will not be viable to deliver water to those irrigators who are left. They will have to bear the cost of continuing irrigating.
- Farmers need to promote what they do for the environment eg eco-systems on-farm. There are many ways that farmers provide eco-system services by their farming practices, and these services should be recognised and taken into account when accounting for environmental management.
- The multiple use of water should be recognised. Amounts of water taken out of a regulated system for the environment – need to take into account the volume that is returned to the river.

Water Trading

- It must be clarified if the Environmental Water Holder will pay normal water charges on environmental water, equal to those paid by irrigators, eg delivery shares, reduced allocations and exit fees.
- Call for a reduction in fixed water charges, given that as water rights are reduced, so too should the amount paid for water. At present, irrigators pay for 100 per cent of their water right, even when they receive less than their full entitlement.

Ideas from the community

- Motion: "that there be no further irrigation cuts to the Torrumbarry Irrigation District's allocation given that there have already been substantial purchases and sales made from the area already".
- Need to connect more with metropolitan people, so they understand the issues and the implications for taking these radical decisions.
- Need to push the issue of SDLs. This submission should hammer the calculations on how the figures were arrived at, and the plan should be delayed until satisfactory information can be supplied (honest and true).
- SDLs should be subject to a separate inquiry.

Table 1 highlights the top seven social impacts of the MDBA's proposed SDLs as identified by attendees of the Kerang and Cohuna consultation forums as most likely to impact on them.

Table 1 Top 7 Social Impacts identified at the Gannawarra Shire Council Consultation Meetings

	Cohuna	Kerang	TOTAL
Farming Families forced to make decisions	17	17	34
Significant rise in stress levels and health impacts	17	14	31
Small community decline	19	10	29
Significant loss of jobs	17	12	29
Declining educational access for children	14	7	21
Loss of young people	13	8	21
Delay to retirement plans	12	9	21

In relation to the economic impacts of any further water reductions, the biggest impact for community members at both sessions was that limited funds would cause difficult decisions to have to be made.

Concerns with the MDBA process

Lack of a socio-economic impact assessment

Apart from adequate justification of the proposed 3,000-4,000 GL reduction in SDLs, Gannawarra's main concern with the MDBA Guide process is the lack of a credible and detailed socio-economic impacts assessment. When considering any issue current best practice is to consider the triple bottom-line impact of any decision, including social, economic and environmental impacts. Although the Water Authority Act 2007 does focus on environmental issues, the Minister has now received legal advice from the Australian Government Solicitor that the plan provides for the use of the Basin water resources in a way that optimises economic, social and environmental outcomes and that subject to the environmentally sustainable limits, maximizes the net economic returns to the Australian community.

Name: Paul & Ann Loosemoore
Company: Mixed Farming
Town: Kerang
Yrs in business: 56

We farm in partnership with our daughter and son-in-law. During the period of low water allocation our operation slipped from a profit of $120,000 a year to an operation making an $80,000 loss. If water was to be taken away on a permanent basis we could not continue to farm as we have been. There needs to be a study done on how or what farmers could grow profitably on a lower water allocation. There is no solution being offered for the future.

In May 2010, Gannawarra Shire Council participated in a study by Marsden Jacobs[4] to explore the economic and social profiles and impact assessment on the Goulburn Murray Irrigation District (GMID) Region. Very little of this information seems to have been included in the Guide. Some of the key findings of the Marsden Jacobs report relevant to Gannawarra are:

- allocation policy employed by Victoria has provided irrigators with high reliability water that has resulted in the development of high value industries dependent on that supply
- Since 2006-07 the region has suffered a series of low allocations, which has led to increased debt due to high cost of annual water purchases and/or bought in feed costs
- Dairy water use efficiency has improved significantly in last 10 years, including significant improvements in feed grown per ML of irrigation water used and is now, in the main, a highly efficient industry
- There are opportunities to improve on farm water use, especially in dairy, but current financial stress will limit investment in the short to medium term

[4] Marsden Jacob Associates May 2010. *Goulburn Murray community profile – Irrigation Region: Delivering the Basin Plan – Economic and social profiles and impact assessment in the Murray Darling Basin.*

- The area has suffered a slump in confidence and high stress , the current environment is highly uncertain due to the substantial reform already undertaken, and uncertainty around likely impacts of SDLs, which is constraining investment
- A reduction in water availability presents a real risk for further loss of confidence (already at low levels) in irrigated dairying and a collapse in value of farm assets
- The irrigations system would need to shrink to about half the scale in the Northern Vicotrian Irrigation Renewal Project (NVIRP) business case to achieve the SDL targets
- Towns reliant on dairying (eg Cohuna) would shrink significantly or become increasingly welfare-dependent
- Tourism is an opportunity based around the Murray River and the Kerang Lakes, however it requires significant development and will not match the regional economic contribution made by irrigated agriculture if there are significant changes to water availability

Consultation

The rural community has largely lost faith in government consultation on environmental issues. It will take time and effort to rebuild that trust. There are doubts regarding the genuineness of the MDBA Plan consultation process and concerns regarding their ability to communicate in language that the community can easily understand. Given the community's very unsatisfactory experience with the Victorian and NSW governments when consulting on the River Red Gum Forests, there is a perception government consultations are only conducted to 'tick a box', with no intention to listen to or consider the communities concerns.

Many rural communities have suffered considerable upheaval over the last decade due to the introduction of water trading, unbundling water from land, prolonged drought, fluctuation in commodity prices and now the locust plague and threat of losing their water to environmental flows. For Victorian farmers, this has placed further stress and mental health concerns on individuals and families, who are already struggling due to the uncertainty surrounding their future.

Although rural Victorians have been facing difficult times, they have been working with government agencies to implement sustainable, long-term solutions to return water to the environment, through projects such as the Living Murray and NVIRP scheme. The Guide does not appear to recognise this effort, but only considers future planned savings, without having evaluated the success of any existing initiatives.

