RSMG's Murray-Darling Model Documentation

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Background to the Report

In 2004 the Risk and Sustainable Management Group (hereafter RSMG) at the University of Queensland started building an economic model of the Murray-Darling Basin (hereafter Basin). This model aims to examine the economic implications to the economy, irrigators, potable water supplies and the environmental from a range of natural resource issues and policy decisions within the Basin by using a state contingent approach to deal with risk and uncertainty.

This documentation aims to detail how the model works and the data sources used. The funding for this exercise came from Professor John Quiggin's ARC Federation Fellowships awarded in (2003 & 2007).

Please note that the model is being constantly updated and this documentation may be out of date. Please consult the RSMG web site (http://www.uq.edu.au/rsmg/) to check if this is the latest version.

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Acronym List

Acronym	Explanation
$m	Millions of dollars
%	percentage
ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
ARC	Australian Research Council
Basin	The Murray Darling Basin
Cap	Is the limit put on water extraction in the Murray Darling Basin
EC	Electrical conductivity is a measure of salinity concentration in water
Economic Value	Return from a production system including operator and labour costs
GL	Giga-litre, is 1,000 ML of water or one billion litres of water
Gross Output	Return from a production system considering yield and income only
H	High water use irrigation technology (e.g. flood irrigation)
Ha	Hectare
L	Low water use irrigation technology (e.g. drip irrigation)
MDBC	Murray Darling Basin Commission
ML	Mega-litre = 1 million litres of water
NSW	New South Wales
QLD	Queensland
RSMG	Risk and Sustainable Management Group
SA	South Australia
SAMDB	South Australian Murray Darling Basin a catchment within the Basin
Total Returns	Return from a production system not including operator and labour costs
VIC	Victoria

Contents

Introduction

The RSMG Murray-Darling Basin Model optimises irrigation resources: water; land; labour and capital to maximise economic returns from water use under uncertainty. The model incorporates a directed flow network of water resources that allows the model to simulate the tradeoffs associated with regional water supply, use and the reflow of salt along the Murray-Darling Basin (hereafter Basin). The model described here is derived from an updated version on the state contingent Murray-Darling Basin Model documented in Adamson, Mallawaarachchi and Quiggin (2007 & 2009).

RSMG has been developing this model since 2004 and throughout this time the model has been constantly updated and modified. The model has been developed in two platforms:

- General Algebraic Modelling System (GAMS) (http://www.gams.com/); and
- Microsoft Excel using Risk Solver Platform (http://www.solver.com/).

This approach has provided a quality assurance framework to check that the models interpret, collate and process the data correctly.

There are two principal ways of solving the model:

- Sequential where the model solves as the water travels down the system. Here the optimum is determined based upon choices made on above catchments; and
- Global where the model optimises the basin as a whole. Here the optimum is determined based upon what is best for the entire basin.

Previous versions of the model have been used to undertake a wide range of analysis. Previously commissioned outputs from the model are outlined in Table 1. These reports are not available at the RSMG web site apart from the Garnaut Contribution (http://www.uq.edu.au/rsmg/)

Table 1 Recent Commissioned Work

Year	Commissioned by	Commissioned to
2008	ARUP Consulting	Provide analysis for the Renmark Irrigation Efficiency Study
2008	Australian Bureau of Agricultural and Resource Economics (ABARE)	Examine the impact of reduction in water supply for the Murray Darling Basin Commission (MDBC)
2008	Australian Bureau of Agricultural and Resource Economics (ABARE)	Examine changes to water supply and changes to water entitlements for the Victorian Department of Primary Industries
2008	Garnaut Climate Change Review	Examine the impact that climate change could have in the Murray Darling Basin

Other recent Murray-Darling Basin related research topics are listed in Table 2 and all of these reports can be found at the RSMG web site (http://www.uq.edu.au/rsmg/)

Table 2 Recent Research Topics

Year	RSMG Research Title	Research Aim
2009	Turing Water in to Carbon: Carbon sequestration and water flow in the Murray-Darling Basin	Determine the second round impacts of climate change mitigation on the water availability in the Basin
2009	Environmental Flows and Agricultural Production in the Murray-Darling Basin	Examination of the water buy-back policy for meeting the environmental needs of the Basin
2008	Opportunity costs from restoring environmental flows to the Snowy Rive	Examine alternative policies to acquire environmental flow and minimising economic costs to the Basin
2008	The return from Salinity Management in the Murray-Darling Basin	Provide understanding on how salinity targets at Adelaide can be achieved by altering policies on salinity mitigation, CAP reductions, changes to Dam release policies, and a combination of approaches
2008	Declining inflows and more frequent droughts in the Murray–Darling Basin: climate change, impact and adaption	Analyse the effects of climate change in the Murray–Darling Basin, using a simulation model that incorporates a state-contingent representation of uncertainty

This report has been divided into the following segments:

- An introduction into the state-contingent approach to risk and uncertainty
- How the model is designed, works, limitations and current projects;
- The sources of the data used; and
- The data and assumptions available in the model.

State Contingent Approach to Risk and Uncertainty

Introduction

The models aim is to illustrate the benefits of a state-contingent approach to risk and uncertainty to allocate resources (land, labour, capital and water) in the Basin. The state contingent approach explicitly defines states of nature (e.g. normal years, drought years and wet years) the management response to the given state and the inputs requirements to produce a given set of outputs by state of nature. By explicit defining the conditions and management options uncertainty is negated. This illustrates how producers effectively use their inputs to maximise the return on their asset base by state of nature. This stipulates that producers are highly adaptive and responsive to climatic events and will alter their inputs to maximise their overall net return on resources.

The classic state contingent production system in Australia is the sheep-wheat belt. For example in good seasons sheep are transferred away from irrigated pastures but in times of drought the breeding stock is shifted back onto irrigation land to ensure their survival.

State Contingent Approach to Risk & Uncertainty

State contingent analysis re-emergence is due to Chambers and Quiggin (2000) who re-examined the foundations described by Arrow (1953) and Debreu (1959). It suggests that decision makers actively respond to states of nature, by altering the inputs to influence the final output, based on past experiences and knowledge in order to meet their objective function. The benefits of a state contingent approach is that it allows for production and decision maker uncertainty to treated separately Rasmussen (2006b). This division removes the blurring of ambiguity found in other decision support systems where production and management inefficiency cannot be separated O'Donnell & Griffiths (2006).

In other models risk and uncertainty is simply dealt with in a stochastic framework that negates the extremities of states and assumes that producers do not actively alter their inputs to produce alternative outputs by state of nature. If we consider for example, that wheat produced in a wet state of nature is the same as wheat produced in a drought we have effectively ignored the influence of variety, screenings, protein and moisture levels which influence the price received.

How it differs to other Approaches

Confusion does exist about the state contingent approach in part due to Just (2003) who suggests that the use of state contingent analysis may be limited if the expected utility hypothesis holds and that a large range of possible production outcomes occur each with a low probability of chance and each of these outcomes is a state of nature. These two issues need to be cleared up:

- Firstly the expected utility hypothesis determines the weighted average of utility (return) from each possible outcome in a state multiplied by the individuals weighting of each outcome within that state. The major difference between this and a state contingent approach is that the inputs and outputs in expect utility theory are predetermined by a stochastic production function within a state and not based on producer's reaction to the given state of nature; and

- In regards to the number of states (Rasmussen 2006b) rightly points out that yields and prices are in fact a consequence of one state of nature and are not states of nature themselves.

Another area of confusion is the application of discrete stochastic programming using multipoint decisions. Although simular in approach to state contingent in trying to separate the producer and output risk and uncertainty it's missing the ability to classify production systems in a state-contingent approach.

Summary

Suggested Further Reading

Chambers, R. G., Quiggin, J., 2000, Uncertainty, Production, Choice and Agency: The State –Contingent Approach, Cambridge University Press, New York

Rasmussen, S 2003, 'Criteria for optimal production under uncertainty. The state-contingent approach', Australian Journal of Agricultural and Resource Economics, vol. 47, no. 4, pp. 447-76.

Model Design

Introduction

This is an optimisation model that maximises economic return of irrigation use throughout the Basin at a regional level. The model looks at three states of nature (normal, drought and wet) where conjunctive water supply sets the description of the state and the producers response to that state is derived from the described commodities produced (i.e. inputs and outputs obtained by state of nature).

Objective Function = Maximise economic return from irrigation use

Constraints

- Water availability
- Water CAP
- End of valley salinity targets
- Operator labour
- Irrigation area (total, plus area of horticulture)

Notes:

- Economic Return =(Gross Return – Operator Labour – Capital Costs) + Water Use Value
- Gross Return = (Yield * Price) – Variable costs (including casual labour)
- Conjunctive Water Supply= Runoff+ Ground Water + Inter-Basin Water Transfers (i.e. Snowy River)

The model is based on that presented in Adamson et al. (2007 & 2009) and includes lessons learnt during Quiggin et al. (2008). Since then the model: has increased from 14 state contingent production systems to 25 state contingent production systems based on updated gross margin budget data; completely reworked water flow due to a disaggregation of the Murray catchment from one to three segments and the removal of the Wimmera catchment, and all underlying data has been re-examined based on GIS analysis.

This section of the report is divided into the following sections. Firstly a discussion on the three states of nature used to frame the model is presented. Secondly the data collected, assumptions used for water resources and salinity in the Basin is detailed. Thirdly the data collected, assumptions used for production systems in the Basin is detailed.

It important to note that due to the design of the model it is very easy to illustrate how assumptions influence the data used in the optimisation process. Secondly the models have been designed to allow new or alternative data sets to be included.

State Contingent Specifications

The model uses three states of nature (S=3): Drought (low precipitation and inflows), Normal (normal precipitation and inflows) and Wet (high precipitation and inflows). Most commonly the model assumes the frequency of state occurrence is: Normal: 0.5; Drought: 0.2; Wet: 0.3 and these probabilities are based on historical records[1].

The model is based on annual data and assumes that all resources are available when required. The model in effect predicts optimal allocation of resources to maximise return on investment over the long term (i.e. a 10 year investment horizon (5 years Normal, 2 years of drought and 3 wet years).

It is important to realise that when the model allocates land to a given production systems that the production systems have to operate every year in that 10 year cycle. Consequently numerous assumptions have been made to incorporate this. For example in drought times water use per hectare of pasture land may increase but the overall area in hectares actually irrigated decreases. In order to illustrate this (see production section) illustrates a decrease in water applied per Ha while in wet times (as more area is irrigated) an increase in water use per Ha. This increase in ML per HA for other commodities may be due to practices of over watering to flush salt way from root zones in good times.

Spatial Representation

The model is based on a modified Catchment Management Region (CMR) scale. The CMR scale was chosen as it follows state boundaries and in order to help the national debate being able to report at a state disaggregation is vital. The CMR catchments have been modified to help illustrate the directed flow net work of the river system, see Figure 1 (i.e. the division of the Murray CMR into 3 zones). Therefore the river system are divided into 21 catchments (k = 1 to 21), which consists of 19 catchments plus Adelaide and the Coorong.

Geographical Information Systems (GIS) have been used to align datasets to the modified CMR scale where required and the GIS datasets used are listed in: Appendix 3.

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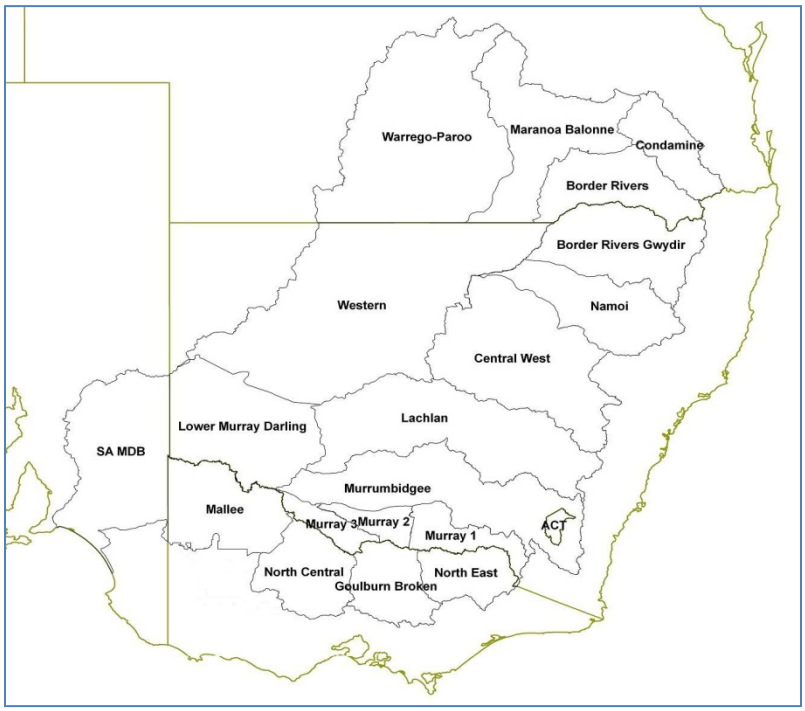
[1] Historical records confirmed through personal correspondence with the Murray Darling Basin Commission in July 2007.

Figure 1 Model's Spatial Scale



Notes:

- ACT is considered as a part of the Murrumbidgee catchment;
- Wimmera has been removed from the model due to a lack of hydrological connectivity with the rest of the basin.
- Adelaide provides a representation of water quality arriving for potable supplies and provides a modelling constraint where EC≤800 EC 95% of the time; and
- Coorong provides a proxy for environmental flows reaching the Coorong.

Flow Structure

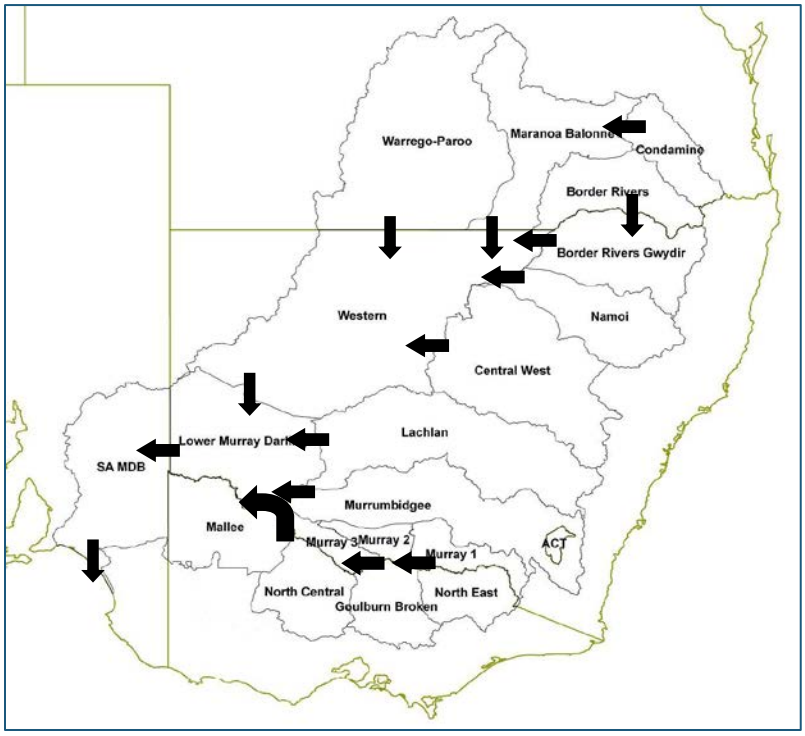
The Basin is represented as a directed water flow network that incorporates state contingent water flows. The water flow is simulated in the model at a CMR scale with the described adjustments above. The catchments are linked by endogenously determined, state-contingent, flows of salt and water. Water flows out of a given catchment are equal to inflows (net of evaporation and seepage) less extractions (net of return flows). Extractions are determined endogenously by land use decisions as described above, subject to limits imposed by the availability of both surface and ground water. The flow structure is simplistic in hydrology terms due to the spatial scale but does attempt to mimic how the river systems operate.

The amount of water available in each CMR is conjunctive and therefore recognises the integration of surface and groundwater sources. Water availability in each catchment is determined by inflow which is natural runoff from rainfall; groundwater; and water transfers from other systems (such as the Snowy river); and the net water flow from upstream CMRs. Net upstream flow takes into account upstream water use, reflow, and conveyance losses (natural loss and seepage). Table 3 and Figure 2 provide the explicit may in which the flow is modelled and a simplified flow diagram, respectively.

Table 3 Models' Flow Structure

Catchment	Cumulative Flow
Condamine	+Condamine
Border Rivers QLD	+ QBRivers
Warrego Paroo	+Warrego-Paroo
Namoi	+Namoi
Central West	+Central West
Maranoa Balonne	+Maranoa-Balonne +Condamine(Net)
Border Rivers Gwydir	+BRGwydir +QBRivers(Net)
Western	+Western +Warrego-Paroo(Net) +Namoi(Net) +Central West(Net) +Maranoa-Balonne(Net) +BRGwydir(Net)
Lachlan	+Lachlan
Murrumbidgee	+Murrumbidgee
North East	+North East
Murray 1	+Murray 1
Goulburn Broken	+Goulburn Broken + ½(North East(Net) +Murray 1(Net))
Murray 2	+Murray 2 + ½(North East(Net) +Murray 1(Net))
North Central	+ North Central + ½(Goulburn Broken(Net) +Murray 2(Net))
Murray 3	+ Murray 3 + ½(Goulburn Broken(Net) +Murray 2(Net))
Mallee	+Mallee + ½(North Central(Net) +Murray 3(Net) + Lachlan(Net) +Murrumbidgee(Net))
Lower Murray Darling	+LMDB + ½(North Central(Net) +Murray 3(Net) +Lachlan(Net) +Murrumbidgee(Net)) +Western(Net)
SA MDB	+SAMDB +LMDB(Net)
Adelaide	+ SAMDB (Net)
Coorong	+ SAMDB(Net) – Adelaide Extractions

Figure 2 Simplified Diagram of the Models Flow



Water Resources

In this model estimations of inflows are adapted from MDBC (2003) and ABS (2008) and are illustrated in Table 4. It is assumed that groundwater sources contribute a total of 1,118 GL to the total cumulative flow in the Basin. This data has been has been adjusted from MDBC (2003) and ground water use estimations in ABS (2008). Cumulative flow is calculated as the sum of inflows and the upstream net water flows. Water use and conveyance losses (see Table 5) are subtracted from the cumulative water for each catchment and the net (remaining) water then flows downstream.

In the baseline version of the model, the Normal state of nature occurs with probability 0.5 and is characterised by aggregate inflows of 23,734 GL. In the Drought state of nature, which occurs with probability 0.2, inflows are reduced by 40 per cent in all catchments relative to the Normal state. In the Wet state of nature, which occurs with probability 0.3, inflows are increased by 20 per cent in all catchments relative to the Normal state. With these parametric values, the distribution of inflows has a mean of 23,600 GL and a standard deviation of 5,300 GL.

The mean value is comparable to that observed historically (Murray–Darling Basin Commission, personal communication, July 2007). The standard deviation is lower than the historically observed standard deviation for natural inflows. This is because

management of the system using dams and controlled releases of water means that the annual variability of inflows of water available for irrigation is less than the variability of natural inflows.

Table 4 Water Data by Catchment

Catchment	Runoff (GL)	Ground Water (GL)	Water Transfer (GL)	Total Water (GL)	Cumulative Water (GL)
Condamine	735	68	0	803	**803**
Border Rivers QLD	726	9	0	735	**735**
Warrego Paroo	407	12	0	419	**419**
Namoi	833	243	0	1,076	**1,076**
Central West	1656	92	0	1,748	**1,748**
Maranoa Balonne	1260	68	0	1,328	**2,131**
Border Rivers Gwydir	1496	156	0	1,652	**2,387**
Western	0	0	0	0	**7,761**
Lachlan	1054	132	0	1,186	**1,186**
Murrumbidgee	4184	224	550	4,958	**4,958**
North East	4484	28	284	4,796	**4,796**
Murray 1	1500	0	284	1,784	**1,784**
Goulburn Broken	3828	49	0	3,877	**7,167**
Murray 2	500	30	0	530	**3,820**
North Central	720	16	0	736	**6,230**
Murray 3	113	49	0	162	**5,656**
Mallee	0	13	0	13	**9,028**
Lower Murray Darling	106	9	0	115	**16,891**
SA MDB	132	30	0	162	**26,080**
Adelaide	0	0	0	0	**26,080**
Coorong	0	0	0	0	**26,080**
TOTAL	**23,734**	**1,228**	**1,118**	**26,080**	

Inter-Basin transfers from the Snowy River provide water to the Murrumbidgee, Murray 1 and North East catchments. This data has been adapted from MDBC (2003) and ABS (2008).

The water reflow is defined as the amount of water that returns to the system once it has been utilised for irrigation purposes. In the model used for this project we assume that the reflow multiplier is kept constant at Reflow is 30 percent in 'Normal' year, 10 percent in 'Drought' and 40 percent in 'Wet' season for all catchments due to the unavailability of reliable data but represents a change by state depending perceived soil

moisture by state. This then simulates the practice of overwatering to drive salts away from the root zones that accumulate in drought times.

Conveyance loss is constant across states of nature however each catchment has its own conveyance loss which is derived from MDBC (2003, 2006) water resource fact sheets. These values were ascertained by matching flows at key locations throughout the basin with the modelled 'Normal' state of nature. We acknowledge that recent work on water infrastructure may lead to a decrease in loss of conveyance however due to a lack of recent publicly available data no changes have been made.

Table 5 Conveyance Losses & Net Water

Catchment	Total Water (GL)	Conveyance Losses	Net Water (GL)	Cumulative Water (GL)
Condamine	803	0.35	517	517
Border Rivers QLD	735	0.45	399	399
Warrego Paroo	419	0.83	67	67
Namoi	1,076	0.30	743	743
Central West	1,748	0.59	696	696
Maranoa Balonne	2,131	0.43	757	1,274
Border Rivers Gwydir	2,387	0.08	1,519	1,918
Western	7,761	0.48	-44	4,654
Lachlan	1,186	0.3	820	820
Murrumbidgee	4,958	0.34	3,222	3,222
North East	4,796	0.1	4,244	4,244
Murray 1	1,784	0.1	1,551	1,551
Goulburn Broken	7,167	0.08	3,522	6,419
Murray 2	3,820	0.1	477	3,375
North Central	6,230	0.25	512	5,409
Murray 3	5,656	0.1	146	5,043
Mallee	9,028	0.02	13	7,260
Lower Murray Darling	16,891	0.01	67	11,968
SA MDB	26,080	0.07	151	19,378
Adelaide	26,080	0.00	0	19,378
Coorong	26,080	0.03	0	19,378

Net Water = -CAP other + (1- Conveyance Loss) * Total Water * State Value

Where:

- Net Water for a catchment is
- CAP Other = Water assigned under the CAP (see next section) for non-irrigation use (i.e. urban supplies)
- Conveyance loss (see
- Total water
- State Value (Normal = 1, Drought = 0.6, Wet = 1.2)

Extractions of water from the system are determined by the land use decisions subject to limits imposed by the availability of both surface water and groundwater.

