

Angas Bremer
Irrigation Management Zone
2006 – 2007 Annual Report
Website: - www.angasbremerwater.org.au



Angas Bremer Water Management Committee Inc

Supported by



Government of South Australia

South Australian Murray-Darling Basin
Natural Resources Management Board

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Angas Bremer Water Management Committee Inc. *Committee Members 2007-2008*

Chairman

Mr. Terry McAnaney

Vice Chairman

Mr. John Pargeter

Treasurer

Mr. Guy Adams

Committee

Ms Sarah Keough & Di Davidson

Messrs. Colin Cross, John Follett, Rick Trezona, Phil Reilly and Brian Wyatt

Non-elected members of the Committee

Mr. Tony Thomson Dept of Water, Land and Biodiversity Conservation (DWLBC)

Ms. Lyz Risby SA Murray- Darling NRM Board

Ms. Lian Jaensch, representing the Langhorne Creek Wine Industry Council

Secretary

Mrs. Barbara Blaser

Program/Project Coordinator

Mr. Bruce Allnutt

Report of the Activities of the Committee 2006-2007

1. FullStop

A very successful FullStop Field day was held at the Lake Breeze winery on the 13th of December 2006 conducted by Richard Stirzaker (CSIRO) and Tony Thomson. The session was most thought provoking and explained the FullStop and its purpose. The care and use of salinity meters was also made clear to the gathering.

Tony Thomson has prepared a report on the FullStop which can be found at pages 16 to 18.

2. Red Gum Health (Contributed by Lyz Risby)

During 2006 a Plant Ecologist Renate Velzeboer, from Department of Environment and Heritage, was requested by the Angas Bremer Water Management Committee (ABWMC) to diagnose trees displaying symptoms of poor health.

Based on visual inspection of the trees it was suggested that the trees were suffering from the progressive die back disease Mundulla Yellows. The typical symptom of trees affected by Mundulla Yellows is a yellowing of the leaves between the veins; this symptom is known as interveinal chlorosis.

Initially Mundulla Yellows was thought to be a virus but research in Victoria has found that Mundulla Yellows is actually related to soil conditions including (but not limited to) high alkalinity, salinity and compaction. The high alkalinity inhibits or prevents the uptake of essential trace elements such as iron and manganese which causes the leaf yellowing and gradual decline in tree health.

Research in Victoria has found that by inserting iron implants into the trunk or branches of affected trees provided a positive response within a few months.

The Angas Bremer Water Management Committee sought and received funding from the SA Murray-Darling Basin NRM Board to undertake research and trials in the Angas Bremer region. The trials have begun and we are currently awaiting for results of soil and leaf foliage analysis. Further updates of the trials will be distributed in next year's irrigation annual report.

The ABWMC and SA MDB NRM Board would like to acknowledge and thank the landholders for their participation in the project. In addition, we also acknowledge the advice and assistance of Renate Velzeboer (DEH), Tony Randall and Natalie Watkins (PIRSA Rural Solutions), Barbara Czerniakowski and John Cauduro (DPI Victoria), David Cooney (Alexandrina Council), John Pargeter and John Follett.

3. Flood Plain Trial

Some of you will recall that the Committee has a number of electronic loggers in Government Observation wells on the Angas and Bremer River flood plains, with soil moisture loggers in vineyards adjacent to the wells. These loggers are recording every 15 minutes and the loggers are downloaded once a month.

This trial has been on-going for five years and the data collected has proven to be invaluable to gauge the effects of river flow, of flooding, of groundwater use and with the escalation of ASR (Aquifer Storage and Recovery) in recent times, the affect of ASR on the aquifer.

In the year 2006-2007 an additional sheet was added to the Irrigation report form asking for more detail of groundwater usage and details of ASR. This extra data is to enable the Committee to consider groundwater usage and ASR in more detail. Further information may be required for the 2007-2008 irrigation year so that this detail can be compared with the well logger data.

4. Map Layers CD

4.1 Flooding Map

It was noted that the 1992 flood map on the Angas Bremer CD (compact disc) did not show the true picture of flooding to the north of Langhorne Creek Township, as the map was made from an aerial photo taken several days after the flood front had passed that area.

With the assistance of a large number of irrigators (and others) a new map has been produced showing the full extent of the area flooded in 1992, this new map will be available soon.

The Committee extends its thanks to those who helped to amend the map

4.2 Pipeline Map

A new project was undertaken to produce a map showing where all the pipelines go to from Lake Alexandrina. Thankyou to those who helped in producing this map.

The pipeline map will also be available soon

With both the flood map and the pipeline map it is understood that they are not 100% correct but have been produced to the best of available knowledge.