The Guide will impact adversely on a number of Australian government policies, including settlement plans and population targets. By reducing industry in rural Australia,

Name:
Tim Mitchell,
B Agric Sci ,
M Agribus
Company:
Stock Feed
Town: Cohuna
Yrs in business: 9

During the four year financial period from July 2005-June 2009, my business in Cohuna, MVP Feeds had a very stable production level varying approximately 6% through those years. Turnover varied according to (grain) input price. Employment was stable at five employees. In the financial year 2009/10 production fell 28% and staff reduced to 3 employees as a direct result of low water allocations from the drought. Turnover fell over 40%. We anticipate the "plan" to have the same impact except permanently. Unfortunately, another 28% fall will be unsustainable.

employment opportunities will be reduced as will opportunities for migrant settlement in rural areas. People will be forced to move to metropolitan centres for employment, placing increased environmental, social and infrastructure pressures on the regional and capital cities.

Environmental Science

The methodology used to determine the environmental water requirements is unclear and merits more comprehensive explanation and clear justification. The Act requires the MDBA to use best practice science, or in the case where this is not available to use the precautionary principle. It is important that MDBA can demonstrate it has used best available science and this should include data at the local catchment level.

There has been no opportunity for peer review of the environmental science and monitoring. It needs to be closely scrutinised by all interested parties, including relevant State Departments and Catchment Management Authorities, local government and the community. The ability of community members and local government to challenge the detail of the science is restricted as resources and access to independent expertise is limited.

The science used also needs to consider the qualitative knowledge held by locals that could be vital to develop a system that works well at the local level.

Name: Cameron English
Company: Mixed Farming
Town: Lake Meran
Yrs in business:
Family has farmed the property for 120 yrs

Family settled in the area in the 1890s because of water security, but have successfully farmed here through drought and floods. Family have used surface water since arriving and implemented gravity irrigation at its inception. Today I am still working the family farm with a young family, water uncertainty changes the dynamics of the farm being mixed, but a lack of water has seen 90% of the farm become dryland and enterprises fail due to lack of water – is this to be our future – will I be able to support my wife and children – will I be able to pass the farm on – will I need my wife to return to work. All these questions. If I lose my water, many of these questions will be answered. My land values will decrease as without water it is very difficult to farm.

Many farmers who attended our community information sessions emphasised their strong environmental credentials, highlighting that to be able to farm sustainably into the future they need to protect the environment. Therefore, they are interested in helping to get the system right.

Of strong concern is the lack of research to measure the existing benefits to the river system of returning environmental flows from projects like the Living Murray.

The 3,000GL requirement for the environment does not take into account existing savings made by environmental projects recently or currently being implemented. This is giving a distorted picture of the total water savings expected from these regions and does not recognise the achievements of those regions that are already trying to make a positive contribution back to the environment. The figures should include recent water saving initiatives that have made a contribution to improved environmental flows, to give a more holistic view of the impacts of water savings to the environment.

The optimised use of infrastructure to deliver improved environmental watering outcomes, eg the Gunbower Forest project, should also be factored in.

The Guide and Technical background documents do not provide enough detail on the environmental watering plan. It is difficult to determine the accuracy of the watering plan for the environmental sites, when it does not provide the detail to assess if the level of environmental flows is appropriate at a local level. This information should be provided at a minimum at the catchment level.

Practicalities of implementing the Plan

The Guide has overlooked some essential parts to the implementation of the Plan. Government buybacks have had a "Swiss cheese" effect on existing irrigation infrastructure systems, with irrigation infrastructure running past blocks no longer being irrigated to reach irrigated land further down the supply line. The work currently being undertaken by NVIRP is looking to address this issue.

Name: John Webb
Company: Transport
Town: Cohuna
Yrs in business: 36

I am 61. My wife and I have worked hard together to build up our business over 36 years. Our small transport business now run with the help of our son was a flourishing business employing 15, turning over an annual gross turnover of $2 million. In March this year the Murray Goulburn Factory closed due to lack of milk and the drought. We lost 54% of our work overnight. Seven people lost their jobs. If we lose 34% of water out of this area that will be the end of our business. Another seven families with no job and therefore no incomes coming back into the town.

Without projects like this however, it leaves substantial unused irrigation infrastructure and the cost of maintenance has to be borne by the few irrigators that are left. This may then make what was a productive, sustainable farming property unviable, forcing farmers to become 'willing sellers', even though they may not wish to sell but do so through desperation.

Impacts of the MDBA Guide on Gannawarra

Impact of the SDLs on the Gannawarra agricultural sector

With the prolonged impact of the drought, and low water allocations since the 2002/03 season when allocations first dipped below 100% in Victoria, there has already seen a substantial change to the Gannawarra agricultural sector. A report conducted by the HMC Property Group[5] looked at the impact for Shires across the GMID. All Shires showed a dramatic decrease in the number of dairy farms between 2006 and 2010, with a 49.1% decrease in dairy farms in the Gannawarra Shire Council being the lowest reduction. However, this still equates to a loss of 179 dairy farms from the Gannawarra municipality over a four year period. With the improvement in conditions this year, a number of these dairy farms have recommenced dairying.

The report also indicates that across the GMID the indication is that there has been a 29.5% decrease in working dairies over the same 4 year period. During this same period, a major value-adding processor, Murray Goulburn, also closed its cheese making factory at Leitchville, the Shire's largest manufacturer. This resulted in the direct loss of 80 jobs, most of which were Gannawarra Shire residents. This doesn't include the numerous indirect jobs that have been lost, including workers who lost their jobs when a

[5] HMC Property Group July 2010. *Changing land use in the Goulburn Murray Irrigation District 2006-2010: Where have all the dairies gone?*

local trucking business that carted to the Leitchville factory had to reduce its workforce (see Webb Transports story on the previous page).