Cap

The Cap on water extractions from the Basin is applied to each of the catchments. Cap data used in the model is adapted from MDBC Water Use reports (various MDBC publications listed in References). In the model CAP is treated as both surface and ground water allocations.

Cap and Salt Data by Catchment for the Murray Darling Basin

Catchment	Cap Other (GL)	Cap (GL)	Ground Water (GL)	Total Irrigation CAP (GL)
Condamine	5	240	68	308
Border Rivers QLD	5	200	9	209
Warrego Paroo	4	35	12	47
Namoi	10	325	243	568
Central West	21	577	92	669
Maranoa Balonne	0	200	68	268
Border Rivers Gwydir	1	660	156	816
Western	44	577	0	577
Lachlan	10	453	132	585
Murrumbidgee	50	2,311	224	2,535
North East	72	92	28	120
Murray 1	55	70	0	70
Goulburn Broken	45	2,000	49	2,049
Murray 2	0	910	30	940
North Central	40	1,627	16	1,643
Murray 3	0	670	49	719
Mallee	0	200	13	213
Lower Murray Darling	47	126	9	135
SA MDB	0	524	30	554

Adelaide	0	206	0	206
Coorong	0	0	0	0
TOTAL	**409**	**12,003**	**1,228**	**13,231**

Salinity

The productivity in a given state of nature depends on the salinity level of irrigation water. In this model salinity is the only water quality control. The salinity level is determined by natural salt loads, the stream flow, salt mobilisation caused by reflow and mitigation activities. The total amount of salt in a catchment presented in this model can be described by the following equation:

$\sigma_s^k = L_s^k / F_s^k$ with

$L_s^k = \sum NL^k + \sum_{1\ldots j} NL + \sum_{1\ldots j} R - \sum M^k$

$$\sigma_s^k \leq Threshold$$

Where σ is the salinity level, *L* is the cumulative salt load and *F* the flow in each catchment *k* in state of nature *s*. The cumulative salt load, *L*, is the result of the natural salt load *NL* in a catchment, the sum of all natural loads in all previous catchments, *1...j*, the total salt carrying reflow, *R*, in all previous catchments less the total of any salt mitigation activities, *M*, in a catchment.

Catchment	Salt Raw (T)	Salt Mitigation (T)	End of Valley Target (T)
Condamine	7,035	0	100
Border Rivers QLD	7,818	0	100
Warrego Paroo	1,672	0	100
Namoi	67,452	0	200
Central West	33,647	0	100
Maranoa Balonne	7,035	0	100
Border Rivers Gwydir	7,891	0	100
Western	0	0	10000
Lachlan	115,819	0	300
Murrumbidgee	160,000	0	300
North East	91,065	0	300
Murray 1	20,000	0	300
Goulburn Broken	120,000	0	300
Murray 2	35,000	0	300

North Central	100,000	25,952	300
Murray 3	45,000	0	300
Mallee	10,431	36,954	450
Lower Murray Darling	20,091	188,203	600
SA MDB	57,909	229,541	600
Adelaide	0	0	800
Coorong	1,892	0	
TOTAL	**909,757**	**417,744**	

Natural salt load data used for the model are shown in Table A.5. The salt data is broken into irrigation districts based on the assumption that salt load increases long the river reaches of the tributaries. The natural salt load is state dependent to represent natural conditions where low rainfall periods do not mobilise the salt in the soil profile. The assumptions used are 50 percent of the 'Normal' salt load is mobilised in the 'Drought' state and 100 percent is again mobilised in the 'Wet' state.

The level of salinity in the water depends on the amount of salt transferred from upstream as well as the natural salt level in the region. Furthermore, the salinity level depends on the stream flow. A higher stream flow reduces salinity as a given amount of salt is diluted within a greater volume of water.

To control the amount of salt being carried with the reflow from the water used upstream, we introduced the Theta value which a variable control. Different to previous versions of the model the Theta value has been set here to 0.04 in the 'Normal' state, 0.02 in the 'Drought' state and 0.04 in the 'Wet' state. This was done to account for the dissolving different loads of salt dissolving under alternative runoff states. It is due to the high water use that the Normal and Wet states of nature have the same values but deliver different volumes of salt to Coorong (see Chapter 5).

The model also accounts for salt mitigation schemes which extract in total about 480,000 tonnes per annum of salt from the system. In the aggregated previous versions of the model salt removal occurred in the North Central, Lower MDB and SA MDB catchments. In the current disaggregated model version it is assumed that the following salt amounts are extracted from the Victorian catchments; Pyramid Boort: 6,256 tonnes, Torrumbarry: 19,696 tonnes and Mallee Residual: 36,954 tonnes. The disaggregation of the North Central mitigation amounts occurred based on the location of current salt interception schemes and their annual capacity to remove salt (River Murray Water 2003). Table A.5 provides details other salt mitigation areas.

The sequential model incorporates 'End of Valley Targets' established by the Murray Darling Basin Commission in 2005. These targets reflect the maximum salt load allowed to be occurring at the end of a catchment before the flow enters the next. Table A.5 documents the catchment salinity targets as assumed in the model. For the

disaggregated Victorian catchments we assumed for the End of Valley Targets that the previous large scale catchment target to be equally shared by the number of newly disaggregated irrigation districts/areas. However as the aims of this analysis is to determine the national benefit only the global version of the model is run. The sequential version of the model optimises water as it flows down the system and the global maximises national benefits by running the Basin as a single enterprise.

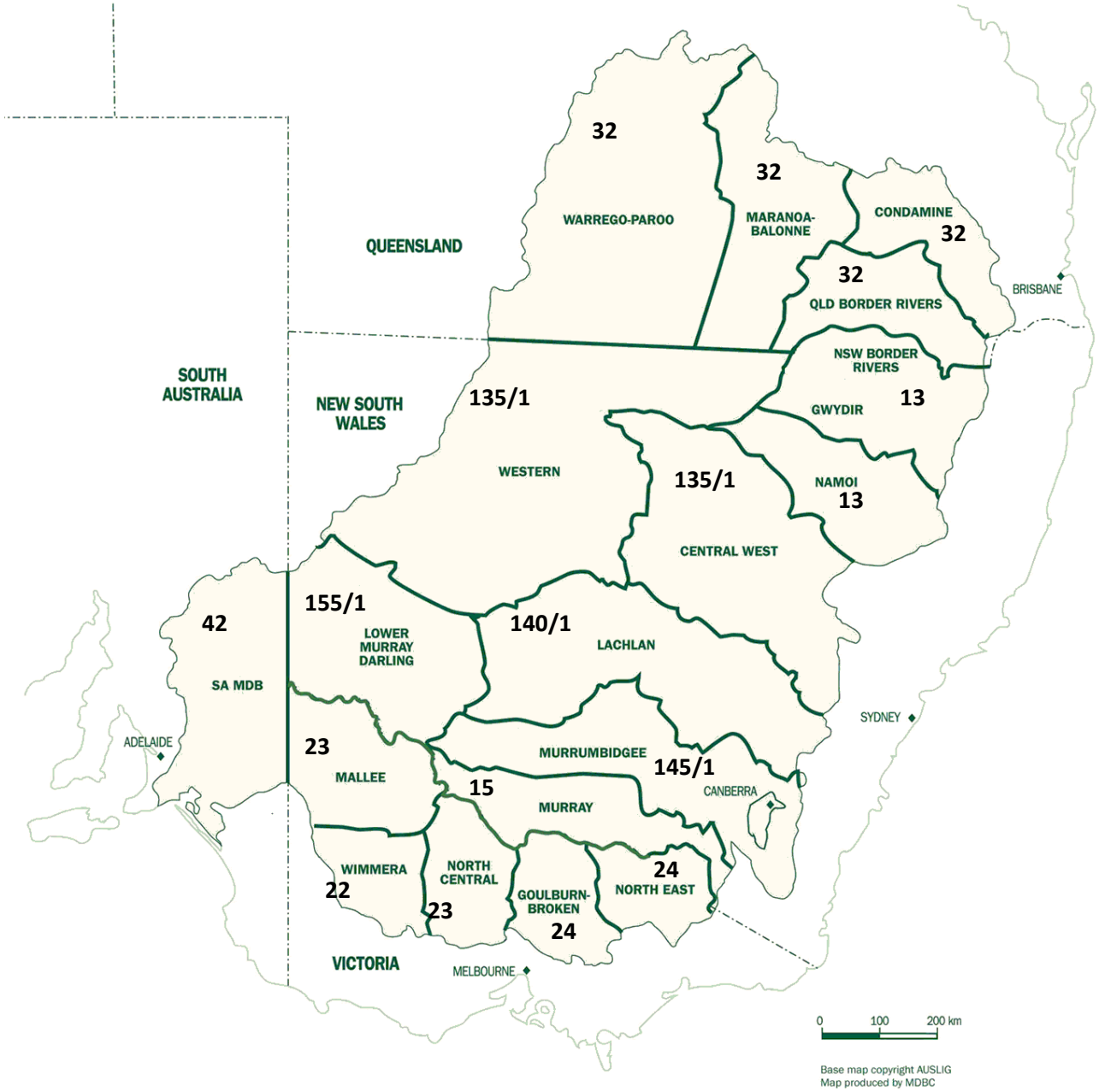
Consequently then the Basin is then managed to satisfy the constraint that salinity at Morgan should not exceed 800 EC units for 95 percent of the time (Murray Darling Basin Commission, 2001). Morgan was chosen as it proxy for Adelaide potable water supply which is diverted from this system at this site. We acknowledge that the MCBC target is to be interpreted as a long-term target for water quality. However, the model we use here simulates land and water use on an annual basis only and does not consider any inter-temporal processes. To simplify we assume that the salinity threshold is to be maintained constant is at 800 EC. The salinity level reaching Morgan is a cumulative salt value that depends on the natural salt load occurring in the SA MDB catchment, salt loads activated in upstream catchments and the water flow.

We outlined above that the condition of the river in each catchment and state of nature is measured by the flow variables and the water quality control. Consequently, the decisions of upstream water users affect crop yields of downstream irrigators.

Modelling Climate Change Impacts on Water Supplies

Every analysis has issues of converting data into consistent spatial areas to allow analysis to take place. The RSMG model uses catchment management regions (CMR) and Roger Jones provided the scenario data for climate change (temperature, rainfall, evaporation and humidity) in statistical division (SD) format. These SD were converted into the CMR's as follows.

Figure 3 Murray Darling Basin Management Catchments by SD (rough)



It has been assumed that where two SD are listed within a CMR then the average of the two or more value listed are used.

Converting data into change in runoff. Jones etal (year) describes the process for determining the change in runoff based from the change in rainfall and evaporation.

Roger was kind enough to provide the data for this model and the data was provided at the Australia's drainage and river basin level (as illustrated in Figure 2 and names documented in Table2). This data was then converted Figure 3 and Table 1 any errors in this conversion are due to us and not Roger Jones.

Table 6 Runoff Reduction By CMR

	Runoff (%)	A	B	δPrec (%)	δEvap (%)	δFlow (%)
Condamine	1.53	3.45	-0.80	1	1	2.7
Border Rivers, QLD	2.05	3.43	-0.79	1	1	2.6
Warrego-Paroo	1.31	3.46	-0.80	1	1	2.7
Namoi	2.53	3.41	-0.79	1	1	2.6
Central West	5.21	3.29	-0.77	1	1	2.5
Maranoa-Balonne	1.28	3.46	-0.80	1	1	2.7
Maranoa-Balonne	1.28	3.46	-0.80	1	1	2.7
Border Rivers-Gwydir	3.93	3.34	-0.78	1	1	2.6
Western	0.82	3.48	-0.80	1	1	2.7
Lachlan	2.40	3.41	-0.79	1	1	2.6
Murrumbidgee	7.66	3.18	-0.75	1	1	2.4
North East	24.01	2.46	-0.63	1	1	1.8
Goulburn-Broken	15.22	2.85	-0.69	1	1	2.2
Wimmera	2.40	3.41	-0.79	1	1	2.6
North Central	6.54	3.23	-0.76	1	1	2.5
Murray	0.00	3.52	-0.81	1	1	2.7
Mallee	1.61	3.45	-0.80	1	1	2.7
Lower Murray Darling	0.15	3.51	-0.81	1	1	2.7
SA MDB	0.37	3.50	-0.81	1	1	2.7

Figure 4 Australia's Drainage & River Basins

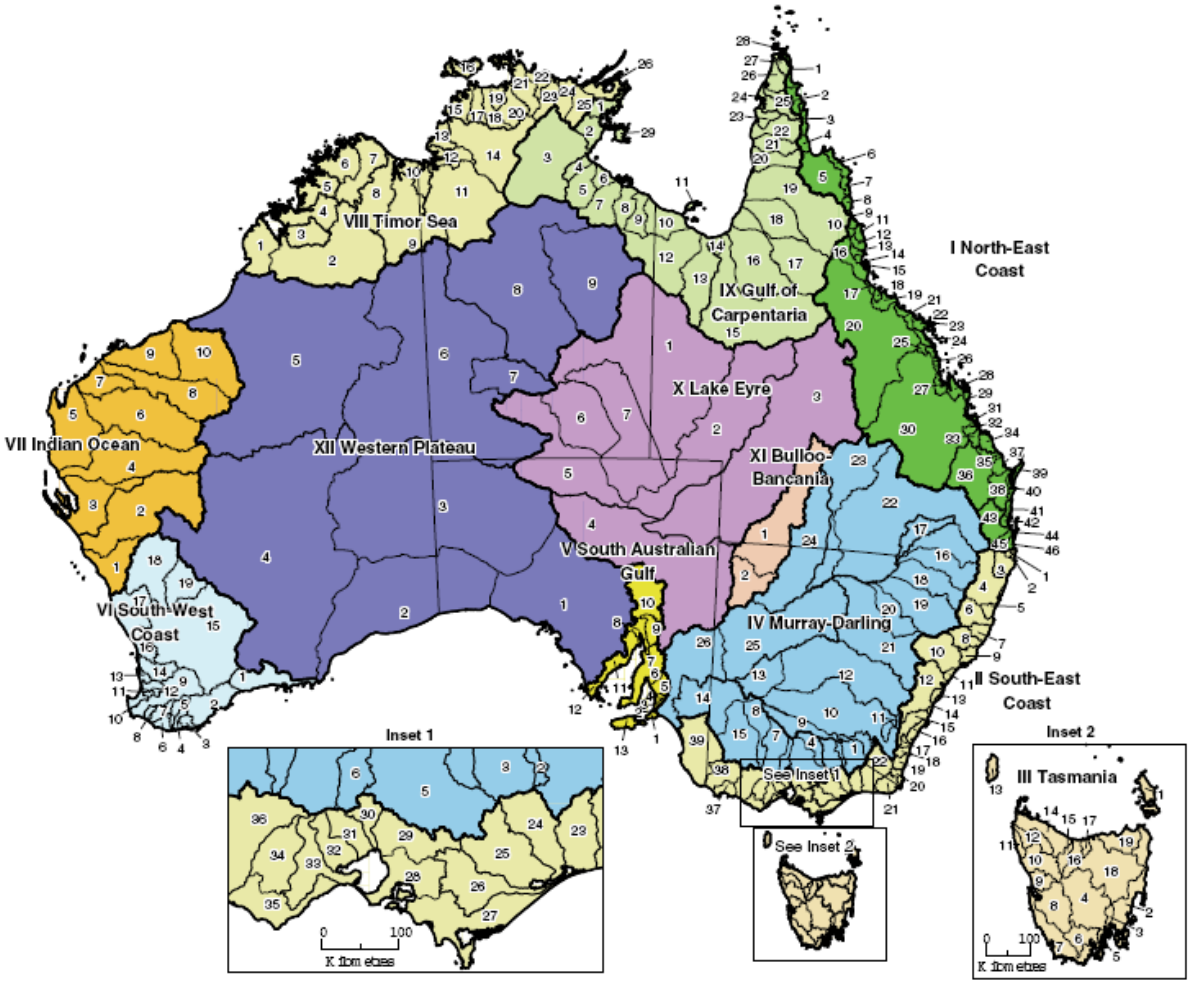


Table 7 Drainage & Basin and Data

I North-East Coast

1 Jacky Jacky Creek
2 Olive-Pascoe Rivers
3 Lockhart River
4 Stewart River
5 Normanby River
6 Jeannie River
7 Endeavour River
8 Daintree River
9 Mossman River
10 Barron River
11 Mulgrave-Russell Rivers
12 Johnstone River
13 Tully River
14 Murray River (QLD)
15 Hinchinbrook Island
16 Herbert River
17 Black River
18 Ross River
19 Haughton River
20 Burdekin River
21 Don River
22 Proserpine River
23 Whitsunday Island
24 O'Connell River
25 Pioneer River
26 Plane Creek
27 Styx River
28 Shoalwater Creek
29 Water Park Creek
30 Fitzroy River (QLD)
31 Curtis Island
32 Calliope River
33 Boyne River
34 Baffle creek
35 Kolan River
36 Burnett River
37 Burrum River
38 Mary River (QLD)
39 Fraser Island
40 Noosa River
41 Maroochy River
42 Pine River
43 Brisbane River
44 Stradbroke Island
45 Logan-Albert Rivers
46 South Coast

II South-East Coast

1 Tweed River
2 Brunswick River
3 Richmond River
4 Clarence River
5 Bellinger River
6 Macleay River
7 Hastings River
8 Manning River
9 Karuah River
10 Hunter River
11 Macquarie-Tuggerah Lakes
12 Hawkesbury River
13 Sydney Coast-Georges River
14 Wollongong Coast
15 Shoalhaven River
16 Clyde River-Jervis Bay
17 Moruya River
18 Tuross River
19 Bega River
20 Towamba River
21 East Gippsland
22 Snowy River
23 Tambo River
24 Mitchell River (VIC)
25 Thomson River
26 Latrobe River
27 South Gippsland
28 Bunyip River
29 Yarra River
30 Maribyrnong River
31 Werribee River
32 Moorabool River
33 Barwon River
34 Lake Corangamite
35 Otway Coast
36 Hopkins River
37 Portland Coast
38 Glenelg River
39 Millicent Coast

III Tasmania

1 Flinders-Cape Barren Islands
2 East Coast
3 Coal River
4 Derwent River
5 Kingston Coast
6 Huon River
7 South-West Coast
8 Gordon River
9 King-Henty Rivers
10 Pieman River
11 Sandy Cape Coast
12 Arthur River
13 King Island
14 Smithton-Burnie Coast
15 Forth River
16 Mersey River
17 Rubicon River
18 Tamar River
19 Piper-Ringarooma Rivers

IV Murray-Darling

1 Upper Murray River
2 Kiewa River
3 Ovens River
4 Broken River
5 Goulburn River
6 Campaspe River
7 Loddon River
8 Avoca River
9 Murray-Riverina
10 Murrumbidgee River
11 Lake George
12 Lachlan River
13 Benanee
14 Mallee
15 Wimmera-Avon Rivers
16 Border Rivers
17 Moonie River
18 Gwydir River
19 Namoi River
20 Castlereagh River
21 Macquarie-Bogan Rivers
22 Condamine-Culgoa Rivers
23 Warrego River
24 Paroo River
25 Darling River
26 Lower Murray River

V South Australian Gulf

1 Fleurieu Peninsula
2 Myponga River
3 Onkaparinga River
4 Torrens River
5 Gawler River
6 Wakefield River
7 Broughton River
8 Mambray Coast
9 Willochra Creek
10 Lake Torrens
11 Spencer Gulf
12 Eyre Peninsula
13 Kangaroo Island

VI South-West Coast

1 Esperance Coast
2 Albany Coast
3 Denmark River
4 Kent River
5 Frankland River
6 Shannon River
7 Warren River
8 Donnelly River
9 Blackwood River
10 Busselton Coast
11 Preston River
12 Collie River
13 Harvey River
14 Murray River (WA)
15 Avon River
16 Swan Coast
17 Moore-Hill Rivers
18 Yarra Yarra Lakes
19 Ninghan

VII Indian Ocean

1 Greenough River
2 Murchison River
3 Wooramel River
4 Gascoyne River
5 Lyndon-Minilya Rivers
6 Ashburton River
7 Onslow Coast
8 Fortescue River
9 Port Hedland Coast
10 De Grey River

VIII Timor Sea

1 Cape Leveque Coast
2 Fitzroy River (WA)
3 Lennard River
4 Isdell River
5 Prince Regent River
6 King Edward River
7 Drysdale River
8 Pentecost River
9 Ord River
10 Keep River
11 Victoria River
12 Fitzmaurice River
13 Moyle River
14 Daly River
15 Finniss River
16 Bathurst and Melville Islands
17 Adelaide River
18 Mary River (NT)
19 Wildman River
20 South Alligator River
21 East Alligator River
22 Goomadeer River
23 Liverpool River
24 Blyth River
25 Goyder River
26 Buckingham River

IX Gulf of Carpentaria

1 Koolatong River
2 Walker River
3 Roper River
4 Towns River
5 Limmen Bight River
6 Rosie River
7 McArthur River
8 Robinson River
9 Calvert River
10 Settlement Creek
11 Mornington Island
12 Nicholson River
13 Leichhardt River
14 Morning Inlet
15 Flinders River
16 Norman River
17 Gilbert River
18 Staaten River
19 Mitchell River (QLD)
20 Coleman River
21 Holroyd River
22 Archer River
23 Watson River
24 Embley River
25 Wenlock River
26 Ducie River
27 Jardine River
28 Torres Strait Islands
29 Groote Eylandt