5. Soils Book

A very comprehensive book "Soils of the Angas Bremer District, South Australia" was completed in June 2007. The book covers 25 different soil types in the AB area, their key properties, laboratory data and soil management.

This Book is a valuable resource to the irrigator and is available from the Langhorne Creek Wine Industry Council Office and is available on the Angas Bremer website.

Comments from irrigators about this book are very positive and those involved in its production require congratulations on a job exceptionally well done.

6. ABWMC Sub-surface Drainage Trial report 2006-2007

A report for the year 2006-2007 can be found as an attachment to this report.

7. Salinity of Groundwater (production) Wells

The Committee saw a need, early in the 2006-07 irrigation year, to obtain more data of groundwater salinity levels from the grower's production wells, a letter was posted to all groundwater users asking groundwater irrigators to record salinity regularly. An extra table was added to the Irrigation Annual Report form for groundwater users to report on salinity levels of their wells. Only one irrigator was able to provide data for the whole year while another 11 irrigators provided data for 6 months or more, the remainder provided data for one to three months. 41 irrigators, in total, provided valuable data, Salinity levels varied from 2000 μ S/cm (1200ppm) to 4667 μ S/cm (2800ppm), the average salinity of all the wells being 3117 μ S/cm (1870ppm) It is most important to measure salinity accurately; your salinity meter should be re-calibrated regularly.

8. Irrigation Annual Reports

Irrigation Annual Report (IAR) forms were posted out to 145 irrigators in the Angas Bremer Irrigation Management Zone (ABIMZ), 53 irrigators returned their IAR's by the due date, July 31st (36%), 79 (54%) Irrigators sent in their IAR's between August the 1st and the 10th of October. The remaining irrigators, 13, have not returned their forms even though some of these 13 requested replacement forms. The 13 missing forms account for 3,000ML River Murray allocation and 300ML Groundwater allocation.

The Committee has notified DWLBC of the late returns and of the non-returns and DWLBC will take appropriate action.

The 46 irrigators who sent in their returns by the due date and who have completed their obligations to the Angas Bremer Code of Practice will receive their "Accredited Irrigator" certificates.

Summary of data from Irrigation Annual reports

Data from IAR's

These graphs and charts have been compiled from the grower's irrigation annual reports. Comments and explanations are included with each of the diagrams.

Flooding: - Flooding was reported by 5 irrigators over a total area of 168ha from mid July 06 to mid August 06. 154ha of crop and 14ha non-crop area were flooded. The time covered by water varied from 10hours to 100 hours.

Water Leasing: - The following table shows the water leasing that occurred during the 2006-2007 irrigation year. The "inside ABIMZ" figures should be the same for "leasing to" and "leasing from", but where the numbers differ it is where data has not been recorded on the IAR's or IAR's have not been returned.

Type of Lease	Megalitres
RM water leased from ABIMZ to outside ABIMZ	862.7
RM water leased from outside ABIMZ to inside ABIMZ	4,449.64
RM water leased from inside ABIMZ to inside ABIMZ	891.179
RM water leased to inside ABIMZ from inside ABIMZ	872.707
Groundwater leased from AB licence to AB licence	251.405
Groundwater leased to AB licence from AB licence	351.405

Chart 1. Allocation & Use:- 'Allocation' is the total for all irrigators, 'Use' does not include the water used by the irrigators who did not return their IAR's. Some of the groundwater figures provided may include 'rollover of unused allocation' which would account for the allocation differences between the years. All the numbers are in mega litres.

Groundwater use in 2006-07 was double that of 2005-06 while River Murray water use approximately the same.

Angas Bremer 2006 - 07 Allocation & Use ML

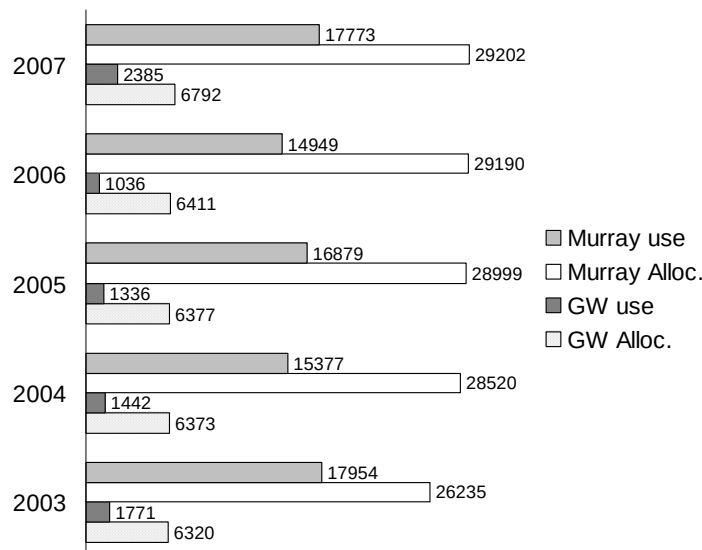


Chart 2. Water used from the River Angas & River : - These water use figures include, water applied directly for irrigation by flood or by flood pump, water stored in a dam for future use and water used for ASR. Any volumes that flooded over the River are not included.