The introduction of the new SDLs is likely to further impact on the agricultural sector and flow on industries. Council conducted a study on the Impact of sales of permanent water[6] and arranged for this work to be updated to assess the socio-economic impact of the proposed SDLs in the Basin Plan Guide on the Gannawarra Shire[7] (Appendix A).

The Marsden Jacobs Associates report[8] on the Goulburn Murray Irrigation District (GMID) indicates that all dairy product is processed in the GMID region. As a result, a substantial reduction in regional output from Gannawarra is likely to have significant flow on effects to the regional value added industries. This is highlighted in the RMCG report to assess the socio-economic impacts of the Basin Plan on Gannawarra[9] (Appendix A), which shows there would be strong negative impacts on the region with:

- the regional output reduced by between $66.4 and $132.7m pa
- the regional value added reduced by between $15.5 to $31.1m pa

Impact on the Gannawarra community

The reduction in regional output and regional value adding will have significant flow on effects for the community. The greatest impacts come from the reduction in value of production from irrigated agriculture, as the impact on dryland is minimal even with climate change. The RMCG report[10] considers how this reduction will impact on employment within the community and is demonstrated in Table 2 (Appendix A, page 15).

Table 2 Direct and indirect impacts on regional output ($million per anum) and employment by 2029

Scenario	Gannawarra Water use GL	Direct impact on output ($million)	Total value added ($million)	Total employment (FTE)	Total population
Base case 2030	212	207	74	1,598	11,297
Scenario 2 2030	141	161	58	1,240	10,409
Scenario 3 2030	71	114	43	881	9,531
Change from 2010 base case					
Scenario 2		-47	-16	-358	-888
Scenario 3		-94	-31	-716	-1,766

While the Basin Plan will not be implemented in Victoria until 2019, the Australian Government has indicated it will achieve the Plan targets mainly through continuation of buyback initiatives. Therefore, the modelled impacts are likely to occur over the next 9 years, not as a steady change over the 20 years of the modelling period or as a step change at 2019.

[6] RMCG February 2010. *Gannawarra Shire: Impacts of sales of permanent water entitlements and land use planning options for new dryland – Final Report.*
[7] RMCG November 2010. *Gannawarra Shire: Socio-economic impact of the Basin Plan – Final Report.*
[8] Marsden Jacob Associates May 2010. *Goulburn Murray community profile – Irrigation Region: Delivering the Basin Plan – Economic and social profiles and impact assessment in the Murray Darling Basin.*
[9] RMCG November 2010. *Gannawarra Shire: Socio-economic impact of the Basin Plan – Final Report.*
[10] As per previous

Currently there is 300GL available for Gannawarra. Based on an anticipated reduction of 100GL of water from Gannawarra (scenario 2), ie one third of water currently available, there will be a loss of 358 jobs. If we lose two-thirds of our water ie 200GL (scenario 3), it will double the loss of jobs to 716 in the Gannawarra region.

This will result in population decline of between 888 and 1,766, based on the economic multiplier of 2.48. With an existing population of around 11,000 this will have substantial impacts for the local community. The findings are substantiated by the Marsden Jacob report, which states that:

> "As water availability falls beyond that provided for by irrigation modernisation (NVIRP) and efficiency programs and buy-backs, social impacts will become severe with displacement of some people, declining populations in rural towns, and decreasing ability by local government and non-government organisations to provide services to at-need rural communities".

The Gannawarra Shire has already started to feel some of these effects. With the closure of the Leitchville Cheese making plant, the region has already lost 80 direct jobs, and even more in indirect employment. This has placed huge stress on the local community, which can lead to mental health issues. There is a grave concern regarding how much more stress can be placed on local communities without detrimental impacts on people's mental health.

Our Ask – next steps

While we recognise and support the intent to improve access to water for the environment there are a number of equally important elements and needs to be addressed in the Plan or in support of it:

- We strongly urge a balanced approach with equal consideration to social and economic impacts of any proposed changes on families and communities, so it is vital to conduct a thorough socio-economic impact assessment at the local level
- Better consultation and communication at a local level, using local councils as an interface with their communities, to better inform the community and minimise any further mistrust
- Clarity regarding the technical data and in particular the true quantum of environmental water genuinely needed and the detailed environmental outcomes to be addressed by this water in each catchment
- The plan must recognise that the proposed SDLs will have a permanent and irreversible impact on the agricultural sector in Gannawarra and therefore on our economy and community
- Maximise water related infrastructure improvements – on farm and off farm and for the efficient delivery of water – to maximise savings and minimise any loss of consumptive water
- Provide early and comprehensive financial and other support for alternative business ventures and related training that will assist in diversifying our economies
- Strengthen the social support services to cater for those is distress

Gannawarra Shire Council

15 December 2010

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HMC Property Group July 2010. *Changing land use in the Goulburn Murray Irrigation District 2006-2010: Where have all the dairies gone?* Published report prepared for the Northern Victorian Irrigation Renewal Project and the Department of Primary Industries.

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Appendix A– Gannawarra Shire: Socio-economic impact of the Basin Plan - Final Report
November 2010, RMCG Consultants for Business, Communities & Environment

Gannawarra Shire

Socio-economic impact of the Basin Plan

Final Report

November 2010

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Table of Contents

1 Introduction 1

2 Water usage scenarios 2

2.1 Adjustment for NVIRP and Commonwealth buyback to date 2

2.2 Adjustment for the Torrumbarry Irrigation Area having had more net trade out than other Victorian irrigation areas 2

2.3 Impact of climate change 4

2.4 Impacts of SDL and climate change 5

2.5 Other water trade impacts 5

2.6 Summary of water availability 6

3 Impacts on value of agricultural production 7

3.1 Analysis of the Shire's Gross value of Agricultural Production 7

3.2 Estimates of gross value of production for each water availability scenario 8

3.2.1 300 GL water available 8

3.2.2 200 GL water available 8

3.2.3 100 GL water available 8

3.3 Summary of impacts on gross value of production 9

4 Economic impacts 10

4.1 Key industry linkages 11

4.2 Estimated impacts 11

5 Population impacts 13

5.1 Existing distribution 13

5.2 Extending the employment estimates 13

6 Summary of socio-economic impacts 15

Comparison with previous modelling findings 16

1 Introduction

In 2010, RMCG undertook an analysis of the impact of sales of permanent water entitlements on the economy, employment and population of Gannawarra. In October 2010, the MDBA announced further changes to water availability in the Basin Guide. Gannawarra requested that RMCG update the economic modelling to include the water availability scenarios outlined in the Basin Guide.