X Lake Eyre

1 Georgina River
2 Diamantina River
3 Cooper Creek
4 Lake Frome
5 Finke River
6 Todd River
7 Hay River

XI Bulloo-Bancannia

1 Bulloo River
2 Lake Bancannia

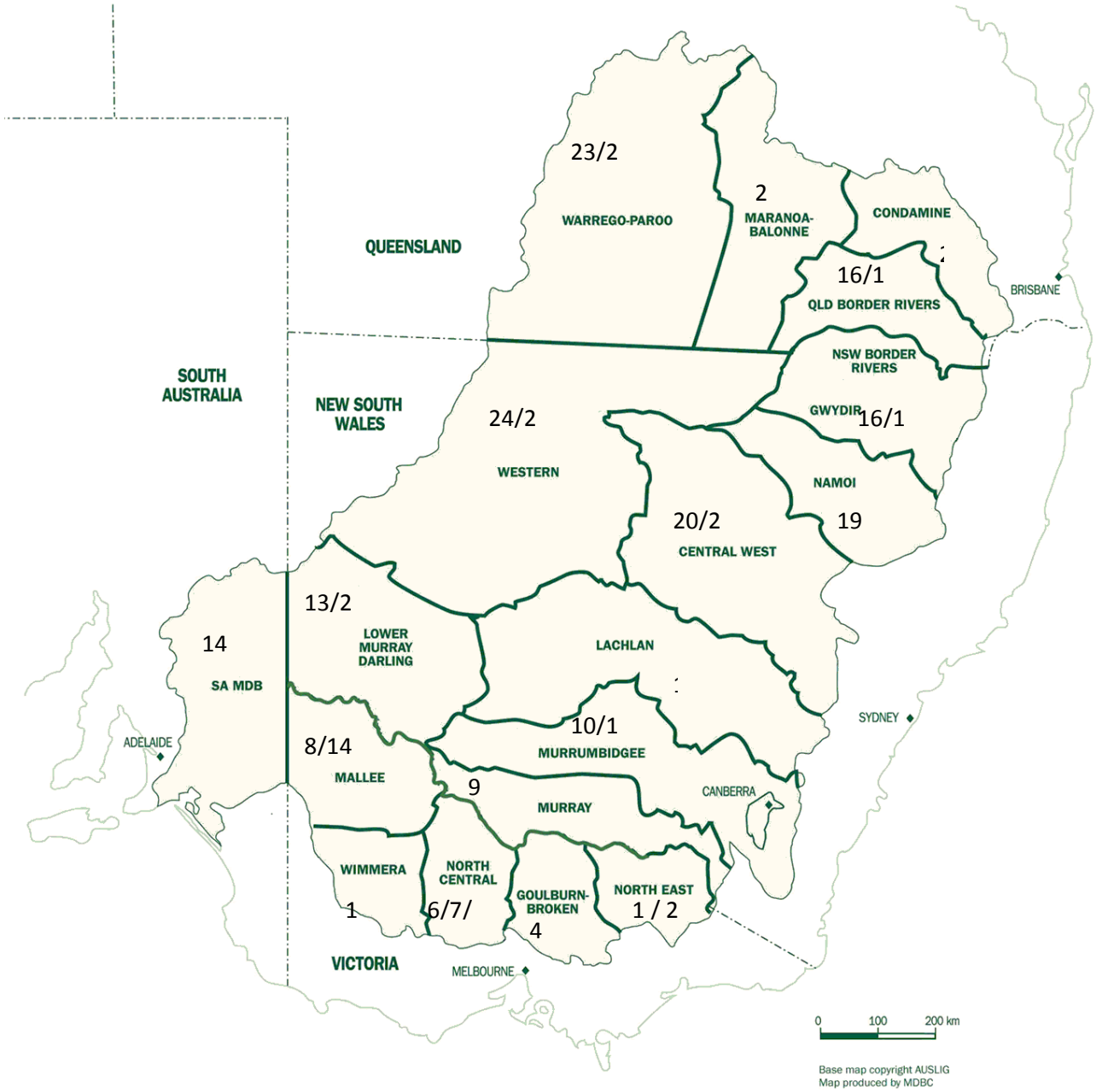
XII Western Plateau

1 Gairdner
2 Nullarbor
3 Warburton
4 Salt Lake
5 Sandy Desert
6 Mackay
7 Burt
8 Wiso
9 Barkly

Source: Geoscience Australia 2004

Dennis Trewin (2006), Water Account Australia 2004–05, Australian Bureau of Statistics, EMBARGO: 11.30AM (CANBERRA TIME) TUES 28 NOV 2006

Figure 5 CMR by NLWRA



The data for all the climate change runs can be found in the appendix.

Production Systems

Agricultural land and water use in each region is modelled by a representative farmer with agricultural land area Lk. The model includes 21 catchments corresponding to Catchment Management Authority regions within the Basin and one urban region, Adelaide. The regions are linked sequentially on the basis of existing flow patterns. The network captures the cumulative water volume and salt loads from the Condamine–Balonne catchment of southern Queensland to the Lower Murray–Darling Catchment that encompasses the South Australian portion of the Basin where the river system joins the sea.

Production Area

The status of the river in each catchment and state of nature is measured by a flow variable and Q water quality variables. The (Q+1)× K×S vector of status variables is determined endogenously by water use decisions. In the present simulations, the only water quality variable is salinity. The interaction between producers arises from the fact that changes in salinity levels, arising from the decisions of upstream water users, affect crop yields for downstream irrigators. The model therefore incorporates the adverse effects of salinity on yields, derived from agronomic data.

There are M distinct agricultural commodities, as well as water supplied for urban use in Adelaide and therefore (M+1)×S distinct state-contingent commodities. In the present simulations, M = 10.

Some commodities are produced using more than one technology. The second column of Table 1 shows commodities produced using a single technology. The third column of Table 1 shows commodities for which two technologies are modelled, one requiring high water inputs and one in which an increased capital input (such as investment in micro-irrigation technology) is used to reduce the water input requirements. The final column of Table 1 shows commodities for which two rotations are available. In the fixed rotation, the proportions of irrigated and dryland fallow land are the same in all states of nature. In the flexible rotation, which may be described as ‘opportunity cropping’, irrigation is used in Wet (high inflow) states of nature, and dryland production in Drought (low inflow) states.

Classification	Commodity	Multiple Technologies	Flexible and Fixed Rotations	Wet Water use	Multiple Combinations
Horticulture	Citrus	Yes			
	Grapes				
	Po me Fruit				
	Stone Fruit	Yes			
	Vegetables		Yes		
Broadacre	Cotton		Yes	Yes	Yes

	Grain Legume				Yes
	Oilseeds				Not activated
	Sorghum				Not activated
	Oilseeds				Not activated
	Rice		Yes	Yes	Not activated
	Wheat				Yes
Pasture	Beef				Not activated
	Sheep				Yes

There are N inputs, committed before the state of nature is known. In the present version, N = 5. The model inputs are water, land, labour, capital, and a generic cash input. A variety of constraints on input use are imposed. Land is constrained by total area, and by soil type for particular commodities. In addition, constraints may be imposed on changes in the total area under irrigation and on the total volume of irrigation consistent with the Cap on extractions imposed by the Council of Australian Governments (1994). The supply of operator and household labour is assumed to be constrained in short run versions of the model, but contract labour is incorporated in the generic cash input.

In general, input and output prices are assumed to be the same in all regions. However, the model allows for different rules for setting water prices.

Activities
In each region, land is allocated across Ak different activities. For one hectare of land an activity is represented by:

- state-contingent outputs of a single commodity (dimension S);
- water use in each state of nature (dimension S); and
- other inputs (dimension N).

Hence, for each region k, the matrix of activity coefficients has dimensions Ak × (N+2S). As in Quiggin (1988), there may be more than one technology used to produce a given commodity. Productivity in a given state of nature will depend on salinity, which in turn will be determined by upstream water use. Constraints on water availability will be determined by the interaction between upstream water use, institutional arrangements and policy variables.

The extended model uses region-specific gross margin budgets, reflecting differences in production conditions between regions. In addition, information on soil type is used to constrain production areas for specific commodities within regions. In this and other respects, geographical information system (GIS) technology has proved valuable in integrating data from different sources, based on inconsistent and overlapping divisions of the study area, into consistent data units.

Because the model is solved on an annual basis, the process of capital investment is modelled as an annuity representing the amortised value of the capital costs over the lifespan of the development activity. This provides the flexibility to permit the modelling of a range of pricing rules for capital, and to allow the imposition of appropriate constraints on adjustment, to derive both short run and long run solutions.

Commodities, Classification & Production Systems

Table4 lists the production systems that are simulated in the model. The model incorporates up to 25 major irrigation production systems plus dryland activities in three states of nature (Normal, Drought and Wet). The model uses irrigation production area data derived from the 2000-01 production season, as it is considered the last 'normal' year and this data was derived from ABS (2002) and disaggregated with GIS. In order to allow growth and development in all regions the model allows the total irrigated area to be expanded by up to 70 per cent, and specifically for high value activities such as horticulture by up to 45 per cent. The accuracy of this area expansion can be found in Chapter 5.

Production Systems	Commodity Classification	Commodities included
	Citrus – High*	Grapefruit, Lemon, Lime, Mandarin, Orange
	Citrus – Low**	Grapefruit, Lemon, Lime, Mandarin, Orange
	Grapes	Table Grapes, Wine Grapes
	Stone Fruits – High*	Apricots, Cherry, Nectarine, Peach, Plum
	Stone Fruits – Low**	Apricots, Cherry, Nectarine, Peach, Plum
	Pome Fruit	Apple
	Vegetables	Asparagus, Beetroot, Broccoli, Burdock, Cabbage, Capsicum, Carrot, Cauliflower, Eggplant, Garlic, Lettuce, Onion, Potato, Pumpkin, Rockmelon, Sweet Corn, Tomato, Watermelon, Zucchini
Cotton Flex	Dryland Cotton	Non-irrigated Cotton
	Cotton	Irrigated Cotton
	Cotton Fix	Irrigated Cotton
Cotton / Chickpea	Cotton	Irrigated Cotton
	Chickpea	Irrigated Chickpea
Dryland Cotton	Dryland Cotton	Non-irrigated Cotton
	Cotton	Irrigated Cotton
Rice PSN	Rice PSD	Production System Drought Rice (less water use)
	Rice PSW	Production System Wet Rice (more water use)
Dryland Wheat	Dryland Wheat	Non-irrigated Wheat
	Rice PSW	Production System Wet Rice (more water use)
	Wheat	Irrigated Wheat

Wheat / Legume	Wheat	Irrigated Wheat
	Legume	Azuki Beans, Chickpeas, Faba Bean, Mungbean, Navy / Bean, Peanut, Soybean,
	Sorghum	Sorghum
	Oil Seeds	Canola, Sunflower
Wheat / Sheep	Wheat	Irrigated Wheat
	Sheep	Sheep on improved pasture
	Dairy – High*	Dairy
	Dairy – Low**	Dairy
	Beef	Beef production using irrigated pasture
	Sheep	Sheep production using irrigated pasture
	Dryland	Dryland production
Note:*High implies that highly efficient irrigation technology was which means a low volume of water is used in the production process, ** Low implies that less efficient irrigation technology was used which means a high water used in the production system		

Table 8: Classification of Commodities and Production Systems

The rationale for the use of production systems in the model is to reflect choice of alternative land uses in irrigation regions subject to the reliability of water availability in the states of nature. The underlying production systems' rules can be found in Table A.8. These rules outline the flexibility of a commodity to be replaced by another commodity depending on the state of nature or expected availability of irrigated water. Therefore logically perennial horticulture must always be grown in all states of nature on the same hectare of land. However, annual crops can be mixed and matched with alternatives depending on the state of nature. This highlights the advantage of using the state contingent modelling approach as the farmers become able to define their possible production mix depending on the availability of irrigation water.

Production costs & income

The model uses data obtained from commodity gross margin budgets (GMBs). GMBs provide information about gross margins for farm enterprises. They typically assist farmers as a decision tool in calculating margins for farming activities. Gross margins refer to the total income derived from an enterprise, less the variable costs incurred in the enterprise. Overhead cost, such as rates, insurance administration, and permanent labour are excluded from gross margins.

Gross margin budgets provide indicative information on a one hectare scale about yields, variable production costs (e.g. water costs, labour costs, chemical costs, machinery costs, and other costs) and prices which are central for this model. We also obtained the irrigation water requirement per commodity from the GMBs. Irrigated land area; water volume and labour availability constrain the production activities within the model. The farm financial budgets were compiled for irrigated agriculture, dryland and livestock production (see Table 8 above) for as many catchments in the Basin as possible. The data is adjusted for inflation, all costs of production and commodity prices are in 2008 values.

GMBs for livestock differ from crop GMBs due to the changing fodder demand throughout the life stages of livestock. The Dry Sheep Equivalent (DSE) was used to compare sheep and beef enterprises and carrying capacities for pasture types using recommendations for NSW pastures. In the model we considered the commodities sheep and beef based on GMB data available from NSW DPI (2008.b). This original dataset included information on improved pasture feeding and other fodder. Separate from sheep and beef production we included irrigated pasture as feeding method which is represented as the commodities Sheep/Pasture and Beef/Pasture (Table A.8.33 and Table A.8.34). Variable costs for fertilizer, herbicide and irrigation cost as well at machinery hours were taken from Spray Irrigated Lucerne GMB (NSW DPI 1999). We assumed that using irrigated pasture feed will make other fodder feeding redundant. The optimum stocking rates vary with climatic states of nature, enterprise, management and risk. We use regional stocking rates for irrigated pasture recommended as by the NSW DPI (2008.a).

The raw data was compiled and aggregated over all commodities to classifications in each catchment according to the data type set up presented in Table A.8 (Summary of aggregated gross margin data tables). The compiled GMB data sets used in the model include: yields and prices, labour input and costs, water requirements, consulting, fertiliser costs and other variable costs. Water is set at a constraint price in the model and price changes have no impact on commodity selection. Commodity prices are either compiled in the GMBs and for where no prices available in the GMBs prices have been assumed as listed in Table A.12.

The model allows the use of capital costs to be included in the analysis. The farm establishment costs and costs of required equipments and their recovery periods were obtained on a commodity basis from a range of sources. The adapted capital costs as used in the model are shown in Table A.10. The interest rate in this model was assumed to be 7 percent per annum and capital costs are settled annually using a fixed repayment structure. Average farm sizes data for each commodity in each of the catchments was adjusted from ABS 2001. Table A.7 shows the data assumptions used for farm sizes within the CMRs.

Interpretation of specific data and worksheets
The determination of production costs and benefits as presented in the GMB Tables A.8.1 to A.8.35 and subsequent have been based upon the variables described in Table 9: GMB Data Format Description.

Column	Description
Catchment	Catchment name
Yield	Average yield per hectare of the commodity in the respective CRM
Price	Average real price of the commodity in the respective CRM
Labour	Average number of work hours per hectare for hired labour
Lab. Chg.	Average real hired labour costs per hour
Tractor Hr	Average number of machinery hours per hectare
Water	Average water volume (in ML) required per hectare
Water Price	Constant water price of $25/ML

Chemicals	Average real costs per hectare of total chemicals required
Contractor	Average real costs per hectare for contractors
Machinery	Average real costs of machinery per hectare
OVC	Average real other variable costs per hectare
VC Excl. Water	Total variable costs per hectare excluding water costs

Table 9: GMB Data Format Description

In the simulation we used commodity prices where available in the GMBs. Otherwise we use assumed market prices for the three states of nature from. These prices can be changed if required. Variable costs considered here include labour costs, chemical costs, contractor costs, machinery costs, other variable costs and water costs. The total variable cost per hectare excluding water costs represents the sum of all variable costs (with casual labour hours times the labour charge) less the water costs per hectare.

In the analyses presented in Chapter 5 we use yield, price, water, labour and variable cost requirements for all catchments in the three states of nature. The calculations of these requirements are based on production rules (A.8) and GMBs (A.8.1 to A.8.35). The production rules summarise the assumed changes to yields, water requirements and costs for the 'Drought' and 'Wet' state of nature. The changes in production inputs or costs are applied to the GMBs. For the 'Normal' state of nature, GMB data remains unchanged.

The commodity yield requirement for each state of nature is a product of the yield shown in the commodity GMB and a yield multiplier which is presented in the production rules. The price for the commodities is based on available data for each state of nature as described above. The income in each state of nature is calculated as a product of the yield in a specific region and the price of the crop. The water requirement for each state of nature is a product of the water needed per hectare for each commodity (shown the GMB tables) and the water multiplier. Variable costs requirements per state of nature are based on the total variable costs including water costs, the annualised repayment rate for capital costs in the GMBs and the adjustments costs per hectare which apply in the 'Drought' and 'Wet' states of nature.

The operator labour cost requirement, is the labour required for operating machinery per state of nature. It is the product of machinery hours required per hectare (see GMBs), a labour multiplier (see Table A.13) and the labour costs for operated machinery which is set fixed to $25.

Determination of economic return

Profit = Income – total costs
Where
Income = Yield * Price (basin wide price not GMB)
Total costs = Variable costs + fixed costs
Variable costs = GMB data (adjusted for basin wide water price and basin wide casual labour costs)

Fixed costs = annualised capital payments + operator labour (operator labour fixed basin wide)

See Table 9 in the Appendix were the average dollar return per megalitre of water is presented.

Limitations of the model

The model used for this project is a replica of the Basin. The limitations of the model include:

- Changes in long term prices and costs are not considered;
- The use of a static simulation approach, the unit of time is a year. There would be advantages in disaggregating time to represent seasonality in the use of water and supply;.
- The need for further spatial disaggregation of the basin scale;
- Environmental assets such as wetlands located along the river systems are not accounted for simplistically in this model. All environmental assets are modelled within a catchment with the exception of the Coorong which s explicitly modelled ;
- Lack and age of some commodity production data for each of the regions;
- Changes in dam release rules are not considered; and
- Changes in long term water supply are not considered

Altering inflows and their reliability due to climate change scenarios can be simulated using this model; however, it is not focus of the analysis for this project.

A detailed list of all sources for data and adjusted data used in this model is provided in the Bibliography.

Summary

The Murray-Darling Basin Model described in this Chapter is constrained by the availability of data and other limitations. However, the problem of uncertainty to irrigated agricultural production is a central issue in the sustainable management of the Murray-Darling Basin. Farmers and other water users adopt a range of strategies to manage and mitigate uncertainly. The state contingent approach provides a way to model flexible responses to uncertainties in the production process. The model in its current state is a tool to test water policies by attempting to optimise irrigated production within the Basin. The aim of these analyses is to illustrate how scarce resources could be utilised within the Basin. For example

environmental issues are of increasing concern and the model can be used to optimise resources by incorporating water quality control in the framework that has a defined required flow by state of nature at key points along the basin.

Data Sources & Bibliography

Introduction

This section is divided into the following sections

Production Statistics

- Area of production & water use in the basin
    - Farming systems data
- Costs of Production
    - Gross Margin Budgets
    - Capital Costs
    - CPI Data

Water Resources

- Water Flow
- CAP
- Salinity

Production Area & Water Use

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Appendices

Appendix: Climate Change Data

Table: No Climate Mitigated – Hot Dry (U1)

Catchment	2020	2030	2040	2050	2060	2070	2080	2090	2100
Condamine	72.0%	57.6%	36.7%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Border Rivers QLD	72.2%	58.0%	37.3%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Warrego-Paroo	68.0%	51.7%	27.8%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Namoi	76.7%	64.8%	47.4%	23.6%	10.0%	10.0%	10.0%	10.0%	10.0%
Central West	75.4%	62.9%	44.5%	19.5%	10.0%	10.0%	10.0%	10.0%	10.0%
Maranoa Balonne	68.0%	51.6%	27.7%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Border Rivers Gwydir	77.1%	65.3%	48.2%	24.9%	10.0%	10.0%	10.0%	10.0%	10.0%
Western	71.4%	56.7%	35.3%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Lachlan	76.9%	65.1%	47.8%	24.3%	10.0%	10.0%	10.0%	10.0%	10.0%
Murrumbidgee	79.8%	69.5%	54.4%	33.8%	10.5%	10.0%	10.0%	10.0%	10.0%
North East	84.8%	77.0%	65.7%	50.2%	32.7%	15.9%	10.0%	10.0%	10.0%
Murray 1	77.0%	65.2%	48.0%	24.6%	10.0%	10.0%	10.0%	10.0%	10.0%
Goulburn Broken	80.3%	70.3%	55.6%	35.5%	12.8%	10.0%	10.0%	10.0%	10.0%
Murray 2	77.0%	65.2%	48.0%	24.6%	10.0%	10.0%	10.0%	10.0%	10.0%
North Central	79.9%	69.7%	54.7%	34.2%	11.1%	10.0%	10.0%	10.0%	10.0%
Murray 3	77.0%	65.2%	48.0%	24.6%	10.0%	10.0%	10.0%	10.0%	10.0%
Mallee	76.5%	64.5%	46.9%	23.0%	10.0%	10.0%	10.0%	10.0%	10.0%
LMDB	72.7%	58.7%	38.4%	10.6%	10.0%	10.0%	10.0%	10.0%	10.0%
SAMDB	74.4%	61.4%	42.3%	16.2%	10.0%	10.0%	10.0%	10.0%	10.0%
Snowy River	82.4%	73.4%	60.3%	42.3%	22.0%	10.0%	10.0%	10.0%	10.0%

Table: No Climate Mitigated –Median Case (U2)

Catchment	2020	2030	2040	2050	2060	2070	2080	2090	2100
Condamine	91.6%	87.4%	81.1%	72.6%	63.0%	53.7%	45.4%	38.2%	31.8%
Border Rivers QLD	91.7%	87.5%	81.3%	72.9%	63.3%	54.2%	45.9%	38.7%	32.4%
Warrego-Paroo	91.4%	87.1%	80.7%	72.0%	62.1%	52.7%	44.1%	36.7%	30.2%
Namoi	93.2%	89.8%	84.7%	77.8%	70.0%	62.5%	55.7%	49.8%	44.7%
Central West	93.4%	90.0%	85.1%	78.3%	70.7%	63.4%	56.8%	51.0%	46.0%
Maranoa Balonne	91.4%	87.1%	80.7%	72.0%	62.1%	52.6%	44.1%	36.7%	30.2%
Border Rivers Gwydir	93.3%	89.9%	84.9%	78.1%	70.4%	63.1%	56.4%	50.6%	45.6%
Western	92.7%	88.9%	83.4%	76.0%	67.5%	59.4%	52.1%	45.7%	40.1%
Lachlan	93.2%	89.7%	84.7%	77.8%	69.9%	62.4%	55.6%	49.8%	44.6%
Murrumbidgee	93.3%	89.9%	84.9%	78.1%	70.3%	62.9%	56.2%	50.4%	45.4%
North East	93.8%	90.7%	86.1%	79.8%	72.7%	65.9%	59.8%	54.4%	49.8%
Murray 1	92.5%	88.7%	83.2%	75.6%	67.0%	58.8%	51.3%	44.9%	39.2%
Goulburn Broken	91.7%	87.5%	81.4%	72.9%	63.4%	54.3%	46.0%	38.9%	32.6%
Murray 2	92.5%	88.7%	83.2%	75.6%	67.0%	58.8%	51.3%	44.9%	39.2%
North Central	91.3%	86.9%	80.5%	71.6%	61.7%	52.1%	43.4%	35.9%	29.4%
Murray 3	92.5%	88.7%	83.2%	75.6%	67.0%	58.8%	51.3%	44.9%	39.2%
Mallee	91.1%	86.5%	79.9%	70.8%	60.5%	50.7%	41.8%	34.0%	27.3%
LMDB	92.2%	88.2%	82.3%	74.4%	65.3%	56.7%	48.9%	42.1%	36.2%
Snowy River	89.3%	83.9%	75.9%	65.0%	52.7%	40.9%	30.2%	21.0%	12.9%