There are no records for 2003. The numbers are in mega litres.

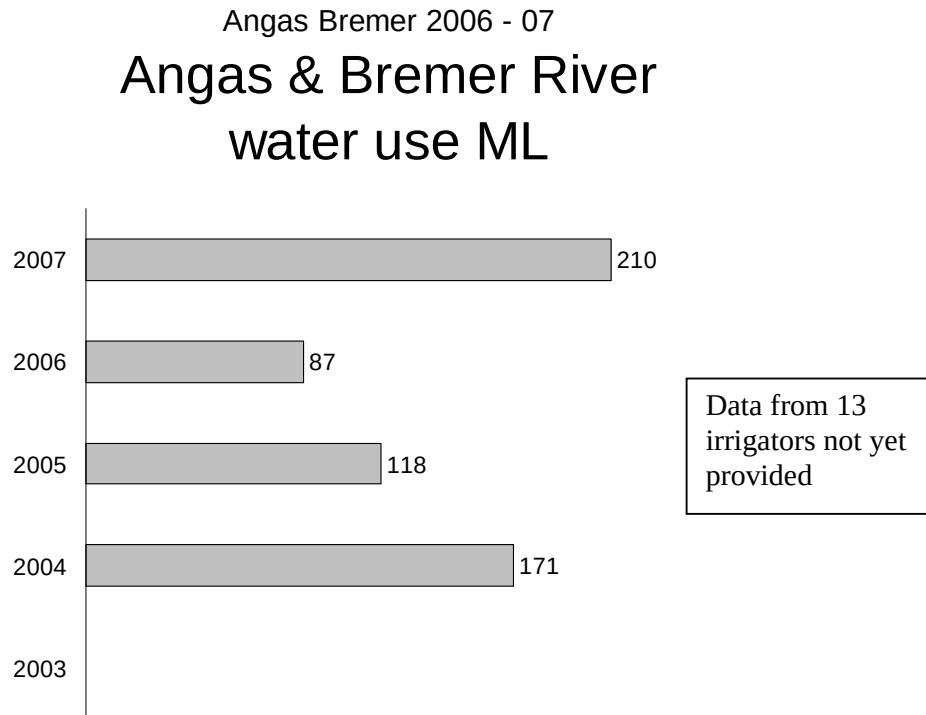
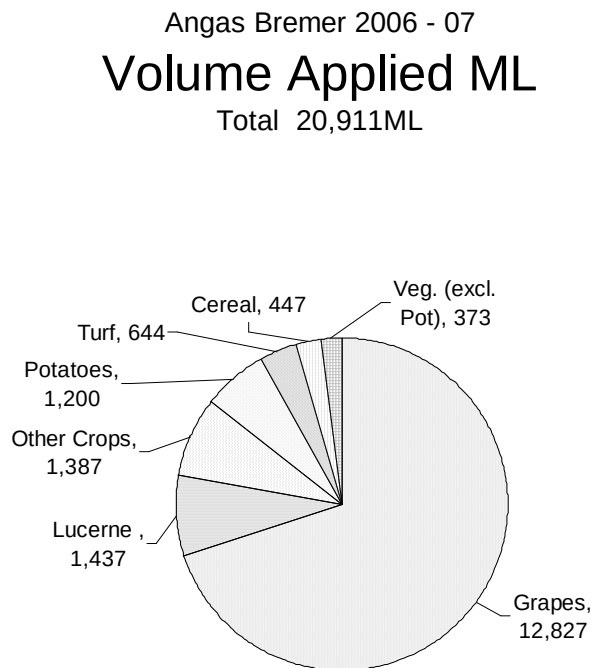


Chart 3(a) Volumes of water applied in ML major crop types:-

The total water used (i.e. 20,911ML) includes water from all sources and compares with the total usage of 15,811 in 2005-06 (see chart on page 15)