The key steps undertaken to do this included:

- Translating the SDLs proposed in the Basin Guide into the net impacts at the local level to provide future water usage;
- Using the future water usage scenarios to calculate impacts on production from irrigated agriculture to provide input into a regional input-output model; and
- Undertaking econometric modeling to isolate the overall change (direct and indirect) in local/regional output, value added and employment under each scenario to 2030.

2 Water usage scenarios

The Basin Guide has set Sustainable Diversion Limits (SDLs) of between 3,000 GL to 4,000 GL. Table 2-1 outlines the reductions of 27% to 35% to water usage in the Victorian Murray, which includes the Torrumbarry Irrigation Area (TIA), as proposed in the Basin Guide.

Table 2-1 Reductions in water usage in the Victorian Murray to achieve SDLs

Description	3000 GL	4000 GL
Reduction required to meet SDL in Victorian Murray	442GL	592GL
Victorian Murray long term Current Diversion Limit	1,656GL	1,656GL
Percentage reduction in water usage (Not including NVIRP and buyback to date)	-27%	-36%
Percentage of long term water use remaining	73%	64%

2.1 Adjustment for NVIRP and Commonwealth buyback to date

The reduction in water usage to achieve the SDLs needs to be adjusted to account for water savings that will be achieved through NVIRP and entitlements already purchased through Commonwealth buyback programs. Table 2-2 shows that a 14% to 23% reduction in water usage in the Victorian Murray is required to achieve the SDLs once NVIRP and Commonwealth buyback to date have been considered.

Table 2-2 Reduction in water usage in the Victorian Murray to achieve SDLs accounting for NVIRP and Commonwealth buyback to date

Description	3000 GL	4000 GL
Volumetric reduction to achieve SDLs in Victorian Murray	442GL	592GL
NVIRP 1 and 2 water savings (Assumes 85 GL out of 175 GL savings for Commonwealth is Murray water)	357GL	507GL
Commonwealth buyback to date (Victorian Murray 133 GL[11])	224GL	374GL
Net reduction to achieve SDL[12]	**224GL**	**374GL**
Vic Murray long term Current Diversion (including losses)	1,656GL	1,656GL
Net percentage reduction in Victorian Murray water usage[13] to achieve SDLs	-14%	-23%

2.2 Adjustment for the Torrumbarry Irrigation Area having had more net trade out than other Victorian irrigation areas

The TIA as at June 2010 held around 25% of the high reliability water shares (HRWS)[14] in the Victorian Murray. Given the scale of permanent trade that has occurred in the past, it is

[11] http://www.environment.gov.au/water/policy-programs/entitlement-purchasing/vicmurray.html accessed 12/11/2010
[12] Assumes that Vic purchases offset Vic SDL and not NSW or SA Murray SDL requirements
[13] Assumes losses can also be captured and used to offset SDL. If not the 1,656 reduces to 1,352 GL and the % reduction is 17% for 3,000 GL and 28% for 4,000 GL
[14] 291,678 ML in Torrumbarry of HRWS G-MW annual report Appendix B4 for 30/6/2010. Murray Vic total HRWS is 1,182,291 ML Vic Water Register 14/7/2010. This is 25% in Torrumbarry.

considered optimistic that buyback of entitlements to achieve the SDLs in the TIA will be no higher 25%.

By way of illustration, the DSE report on water trade 2008 indicates that up to 2005/06, 75% of all net permanent trade out of the Victorian Murray irrigation districts was from the TIA (Figure 2-1). However, more recently the percentage net permanent trade from the TIA has dropped to around 60%, with more water share traded out of the Murray Valley Irrigation Area. For this modelling, it has been assumed that the percentage of SDL buyback from the TIA will be between 25% and 60%[15] of the 224 to 374 GL Victorian Murray usage outlined in Table 2-2.

This translates to a reduction of 56 to 224 GL in usage in the TIA (Table 2-3).