Table: No Climate Mitigated – Wet Mild (U3)

Catchment	2020	2030	2040	2050	2060	2070	2080	2090	2100
Condamine	109.5%	114.3%	121.4%	131.0%	141.9%	152.4%	161.9%	170.1%	177.3%
Border Rivers QLD	109.4%	114.2%	121.2%	130.7%	141.5%	151.9%	161.3%	169.4%	176.5%
Warrego-Paroo	111.7%	117.7%	126.4%	138.4%	151.9%	164.8%	176.5%	186.7%	190.0%
Namoi	108.4%	112.6%	118.9%	127.4%	137.0%	146.2%	154.6%	161.8%	168.1%
Central West	108.3%	112.6%	118.8%	127.3%	137.0%	146.2%	154.5%	161.8%	168.1%
Maranoa Balonne	111.7%	117.7%	126.5%	138.4%	151.9%	164.9%	176.6%	186.8%	190.0%
Border Rivers Gwydir	108.2%	112.4%	118.5%	126.9%	136.3%	145.4%	153.6%	160.7%	167.0%
Western	110.8%	116.4%	124.5%	135.5%	148.0%	160.0%	170.8%	180.2%	188.4%
Lachlan	106.6%	109.9%	114.8%	121.5%	129.1%	136.4%	142.9%	148.6%	153.6%
Murrumbidgee	104.4%	106.7%	110.0%	114.5%	119.7%	124.6%	129.0%	132.9%	136.2%
North East	101.3%	101.9%	102.9%	104.2%	105.6%	107.0%	108.3%	109.4%	110.4%
Murray 1	105.4%	108.2%	112.2%	117.7%	124.0%	130.0%	135.4%	140.1%	144.2%
Goulburn Broken	101.2%	101.7%	102.6%	103.8%	105.1%	106.4%	107.6%	108.6%	109.4%
Murray 2	105.4%	108.2%	112.2%	117.7%	124.0%	130.0%	135.4%	140.1%	144.2%
North Central	101.0%	101.5%	102.3%	103.3%	104.5%	105.6%	106.6%	107.5%	108.2%
Murray 3	105.4%	108.2%	112.2%	117.7%	124.0%	130.0%	135.4%	140.1%	144.2%
Mallee	103.8%	105.8%	108.7%	112.6%	117.0%	121.3%	125.1%	128.4%	131.4%
LMDB	108.8%	113.3%	119.9%	128.8%	139.0%	148.7%	157.5%	165.1%	171.8%
Snowy River	103.1%	104.7%	107.0%	110.2%	113.8%	117.2%	120.3%	123.0%	125.4%

Table: Mitigation Scenario 550 –Dry

Catchment	2020	2030	2040	2050	2060	2070	2080	2090	2100
Condamine	69.8%	52.6%	35.2%	22.7%	14.9%	10.5%	10.0%	10.0%	10.0%
Border Rivers QLD	70.1%	53.1%	35.8%	23.5%	15.7%	11.3%	10.0%	10.0%	10.0%
Warrego-Paroo	65.6%	46.0%	26.1%	11.8%	10.0%	10.0%	10.0%	10.0%	10.0%
Namoi	74.9%	60.6%	46.2%	35.8%	29.3%	25.6%	22.8%	20.8%	19.4%
Central West	73.5%	58.5%	43.2%	32.3%	25.4%	21.5%	18.6%	16.5%	15.0%
Maranoa Balonne	65.5%	45.9%	26.0%	11.8%	10.0%	10.0%	10.0%	10.0%	10.0%
Border Rivers Gwydir	75.3%	61.3%	47.0%	36.8%	30.4%	26.8%	24.0%	22.1%	20.7%
Western	69.2%	51.6%	33.8%	21.1%	13.1%	10.0%	10.0%	10.0%	10.0%
Lachlan	75.1%	61.0%	46.6%	36.3%	29.9%	26.3%	23.5%	21.5%	20.1%
Murrumbidgee	78.3%	65.9%	53.3%	44.3%	38.7%	35.5%	33.0%	31.3%	30.1%
North East	83.7%	74.3%	64.9%	58.1%	53.9%	51.5%	49.7%	48.4%	47.5%
Murray 1	75.2%	61.1%	46.8%	36.6%	30.1%	26.5%	23.7%	21.8%	20.4%
Goulburn Broken	78.8%	66.8%	54.5%	45.8%	40.3%	37.2%	34.8%	33.1%	32.0%
Murray 2	75.2%	61.1%	46.8%	36.6%	30.1%	26.5%	23.7%	21.8%	20.4%
North Central	78.4%	66.1%	53.6%	44.7%	39.1%	35.9%	33.5%	31.8%	30.6%
Murray 3	75.2%	61.1%	46.8%	36.6%	30.1%	26.5%	23.7%	21.8%	20.4%
Mallee	74.7%	60.3%	45.7%	35.2%	28.6%	24.9%	22.1%	20.1%	18.7%
LMDB	70.6%	53.9%	36.9%	24.8%	17.2%	12.9%	10.0%	10.0%	10.0%
Snowy River	72.5%	56.8%	40.9%	29.5%	22.4%	18.4%	15.3%	13.1%	11.6%

Table: Mitigation Scenario 550 –Median

Catchment	2020	2030	2040	2050	2060	2070	2080	2090	2100
Condamine	91.0%	85.9%	80.7%	77.0%	74.6%	73.3%	72.3%	71.6%	71.1%
Border Rivers QLD	91.1%	86.0%	80.9%	77.2%	74.9%	73.6%	72.6%	71.9%	71.4%
Warrego-Paroo	90.8%	85.6%	80.2%	76.4%	74.1%	72.7%	71.7%	70.9%	70.4%
Namoi	92.7%	88.5%	84.3%	81.3%	79.4%	78.4%	77.5%	77.0%	76.6%
Central West	92.9%	88.8%	84.7%	81.8%	79.9%	78.9%	78.1%	77.5%	77.1%
Maranoa Balonne	90.8%	85.5%	80.2%	76.4%	74.0%	72.7%	71.6%	70.9%	70.4%
Border Rivers Gwydir	92.8%	88.7%	84.6%	81.6%	79.8%	78.7%	77.9%	77.3%	76.9%
Western	92.1%	87.6%	83.0%	79.8%	77.7%	76.6%	75.7%	75.1%	74.6%
Lachlan	92.7%	88.5%	84.3%	81.3%	79.4%	78.3%	77.5%	76.9%	76.5%
Murrumbidgee	92.8%	88.7%	84.5%	81.5%	79.7%	78.6%	77.8%	77.2%	76.8%
North East	93.4%	89.6%	85.8%	83.0%	81.3%	80.3%	79.6%	79.1%	78.7%
Murray 1	92.0%	87.4%	82.8%	79.5%	77.4%	76.2%	75.3%	74.7%	74.2%
Goulburn Broken	91.1%	86.0%	80.9%	77.2%	74.9%	73.6%	72.6%	71.9%	71.4%
Murray 2	92.0%	87.4%	82.8%	79.5%	77.4%	76.2%	75.3%	74.7%	74.2%
North Central	90.7%	85.4%	80.0%	76.1%	73.7%	72.4%	71.3%	70.6%	70.1%
Murray 3	92.0%	87.4%	82.8%	79.5%	77.4%	76.2%	75.3%	74.7%	74.2%
Mallee	90.4%	84.9%	79.4%	75.4%	73.0%	71.5%	70.5%	69.7%	69.2%
LMDB	91.6%	86.8%	81.9%	78.4%	76.3%	75.0%	74.1%	73.4%	73.0%
Snowy River	88.5%	82.0%	75.3%	70.6%	67.6%	65.9%	64.6%	63.7%	63.1%

Table: Mitigation Scenario 550 –Wet

Catchment	2020	2030	2040	2050	2060	2070	2080	2090	2100
Condamine	110.2%	116.0%	121.9%	126.1%	128.7%	130.2%	131.4%	132.2%	132.7%
Border Rivers QLD	110.1%	115.8%	121.7%	125.8%	128.5%	129.9%	131.1%	131.9%	132.4%
Warrego-Paroo	112.6%	119.8%	127.1%	132.3%	135.5%	137.4%	138.8%	139.8%	140.5%
Namoi	109.0%	114.1%	119.3%	123.0%	125.3%	126.7%	127.7%	128.4%	128.9%
Central West	109.0%	114.1%	119.3%	123.0%	125.3%	126.6%	127.7%	128.4%	128.9%
Maranoa Balonne	112.6%	119.8%	127.1%	132.3%	135.6%	137.4%	138.9%	139.8%	140.5%
Border Rivers Gwydir	108.8%	113.9%	119.0%	122.6%	124.9%	126.2%	127.2%	127.9%	128.4%
Western	111.7%	118.3%	125.0%	129.9%	132.9%	134.6%	135.9%	136.8%	137.5%
Lachlan	107.1%	111.1%	115.2%	118.1%	119.9%	121.0%	121.8%	122.3%	122.7%
Murrumbidgee	104.8%	107.5%	110.3%	112.2%	113.5%	114.2%	114.7%	115.1%	115.4%
North East	101.4%	102.1%	102.9%	103.5%	103.9%	104.1%	104.2%	104.3%	104.4%
Murray 1	105.8%	109.1%	112.5%	114.9%	116.4%	117.3%	117.9%	118.4%	118.7%
Goulburn Broken	101.2%	102.0%	102.7%	103.2%	103.5%	103.7%	103.8%	103.9%	104.0%
Murray 2	105.8%	109.1%	112.5%	114.9%	116.4%	117.3%	117.9%	118.4%	118.7%
North Central	101.1%	101.7%	102.3%	102.8%	103.1%	103.2%	103.3%	103.4%	103.5%
Murray 3	105.8%	109.1%	112.5%	114.9%	116.4%	117.3%	117.9%	118.4%	118.7%
Mallee	104.1%	106.5%	108.9%	110.6%	111.7%	112.3%	112.7%	113.1%	113.3%
LMDB	109.5%	114.9%	120.3%	124.3%	126.7%	128.1%	129.2%	129.9%	130.4%
Snowy River	103.3%	105.2%	107.1%	108.4%	109.3%	109.8%	110.2%	110.4%	110.6%

Table: Mitigation Scenario 450 –Median

Catchment	2020	2030	2040	2050	2060	2070	2080	2090	2100
Condamine	89.6%	84.6%	81.4%	79.4%	78.4%	77.9%	77.7%	77.8%	78.0%
Border Rivers QLD	89.7%	84.7%	81.5%	79.6%	78.6%	78.1%	77.9%	78.0%	78.2%
Warrego-Paroo	89.4%	84.3%	80.9%	78.9%	77.9%	77.4%	77.2%	77.3%	77.5%
Namoi	91.6%	87.5%	84.9%	83.3%	82.5%	82.1%	81.9%	82.0%	82.2%
Central West	91.8%	87.8%	85.2%	83.7%	82.9%	82.5%	82.3%	82.4%	82.6%
Maranoa Balonne	89.4%	84.2%	80.9%	78.9%	77.9%	77.3%	77.2%	77.3%	77.5%
Border Rivers Gwydir	91.7%	87.7%	85.1%	83.5%	82.7%	82.3%	82.2%	82.3%	82.5%
Western	90.9%	86.5%	83.6%	81.9%	81.0%	80.6%	80.4%	80.5%	80.7%
Lachlan	91.6%	87.5%	84.9%	83.3%	82.4%	82.0%	81.9%	82.0%	82.1%
Murrumbidgee	91.7%	87.7%	85.1%	83.5%	82.7%	82.3%	82.1%	82.2%	82.4%
North East	92.4%	88.7%	86.3%	84.8%	84.1%	83.7%	83.6%	83.6%	83.8%
Murray 1	90.8%	86.3%	83.4%	81.6%	80.7%	80.3%	80.1%	80.2%	80.4%
Goulburn Broken	89.8%	84.8%	81.6%	79.6%	78.6%	78.1%	78.0%	78.0%	78.3%
Murray 2	90.8%	86.3%	83.4%	81.6%	80.7%	80.3%	80.1%	80.2%	80.4%
North Central	89.3%	84.1%	80.7%	78.7%	77.6%	77.1%	76.9%	77.0%	77.2%
Murray 3	90.8%	86.3%	83.4%	81.6%	80.7%	80.3%	80.1%	80.2%	80.4%
Mallee	88.9%	83.6%	80.1%	78.0%	76.9%	76.4%	76.2%	76.3%	76.6%
LMDB	90.3%	85.6%	82.6%	80.7%	79.8%	79.3%	79.1%	79.2%	79.4%
Snowy River	86.8%	80.3%	76.2%	73.7%	72.4%	71.7%	71.5%	71.6%	71.9%

Table: A –Dry Reference Case

Catchment	2020	2030	2040	2050	2060	2070	2080	2090	2100
Condamine	79.2%	73.8%	68.3%	62.8%	58.0%	54.3%	51.5%	49.7%	48.8%
Border Rivers QLD	79.4%	74.1%	68.6%	63.2%	58.4%	54.7%	52.0%	50.2%	49.2%
Warrego-Paroo	76.2%	70.1%	63.8%	57.6%	52.1%	47.8%	44.7%	42.6%	41.5%
Namoi	82.7%	78.2%	73.6%	69.1%	65.1%	62.0%	59.7%	58.2%	57.4%
Central West	81.7%	77.0%	72.2%	67.4%	63.2%	59.9%	57.5%	55.9%	55.1%
Maranoa Balonne	76.2%	70.1%	63.8%	57.5%	52.1%	47.8%	44.6%	42.6%	41.5%
Border Rivers Gwydir	83.0%	78.6%	74.1%	69.6%	65.7%	62.6%	60.4%	58.9%	58.1%
Western	78.7%	73.3%	67.6%	62.0%	57.1%	53.3%	50.5%	48.6%	47.6%
Lachlan	82.8%	78.4%	73.9%	69.4%	65.4%	62.3%	60.1%	58.6%	57.8%
Murrumbidgee	85.0%	81.1%	77.1%	73.2%	69.7%	67.0%	65.1%	63.7%	63.1%
North East	88.7%	85.8%	82.8%	79.9%	77.3%	75.2%	73.7%	72.7%	72.2%
Murray 1	82.9%	78.5%	74.0%	69.5%	65.5%	62.4%	60.2%	58.7%	57.9%
Goulburn Broken	85.4%	81.6%	77.7%	73.9%	70.5%	67.9%	66.0%	64.7%	64.0%
Murray 2	82.9%	78.5%	74.0%	69.5%	65.5%	62.4%	60.2%	58.7%	57.9%
North Central	85.1%	81.3%	77.3%	73.4%	70.0%	67.3%	65.3%	64.0%	63.3%
Murray 3	82.9%	78.5%	74.0%	69.5%	65.5%	62.4%	60.2%	58.7%	57.9%
Mallee	82.5%	78.0%	73.4%	68.8%	64.8%	61.6%	59.3%	57.8%	57.0%
LMDB	79.7%	74.5%	69.1%	63.8%	59.1%	55.5%	52.8%	51.0%	50.1%
Snowy River	86.9%	83.6%	80.1%	76.7%	73.7%	71.3%	69.6%	68.4%	67.8%

Table: B –Warm-Wet Reference Case

Catchment	2020	2030	2040	2050	2060	2070	2080	2090	2100
Condamine	107.0%	108.8%	110.7%	112.6%	114.2%	115.5%	116.4%	117.0%	117.3%
Border Rivers QLD	107.0%	108.8%	110.6%	112.4%	114.0%	115.3%	116.2%	116.8%	117.1%
Warrego-Paroo	108.7%	110.9%	113.3%	115.5%	117.5%	119.1%	120.3%	121.0%	121.4%
Namoi	106.2%	107.8%	109.5%	111.1%	112.5%	113.6%	114.4%	115.0%	115.3%
Central West	106.2%	107.8%	109.4%	111.1%	112.5%	113.6%	114.4%	115.0%	115.3%
Maranoa Balonne	108.7%	110.9%	113.3%	115.5%	117.6%	119.1%	120.3%	121.0%	121.4%
Border Rivers Gwydir	106.1%	107.7%	109.3%	110.9%	112.3%	113.4%	114.2%	114.7%	115.0%
Western	108.1%	110.1%	112.3%	114.4%	116.2%	117.7%	118.7%	119.4%	119.8%
Lachlan	104.9%	106.1%	107.4%	108.7%	109.8%	110.7%	111.4%	111.8%	112.0%
Murrumbidgee	103.3%	104.1%	105.0%	105.9%	106.6%	107.2%	107.7%	108.0%	108.1%
North East	100.9%	101.2%	101.4%	101.7%	101.9%	102.1%	102.2%	102.3%	102.3%
Murray 1	104.0%	105.1%	106.1%	107.2%	108.1%	108.8%	109.4%	109.7%	109.9%
Goulburn Broken	100.9%	101.1%	101.3%	101.5%	101.7%	101.9%	102.0%	102.1%	102.1%
Murray 2	104.0%	105.1%	106.1%	107.2%	108.1%	108.8%	109.4%	109.7%	109.9%
North Central	100.8%	100.9%	101.1%	101.3%	101.5%	101.6%	101.7%	101.8%	101.8%
Murray 3	104.0%	105.1%	106.1%	107.2%	108.1%	108.8%	109.4%	109.7%	109.9%
Mallee	102.9%	103.6%	104.3%	105.1%	105.8%	106.3%	106.6%	106.9%	107.0%
LMDB	106.5%	108.2%	110.0%	111.7%	113.2%	114.4%	115.2%	115.8%	116.1%
Snowy River	102.3%	102.9%	103.5%	104.1%	104.7%	105.1%	105.4%	105.6%	105.7%

Table: C –Median Reference Case

Catchment	2020	2030	2040	2050	2060	2070	2080	2090	2100
Condamine	93.7%	92.2%	91.0%	90.5%	90.4%	90.6%	90.9%	91.3%	91.7%
Border Rivers QLD	93.8%	92.3%	91.1%	90.6%	90.5%	90.7%	91.0%	91.4%	91.8%
Warrego-Paroo	93.6%	92.0%	90.8%	90.3%	90.2%	90.4%	90.7%	91.1%	91.5%
Namoi	94.9%	93.7%	92.7%	92.3%	92.2%	92.4%	92.6%	93.0%	93.3%
Central West	95.0%	93.8%	92.9%	92.5%	92.4%	92.6%	92.8%	93.1%	93.4%
Maranoa Balonne	93.6%	92.0%	90.8%	90.3%	90.2%	90.4%	90.7%	91.1%	91.5%
Border Rivers Gwydir	95.0%	93.8%	92.8%	92.4%	92.4%	92.5%	92.8%	93.1%	93.4%
Western	94.5%	93.1%	92.1%	91.6%	91.6%	91.8%	92.0%	92.4%	92.7%
Lachlan	94.9%	93.7%	92.7%	92.3%	92.2%	92.4%	92.6%	92.9%	93.3%
Murrumbidgee	95.0%	93.7%	92.8%	92.4%	92.3%	92.5%	92.7%	93.0%	93.4%
North East	95.4%	94.3%	93.4%	93.0%	92.9%	93.1%	93.3%	93.6%	93.9%
Murray 1	94.4%	93.0%	92.0%	91.5%	91.5%	91.6%	91.9%	92.3%	92.6%
Goulburn Broken	93.8%	92.3%	91.1%	90.6%	90.5%	90.7%	91.0%	91.4%	91.8%
Murray 2	94.4%	93.0%	92.0%	91.5%	91.5%	91.6%	91.9%	92.3%	92.6%
North Central	93.5%	91.9%	90.7%	90.1%	90.1%	90.3%	90.6%	91.0%	91.4%
Murray 3	94.4%	93.0%	92.0%	91.5%	91.5%	91.6%	91.9%	92.3%	92.6%
Mallee	93.3%	91.7%	90.4%	89.8%	89.8%	90.0%	90.3%	90.7%	91.2%
LMDB	94.1%	92.7%	91.6%	91.1%	91.0%	91.2%	91.5%	91.9%	92.2%
Snowy River	95.2%	94.0%	93.1%	92.7%	92.6%	92.8%	93.0%	93.3%	93.6%

Table: AIB –Dry

Catchment	2020	2030	2040	2050	2060	2070	2080	2090	2100
Condamine	91%	75%	58%	41%	24%	16%	16%	16%	16%
Border Rivers QLD	91%	74%	58%	40%	23%	16%	16%	16%	16%
Warrego-Paroo	88%	70%	51%	31%	16%	16%	16%	16%	16%
Namoi	95%	81%	67%	52%	38%	27%	18%	16%	16%
Central West	93%	79%	63%	47%	32%	20%	16%	16%	16%
Maranoa Balonne	88%	70%	52%	33%	16%	16%	16%	16%	16%
Border Rivers Gwydir	95%	81%	66%	50%	36%	25%	16%	16%	16%
Western	91%	74%	58%	40%	23%	16%	16%	16%	16%
Lachlan	97%	84%	70%	56%	42%	32%	24%	16%	16%
Murrumbidgee	101%	91%	81%	69%	58%	51%	44%	38%	34%
North East	99%	87%	75%	61%	49%	40%	33%	26%	20%
Murray 1	95%	80%	66%	50%	35%	24%	16%	16%	16%
Goulburn Broken	97%	85%	72%	58%	45%	35%	27%	19%	16%
Murray 2	95%	80%	66%	50%	35%	24%	16%	16%	16%
North Central	97%	85%	72%	58%	45%	35%	27%	20%	16%
Murray 3	95%	80%	66%	50%	35%	24%	16%	16%	16%
Mallee	95%	81%	66%	50%	36%	25%	16%	16%	16%
LMDB	92%	76%	59%	42%	26%	16%	16%	16%	16%
Snowy River	97%	83%	70%	55%	42%	32%	23%	16%	16%

Table: AIB –WET

Catchment	2020	2030	2040	2050	2060	2070	2080	2090	2100
Condamine	109%	113%	118%	123%	128%	132%	136%	140%	142%
Border Rivers QLD	108%	113%	118%	123%	128%	132%	136%	139%	142%
Warrego-Paroo	110%	116%	122%	128%	134%	139%	144%	148%	151%
Namoi	108%	112%	116%	121%	125%	129%	132%	135%	138%
Central West	107%	112%	116%	120%	124%	128%	132%	134%	137%
Maranoa Balonne	111%	117%	123%	129%	135%	140%	145%	149%	153%
Border Rivers Gwydir	108%	112%	116%	120%	125%	129%	132%	135%	137%
Western	109%	114%	119%	124%	129%	134%	138%	141%	144%
Lachlan	104%	107%	109%	112%	114%	116%	118%	120%	121%
Murrumbidgee	104%	106%	109%	111%	113%	115%	117%	119%	120%
North East	102%	103%	104%	105%	105%	106%	107%	108%	108%
Murray 1	105%	108%	111%	114%	117%	119%	122%	124%	125%
Goulburn Broken	101%	102%	102%	103%	103%	104%	104%	105%	105%
Murray 2	105%	108%	111%	114%	117%	119%	122%	124%	125%
North Central	101%	102%	102%	103%	103%	104%	104%	105%	105%
Murray 3	105%	108%	111%	114%	117%	119%	122%	124%	125%
Mallee	103%	105%	107%	109%	111%	113%	115%	116%	117%
LMDB	107%	110%	114%	118%	122%	125%	128%	131%	133%
Snowy River	103%	104%	106%	108%	109%	111%	112%	113%	114%

Table A.6: Irrigated area in the Murray-Darling Basin per commodity

Catchment	Citrus-H	Citrus-L	Grapes	Stone Fruit-H	Stone Fruit-L	Pome Fruit-H	Pome Fruit-L	Vegetables	Cotton	Rice	Grains	.....continued next page
Condamine	0.7	0.3	149.7	31.4	13.4	2.1	0.9	2,199.3	28,704.8	32.9	13,943.2	...
Border Rivers QLD	0.0	0.0	644.4	527.4	226.0	734.8	314.9	1,946.2	42,014.4	0.0	3,325.7	...
Warrego-Paroo	0.0	0.0	96.0	0.0	0.0	0.0	0.0	13.0	14,603.9	0.0	402.9	...
Namoi	1.1	0.5	33.1	14.7	6.3	1.8	0.8	368.8	65,829.8	1.0	15,629.7	...
Central West	95.5	40.9	2,899.2	180.8	77.5	515.6	221.0	1,085.0	56,149.8	106.0	11,551.4	...
Maranoa Balonne	0.0	0.0	149.4	0.0	0.0	0.0	0.0	64.5	21,503.6	0.0	1,065.2	...
Border Rivers Gwydir	0.7	0.3	115.4	20.1	8.6	53.7	23.0	257.5	126,525.2	0.0	8,414.2	...
Western	88.0	37.7	482.2	17.9	7.7	36.0	15.4	29.8	31,349.3	0.0	1,576.6	...
Lachlan	154.4	66.2	3,110.0	845.7	362.4	161.5	69.2	3,106.9	12,594.9	10,956.5	36,983.4	...
Murrumbidgee	2,145.9	919.7	12,704.7	1,170.1	501.5	862.4	369.6	6,903.6	4,312.8	92,147.9	178,757.3	...
North East	11.1	4.8	2,681.7	78.1	33.5	159.5	68.3	122.5	0.0	107.0	245.7	...
Murray 1	4.1	1.8	215.9	13.9	5.9	49.7	21.3	299.2	0.0	2,471.5	4,138.3	...
Goulburn Broken												...
Murray 2	35.2	15.1	578.5	5.0	2.1	2.8	1.2	1,052.5	3.5	44,748.4	76,743.9	...
North Central												...
Murray 3	120.6	51.7	460.0	43.9	18.8	0.1	0.1	494.3	4.6	25,579.8	50,262.7	...
Mallee												...
LMDB	686.2	294.1	6,928.6	22.0	9.4	5.1	2.2	446.2	1,023.0	0.0	3,792.5	...
SAMDB	2,171.3	930.5	26,599.3	479.8	205.6	111.1	47.6	6,836.9	0.0	0.0	1,115.5	...

Catchment	...continued from prev. page	Beef/Sheep-H	Beef/Sheep-L	Dairy-H	Dairy-L	Other	Total	Total Horticulture
Condamine	...	1,906.4	1,906.4	1,906.4	1,906.4	3,483.6	56,188	2,398
Border Rivers QLD	...	1,322.9	1,322.9	1,322.9	1,322.9	3,309.5	58,335	4,394
Warrego-Paroo	...	1,041.8	1,041.8	1,041.8	1,041.8	370.4	19,653	109
Namoi	...	1,902.2	1,902.2	1,902.2	1,902.2	4,655.4	94,152	427
Central West	...	2,722.2	2,722.2	2,722.2	2,722.2	2,550.9	86,362	5,115
Maranoa Balonne	...	1,621.4	1,621.4	1,621.4	1,621.4	440.5	40,000	214
Border Rivers Gwydir	...	749.4	749.4	749.4	749.4	3,147.3	141,564	479
Western	...	268.9	268.9	268.9	268.9	213.8	34,930	715
Lachlan	...	10,516.8	10,516.8	10,516.8	10,516.8	0.0	105,017	7,876
Murrumbidgee	...	21,055.8	21,055.8	21,055.8	21,055.8	0.0	305,212	25,577
North East	...	2,112.2	2,112.2	2,112.2	2,112.2	2,203.9	14,165	3,159
Murray 1	...	1,678.0	1,678.0	1,678.0	1,678.0	0.0	12,269	612
Goulburn Broken	...							
Murray 2	...	17,682.6	17,682.6	17,682.6	17,682.6	0.0	152,286	1,693
North Central	...							
Murray 3	...	14,789.5	14,789.5	14,789.5	14,789.5	0.0	111,740	1,189
Mallee	...							
LMDB	...	847.7	847.7	847.7	847.7	1,876.8	18,477	8,394
SAMDB	...	3,466.2	3,466.2	3,466.2	3,466.2	1,614.4	53,977	37,382

Table A.7: Average Farm Size per Commodity in the Murray-Darling Basin (in hectare)

Catchment	Citrus-H	Citrus-L	Grapes-L	Stone Fruit-H	Stone Fruit-L	Pome Fruit-H	Vegetables	Cotton	Rice	Wheat	Dairy-H	.....continued next page
Condamine	40	40	45	40	40	40	40	3,000	400	500	277	...
Border Rivers QLD	40	40	45	40	40	40	40	3,000	0	500	277	...
Warrego-Paroo	0	0	45	0	0	0	40	3,000	0	500	277	...
Namoi	40	40	45	40	40	40	40	3,000	400	500	277	...
Central West	40	40	45	40	40	40	40	3,000	400	500	324	...
Maranoa Balonne	40	40	45	40	40	40	40	3,000	0	500	277	...
Border Rivers Gwydir	40	40	45	40	40	40	40	3,000	0	500	277	...
Western	40	40	45	40	40	40	40	3,000	0	500	277	...
Lachlan	40	40	45	40	40	40	40	3,000	400	500	324	...
Murrumbidgee	20	20	45	20	20	20	20	500	400	500	342	...
North East	20	20	45	20	20	20	20	0	400	300	173	...
Murray 1	20	20	45	20	20	20	20	500	400	500	215	...
Goulburn Broken)	20	20	45	20	20	30	20	0	400	300	215	...
Murray 2												
North Central	20	20	45	20	20	20	20	0	400	300	215	...
Murray 3	20	20	45	20	20	20	20	500	400	500	215	...
Mallee	30	30	45	30	30	20	20	0	400	300	215	...
LMDB	20	20	45	20	30	20	20	300	0	300	215	...
SAMDB	20	20	45	20	20	20	20	300	0	300	400	...

Catchment	...continued from prev. page	Dairy-L	Sheep/Wheat	Beef	Sheep
Condamine	...	278	600	600	600
Border Rivers QLD	...	278	600	600	600
Warrego-Paroo	...	278	600	600	600
Namoi	...	278	600	600	600
Central West	...	325	600	600	600
Maranoa Balonne	...	278	600	600	600
Border Rivers Gwydir	...	278	600	600	600
Western	...	278	600	600	600
Lachlan	...	325	600	600	600
Murrumbidgee	...	342	600	600	600
North East	...	173	600	600	600
Murray 1	...	215	600	600	600
Goulburn Broken	...	215	600	600	600
Murray 2	...	215	600	600	600
North Central	...	215	600	600	600
Murray 3	...	215	600	600	600
Mallee	...	215	600	600	600
LMDB	...	215	600	600	600
SAMDB	...	400	600	600	600

Table A.8: Production Rules

Normal State	Drought State multipliers				Wet State multipliers			
Commodity A	**Commodity B**	**Yield**	**Water (ML)**	**Adjustment Cost**	**Commodity**	**Yield**	**Water (ML)**	**Adjustment Cost**
Citrus-H	Citrus-H	0.8	1.0	$20	Citrus-H	1.2	1.2	$20
Citrus-L	Citrus-L	0.9	1.0	$0	Citrus-L	1.2	1.2	$100
Grapes	Grapes	0.9	1.0	$20	Grapes	1.2	1.2	$20
Stone Fruit-H	Stone Fruit-H	0.8	1.0	$20	Stone Fruit-H	1.2	1.2	$20
Stone Fruit-L	Stone Fruit-L	0.9	1.0	$0	Stone Fruit-L	1.2	1.2	$100
Pome Fruit	Pome Fruit	0.9	1.0	$20	Pome Fruit	1.2	1.2	$20
Vegetables	Melons	1.0	1.0	$0	Fresh Tomatoes	1.0	1.0	$0
Cotton Flex	Dryland Cotton	1.0	1.0	$0	Cotton	1.0	1.0	$100
Cotton Fixed	Cotton Fixed	1.0	1.0	$0	Cotton Fixed	1.0	1.0	$0
Cotton/Chickpea	Chickpea	1.0	1.0	$0	Cotton	1.0	1.0	$100
Dryland Cotton	Dryland Cotton	0.8	1.0	$0	Cotton	0.9	1.2	$100
Rice PSN	Rice PSD	1.0	1.0	$0	Rice PSW	1.0	1.2	$100
Dryland Wheat	Dryland Wheat	0.7	1.0	$0	Rice PSW	0.9	1.2	$100
Wheat	Wheat	0.8	1.0	$0	Wheat	1.1	1.2	$50
Wheat Legume	Wheat Legume Dry	1.0	1.0	$0	Wheat Legume Wet	1.0	1.0	$0
Sorghum	Sorghum	0.8	1.0	$0	Sorghum	1.1	1.2	$100
Oilseeds	Oilseeds	0.8	1.0	$0	Oilseeds	1.1	1.0	$0
Sheep Wheat	Sheep Wheat Dry	1.0	1.0	$50	Sheep Wheat Wet	1.0	1.0	$0
Dairy-H	Dairy-H	0.9	1.0	$300	Dairy-H	1.5	1.2	$0
Dairy-L	Dairy-L	0.8	1.0	$300	Dairy-L	1.2	1.2	$0
Beef	Beef	0.7	1.0	$20	Beef	1.2	1.0	$10
Sheep	Sheep	0.7	1.0	$20	Sheep	1.2	1.0	$15
Adelaide	Adelaide	1.0	1.0	$0	Adelaide	1.0	1.0	$0

Gross Margin Budgets

Commodity Citrus-H

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Border Rivers QLD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Warrego Paroo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Namoi	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Central West	28.9	250.0	222.8	14.8	34.3	5.0	13.4	2059.5	0.0	185.5	123.7	5825.8
Maranoa Balonne	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Border Rivers Gwydir	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Western	30.8	200.0	222.8	14.8	34.3	5.0	25.8	2059.5	0.0	185.5	123.7	5825.8
Lachlan	30.8	200.0	222.8	14.8	34.3	5.0	25.8	2059.5	0.0	185.5	123.7	5825.8
Murrumbidgee	30.8	200.0	222.8	14.8	34.3	7.5	25.8	2059.5	0.0	185.5	123.7	5825.8
North East	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Murray 1	29.6	216.7	222.8	14.8	34.3	7.5	21.7	2059.5	0.0	185.5	123.7	5825.8
Goulburn Broken	29.6	216.7	222.8	14.8	34.3	7.5	21.7	2059.5	0.0	185.5	123.7	5825.8
Murray 2	29.6	216.7	222.8	14.8	34.3	7.5	21.7	2059.5	0.0	185.5	123.7	5825.8
North Central	29.6	216.7	222.8	14.8	34.3	7.5	21.7	2059.5	0.0	185.5	123.7	5825.8
Murray 3	29.6	216.7	222.8	14.8	34.3	7.5	21.7	2059.5	0.0	185.5	123.7	5825.8
Mallee	29.6	216.7	222.8	14.8	34.3	7.5	21.7	2059.5	0.0	185.5	123.7	5825.8
Lower Murray Darling	30.8	200.0	222.8	14.8	34.3	7.5	25.8	2059.5	0.0	185.5	123.7	5825.8
SA MDB	29.6	216.7	222.8	14.8	34.3	7.5	21.7	2059.5	0.0	185.5	123.7	5825.8

Commodity Citrus-L

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Border Rivers QLD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Warrego Paroo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Namoi	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Central West	32.1	356.7	96.3	11.0	37.1	7.8	96.8	1067.3	3007.0	280.3	588.3	6437.0
Maranoa Balonne	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Border Rivers Gwydir	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Western	34.3	356.7	96.3	11.0	37.1	7.8	96.8	1067.3	3007.0	280.3	588.3	6437.0
Lachlan	34.3	351.4	103.1	10.3	36.7	7.8	83.0	980.1	3000.0	251.0	586.4	6417.6
Murrumbidgee	34.3	351.4	103.1	10.3	36.7	10.0	83.0	980.1	3000.0	251.0	586.4	6417.6
North East	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Murray 1	32.8	351.4	103.1	10.3	36.7	10.0	83.0	980.1	3000.0	251.0	586.4	6417.6
Goulburn Broken	32.8	351.4	103.1	10.3	36.7	10.0	83.0	980.1	3000.0	251.0	586.4	6417.6
Murray 2	32.8	351.4	103.1	10.3	36.7	10.0	83.0	980.1	3000.0	251.0	586.4	6417.6
North Central	32.8	351.4	103.1	10.3	36.7	10.0	83.0	980.1	3000.0	251.0	586.4	6417.6
Murray 3	32.8	351.4	103.1	10.3	36.7	10.0	83.0	980.1	3000.0	251.0	586.4	6417.6
Mallee	32.8	351.4	103.1	10.3	36.7	10.0	83.0	980.1	3000.0	251.0	586.4	6417.6
Lower Murray Darling	34.3	362.0	89.4	11.6	37.4	9.6	110.6	1154.6	3014.0	309.5	590.2	6456.4
SA MDB	32.8	322.0	162.9	12.6	32.5	9.9	93.0	1099.5	2688.0	412.5	1501.0	8228.4

Commodity Grapes

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine	15.0	3490.0	279.8	17.3	30.0	5.0	63.5	1571.3	0.0	270.0	2920.9	9104.5
Border Rivers QLD	15.0	6000.0	275.0	16.6	25.0	5.0	35.4	1375.7	0.0	300.0	9697.1	15640.8
Warrego Paroo	15.0	4745.0	277.4	16.9	27.5	5.0	49.5	1473.5	790.0	285.0	6309.0	13162.6
Namoi	20.2	840.0	97.3	13.4	32.6	6.1	50.7	1140.3	790.0	455.0	6273.9	10168.8
Central West	20.2	840.0	97.3	13.4	32.6	6.1	50.7	1140.3	790.0	455.0	6273.9	10168.8
Maranoa Balonne	15.0	4745.0	277.4	16.9	27.5	5.0	49.5	1473.5	790.0	285.0	6309.0	13162.6
Border Rivers Gwydir	20.2	840.0	97.3	13.4	32.6	6.1	50.7	1140.3	790.0	455.0	6273.9	10168.8
Western	20.2	840.0	97.3	13.4	32.6	6.1	50.7	1140.3	790.0	455.0	6273.9	10168.8
Lachlan	20.2	840.0	97.3	13.4	32.6	6.1	50.7	1140.3	790.0	455.0	6273.9	10168.8
Murrumbidgee	20.2	840.0	97.3	13.4	32.6	6.1	50.7	1140.3	790.0	455.0	6273.9	10168.8
North East	20.2	840.0	97.3	13.4	32.6	6.1	50.7	1140.3	790.0	455.0	6273.9	10168.8
Murray 1	20.2	840.0	97.3	13.4	32.6	6.1	50.7	1140.3	790.0	455.0	6273.9	10168.8
Goulburn Broken	20.4	811.5	7.0	19.0	32.6	6.8	15.6	1069.1	790.0	455.0	9453.6	11876.3
Murray 2	20.2	840.0	97.3	13.4	32.6	6.1	50.7	1140.3	790.0	455.0	6273.9	10168.8
North Central	20.0	868.4	187.5	7.7	32.6	5.5	85.7	1211.5	0.0	455.0	3094.2	7671.4
Murray 3	20.2	840.0	97.3	13.4	32.6	6.1	50.7	1140.3	790.0	455.0	6273.9	10168.8
Mallee	20.2	840.0	97.3	13.4	32.6	6.1	50.7	1140.3	790.0	455.0	6273.9	10168.8
Lower Murray Darling	20.2	840.0	97.3	13.4	32.6	6.1	50.7	1140.3	790.0	455.0	6273.9	10168.8
SA MDB	15.2	880.3	36.4	18.0	32.6	3.5	93.0	586.3	1036.7	100.0	1627.9	3915.7

Commodity Stone Fruit- H

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine	18.7	2473.0	1141.2	17.2	16.9	3.3	152.8	3034.7	0.0	454.4	17629.2	38828.9
Border Rivers QLD	18.7	2473.0	1141.2	17.2	16.9	3.3	152.8	3034.7	0.0	454.4	17629.2	38828.9
Warrego Paroo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Namoi	18.0	3000.0	1337.5	17.3	13.0	5.0	121.7	3633.2	0.0	468.0	21358.4	46217.6
Central West	21.8	2633.5	1560.4	17.0	20.9	1.7	85.5	2643.2	0.0	644.3	17671.0	45176.4
Maranoa Balonne	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Border Rivers Gwydir	18.0	3000.0	1337.5	17.3	13.0	5.0	121.7	3633.2	0.0	468.0	21358.4	46217.6
Western	21.8	2633.5	1560.4	17.0	20.9	1.7	85.5	2643.2	0.0	644.3	17671.0	45176.4
Lachlan	16.0	1961.5	671.8	17.3	20.7	3.6	160.5	2450.4	0.0	315.3	13465.0	26656.2
Murrumbidgee	19.0	2297.1	994.9	17.3	13.0	3.0	243.4	3411.9	0.0	390.0	18022.6	37265.6
North East	19.0	2297.1	994.9	17.3	13.0	3.0	243.4	3411.9	0.0	390.0	18022.6	37265.6
Murray 1	19.0	2297.1	994.9	17.3	13.0	3.0	243.4	3411.9	0.0	390.0	18022.6	37265.6
Goulburn Broken	19.0	2297.1	994.9	17.3	13.0	3.0	243.4	3411.9	0.0	390.0	18022.6	37265.6
Murray 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
North Central	19.0	2297.1	994.9	17.3	13.0	3.0	243.4	3411.9	0.0	390.0	18022.6	37265.6
Murray 3	19.0	2297.1	994.9	17.3	13.0	3.0	243.4	3411.9	0.0	390.0	18022.6	37265.6
Mallee	19.0	2297.1	994.9	17.3	13.0	3.0	243.4	3411.9	0.0	390.0	18022.6	37265.6
Lower Murray Darling	17.5	2129.3	833.3	17.3	16.8	3.3	201.9	2931.1	0.0	352.6	15743.8	31960.8
SA MDB	19.0	2297.1	994.9	17.3	13.0	3.0	243.4	3411.9	0.0	390.0	18022.6	37265.6

Commodity Stone Fruit- L

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine	22.8	1679.7	452.4	17.7	14.7	6.4	100.4	1328.8	3403.1	58.2	16555.2	28365.8
Border Rivers QLD	22.8	1679.7	452.4	17.7	14.7	6.4	100.4	1328.8	3403.1	58.2	16555.2	28365.8
Warrego Paroo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Namoi	22.8	1679.7	452.4	17.7	14.7	6.4	100.4	1328.8	3403.1	58.2	16555.2	28365.8
Central West	22.8	1679.7	452.4	17.7	14.7	6.4	100.4	1328.8	3403.1	58.2	16555.2	28365.8
Maranoa Balonne	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Border Rivers Gwydir	22.8	1679.7	452.4	17.7	14.7	6.4	100.4	1328.8	3403.1	58.2	16555.2	28365.8
Western	22.8	1679.7	452.4	17.7	14.7	6.4	100.4	1328.8	3403.1	58.2	16555.2	28365.8
Lachlan	22.8	1679.7	452.4	17.7	14.7	6.4	100.4	1328.8	3403.1	58.2	16555.2	28365.8
Murrumbidgee	22.8	1679.7	452.4	17.7	14.7	6.4	100.4	1328.8	3403.1	58.2	16555.2	28365.8
North East	22.8	1679.7	452.4	17.7	14.7	6.4	100.4	1328.8	3403.1	58.2	16555.2	28365.8
Murray 1	22.8	1679.7	452.4	17.7	14.7	6.4	100.4	1328.8	3403.1	58.2	16555.2	28365.8
Goulburn Broken	22.2	1874.7	69.5	19.9	4.6	6.0	102.2	1009.9	4609.2	83.4	22772.6	29553.4
Murray 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
North Central	23.4	1484.8	835.2	15.5	24.8	6.9	98.6	1647.6	2197.0	33.0	10337.7	27178.2
Murray 3	22.8	1679.7	452.4	17.7	14.7	6.4	100.4	1328.8	3403.1	58.2	16555.2	28365.8
Mallee	22.8	1679.7	452.4	17.7	14.7	6.4	100.4	1328.8	3403.1	58.2	16555.2	28365.8
Lower Murray Darling	22.8	1679.7	452.4	17.7	14.7	6.4	100.4	1328.8	3403.1	58.2	16555.2	28365.8
SA MDB	17.2	3053.0	19.0	18.0	15.0	10.5	93.0	1325.8	14791.5	250.0	9896.0	26557.5