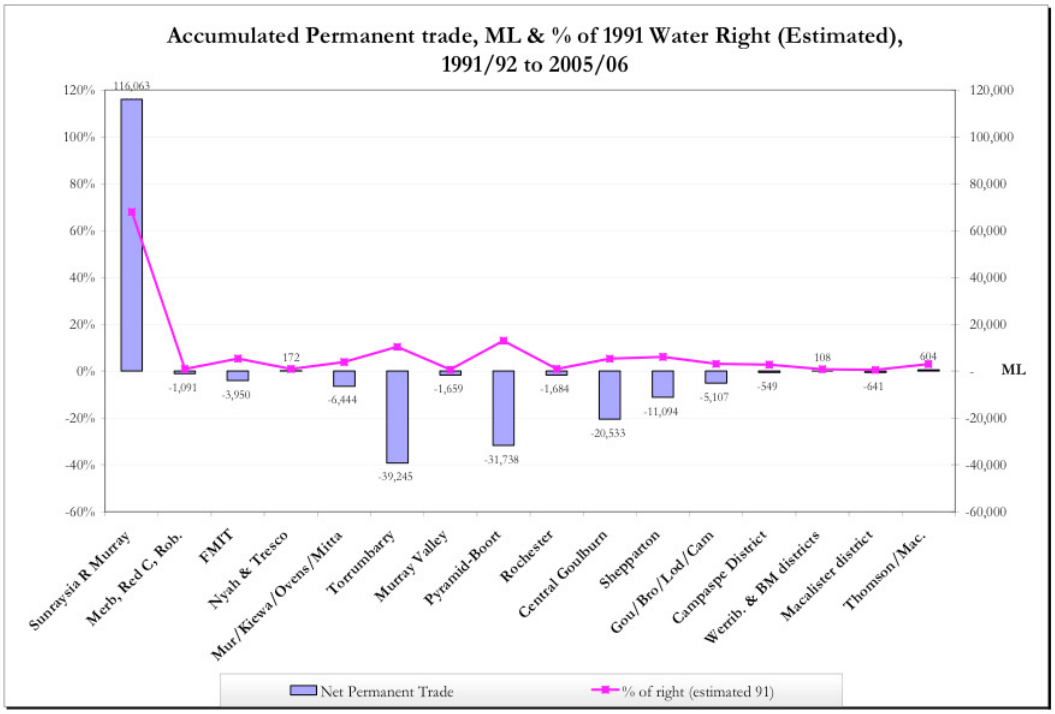

Figure 2-1 Cumulative permanent water trade in Victoria (1994/95 to 2005/06)

[15] Estimate for more recent trade %

Table 2-3 Estimated water usage in the TIA under the Basin Guide[16]

SDL Scenario	4000 GL		3000 GL	
Proportion of Vic Murray buyback from TIA	**60%**	**25%**	**60%**	**25%**
Net reduction to achieve SDL	374	364	224	22
Buyback impact on TIA usage	- 224	- 93	-134	- 56
TIA HRWS as at 30/6/2010	292	292	292	292
Long term usage pre SDL assuming 124%[16] of HRWS to allow for LRWS and temporary trade	362	362	362	362
Remaining TIA usage within SDL	137	268	227	306

2.3 Impact of climate change

Reduction in water availability due to climate change is additional to reduction in water availability from implementation of the Basin Guide[17]. Reduction in water availability due to climate change are outlined in Table 2-4. These have been updated since the first report to include more recent climate change scenarios available in background reports to the Northern SWS. (Background Report 2[18])

Table 2-4 Change in average water allocation associated with climate change

	Water shares in TIA (ML)		**HRWS 291,678[19] ML**	**LRWS 164,709[20] ML**
Entitlement	**Climate change scenario**	**Average allocation derived from graphs**	**Average allocation from HRWS (ML)**	**Average allocation from LRWS (ML)**
Murray HRWS	Base case – long term average	99.3%	289,636	
	Scenario B – medium climate change	93.7%	273,302	
	Scenario D – severe climate change	84.3%	245,885	
Murray LRWS	Base case – long term average	59.5%		98,002
	Scenario B – medium climate change	36.0%		59,295
	Scenario D – severe climate change	18.8%		30,965

[16] Note the above table assumes LRWS (low reliability water share is reduced in the same proportion as HRWS and that usage of HRWS allocation plus LRWS allocation and net temporary trade is equivalent to 124% of HRWS volume held. Note modelling from N. Vic. SWS suggests with Torrumbarry holdings of 292 GL HRWS and 165 GL LRWS there would be 388 GL available or 133% of HRWS (before climate change). However, usage would be expected to be below availability and 124% has been assumed. 124% is equivalent to an average 50% allocation of LRWS at 0.48 ML LRWS per HRWS, which is the ratio of LRWS issued at unbundling in 2007.
[17] On Page 34 the Basin Plan allowed for a 3% reduction in water availability due to climate change and the gap between the SDL and the CDL. This ignores the 3% and looks at the climate change impacts from the Northern Victoria Sustainable Water Strategy on long term water availability assuming there has been no reduction.
[18] page 2 background report to chapter 2 vic nsws
[19] G-MW Annual Report Page 90
[20] Based on 48% of HRWS held in Torrumbarry at time of unbundling in 2007 and assuming negligible net trade in LRWS

Table 2-5 Change in water available for irrigation under climate change

Climate change scenario	Water usage (ML)	Water usage reduction (ML)	Percentage reduction
Base case – long term average	387,638[21]		
Scenario B – medium climate change	332,598	-55,041	-14%
Scenario D – severe climate change	276,850	-110,788	-29%

Therefore, the reduction in water availability due to climate change is estimated to be 14% for medium climate change and 29% for severe.

It is understood that these scenarios do not include the new reserve policy, which will affect the reliability of water in drought years. However, data is not yet available for this to be considered as part of this modelling.

2.4 Impacts of SDL and climate change

The combined impact on water use from climate change and the Basin Guide in the TIA is outlined in Table 2-6.

Table 2-6 Water use after climate change and the Basin Guide SDLs

Scenario	Proportion of buyback in TIA	Water use (GL)		
		Base case Nil climate change	Scenario B Medium climate change	Scenario D Severe climate change
Base Case – no Basin Guide	Nil	362	310	258
3,000 GL SDL	25%	306	262	218
	60%	227	195	162
4,000 GL SDL	25%	268	230	192
	60%	137	118	98

2.5 Other water trade impacts

The TIA has been a net seller of HRWS, generally to horticulture in the Mallee Region. The rate has been around 5 GL/y. Therefore, the total water use outlined in Table 2-6 may be further reduced by other longer-term water trade impacts. In earlier work these were tested at 3, 5 and 7 GL net trade out per year of HRWS from years 5 to 20 totalling reductions of 45 GL, 75 GL and 105 GL at year 20.