Commodity Pome Fruit

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Border Rivers QLD	43.3	1154.7	39.5	15.3	48.6	7.0	117.9	3157.4	15075.0	827.0	25594.9	45267.9
Warrego Paroo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Namoi	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Central West	43.3	1154.7	39.5	15.3	48.6	7.0	117.9	3157.4	15075.0	827.0	25594.9	45267.9
Maranoa Balonne	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Border Rivers Gwydir	43.3	1154.7	39.5	15.3	48.6	7.0	117.9	3157.4	15075.0	827.0	25594.9	45267.9
Western	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lachlan	43.3	1154.7	39.5	15.3	48.6	7.0	117.9	3157.4	15075.0	827.0	25594.9	45267.9
Murrumbidgee	43.3	1154.7	39.5	15.3	48.6	7.0	117.9	3157.4	15075.0	827.0	25594.9	45267.9
North East	43.3	1154.7	39.5	15.3	48.6	7.0	117.9	3157.4	15075.0	827.0	25594.9	45267.9
Murray 1	40.8	1565.8	254.6	17.4	34.5	7.0	57.4	2954.2	5353.5	231.5	39689.2	52179.9
Goulburn Broken	50.0	1370.4	29.4	20.1	39.2	6.0	16.5	2410.1	7400.0	430.0	48181.4	58877.8
Murray 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
North Central	31.5	1761.1	479.8	14.7	29.8	8.0	98.2	3498.4	3307.0	33.0	31197.1	45482.0
Murray 3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mallee	43.3	1154.7	39.5	15.3	48.6	7.0	117.9	3157.4	15075.0	827.0	25594.9	45267.9
Lower Murray Darling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SA MDB	43.3	1154.7	39.5	15.3	48.6	7.0	117.9	3157.4	15075.0	827.0	25594.9	45267.9

Commodity Vegetables- Normal State

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine	32.5	360.0	140.0	14.4	13.1	4.0	46.3	1211.4	0.0	182.3	15720.9	19287.4
Border Rivers QLD	32.5	360.0	140.0	14.4	13.1	4.0	46.3	1211.4	1477.7	182.3	15720.9	20765.2
Warrego Paroo	32.5	360.0	140.0	14.4	13.1	4.0	46.3	1211.4	1477.7	182.3	15720.9	20765.2
Namoi	32.6	790.3	4.1	1.7	10.9	5.9	39.1	1212.0	2424.4	298.6	7525.4	11523.3
Central West	28.8	869.9	57.3	10.9	12.3	7.1	32.3	1148.1	1477.7	322.8	8519.7	12357.3
Maranoa Balonne	32.5	360.0	140.0	14.4	13.1	4.0	46.3	1211.4	1477.7	182.3	15720.9	20765.2
Border Rivers Gwydir	32.6	790.3	4.1	1.7	10.9	5.9	39.1	1212.0	2424.4	298.6	7525.4	11523.3
Western	28.8	869.9	57.3	10.9	12.3	7.1	32.3	1148.1	1477.7	322.8	8519.7	12357.3
Lachlan	24.9	949.5	110.5	20.1	13.6	8.2	25.5	1084.1	531.1	347.0	9514.0	13191.5
Murrumbidgee	24.9	949.5	110.5	20.1	13.6	8.2	25.5	1084.1	531.1	347.0	9514.0	13191.5
North East	24.9	949.5	110.5	20.1	13.6	8.2	25.5	1084.1	531.1	347.0	9514.0	13191.5
Murray 1	24.9	949.5	110.5	20.1	13.6	8.2	25.5	1084.1	531.1	347.0	9514.0	13191.5
Goulburn Broken	52.3	803.0	65.3	24.8	8.7	4.7	49.4	1595.0	350.0	226.2	32231.7	35415.9
Murray 2	24.9	949.5	110.5	20.1	13.6	8.2	25.5	1084.1	531.1	347.0	9514.0	13191.5
North Central	24.9	949.5	110.5	20.1	13.6	8.2	25.5	1084.1	531.1	347.0	9514.0	13191.5
Murray 3	24.9	949.5	110.5	20.1	13.6	8.2	25.5	1084.1	531.1	347.0	9514.0	13191.5
Mallee	24.9	949.5	110.5	20.1	13.6	8.2	25.5	1084.1	531.1	347.0	9514.0	13191.5
Lower Murray Darling	24.9	949.5	110.5	20.1	13.6	8.2	25.5	1084.1	531.1	347.0	9514.0	13191.5
SA MDB	30.0	300.0	45.4	18.0	13.6	7.4	93.0	1127.0	4705.0	347.0	37.5	6920.7

Commodity Vegetables- Drought State

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine	22.5	250.0	3.0	14.5	11.0	0.0	0.0	343.1	720.0	392.0	4002.0	5503.7
Border Rivers QLD	22.5	250.0	3.0	14.5	11.0	0.0	0.0	343.1	720.0	392.0	4002.0	5503.7
Warrego Paroo	22.5	250.0	3.0	14.5	11.0	0.0	0.0	343.1	720.0	392.0	4002.0	5503.7
Namoi	22.5	250.0	3.0	14.5	11.0	0.0	0.0	343.1	720.0	392.0	4002.0	5503.7
Central West	22.5	250.0	3.0	14.5	11.0	0.0	0.0	343.1	720.0	392.0	4002.0	5503.7
Maranoa Balonne	22.5	250.0	3.0	14.5	11.0	0.0	0.0	343.1	720.0	392.0	4002.0	5503.7
Border Rivers Gwydir	22.5	250.0	3.0	14.5	11.0	0.0	0.0	343.1	720.0	392.0	4002.0	5503.7
Western	22.5	250.0	3.0	14.5	11.0	0.0	0.0	343.1	720.0	392.0	4002.0	5503.7
Lachlan	22.5	250.0	3.0	14.5	11.0	0.0	0.0	343.1	720.0	392.0	4002.0	5503.7
Murrumbidgee	22.5	250.0	3.0	14.5	11.0	0.0	0.0	343.1	720.0	392.0	4002.0	5503.7
North East	22.5	250.0	3.0	14.5	11.0	0.0	0.0	343.1	720.0	392.0	4002.0	5503.7
Murray 1	22.5	250.0	3.0	14.5	11.0	0.0	0.0	343.1	720.0	392.0	4002.0	5503.7
Goulburn Broken	22.5	250.0	3.0	14.5	11.0	0.0	0.0	343.1	720.0	392.0	4002.0	5503.7
Murray 2	22.5	250.0	3.0	14.5	11.0	0.0	0.0	343.1	720.0	392.0	4002.0	5503.7
North Central	22.5	250.0	3.0	14.5	11.0	0.0	0.0	343.1	720.0	392.0	4002.0	5503.7
Murray 3	22.5	250.0	3.0	14.5	11.0	0.0	0.0	343.1	720.0	392.0	4002.0	5503.7
Mallee	22.5	250.0	3.0	14.5	11.0	0.0	0.0	343.1	720.0	392.0	4002.0	5503.7
Lower Murray Darling	22.5	250.0	3.0	14.5	11.0	0.0	0.0	343.1	720.0	392.0	4002.0	5503.7
SA MDB	22.5	250.0	3.0	14.5	11.0	0.0	0.0	343.1	720.0	392.0	4002.0	5503.7

Commodity Vegetables- Wet State

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine	50.0	1001.7	939.4	16.1	28.5	6.0	52.7	1880.2	0.0	1022.0	25784.7	43266.1
Border Rivers QLD	50.0	1001.7	939.4	16.1	28.5	6.0	52.7	1880.2	0.0	1022.0	25784.7	43266.1
Warrego Paroo	50.0	1001.7	939.4	16.1	28.5	6.0	52.7	1880.2	0.0	1022.0	25784.7	43266.1
Namoi	50.0	1001.7	939.4	16.1	28.5	6.0	52.7	1880.2	0.0	1022.0	25784.7	43266.1
Central West	50.0	1001.7	939.4	16.1	28.5	6.0	52.7	1880.2	0.0	1022.0	25784.7	43266.1
Maranoa Balonne	50.0	1001.7	939.4	16.1	28.5	6.0	52.7	1880.2	0.0	1022.0	25784.7	43266.1
Border Rivers Gwydir	50.0	1001.7	939.4	16.1	28.5	6.0	52.7	1880.2	0.0	1022.0	25784.7	43266.1
Western	50.0	1001.7	939.4	16.1	28.5	6.0	52.7	1880.2	0.0	1022.0	25784.7	43266.1
Lachlan	50.0	1001.7	939.4	16.1	28.5	6.0	52.7	1880.2	0.0	1022.0	25784.7	43266.1
Murrumbidgee	50.0	1001.7	939.4	16.1	28.5	6.0	52.7	1880.2	0.0	1022.0	25784.7	43266.1
North East	50.0	1001.7	939.4	16.1	28.5	6.0	52.7	1880.2	0.0	1022.0	25784.7	43266.1
Murray 1	50.0	1001.7	939.4	16.1	28.5	6.0	52.7	1880.2	0.0	1022.0	25784.7	43266.1
Goulburn Broken	50.0	1001.7	939.4	16.1	28.5	6.0	52.7	1880.2	0.0	1022.0	25784.7	43266.1
Murray 2	50.0	1001.7	939.4	16.1	28.5	6.0	52.7	1880.2	0.0	1022.0	25784.7	43266.1
North Central	50.0	1001.7	939.4	16.1	28.5	6.0	52.7	1880.2	0.0	1022.0	25784.7	43266.1
Murray 3	50.0	1001.7	939.4	16.1	28.5	6.0	52.7	1880.2	0.0	1022.0	25784.7	43266.1
Mallee	50.0	1001.7	939.4	16.1	28.5	6.0	52.7	1880.2	0.0	1022.0	25784.7	43266.1
Lower Murray Darling	50.0	1001.7	939.4	16.1	28.5	6.0	52.7	1880.2	0.0	1022.0	25784.7	43266.1
SA MDB	50.0	1001.7	939.4	16.1	28.5	6.0	52.7	1880.2	0.0	1022.0	25784.7	43266.1

Commodity Cotton Flexible

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine	8.8	538.9	122.0	15.1	3.3	5.0	41.0	885.7	370.1	50.6	180.0	3379.8
Border Rivers QLD	8.8	538.9	122.0	15.1	3.3	5.0	41.0	885.7	370.1	50.6	393.7	3593.5
Warrego Paroo	8.8	538.9	122.0	15.1	3.3	5.0	41.0	885.7	370.1	50.6	286.9	3486.7
Namoi	11.6	371.5	122.0	5.8	3.4	5.6	18.2	497.2	368.9	12.7	988.2	3760.4
Central West	9.3	495.8	113.5	5.8	3.4	6.3	17.1	590.1	368.9	22.2	1009.8	3752.5
Maranoa Balonne	8.8	538.9	122.0	15.1	3.3	5.0	41.0	885.7	368.9	50.6	394.8	3593.5
Border Rivers Gwydir	9.3	620.0	105.0	0.0	3.3	7.0	16.1	683.0	368.9	31.8	1031.4	3744.6
Western	7.0	620.0	105.0	0.0	3.3	7.0	16.1	683.0	368.9	31.8	1031.4	3744.6
Lachlan	7.2	499.4	105.0	14.5	2.5	9.8	14.3	1089.0	384.0	54.3	780.3	3937.3
Murrumbidgee	10.0	1018.4	105.0	0.0	3.3	10.3	29.0	746.3	294.4	54.3	1422.4	4147.1
North East	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Murray 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Goulburn Broken	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Murray 2	10.0	1018.4	105.0	10.1	3.3	10.3	29.0	746.3	294.4	54.3	1422.4	4147.1
North Central	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Murray 3	10.0	1018.4	105.0	10.1	3.3	10.3	29.0	746.3	294.4	54.3	1422.4	4147.1
Mallee	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lower Murray Darling	8.6	758.9	105.0	14.5	2.9	10.1	21.7	917.7	339.2	54.3	1101.4	4042.2
SA MDB	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Commodity Cotton Dryland

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine	3.2	420.3	4.9	9.6	2.2	0.0	0.0	391.8	209.6	29.9	91.4	798.8
Border Rivers QLD	3.2	420.3	4.9	9.6	2.2	0.0	0.0	391.8	209.6	29.9	91.4	798.8
Warrego Paroo	3.2	420.3	4.9	9.6	2.2	0.0	0.0	391.8	209.6	29.9	91.4	798.8
Namoi	3.5	191.4	4.9	9.6	0.8	0.0	0.0	316.9	170.9	5.4	277.8	847.1
Central West	3.5	191.4	4.9	9.6	0.8	0.0	0.0	316.9	170.9	5.4	277.8	847.1
Maranoa Balonne	3.2	420.3	4.9	9.6	2.2	0.0	0.0	391.8	209.6	29.9	91.4	798.8
Border Rivers Gwydir	3.5	191.4	4.9	9.6	0.8	0.0	0.0	316.9	170.9	5.4	277.8	847.1
Western	3.5	191.4	4.9	9.6	0.8	0.0	0.0	316.9	170.9	5.4	277.8	847.1
Lachlan	3.5	191.4	4.9	9.6	0.8	0.0	0.0	316.9	170.9	5.4	277.8	847.1
Murrumbidgee	3.5	191.4	4.9	9.6	0.8	0.0	0.0	316.9	170.9	5.4	277.8	847.1
North East	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Murray 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Goulburn Broken	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Murray 2	3.5	191.4	4.9	9.6	0.8	0.0	0.0	316.9	170.9	5.4	277.8	847.1
North Central	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Murray 3	3.5	191.4	4.9	9.6	0.8	0.0	0.0	316.9	170.9	5.4	277.8	847.1
Mallee	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lower Murray Darling	3.5	191.4	4.9	9.6	0.8	0.0	0.0	316.9	170.9	5.4	277.8	847.1
SA MDB	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Commodity Cotton Fixed

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine	7.4	538.9	122.0	15.1	3.3	5.0	41.0	885.7	370.1	50.6	180.0	2872.9
Border Rivers QLD	7.4	538.9	122.0	15.1	3.3	5.0	41.0	885.7	370.1	50.6	393.7	3054.5
Warrego Paroo	7.4	538.9	122.0	15.1	3.3	5.0	41.0	885.7	370.1	50.6	286.9	2963.7
Namoi	9.8	371.5	122.0	5.8	3.4	5.6	18.2	497.2	368.9	12.7	988.2	3196.3
Central West	7.9	495.8	113.5	5.8	3.4	6.3	17.1	590.1	368.9	22.2	1009.8	3189.6
Maranoa Balonne	7.4	538.9	122.0	15.1	3.3	5.0	41.0	885.7	368.9	50.6	394.8	3054.4
Border Rivers Gwydir	7.9	620.0	105.0	0.0	3.3	7.0	16.1	683.0	368.9	31.8	1031.4	3182.9
Western	6.0	620.0	105.0	0.0	3.3	7.0	16.1	683.0	368.9	31.8	1031.4	3182.9
Lachlan	6.1	499.4	105.0	14.5	2.5	9.8	14.3	1089.0	384.0	54.3	780.3	3346.7
Murrumbidgee	8.5	1018.4	105.0	0.0	3.3	10.3	29.0	746.3	294.4	54.3	1422.4	3525.0
North East	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Murray 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Goulburn Broken	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Murray 2	8.5	1018.4	105.0	10.1	3.3	10.3	29.0	746.3	294.4	54.3	1422.4	3525.0
North Central	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Murray 3	8.5	1018.4	105.0	10.1	3.3	10.3	29.0	746.3	294.4	54.3	1422.4	3525.0
Mallee	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lower Murray Darling	7.3	758.9	105.0	14.5	2.9	10.1	21.7	917.7	339.2	54.3	1101.4	3435.9
SA MDB	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Commodity Rice

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Border Rivers QLD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Warrego Paroo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Namoi	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Central West	9.2	362.6	0.0	0.0	1.9	14.3	31.3	455.7	211.8	10.4	239.1	917.0
Maranoa Balonne	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Border Rivers Gwydir	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Western	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lachlan	9.6	360.5	0.0	0.0	1.8	14.6	27.1	418.5	221.3	9.4	242.6	891.8
Murrumbidgee	9.6	360.5	0.0	0.0	1.8	14.6	27.1	418.5	221.3	9.4	242.6	891.8
North East	9.2	362.6	0.0	0.0	1.9	14.3	31.3	455.7	211.8	10.4	239.1	917.0
Murray 1	8.8	364.8	0.0	0.0	1.9	14.0	35.5	493.0	202.3	11.4	235.6	942.2
Goulburn Broken	9.6	360.5	0.0	0.0	1.8	14.6	27.1	418.5	221.3	9.4	242.6	891.8
Murray 2	8.8	364.8	0.0	0.0	1.9	14.0	35.5	493.0	202.3	11.4	235.6	942.2
North Central	7.0	295.0	0.0	0.0	1.9	11.3	39.8	659.4	180.0	11.4	292.4	1143.2
Murray 3	8.8	364.8	0.0	0.0	1.9	14.0	35.5	493.0	202.3	11.4	235.6	942.2
Mallee	9.2	362.6	0.0	0.0	1.9	14.3	31.3	455.7	211.8	10.4	239.1	917.0
Lower Murray Darling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SA MDB	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Commodity Wheat

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine	5.0	167.3	0.0	0.0	1.3	1.5	59.8	143.6	66.7	19.2	47.0	276.5
Border Rivers QLD	5.0	167.3	0.0	0.0	1.3	1.5	59.8	143.6	66.7	19.2	47.0	276.5
Warrego Paroo	5.0	167.3	0.0	0.0	1.3	1.5	59.8	143.6	66.7	19.2	47.0	276.5
Namoi	5.5	181.0	0.0	0.0	1.2	3.4	21.0	239.0	84.3	21.8	86.6	431.7
Central West	5.0	172.0	0.0	0.0	1.9	5.4	12.0	198.0	62.0	52.0	71.2	383.2
Maranoa Balonne	5.0	167.3	0.0	0.0	1.3	1.5	59.8	143.6	66.7	19.2	47.0	276.5
Border Rivers Gwydir	5.5	181.0	0.0	0.0	1.2	3.4	21.0	239.0	84.3	18.5	89.8	431.7
Western	5.5	190.0	0.0	0.0	1.2	3.4	27.7	226.6	84.3	18.5	83.2	412.6
Lachlan	5.0	172.0	0.0	0.0	1.9	5.4	12.0	198.0	62.0	52.0	71.2	383.2
Murrumbidgee	5.4	181.0	0.0	0.0	1.4	3.9	20.4	225.7	78.7	27.7	82.7	414.8
North East	5.4	181.0	0.0	0.0	1.4	3.9	20.4	225.7	78.7	27.7	82.7	414.8
Murray 1	5.8	212.5	0.0	0.0	1.2	3.5	40.9	198.2	37.0	18.5	226.9	480.7
Goulburn Broken	5.4	181.0	0.0	0.0	1.4	3.9	20.4	225.7	78.7	27.7	82.7	414.8
Murray 2	5.8	212.5	0.0	0.0	1.2	3.5	40.9	198.2	37.0	18.5	226.9	480.7
North Central	5.8	212.5	0.0	0.0	1.2	3.5	40.9	198.2	37.0	18.5	226.9	480.7
Murray 3	5.8	212.5	0.0	0.0	1.2	3.5	40.9	198.2	37.0	18.5	226.9	480.7
Mallee	5.4	181.0	0.0	0.0	1.4	3.9	20.4	225.7	78.7	27.7	82.7	414.8
Lower Murray Darling	5.4	181.0	0.0	0.0	1.4	3.9	20.4	225.7	78.7	27.7	82.7	414.8
SA MDB	5.4	181.0	0.0	0.0	1.4	3.9	20.4	225.7	78.7	27.7	82.7	414.8

Commodity Dryland Wheat

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine	2.5	182.8	0.0	0.0	0.5	0.0	0.0	100.8	47.6	7.8	26.4	182.7
Border Rivers QLD	2.5	182.8	0.0	0.0	0.5	0.0	0.0	100.8	47.6	7.8	26.4	182.7
Warrego Paroo	2.5	182.8	0.0	0.0	0.5	0.0	0.0	100.8	47.6	7.8	26.4	182.7
Namoi	2.5	190.0	0.0	0.0	0.6	0.0	0.0	156.6	38.4	24.4	44.4	263.8
Central West	2.4	170.0	0.0	0.0	0.9	0.0	0.0	105.1	25.0	25.0	33.9	189.0
Maranoa Balonne	2.5	182.8	0.0	0.0	0.5	0.0	0.0	100.8	47.6	7.8	26.4	182.7
Border Rivers Gwydir	2.5	181.3	0.0	0.0	0.7	0.0	0.0	126.9	33.0	23.7	33.9	217.4
Western	2.7	184.0	0.0	0.0	0.5	0.0	0.0	118.8	35.6	21.8	23.3	199.5
Lachlan	2.5	181.3	0.0	0.0	0.7	0.0	0.0	126.9	33.0	23.7	33.9	217.4
Murrumbidgee	3.0	181.3	0.0	0.0	0.7	0.0	0.0	126.9	33.0	23.7	33.9	217.4
North East	2.5	181.3	0.0	0.0	0.7	0.0	0.0	126.9	33.0	23.7	33.9	217.4
Murray 1	3.0	181.3	0.0	0.0	0.7	0.0	0.0	126.9	33.0	23.7	33.9	217.4
Goulburn Broken	2.5	181.3	0.0	0.0	0.7	0.0	0.0	126.9	33.0	23.7	33.9	217.4
Murray 2	3.0	181.3	0.0	0.0	0.7	0.0	0.0	126.9	33.0	23.7	33.9	217.4
North Central	2.5	181.3	0.0	0.0	0.7	0.0	0.0	126.9	33.0	23.7	33.9	217.4
Murray 3	3.0	181.3	0.0	0.0	0.7	0.0	0.0	126.9	33.0	23.7	33.9	217.4
Mallee	2.5	181.3	0.0	0.0	0.7	0.0	0.0	126.9	33.0	23.7	33.9	217.4
Lower Murray Darling	2.5	181.3	0.0	0.0	0.7	0.0	0.0	126.9	33.0	23.7	33.9	217.4
SA MDB	2.5	181.3	0.0	0.0	0.7	0.0	0.0	126.9	33.0	23.7	33.9	217.4

Commodity: Rice Production System Normal (Rice PSN)

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Border Rivers QLD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Warrego Paroo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Namoi	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Central West	8.6	295.3	0.3	1.5	3.0	8.4	18.4	318.2	183.9	77.3	527.4	1111.5
Maranoa Balonne	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Border Rivers Gwydir	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Western	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lachlan	8.8	295.3	0.3	1.5	2.9	8.5	17.0	305.8	187.1	77.0	528.5	1103.1
Murrumbidgee	9.0	295.3	0.3	1.5	2.6	7.5	22.6	324.3	198.2	60.8	536.2	1124.1
North East	8.9	295.3	0.3	1.5	2.6	7.4	24.0	336.7	195.1	61.1	535.0	1132.5
Murray 1	9.0	295.3	0.3	1.5	2.5	7.0	39.1	330.8	164.1	55.3	630.0	1184.9
Goulburn Broken	9.0	295.3	0.3	1.5	2.6	7.5	22.6	324.3	198.2	60.8	536.2	1124.1
Murray 2	9.0	295.3	0.3	1.5	2.5	7.0	39.1	330.8	164.1	55.3	630.0	1184.9
North Central	8.4	295.3	0.3	1.5	2.5	6.1	40.5	386.3	156.7	55.3	649.0	1251.9
Murray 3	9.0	295.3	0.3	1.5	2.5	7.0	39.1	330.8	164.1	55.3	630.0	1184.9
Mallee	8.9	295.3	0.3	1.5	2.6	7.4	24.0	336.7	195.1	61.1	535.0	1132.5
Lower Murray Darling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SA MDB	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Commodity: Rice Production System Drought (Rice PSD)

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Border Rivers QLD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Warrego Paroo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Namoi	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Central West	4.7	223.3	0.0	0.0	1.2	4.8	10.4	222.0	87.3	20.1	102.3	431.7
Maranoa Balonne	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Border Rivers Gwydir	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Western	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lachlan	4.9	223.3	0.0	0.0	1.0	4.9	9.0	224.1	95.7	19.0	103.4	442.2
Murrumbidgee	5.2	223.3	0.0	0.0	1.0	4.9	9.0	224.1	95.7	19.0	103.4	442.2
North East	4.8	223.3	0.0	0.0	1.1	4.8	10.4	236.5	92.6	19.3	102.3	450.6
Murray 1	4.9	223.3	0.0	0.0	1.1	4.7	11.8	248.9	89.4	19.6	101.1	459.0
Goulburn Broken	4.9	223.3	0.0	0.0	1.0	4.9	9.0	224.1	95.7	19.0	103.4	442.2
Murray 2	4.9	223.3	0.0	0.0	1.1	4.7	11.8	248.9	89.4	19.6	101.1	459.0
North Central	4.0	223.3	0.0	0.0	1.1	3.8	13.3	304.4	82.0	19.6	120.0	526.0
Murray 3	4.9	223.3	0.0	0.0	1.1	4.7	11.8	248.9	89.4	19.6	101.1	459.0
Mallee	4.8	223.3	0.0	0.0	1.1	4.8	10.4	236.5	92.6	19.3	102.3	450.6
Lower Murray Darling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SA MDB	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Commodity: Rice Production System Wet (Rice PSW)

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Border Rivers QLD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Warrego Paroo	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Namoi	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Central West	9.8	331.3	0.5	2.2	3.5	8.4	18.4	335.4	219.9	96.9	727.5	1386.7
Maranoa Balonne	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Border Rivers Gwydir	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Western	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lachlan	9.9	331.3	0.5	2.2	3.5	8.5	17.0	322.9	223.1	96.6	728.6	1378.2
Murrumbidgee	10.2	331.3	0.5	2.2	3.2	7.5	22.6	341.4	234.2	80.4	736.3	1399.3
North East	10.0	331.3	0.5	2.2	3.2	7.4	24.0	353.8	231.1	80.7	735.1	1407.7
Murray 1	10.1	331.3	0.5	2.2	3.1	7.0	39.1	347.9	200.1	74.9	830.1	1460.1
Goulburn Broken	10.2	331.3	0.5	2.2	3.2	7.5	22.6	341.4	234.2	80.4	736.3	1399.3
Murray 2	10.1	331.3	0.5	2.2	3.1	7.0	39.1	347.9	200.1	74.9	830.1	1460.1
North Central	9.5	331.3	0.5	2.2	3.1	6.1	40.5	403.4	192.7	74.9	849.1	1527.1
Murray 3	10.1	331.3	0.5	2.2	3.1	7.0	39.1	347.9	200.1	74.9	830.1	1460.1
Mallee	10.0	331.3	0.5	2.2	3.2	7.4	24.0	353.8	231.1	80.7	735.1	1407.7
Lower Murray Darling	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SA MDB	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Commodity: Grain Legumes

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine	2.8	546.8	0.0	0.0	2.0	3.8	51.6	312.1	156.8	39.5	144.8	653.2
Border Rivers QLD	2.9	450.5	0.0	0.0	1.7	3.5	51.0	261.4	156.8	16.3	144.1	578.6
Warrego Paroo	2.8	498.7	0.0	0.0	1.9	3.6	51.3	286.8	156.8	27.9	144.5	615.9
Namoi	1.9	499.9	0.0	0.0	2.0	2.6	41.4	172.9	78.4	7.9	147.9	407.1
Central West	1.8	915.6	0.0	0.0	1.9	7.0	58.2	589.2	212.3	7.9	346.7	1156.1
Maranoa Balonne	2.9	450.5	0.0	0.0	1.7	3.5	51.0	261.4	175.0	21.8	131.1	589.3
Border Rivers Gwydir	2.1	478.5	0.0	0.0	1.0	3.5	40.6	161.5	175.3	21.2	61.9	419.8
Western	2.3	420.4	0.0	0.0	1.4	3.8	38.2	126.2	114.9	22.2	119.6	382.8
Lachlan	2.5	701.1	0.0	0.0	2.0	7.8	43.0	433.9	161.4	5.1	277.0	877.4
Murrumbidgee	3.2	486.7	0.0	0.0	2.0	8.7	27.7	278.6	110.4	2.3	207.3	598.7
North East	2.9	499.6	0.0	0.0	1.8	8.5	31.6	265.2	102.7	13.8	221.5	603.2
Murray 1	2.6	512.5	0.0	0.0	1.7	8.4	35.5	251.8	95.0	25.3	235.7	607.8
Goulburn Broken	3.2	486.7	0.0	0.0	2.0	8.7	27.7	278.6	110.4	2.3	207.3	598.7
Murray 2	2.6	512.5	0.0	0.0	1.7	8.4	35.5	251.8	95.0	25.3	235.7	607.8
North Central	3.3	427.5	0.0	0.0	2.5	4.8	39.8	285.2	40.8	25.3	299.8	651.0
Murray 3	2.6	512.5	0.0	0.0	1.7	8.4	35.5	251.8	95.0	25.3	235.7	607.8
Mallee	2.9	499.6	0.0	0.0	1.8	8.5	31.6	265.2	102.7	13.8	221.5	603.2
Lower Murray Darling	3.0	450.0	0.0	0.0	3.6	9.0	26.3	269.3	75.0	55.5	212.8	612.5
SA MDB	2.9	499.6	0.0	0.0	1.8	8.5	31.6	265.2	102.7	13.8	221.5	603.2

Commodity: Wheat -Grain Legumes Normal

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine	4.0	280.0	0.0	0.0	1.6	2.6	55.7	227.9	111.7	29.4	95.9	464.9
Border Rivers QLD	4.1	280.0	0.0	0.0	1.5	2.5	55.4	202.5	111.7	17.7	95.6	427.6
Warrego Paroo	4.0	280.0	0.0	0.0	1.6	2.6	55.6	215.2	111.7	23.6	95.7	446.2
Namoi	3.8	280.0	0.0	0.0	1.6	3.0	31.2	205.9	81.3	14.8	117.3	419.4
Central West	3.5	280.0	0.0	0.0	1.9	6.2	35.1	393.6	137.2	29.9	209.0	769.6
Maranoa Balonne	4.1	280.0	0.0	0.0	1.5	2.5	55.4	202.5	120.8	20.5	89.1	432.9
Border Rivers Gwydir	3.9	280.0	0.0	0.0	1.1	3.5	30.8	200.3	129.8	19.9	75.9	425.7
Western	4.0	280.0	0.0	0.0	1.3	3.6	32.9	176.4	99.6	20.4	101.4	397.7
Lachlan	3.9	280.0	0.0	0.0	1.9	6.6	27.5	315.9	111.7	28.5	174.1	630.3
Murrumbidgee	4.4	280.0	0.0	0.0	1.7	6.3	24.1	252.1	94.5	15.0	145.0	506.7
North East	4.3	280.0	0.0	0.0	1.6	6.2	26.0	245.4	90.7	20.7	152.1	509.0
Murray 1	4.3	280.0	0.0	0.0	1.4	5.9	38.2	225.0	66.0	21.9	231.3	544.2
Goulburn Broken	4.4	280.0	0.0	0.0	1.7	6.3	24.1	252.1	94.5	15.0	145.0	506.7
Murray 2	4.3	280.0	0.0	0.0	1.4	5.9	38.2	225.0	66.0	21.9	231.3	544.2
North Central	4.6	280.0	0.0	0.0	1.9	4.1	40.4	241.7	38.9	21.9	263.4	565.8
Murray 3	4.3	280.0	0.0	0.0	1.4	5.9	38.2	225.0	66.0	21.9	231.3	544.2
Mallee	4.3	280.0	0.0	0.0	1.6	6.2	26.0	245.4	90.7	20.7	152.1	509.0
Lower Murray Darling	4.3	280.0	0.0	0.0	2.5	6.5	23.3	247.5	76.9	41.6	147.7	513.7
SA MDB	4.3	280.0	0.0	0.0	1.6	6.2	26.0	245.4	90.7	20.7	152.1	509.0

Commodity: Wheat -Grain Legumes Drought

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine	5.5	231.0	0.0	0.0	1.4	1.7	65.8	157.9	73.3	21.1	51.7	304.2
Border Rivers QLD	5.5	231.0	0.0	0.0	1.4	1.7	65.8	157.9	73.3	21.1	51.7	304.2
Warrego Paroo	5.5	231.0	0.0	0.0	1.4	1.7	65.8	157.9	73.3	21.1	51.7	304.2
Namoi	6.1	231.0	0.0	0.0	1.3	3.7	23.0	262.9	92.7	23.9	95.3	474.8
Central West	5.5	231.0	0.0	0.0	2.0	5.9	13.2	217.8	68.2	57.2	78.3	421.5
Maranoa Balonne	5.5	231.0	0.0	0.0	1.4	1.7	65.8	157.9	73.3	21.1	51.7	304.2
Border Rivers Gwydir	6.1	231.0	0.0	0.0	1.3	3.7	23.0	262.9	92.7	20.4	98.8	474.8
Western	6.1	231.0	0.0	0.0	1.3	3.7	30.4	249.3	92.7	20.4	91.6	453.9
Lachlan	5.5	231.0	0.0	0.0	2.0	5.9	13.2	217.8	68.2	57.2	78.3	421.5
Murrumbidgee	5.9	231.0	0.0	0.0	1.5	4.3	22.4	248.2	86.6	30.5	91.0	456.2
North East	5.9	231.0	0.0	0.0	1.5	4.3	22.4	248.2	86.6	30.5	91.0	456.2
Murray 1	6.3	231.0	0.0	0.0	1.3	3.9	45.0	218.1	40.7	20.4	249.6	528.8
Goulburn Broken	5.9	231.0	0.0	0.0	1.5	4.3	22.4	248.2	86.6	30.5	91.0	456.2
Murray 2	6.3	231.0	0.0	0.0	1.3	3.9	45.0	218.1	40.7	20.4	249.6	528.8
North Central	6.3	231.0	0.0	0.0	1.3	3.9	45.0	218.1	40.7	20.4	249.6	528.8
Murray 3	6.3	231.0	0.0	0.0	1.3	3.9	45.0	218.1	40.7	20.4	249.6	528.8
Mallee	5.9	231.0	0.0	0.0	1.5	4.3	22.4	248.2	86.6	30.5	91.0	456.2
Lower Murray Darling	5.9	231.0	0.0	0.0	1.5	4.3	22.4	248.2	86.6	30.5	91.0	456.2
SA MDB	5.9	231.0	0.0	0.0	1.5	4.3	22.4	248.2	86.6	30.5	91.0	456.2

Commodity: Wheat -Grain Legumes Wet

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine	3.7	318.5	0.0	0.0	1.9	3.2	57.1	268.7	133.1	34.4	117.8	554.0
Border Rivers QLD	3.8	318.5	0.0	0.0	1.6	3.0	56.7	233.2	133.1	18.1	117.4	501.8
Warrego Paroo	3.7	318.5	0.0	0.0	1.8	3.1	56.9	251.0	133.1	26.2	117.6	527.9
Namoi	3.2	318.5	0.0	0.0	1.8	3.0	36.3	204.7	84.4	13.1	133.8	436.0
Central West	3.0	318.5	0.0	0.0	2.0	6.8	44.9	481.7	170.3	23.7	267.6	943.4
Maranoa Balonne	3.8	318.5	0.0	0.0	1.6	3.0	56.7	233.2	145.8	22.0	108.2	509.3
Border Rivers Gwydir	3.4	318.5	0.0	0.0	1.1	3.6	35.8	196.7	152.2	21.3	74.7	445.0
Western	3.5	318.5	0.0	0.0	1.4	3.8	36.4	167.6	109.9	22.0	112.9	412.4
Lachlan	3.5	318.5	0.0	0.0	2.0	7.4	34.3	373.0	134.6	21.8	218.8	748.3
Murrumbidgee	4.1	318.5	0.0	0.0	1.9	7.4	26.5	274.0	104.8	11.3	174.1	564.2
North East	3.9	318.5	0.0	0.0	1.8	7.3	29.3	264.6	99.4	19.4	184.0	567.4
Murray 1	3.8	318.5	0.0	0.0	1.6	7.1	39.2	245.6	79.5	24.2	244.4	593.7
Goulburn Broken	4.1	318.5	0.0	0.0	1.9	7.4	26.5	274.0	104.8	11.3	174.1	564.2
Murray 2	3.8	318.5	0.0	0.0	1.6	7.1	39.2	245.6	79.5	24.2	244.4	593.7
North Central	4.3	318.5	0.0	0.0	2.2	4.6	42.2	269.0	41.5	24.2	289.3	623.9
Murray 3	3.8	318.5	0.0	0.0	1.6	7.1	39.2	245.6	79.5	24.2	244.4	593.7
Mallee	3.9	318.5	0.0	0.0	1.8	7.3	29.3	264.6	99.4	19.4	184.0	567.4
Lower Murray Darling	4.0	318.5	0.0	0.0	3.0	7.7	25.5	267.5	80.0	48.5	177.9	573.9
SA MDB	3.9	318.5	0.0	0.0	1.8	7.3	29.3	264.6	99.4	19.4	184.0	567.4

Commodity: Sorghum

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine	8.0	188.2	0.0	0.0	1.3	4.0	41.0	292.4	53.0	24.5	121.1	490.9
Border Rivers QLD	8.0	188.2	0.0	0.0	1.3	4.0	41.0	292.4	53.0	24.5	121.1	490.9
Warrego Paroo	8.0	188.2	0.0	0.0	1.3	4.0	41.0	292.4	53.0	24.5	121.1	490.9
Namoi	6.8	186.7	0.0	0.0	0.6	2.9	27.2	316.6	66.7	12.2	152.5	547.9
Central West	6.8	186.7	0.0	0.0	0.6	2.9	27.2	316.6	66.7	12.2	152.5	547.9
Maranoa Balonne	8.0	188.2	0.0	0.0	1.3	4.0	41.0	292.4	53.0	24.5	121.1	490.9
Border Rivers Gwydir	6.8	186.7	0.0	0.0	0.6	2.9	27.2	316.6	66.7	12.2	152.5	547.9
Western	6.8	186.7	0.0	0.0	0.6	2.9	27.2	316.6	66.7	12.2	152.5	547.9
Lachlan	7.7	193.3	0.0	0.0	1.5	5.2	28.1	315.1	59.8	35.1	166.4	576.5
Murrumbidgee	8.5	200.0	0.0	0.0	2.5	7.5	29.1	313.7	53.0	57.9	180.4	605.0
North East	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Murray 1	8.5	200.0	0.0	0.0	2.5	7.5	29.1	313.7	53.0	57.9	180.4	605.0
Goulburn Broken	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Murray 2	8.5	200.0	0.0	0.0	2.5	7.5	29.1	313.7	53.0	57.9	180.4	605.0
North Central	8.5	200.0	0.0	0.0	2.5	7.5	29.1	313.7	53.0	57.9	180.4	605.0
Murray 3	8.5	200.0	0.0	0.0	2.5	7.5	29.1	313.7	53.0	57.9	180.4	605.0
Mallee	8.5	200.0	0.0	0.0	2.5	7.5	29.1	313.7	53.0	57.9	180.4	605.0
Lower Murray Darling	8.5	200.0	0.0	0.0	2.5	7.5	29.1	313.7	53.0	57.9	180.4	605.0
SA MDB	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Commodity: Oilseeds

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine	3.0	346.5	0.0	0.0	1.3	4.0	41.0	168.2	87.7	24.5	59.1	339.3
Border Rivers QLD	3.0	346.5	0.0	0.0	1.3	4.0	41.0	168.2	0.0	24.5	152.7	345.3
Warrego Paroo	3.0	346.5	0.0	0.0	1.3	4.0	41.0	168.2	87.7	24.5	105.9	386.1
Namoi	2.5	530.0	0.0	0.0	0.9	3.0	27.6	222.4	47.7	12.7	101.3	384.1
Central West	2.6	340.0	0.0	0.0	1.9	5.4	12.0	225.9	82.0	46.5	38.9	393.4
Maranoa Balonne	3.0	346.5	0.0	0.0	1.3	4.0	41.0	168.2	0.0	24.5	152.7	345.3
Border Rivers Gwydir	3.0	390.0	0.0	0.0	1.6	5.0	30.9	59.7	0.0	38.2	304.9	402.7
Western	2.0	495.0	0.0	0.0	0.7	2.5	15.5	118.8	21.5	19.1	157.3	316.7
Lachlan	2.8	350.3	0.0	0.0	2.6	6.7	19.1	293.6	59.5	51.0	85.1	489.2
Murrumbidgee	3.0	360.5	0.0	0.0	3.3	8.0	26.3	361.3	37.1	55.5	131.2	585.0
North East	3.0	360.5	0.0	0.0	3.3	8.0	26.3	361.3	37.1	55.5	131.2	585.0
Murray 1	3.0	360.5	0.0	0.0	3.3	8.0	26.3	361.3	37.1	55.5	131.2	585.0
Goulburn Broken	3.0	360.5	0.0	0.0	3.3	8.0	26.3	361.3	37.1	55.5	131.2	585.0
Murray 2	3.0	360.5	0.0	0.0	3.3	8.0	26.3	361.3	37.1	55.5	131.2	585.0
North Central	2.9	485.0	0.0	0.0	0.0	3.5	39.8	234.6	68.5	0.0	198.2	501.3
Murray 3	3.0	360.5	0.0	0.0	3.3	8.0	26.3	361.3	37.1	55.5	131.2	585.0
Mallee	3.0	360.5	0.0	0.0	3.3	8.0	26.3	361.3	37.1	55.5	131.2	585.0
Lower Murray Darling	3.0	360.5	0.0	0.0	3.3	8.0	26.3	361.3	37.1	55.5	131.2	585.0
SA MDB	3.0	360.5	0.0	0.0	3.3	8.0	26.3	361.3	37.1	55.5	131.2	585.0

Commodity: Oilseeds

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine	3.0	346.5	0.0	0.0	1.3	4.0	41.0	168.2	87.7	24.5	59.1	339.3
Border Rivers QLD	3.0	346.5	0.0	0.0	1.3	4.0	41.0	168.2	0.0	24.5	152.7	345.3
Warrego Paroo	3.0	346.5	0.0	0.0	1.3	4.0	41.0	168.2	87.7	24.5	105.9	386.1
Namoi	2.5	530.0	0.0	0.0	0.9	3.0	27.6	222.4	47.7	12.7	101.3	384.1
Central West	2.6	340.0	0.0	0.0	1.9	5.4	12.0	225.9	82.0	46.5	38.9	393.4
Maranoa Balonne	3.0	346.5	0.0	0.0	1.3	4.0	41.0	168.2	0.0	24.5	152.7	345.3
Border Rivers Gwydir	3.0	390.0	0.0	0.0	1.6	5.0	30.9	59.7	0.0	38.2	304.9	402.7
Western	2.0	495.0	0.0	0.0	0.7	2.5	15.5	118.8	21.5	19.1	157.3	316.7
Lachlan	2.8	350.3	0.0	0.0	2.6	6.7	19.1	293.6	59.5	51.0	85.1	489.2
Murrumbidgee	3.0	360.5	0.0	0.0	3.3	8.0	26.3	361.3	37.1	55.5	131.2	585.0
North East	3.0	360.5	0.0	0.0	3.3	8.0	26.3	361.3	37.1	55.5	131.2	585.0
Murray 1	3.0	360.5	0.0	0.0	3.3	8.0	26.3	361.3	37.1	55.5	131.2	585.0
Goulburn Broken	3.0	360.5	0.0	0.0	3.3	8.0	26.3	361.3	37.1	55.5	131.2	585.0
Murray 2	3.0	360.5	0.0	0.0	3.3	8.0	26.3	361.3	37.1	55.5	131.2	585.0
North Central	2.9	485.0	0.0	0.0	0.0	3.5	39.8	234.6	68.5	0.0	198.2	501.3
Murray 3	3.0	360.5	0.0	0.0	3.3	8.0	26.3	361.3	37.1	55.5	131.2	585.0
Mallee	3.0	360.5	0.0	0.0	3.3	8.0	26.3	361.3	37.1	55.5	131.2	585.0
Lower Murray Darling	3.0	360.5	0.0	0.0	3.3	8.0	26.3	361.3	37.1	55.5	131.2	585.0
SA MDB	3.0	360.5	0.0	0.0	3.3	8.0	26.3	361.3	37.1	55.5	131.2	585.0