The horticulture development has slowed enormously since 2008 and so these reductions may not continue at such a high rate. For this modelling, 50 GL[22] net trade out has been assumed as a *reasonable* estimate of future permanent trade. This is equivalent to a reduction in water use of 62 GL (assuming LRWS is lost at same rate and the relationship of 124% holds).

[21] This availability is 133% of HRWS and is different to usage of 124% 362 GL as not all water available is used or carried over for use, some may be traded temporarily out of Torrumbarry.
[22] Assumed figures based on reduced sales

2.6 Summary of water availability

Water usage for irrigation at 2030 in the TIA for each of the SDL and climate change scenarios is summarised in Table 2-7.

Table 2-7 Summary of impacts of climate change, Basin Guide and water trade on water use for irrigation in the TIA

Scenario	Proportion of buyback in TIA	Estimated water use in 2030 (GL)		
		Base case Nil climate change	Scenario B medium climate change	Scenario D severe climate change
Base Case	nil	300[23]	248	196
3,000 GL SDL	25%	244	200	156
	60%	165	133	100
4,000 GL SDL	25%	206	168	130
	60%	75	56	36

There is a lot of uncertainty associated with these numbers due to the assumptions that have been made. For the purposes of estimating economic impacts the, following water usage amounts were used to estimate gross value of agricultural production. This will provide an indication of the scale and range of impacts on the economy of Gannawarra.

These are:-

- 300 GL usage, shown in green, representing 2010 conditions;
- 200 GL usage, shown in grey, representing:
  - Severe climate change with no SDL;
  - **Or** medium climate change with 3,000 GL scenario at 25% buyback for Torrumbarry;
  - **Or** nil climate change with 4,000 GL SDL with 25% buyback in Torrumbarry; and
- 100 GL usage, shown in red, representing 3,000 GL SDL at 60% buyback for Torrumbarry with severe climate change.

[23] Goulburn Murray Water

3 Impacts on value of agricultural production

3.1 Analysis of the Shire's Gross value of Agricultural Production

Gross value of agricultural production and area of agriculture ABS data for 2001 and 2006 were used to estimate the value of production generated per megalitre of water used (Table 3-1,

Table 3-2). Since 2006, the value of production per ML has risen due to intensification of dairying and more reliance on bought in feeds. It is estimated that this is now higher than the $542/ML estimated in

Table 3-2. There are also ongoing improvements in productivity and a value of $715/ML for irrigation and $200/ha for dryland has been assumed for the future 20 year scenarios.

Table 3-1 Area of agriculture and gross value of production (2001) used to estimate value of production per unit land area and per megalitre of water used in Gannawarra

	Land area (ha)	Gross value of production ($million)	Value of production per land area ($/ha)	Value of production per ML of water used ($/ML)
Total Irrigated Area (2001) 563,435 ML used all TIA 397,222 ML used Gannawarra	101,661	$183	$1,800	$461
Total dryland area (2001)	233,647	$40	$171	
Intensive animal industries	Not available	$25		
Total Agricultural Area	**335,308**	**$248**	**$740**	

Table 3-2 Area of agriculture and gross value of production (2006) used to estimate value of production per unit land area and per megalitre of water used in Gannawarra

	Land area (ha)	Gross value of production ($million)	Value of production per land area ($/ha)	Value of production per ML of water used ($/ML)
Total Irrigated Area (2006) 468,470 ML used all TIA 330,271 ML used Gannawarra	84,526	$179	$2,118	$542
Total dryland area (2006)	250,782	$37	$148	
Intensive animal industries	Not available	$10		
Total Agricultural Area	**335,308**	**$226**	**$674**	

3.2 Estimates of gross value of production for each water availability scenario

For each of the water availability scenarios, the gross value of production has been estimated using $715/ML for irrigation and $200/ha for dryland. No change has been assumed in the value of intensive animal production and an average value of production of $17.5 million was used. Note that the area of production associated with intensive animal production is not recorded by the ABS.

3.2.1 300 GL water available

300 GL of water usage in the TIA, equates to approximately 212 GL water usage in Gannawarra Shire. The gross value of agricultural production in Gannawarra, based on using 212 GL is estimated to be $225 million (Table 3-3).

Table 3-3 Gross value of agricultural production, 300 GL water available in TIA

Agricultural land use	Land Area (ha)	Estimated gross value of agricultural production ($million)	Value of production per land area ($/ha)	Value of production per ML of water used ($/ML)
Total irrigated area	54,129	$151	$2,794	**$**715
Total dryland area 2009	281,179	$56	$200	
Intensive animal industries	Not available	$18		
Total agricultural area	335,308	**$225**	$671	

3.2.2 200 GL water available

200 GL of water usage in the TIA equates to approximately 141 GL of water usage in Gannawarra Shire. The gross value of production in Gannawarra, based on using 141 GL is estimated to be $178 million (Table 3-4).

Table 3-4 Gross value of agricultural production, 200 GL water available in TIA

Agricultural land use	ha	Estimated gross value of agricultural production ($million)	Value of production per land area ($/ha)	Value of production per ML of water used ($/ML)
Total Irrigated area	36,086	$101	$2,794	**$**715
Total dryland area 2009	299,222	$60	$200	
Intensive animal industries	Not available	$18		
Total Agricultural Area	335,308	**$178**	$531	

3.2.3 100 GL water available

100 GL of water usage in the TIA, equates to approximately 71 GL of water usage Gannawarra Shire. The gross value of agricultural production in Gannawarra, based on using 71 GL is estimated to be $131 million (Table 3-5).