Commodity: Chickpeas

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine	2.8	546.8	0.0	0.0	2.0	3.8	51.6	312.1	156.8	39.5	144.8	653.2
Border Rivers QLD	2.9	450.5	0.0	0.0	1.7	3.5	51.0	261.4	156.8	16.3	144.1	578.6
Warrego Paroo	2.8	498.7	0.0	0.0	1.9	3.6	51.3	286.8	156.8	27.9	144.5	615.9
Namoi	1.9	499.9	0.0	0.0	2.0	2.6	41.4	172.9	78.4	7.9	147.9	407.1
Central West	1.8	915.6	0.0	0.0	1.9	7.0	58.2	589.2	212.3	7.9	346.7	1156.1
Maranoa Balonne	2.9	450.5	0.0	0.0	1.7	3.5	51.0	261.4	175.0	21.8	131.1	589.3
Border Rivers Gwydir	2.1	478.5	0.0	0.0	1.0	3.5	40.6	161.5	175.3	21.2	61.9	419.8
Western	2.3	420.4	0.0	0.0	1.4	3.8	38.2	126.2	114.9	22.2	119.6	382.8
Lachlan	2.5	701.1	0.0	0.0	2.0	7.8	43.0	433.9	161.4	5.1	277.0	877.4
Murrumbidgee	3.2	486.7	0.0	0.0	2.0	8.7	27.7	278.6	110.4	2.3	207.3	598.7
North East												0.0
Murray 1												0.0
Goulburn Broken												0.0
Murray 2	2.6	512.5	0.0	0.0	1.7	8.4	35.5	251.8	95.0	25.3	235.7	607.8
North Central												0.0
Murray 3	2.6	512.5	0.0	0.0	1.7	8.4	35.5	251.8	95.0	25.3	235.7	607.8
Mallee												0.0
Lower Murray Darling	3.0	450.0	0.0	0.0	3.6	9.0	26.3	269.3	75.0	55.5	212.8	612.5
SA MDB	2.8	546.8	0.0	0.0	2.0	3.8	51.6	312.1	156.8	39.5	144.8	653.2

Commodity: Dairy-H

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine	4020.0	0.3	0.0	0.0	2.0	4.8	20.0	103.4	0.0	20.0	618.6	742.0
Border Rivers QLD	4020.0	0.3	0.0	0.0	2.0	4.8	20.0	103.4	0.0	20.0	618.6	742.0
Warrego Paroo	0.0	0.3	0.0	0.0	2.0	0.0	20.0	103.4	0.0	20.0	0.0	123.4
Namoi	5400.0	0.3	0.0	0.0	2.0	4.8	20.0	103.4	0.0	20.0	618.6	742.0
Central West	5400.0	0.3	0.0	0.0	2.0	4.8	20.0	103.4	0.0	20.0	618.6	742.0
Maranoa Balonne	0.0	0.3	0.0	0.0	2.0	0.0	20.0	103.4	0.0	20.0	0.0	123.4
Border Rivers Gwydir	5400.0	0.3	0.0	0.0	2.0	4.8	20.0	103.4	0.0	20.0	618.6	742.0
Western	5400.0	0.3	0.0	0.0	2.0	4.8	20.0	103.4	0.0	20.0	618.6	742.0
Lachlan	7040.0	0.3	0.0	0.0	2.0	4.1	20.0	103.4	0.0	20.0	569.7	693.1
Murrumbidgee	7040.0	0.3	0.0	0.0	2.0	4.1	20.0	103.4	0.0	20.0	569.7	693.1
North East	10780.0	0.3	0.0	0.0	2.0	4.9	20.0	103.4	0.0	20.0	618.6	742.0
Murray 1	9310.0	0.3	0.0	0.0	2.0	4.5	20.0	103.4	0.0	20.0	618.6	742.0
Goulburn Broken	10780.0	0.3	0.0	0.0	2.0	4.9	20.0	103.4	0.0	20.0	618.6	742.0
Murray 2	9310.0	0.3	0.0	0.0	2.0	4.5	20.0	103.4	0.0	20.0	618.6	742.0
North Central	10780.0	0.3	0.0	0.0	2.0	4.9	20.0	103.4	0.0	20.0	618.6	742.0
Murray 3	9310.0	0.3	0.0	0.0	2.0	4.5	20.0	103.4	0.0	20.0	618.6	742.0
Mallee	10780.0	0.3	0.0	0.0	2.0	4.9	20.0	103.4	0.0	20.0	618.6	742.0
Lower Murray Darling	5400.0	0.3	0.0	0.0	2.0	4.8	20.0	103.4	0.0	20.0	618.6	742.0
SA MDB	4500.0	0.3	0.0	0.0	2.0	4.8	20.0	103.4	0.0	20.0	618.6	742.0

Commodity: Dairy-L

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine	3960.0	0.3	0.0	0.0	2.0	3.2	20.0	103.4	0.0	20.0	668.6	792.0
Border Rivers QLD	3960.0	0.3	0.0	0.0	2.0	3.2	20.0	103.4	0.0	20.0	668.6	792.0
Warrego Paroo	0.0	0.3	0.0	0.0	2.0	0.0	20.0	103.4	0.0	20.0	0.0	123.4
Namoi	5400.0	0.3	0.0	0.0	2.0	4.2	20.0	103.4	0.0	20.0	648.6	772.0
Central West	5400.0	0.3	0.0	0.0	2.0	4.2	20.0	103.4	0.0	20.0	648.6	772.0
Maranoa Balonne	0.0	0.3	0.0	0.0	2.0	0.0	20.0	103.4	0.0	20.0	0.0	123.4
Border Rivers Gwydir	5400.0	0.3	0.0	0.0	2.0	4.2	20.0	103.4	0.0	20.0	648.6	772.0
Western	5400.0	0.3	0.0	0.0	2.0	4.2	20.0	103.4	0.0	20.0	648.6	772.0
Lachlan	7040.0	0.3	0.0	0.0	2.0	3.6	20.0	103.4	0.0	20.0	588.6	712.0
Murrumbidgee	7040.0	0.3	0.0	0.0	2.0	3.6	20.0	103.4	0.0	20.0	589.3	712.7
North East	10500.0	0.3	0.0	0.0	2.0	3.6	20.0	103.4	0.0	20.0	618.6	742.0
Murray 1	9310.0	0.3	0.0	0.0	2.0	3.6	20.0	103.4	0.0	20.0	638.2	761.5
Goulburn Broken	10500.0	0.3	0.0	0.0	2.0	3.6	20.0	103.4	0.0	20.0	618.6	742.0
Murray 2	9310.0	0.3	0.0	0.0	2.0	3.6	20.0	103.4	0.0	20.0	638.2	761.5
North Central	10500.0	0.3	0.0	0.0	2.0	3.6	20.0	103.4	0.0	20.0	618.6	742.0
Murray 3	9310.0	0.3	0.0	0.0	2.0	3.6	20.0	103.4	0.0	20.0	638.2	761.5
Mallee	10500.0	0.3	0.0	0.0	2.0	3.6	20.0	103.4	0.0	20.0	618.6	742.0
Lower Murray Darling	5400.0	0.3	0.0	0.0	2.0	3.6	20.0	103.4	0.0	20.0	648.0	771.3
SA MDB	4500.0	0.3	0.0	0.0	2.0	3.9	20.0	103.4	0.0	20.0	667.5	790.9

Commodity: Sheep

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine	9.8	49.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.1	23.1
Border Rivers QLD	9.8	49.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.1	23.1
Warrego Paroo	9.8	49.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.1	23.1
Namoi	9.8	49.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.1	23.1
Central West	9.8	49.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.1	23.1
Maranoa Balonne	9.8	49.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.1	23.1
Border Rivers Gwydir	9.8	49.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.1	23.1
Western	9.8	49.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.1	23.1
Lachlan	9.8	49.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.1	23.1
Murrumbidgee	8.0	44.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.6	15.6
North East	6.0	37.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.9	7.9
Murray 1	6.0	37.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.9	7.9
Goulburn Broken	6.0	37.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.9	7.9
Murray 2	8.0	44.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.6	15.6
North Central	6.0	37.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.9	7.9
Murray 3	10.0	51.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.3	23.3
Mallee	8.0	44.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.6	15.6
Lower Murray Darling	10.0	40.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.4	16.4
SA MDB	8.0	44.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.6	15.6

Commodity: Sheep on Irrigated Pasture

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine	12.5	46.7	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	262.7	576.4
Border Rivers QLD	12.5	46.7	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	262.7	576.4
Warrego Paroo	12.5	46.7	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	262.7	576.4
Namoi	12.5	46.7	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	262.7	576.4
Central West	12.5	54.0	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	319.6	633.2
Maranoa Balonne	12.5	46.7	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	262.7	576.4
Border Rivers Gwydir	12.5	46.7	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	262.7	576.4
Western	12.5	50.4	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	291.2	604.8
Lachlan	15.0	49.9	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	272.6	586.2
Murrumbidgee	15.0	44.9	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	189.5	503.1
North East	15.0	37.3	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	95.6	409.3
Murray 1	20.0	37.3	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	127.5	441.1
Goulburn Broken	15.0	37.3	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	100.4	414.0
Murray 2	20.0	44.9	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	252.6	566.2
North Central	15.0	37.3	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	95.6	409.3
Murray 3	15.0	51.1	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	283.3	596.9
Mallee	17.5	44.5	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	213.2	526.8
Lower Murray Darling	15.0	40.2	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	180.4	494.1
SA MDB	17.5	44.5	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	213.2	526.8

Commodity: Sheep- Wheat Normal

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine	8.8	92.1	0.0	0.0	1.1	4.8	71.3	218.2	33.3	20.1	154.9	426.4
Border Rivers QLD	8.8	92.1	0.0	0.0	1.1	4.8	71.3	218.2	33.3	20.1	154.9	426.4
Warrego Paroo	8.8	92.1	0.0	0.0	1.1	4.8	71.3	218.2	33.3	20.1	154.9	426.4
Namoi	9.0	95.4	0.0	0.0	1.1	5.7	51.9	265.9	42.1	21.3	174.7	504.0
Central West	8.8	92.1	0.0	0.0	1.4	6.7	47.4	245.4	31.0	36.4	195.4	508.2
Maranoa Balonne	8.8	92.1	0.0	0.0	1.1	4.8	71.3	218.2	33.3	20.1	154.9	426.4
Border Rivers Gwydir	9.0	95.4	0.0	0.0	1.1	5.7	51.9	265.9	42.1	19.7	176.3	504.0
Western	9.0	95.4	0.0	0.0	1.1	5.7	55.2	259.7	42.1	19.7	187.2	508.7
Lachlan	10.0	86.3	0.0	0.0	1.4	6.7	47.4	245.4	31.0	36.4	171.9	484.7
Murrumbidgee	10.2	88.6	0.0	0.0	1.2	6.0	51.6	259.2	39.4	24.3	136.1	458.9
North East	10.2	88.6	0.0	0.0	1.2	6.0	51.6	259.2	39.4	24.3	89.2	412.0
Murray 1	12.9	81.8	0.0	0.0	1.1	5.8	61.9	245.5	18.5	19.7	177.2	460.9
Goulburn Broken	10.2	88.6	0.0	0.0	1.2	6.0	51.6	259.2	39.4	24.3	91.6	414.4
Murray 2	12.9	81.8	0.0	0.0	1.1	5.8	61.9	245.5	18.5	19.7	239.8	523.5
North Central	10.4	90.7	0.0	0.0	1.1	5.8	61.9	245.5	18.5	19.7	161.3	445.0
Murray 3	10.4	90.7	0.0	0.0	1.1	5.8	61.9	245.5	18.5	19.7	255.1	538.8
Mallee	11.4	83.8	0.0	0.0	1.2	6.0	51.6	259.2	39.4	24.3	148.0	470.8
Lower Murray Darling	10.2	88.6	0.0	0.0	1.2	6.0	51.6	259.2	39.4	24.3	131.6	454.4
SA MDB	11.4	83.8	0.0	0.0	1.2	6.0	51.6	259.2	39.4	24.3	148.0	470.8

Commodity: Sheep- Wheat Drought

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine	11.8	52.0	0.0	0.0	1.0	7.4	80.5	277.8	6.7	20.7	241.2	546.4
Border Rivers QLD	11.8	52.0	0.0	0.0	1.0	7.4	80.5	277.8	6.7	20.7	241.2	546.4
Warrego Paroo	11.8	52.0	0.0	0.0	1.0	7.4	80.5	277.8	6.7	20.7	241.2	546.4
Namoi	11.8	52.7	0.0	0.0	1.0	7.5	76.6	287.4	8.4	21.0	245.1	561.9
Central West	11.8	52.0	0.0	0.0	1.0	7.7	75.7	283.3	6.2	24.0	294.7	608.2
Maranoa Balonne	11.8	52.0	0.0	0.0	1.0	7.4	80.5	277.8	6.7	20.7	241.2	546.4
Border Rivers Gwydir	11.8	52.7	0.0	0.0	1.0	7.5	76.6	287.4	8.4	20.7	245.4	561.9
Western	11.8	52.7	0.0	0.0	1.0	7.5	77.3	286.1	8.4	20.7	270.4	585.6
Lachlan	14.0	50.9	0.0	0.0	1.0	7.7	75.7	283.3	6.2	24.0	252.4	565.9
Murrumbidgee	14.0	51.3	0.0	0.0	1.0	7.6	76.6	286.0	7.9	21.6	178.8	494.2
North East	14.0	51.3	0.0	0.0	1.0	7.6	76.6	286.0	7.9	21.6	94.3	409.8
Murray 1	18.6	50.1	0.0	0.0	1.0	7.6	78.6	283.3	3.7	20.7	137.5	445.1
Goulburn Broken	14.0	51.3	0.0	0.0	1.0	7.6	76.6	286.0	7.9	21.6	98.7	414.1
Murray 2	18.6	50.1	0.0	0.0	1.0	7.6	78.6	283.3	3.7	20.7	250.0	557.7
North Central	14.1	51.7	0.0	0.0	1.0	7.6	78.6	283.3	3.7	20.7	108.8	416.4
Murray 3	14.1	51.7	0.0	0.0	1.0	7.6	78.6	283.3	3.7	20.7	277.6	585.3
Mallee	16.3	50.5	0.0	0.0	1.0	7.6	76.6	286.0	7.9	21.6	200.2	515.6
Lower Murray Darling	14.0	51.3	0.0	0.0	1.0	7.6	76.6	286.0	7.9	21.6	170.7	486.1
SA MDB	16.3	50.5	0.0	0.0	1.0	7.6	76.6	286.0	7.9	21.6	200.2	515.6

Commodity: Sheep- Wheat Wet

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine	7.3	124.7	0.0	0.0	1.2	3.5	66.7	188.3	46.7	19.7	111.8	366.5
Border Rivers QLD	7.3	124.7	0.0	0.0	1.2	3.5	66.7	188.3	46.7	19.7	111.8	366.5
Warrego Paroo	7.3	124.7	0.0	0.0	1.2	3.5	66.7	188.3	46.7	19.7	111.8	366.5
Namoi	7.6	128.6	0.0	0.0	1.1	4.8	39.5	255.1	59.0	21.5	139.4	475.1
Central West	7.3	124.7	0.0	0.0	1.6	6.2	33.2	226.4	43.4	42.6	145.7	458.2
Maranoa Balonne	7.3	124.7	0.0	0.0	1.2	3.5	66.7	188.3	46.7	19.7	111.8	366.5
Border Rivers Gwydir	7.6	128.6	0.0	0.0	1.1	4.8	39.5	255.1	59.0	19.2	141.7	475.1
Western	7.6	128.6	0.0	0.0	1.1	4.8	44.2	246.4	59.0	19.2	145.6	470.3
Lachlan	8.0	117.2	0.0	0.0	1.6	6.2	33.2	226.4	43.4	42.6	131.6	444.1
Murrumbidgee	8.3	120.2	0.0	0.0	1.2	5.1	39.1	245.8	55.1	25.7	114.7	441.3
North East	8.3	120.2	0.0	0.0	1.2	5.1	39.1	245.8	55.1	25.7	86.6	413.1
Murray 1	10.0	111.2	0.0	0.0	1.1	4.9	53.5	226.6	25.9	19.2	197.1	468.8
Goulburn Broken	8.3	120.2	0.0	0.0	1.2	5.1	39.1	245.8	55.1	25.7	88.0	414.6
Murray 2	10.0	111.2	0.0	0.0	1.1	4.9	53.5	226.6	25.9	19.2	234.6	506.3
North Central	8.5	122.9	0.0	0.0	1.1	4.9	53.5	226.6	25.9	19.2	187.5	459.3
Murray 3	8.5	122.9	0.0	0.0	1.1	4.9	53.5	226.6	25.9	19.2	243.8	515.5
Mallee	9.0	113.9	0.0	0.0	1.2	5.1	39.1	245.8	55.1	25.7	121.9	448.4
Lower Murray Darling	8.3	120.2	0.0	0.0	1.2	5.1	39.1	245.8	55.1	25.7	112.0	438.6
SA MDB	9.0	113.9	0.0	0.0	1.2	5.1	39.1	245.8	55.1	25.7	121.9	448.4

Commodity: Beef on Irrigated Pasture

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine	12.5	46.7	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	262.7	576.4
Border Rivers QLD	12.5	46.7	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	262.7	576.4
Warrego Paroo	12.5	46.7	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	262.7	576.4
Namoi	12.5	46.7	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	262.7	576.4
Central West	12.5	54.0	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	319.6	633.2
Maranoa Balonne	12.5	46.7	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	262.7	576.4
Border Rivers Gwydir	12.5	46.7	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	262.7	576.4
Western	12.5	50.4	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	291.2	604.8
Lachlan	15.0	47.5	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	322.2	635.9
Murrumbidgee	15.0	94.2	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	816.4	1130.0
North East	15.0	37.3	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	95.6	409.3
Murray 1	20.0	37.3	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	127.5	441.1
Goulburn Broken	15.0	37.3	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	100.4	414.0
Murray 2	20.0	74.3	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	813.7	1127.3
North Central	15.0	37.3	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	95.6	409.3
Murray 3	15.0	51.1	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	283.3	596.9
Mallee	17.5	64.2	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	510.2	823.8
Lower Murray Darling	15.0	54.0	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	383.5	697.1
SA MDB	17.5	64.2	0.0	0.0	0.9	8.0	82.8	292.7	0.0	20.9	510.2	823.8

Commodity: Timber: Carbon Sequestration

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine												
Border Rivers QLD												
Warrego Paroo												
Namoi												
Central West												
Maranoa Balonne												
Border Rivers Gwydir												
Western												
Lachlan												
Murrumbidgee	7.2	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
North East	10.3	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Murray 1	7.9	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Goulburn Broken	7.4	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Murray 2	7.2	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
North Central	7.1	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Murray 3	7.2	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mallee												
Lower Murray Darling												
SA MDB												

Commodity: Timber: Timber Harvest

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine												
Border Rivers QLD												
Warrego Paroo												
Namoi												
Central West												
Maranoa Balonne												
Border Rivers Gwydir												
Western												
Lachlan												
Murrumbidgee	8.0	30.0	17.0	15.5	5.0	0.7	25.0	16.7	0.0	7.0	50.0	337.5
North East	15.8	30.0	17.0	15.5	5.0	0.0	25.0	16.7	0.0	7.0	50.0	337.6
Murray 1	9.8	30.0	17.0	15.5	5.0	0.0	25.0	16.7	0.0	7.0	50.0	337.5
Goulburn Broken	8.6	30.0	17.0	15.5	5.0	0.0	25.0	16.7	0.0	7.0	50.0	337.6
Murray 2	8.0	30.0	17.0	15.5	5.0	1.9	25.0	16.7	0.0	7.0	50.0	337.6
North Central	8.0	30.0	17.0	15.0	5.0	0.5	25.0	16.7	0.0	7.0	50.0	337.5
Murray 3	8.0	30.0	17.0	15.0	5.0	2.1	25.0	16.7	0.0	7.0	50.0	337.5
Mallee												
Lower Murray Darling												
SA MDB												

Commodity: Timber: Timber Harvest Plus Carbon Sequestration

Catchment	Yield	Price	Labour	Lab. Chg.	Tractor Hr	Water Req.	Water Price	Chemicals	Contractor	Machinery	OVC	VC Excl. Water
Condamine												
Border Rivers QLD												
Warrego Paroo												
Namoi												
Central West												
Maranoa Balonne												
Border Rivers Gwydir												
Western												
Lachlan												
Murrumbidgee	15.2	20.6	17.0	15.5	5.0	2.7	25.0	16.7	0.0	7.0	50.0	337.5
North East	26.1	22.1	17.0	15.5	5.0	2.0	25.0	16.7	0.0	7.0	50.0	337.6
Murray 1	17.7	21.1	17.0	15.5	5.0	2.0	25.0	16.7	0.0	7.0	50.0	337.5
Goulburn Broken	16.0	20.8	17.0	15.5	5.0	2.0	25.0	16.7	0.0	7.0	50.0	337.6
Murray 2	15.2	20.6	17.0	15.5	5.0	3.9	25.0	16.7	0.0	7.0	50.0	337.6
North Central	15.1	20.6	17.0	15.0	5.0	2.5	25.0	16.7	0.0	7.0	50.0	337.5
Murray 3	15.2	20.6	17.0	15.0	5.0	4.1	25.0	16.7	0.0	7.0	50.0	337.5
Mallee												
Lower Murray Darling												
SA MDB												

Appendix 3: GIS data sets used in this Report

Map	Layer	Source/ Title	Custodian	Email	Date Accessed
Groundwater	flowsyst	Australian Groundwater Flow Systems - National Land and Water Resources Audit, January 2000.	Bureau of Rural Sciences	dataman@brs.gov.au	May 2008
	aus10vgd	GEODATA TOPO 10M 2002: Road transport	Geoscience Australia	sales@ga.gov.au	May 2008
	MDB_CMR			Thilak	May 2008
MDB Cover	aus_dam	Dams and Water Storages 1990	Geoscience Australia	sales@ga.gov.au	May 2008
	aus10lgd	GEODATA TOPO 10M 2002: Localities	Geoscience Australia	sales@ga.gov.au	May 2008
MDB Population	MDB_Population	Census 2001, Population Size & Growth, Age by Sex; based on Statistical Local Areas	Australian Bureau of Statistics	client.services@abs.gov.au	May 2008
MDB Features	aus10wgd	GEODATA TOPO 10M 2002: Waterbodies	Geoscience Australia	sales@ga.gov.au	May 2008
	mdbele	Global Map. Global Map elevation of Australia. 1Million 2001	Geoscience Australia	sales@ga.gov.au	May 2008
	irrv1ac	Australian Irrigation Areas, Version 1A, National Land and Water Resources Audit	Bureau of Rural Sciences	dataman@brs.gov.au	May 2008
	diwa_type_criteria	Directory of Important Wetlands Spatial Database including Wetlands Type and Criteria	Australian Government Department of the Environment, Water, Heritage and the Arts	water.metadata@environment.gov.au	May 2008
	aus10fgd	GEODATA TOPO 10M 2002: Offshore	Geoscience Australia	sales@ga.gov.au	May 2008
	MDB_Basins			Thilak	May 2008