Table 3-5 Gross value of agricultural production, 100 GL water available in TIA

Agricultural land use	ha	Estimated gross value of agricultural production ($million)	Value of production per land area ($/ha)	Value of production per ML of water used ($/ML)
Total Irrigated area	18,043	$50	$2,794	**$**715
Total dryland area 2009	317,265	$63	$200	
Intensive animal industries	Not available	$18		
Total Agricultural Area	335,308	**$138**	$392	

3.3 Summary of impacts on gross value of production

The impacts on gross value of production are summarised in Table 3-6. The reality is that this would be the ***maximum economic impact*** for these usage figures, as the water for the SDL will be acquired through a voluntary buyback. Buyback tends to reduce economic impacts, as water used to produce lower value commodities is generally sold in preference to the water used for higher value production. This means that the average gross income per ML for the usage following buyback would be higher than the $715/ML average assumed in the modelling. Therefore these figures indicate the range of maximum economic impact. The reality may be somewhere in between.

Table 3-6 Impacts of changed usage on gross value of production by 2030

TIA water usage	Gross value of production in Gannawarra ($million)	Reduction in Gross value of production from 2010 ($million)
Scenario 1 - 300 GL	$225	n/a
Scenario 2 - 200 GL	$178	-$47
Scenario 3 - 100 GL	$131	-$94

Note that impacts are very sensitive to value of production per ML. The following table illustrates this, with the overall economic impacts halved for the three scenarios if the value of production per ML increases.

TIA water usage	Value of irrigated production ($/ML)	Gross value of production in Gannawarra ($million)	Reduction in Gross value of production from 2010 ($million)
Scenario 1 - 300 GL	$715	$225	n/a
Scenario 2 - 200 GL	$880	$201	-$24
Scenario 3 - 100 GL	$1,400	$180	-$45

4 Economic impacts

SGS Planning and Economics undertook the economic modelling. The model uses a methodology to generate customised regional input-output tables to measure the upstream (supplier) and downstream (buyer) linkages in a regional economy. By doing this a detailed picture of the industry dynamics in a region can be drawn.

A key input to this is the national input-output (IO) table published by the Australian Bureau of Statistics. It estimates the flows to and from each industry for Australia as a whole. That is, it shows, in monetary terms, the flow of goods and services from each industry to all intermediate industries, as well as those flows that are form consumption spending by different sectors such as households, government, fixed capital expenditure, etc. It also gives details of inputs into each industry such as wages and salaries, producer surpluses, indirect taxes, exports and imports. In estimating these flows to and from each industry, the national IO table gives a detailed "picture" of the entire economic system.

SGS uses the latest available localised data to scale down the national IO table, first to the host state economy, then to the local economy in question. The results of this process are a set of industry specific multipliers that estimate how $1 million of turnover in a specific industry flows through to total regional:

- Output (or income or turnover)
- Value added (or contribution to Gross Regional Product (GRP), which is basically regional output less the value of imported product embodied in regional output)
- Full time equivalent employment levels

The SGS model traces industry sectors at a detailed level of classification, covering 109 industry sectors. In this study, the combination of industries used to simulate irrigated and dryland agriculture are as follows:

- Irrigated agriculture includes dairy cattle and horticulture industries
- Dryland farming includes grains, sheep, beef cattle and all other agriculture

The multipliers generated for the relevant industry sectors in Gannawarra are summarised in Table 4-1. They indicate that, for example, the Dairy Cattle industry in Gannawarra has an economic output multiplier of 1.41. This implies that for every $100 of output produced by Dairy Cattle an additional $41 is induced in the Gannawarra economy to support this and as a result of this production. Similarly, for employment, every 100 jobs in the Dairy Cattle sector supports 29 jobs in the Gannawarra economy.

Note that the impact of intensive livestock farming has not been modelled, as its contribution to the Gannawarra economy is stable throughout each of the three scenarios.

Table 4-1 Generated Economic Activity Multipliers (SGS)*

	Industry Sector	Output Multipliers	Value Added Multipliers	Employment Multipliers
Irrigated Agriculture	Dairy cattle	1.41	1.26	1.29
	Horticulture	1.46	1.22	1.23
Dryland Agriculture	Sheep	1.43	1.27	1.31
	Grains	1.65	1.28	1.52
	Beef cattle	1.46	1.26	1.26
	Other agriculture	1.46	1.22	1.23

* Note that the multipliers estimated are broadly in line with those reported by the CRC for Irrigation Futures (2005). For instance, in Goulburn-Broken the employment multipliers estimated were: Cereal crops 1.5; Dairy 1.9; Fruit 1.7; Grapes 1.2; Grazing 2.4; Hay/seed 1.5; Other horticulture 1.2; and Tomatoes (proc) 1.2.

4.1 Key industry linkages

Changes to irrigated agriculture in Gannawarra will impact different industries at varying rates. The analysis of the industries that are most affected highlights the following top ten (SGS Planning and Economics):

1. Wholesale trade
2. Retail trade
3. Other food products
4. Road transport
5. Other property services
6. Banking
7. Other agriculture
8. Accommodation, cafes and restaurants
9. Services to agriculture
10. Retail mechanical repairs

4.2 Estimated impacts

The economic impacts of the progressive shift towards dryland farming in the Gannawarra economy, i.e. in moving from Scenario 1 to Scenario 2 and 3 respectively, are shown in the following tables. These are modelled assuming the value of production per ML of water used remains at $715/ML; i.e. maximum economic impact as outlined in Section 3.3.

Table 4-2 Direct and In-direct Impacts on regional output (in $ million p.a.) by 2030

	Direct impact on output ($million)	Flow on impact on output ($million)	Total output ($million)
Scenario 1 (Base Case)	207	94	302
Scenario 2	161	75	235
Scenario 3	114	55	167
Change from Base Case			
Scenario 2	-46.8	-19.6	-66.4
Scenario 3	-93.6	-39.1	-132.7

Table 4-3 Direct and In-direct impacts on regional value added (in $ million p.a.) by 2030

	Direct impact on value added ($million)	Flow on impact on value added ($million)	Total value added ($million)
Scenario 1 (Base Case)	59	15	74
Scenario 2	46	12	58
Scenario 3	34	9	43
Change from Base Case			
Scenario 2	-12.5	-3.1	-15.6
Scenario 3	-24.9	-6.2	-31.1

Table 4-4 Direct and in-direct impacts on regional employment (EFT jobs)

	Direct impact on employment (FTE)	Flow on impact on employment (FTE)	Total employment (FTE)
Scenario 1 (Base Case)	1,235	363	1,598
Scenario 2	951	290	1,240
Scenario 3	666	215	881
Change from Base Case			
Scenario 2	-284	-74	-358
Scenario 3	-569	-147	-716

5 Population impacts

5.1 Existing distribution

RMCG's previous report highlights that development in Gannawarra is clearly focussed in Kerang, with Cohuna, Koondrook and Quambatook all comprising a residential base outweighed by the balance of the rural population. All but Koondrook have reduced in size over the past few decades, consistent with the trend across regional Victoria of large regional centres growing and most other towns declining.

Table 5-1 Towns in Gannawarra 1981 & 2006

Town	Population		Comments
	1981	2006	
Kerang	4,049	3,671	The population was stable in the 1980s, but has declined by almost 10% since 1991.
Cohuna	2,178	1,816	The population has declined steadily since 1981, and is particularly evident in the large decreases in the younger age groups and families with children. Decline in household size has been quite rapid, from 3.0 persons in 1981, to 2.1 persons in 2006.
Rural balance		2,572	Population declined by 1.1% between 2001 and 2006.
Koondrook	720	759	Modest population growth only.
Quambatook	359	232	

To the extent that the employment losses estimated in the previous section lead to population declines will obviously vary across Gannawarra. This will reflect the dependency of each town on irrigated horticulture and the proximity of substitute or competitor employment and residential locations.

Undoubtedly the loss of employment estimated is likely to be associated with some population losses. However it is very difficult to estimate if these associated population losses are likely to lead or indeed, exacerbate, a spiral of decline.

5.2 Extending the employment estimates

To provide an estimation of the population losses likely to be associated with the employment losses generated in Section 3.4, SGS has matched recent employment to population rates in Gannawarra. The analysis in Table 5-2 indicates that a population of 2.48 supports each job in Gannawarra.

Table 5-2 Jobs to Employment Ratio, 2001-2006

	2001	2006
Total employment	4,861	4,317
Total population	11,378	11,297
Job to population ratio	2.34	2.62
Average	**2.48**	

If it is assumed that this relationship holds in future, the change from Scenario 1 to 2 and 3 respectively can be estimated. Table 5-3 summarises this analysis.

In short, it is estimated that by 2030 moving from Scenario 1 to:

- Scenario 2 would be associated with an overall decline in population of 888
- Scenario 3 would be associated with an overall decline in population of 1,776

Table 5-3 Population Estimates for 2029 Scenarios

	Ratio	Scenario 2	Scenario 3
Employment Loss		-358	-716
Population	2.48	-888	-1,776

6 Summary of socio-economic impacts

Error! Reference source not found. summarises the economic, and employment impacts of the Basin Guide and climate change in Gannawarra.

Things to note:

- In using the model output, we recommend that the range of the impacts be quoted, as there are many variables that will impact on the true outcome.
- The greatest impacts come from the reduction in value of production from irrigated agriculture. Impact on dryland is minimal even with climate change.
- While the Basin Plan will not be implemented in Victoria in 2019, the Australian Government has indicated that it will achieve the Plan targets mainly through continuation of buyback initiatives. Therefore, the modelled impacts are likely to occur over the next 9 years, not as a steady change over the 20 years of the modelling period or as a step change at 2019.

Table 6-1 Direct and indirect impacts on regional output ($million per anum) and employment by 2029

Scenario	Gannawarra Water use GL	Direct impact on output ($million)	Total value added ($million)	Total employment (FTE)	Total population
Base case 2030	212	207	74	1,598	11,297
Scenario 2 2030	141	161	58	1,240	10,409
Scenario 3 2030	71	114	43	881	9,531
Change from 2010 base case					
Scenario 2		-47	-16	-358	-888
Scenario 3		-94	-31	-716	-1,766

Comparison with previous modelling findings

The table below summarises the scenarios modelled and reported in the February 2010 report and from this work.

Things to note:

- Since the modelling was undertaken in Feb 2010, the estimates of Base Case water usage has declined further. The base case in the November 2010 model is for 2010 conditions, no climate change, no SDL, with water trade out (62 GL) for the year 2030 so that in comparing the two model outputs, the starting points are not the same:-
  - (387 GL in Feb 2010 for all Torrumbarry for 2009 base case with 273 GL use in Gannawarra; compared to
  - 300 GL for all Torrumbarry 2030 base case and 212 GL use in Gannawarra for Nov 2010)
- The base case in February 2010 had a water use of 387 GL in Torrumbarry for year 2009 conditions (under normal climate); this has reduced to an estimated 362 GL for 2010 due to sale of water shares out of Torrumbarry from 337 GL HRWS to 292 GL HRWS.

Direct and indirect impacts on regional output ($million per anum) and employment by 2029

Model	Scenario	Gannawarra Water use GL	Direct impact on output		Total value added		Total employment	
			Irrigation	Dryland	Irrigation	Dryland	Irrigation	Dryland
February 2010 modelling	Base case 2009	273	195	53	66	21	1,159	439
	Scenario 1 2029	106	76	62	26	25	452	509
	Change from 2009 base case							
	Scenario 1 2029		-110		-37		-636	

			Irrigation	Dryland	Irrigation	Dryland	Irrigation	Dryland
November 2010 modelling	Base case 2030	212	151	56	51	23	1,159	439
	Scenario 2 2030	141	101	60	34	24	773	467
	Scenario 3 2030	71	50	63	17	26	386	495
	Change from 2010 base case							
	Scenario 2		-46.8		-16		-358	
	Scenario 3		-93.6		-31		-716	