Data from 13 irrigators not yet provided

Chart 3(b) Volume Applied to in ML "Other" crops:-

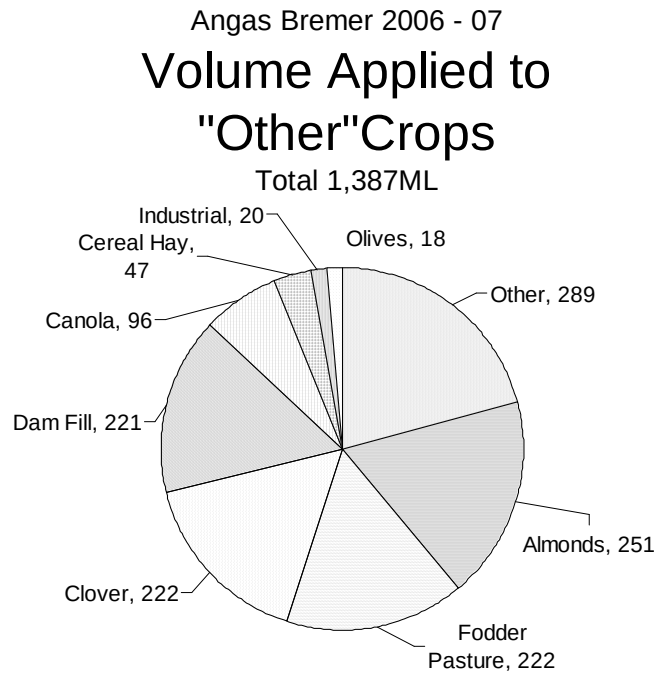
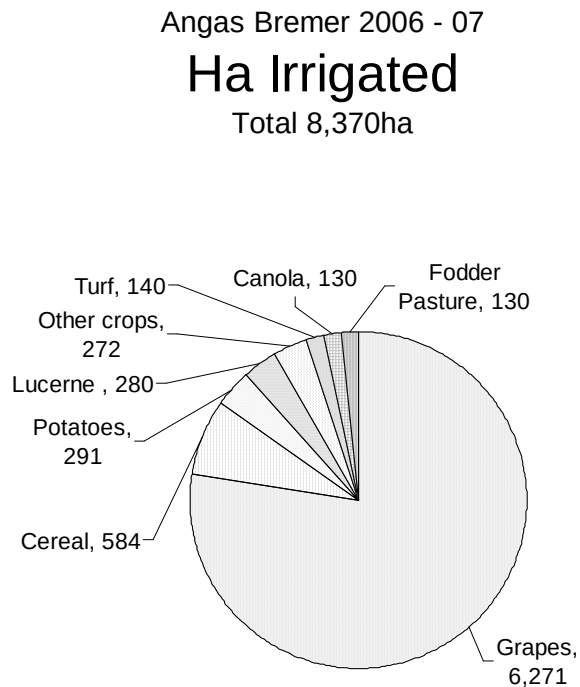


Chart 4(a) Area, in Ha, Irrigated major crop types:-

Total area irrigated 2006-07 was 8,370ha compared with 7,739ha irrigated in 2005-06, see chart on page 15 for comparison with other years.



Data from 13 irrigators not yet provided

Chart 4(b) Area, in Ha, Irrigated other crop types:-

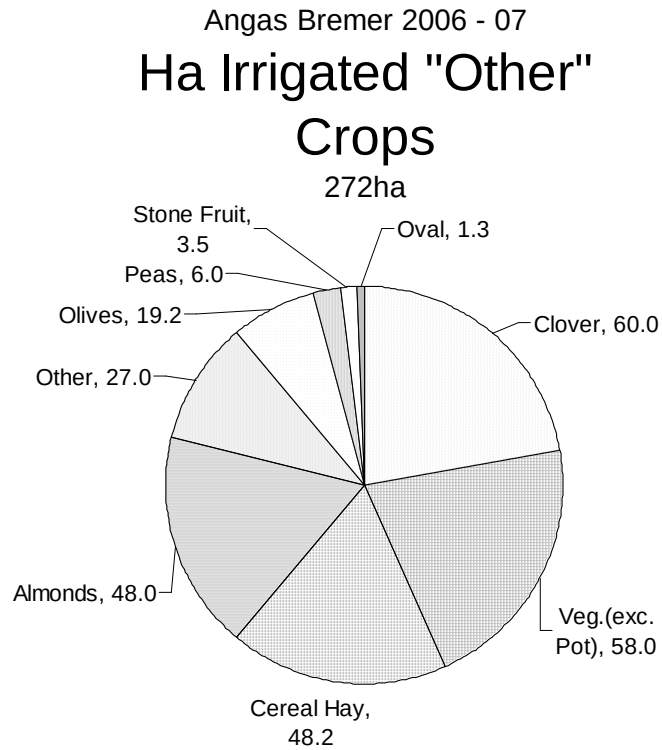
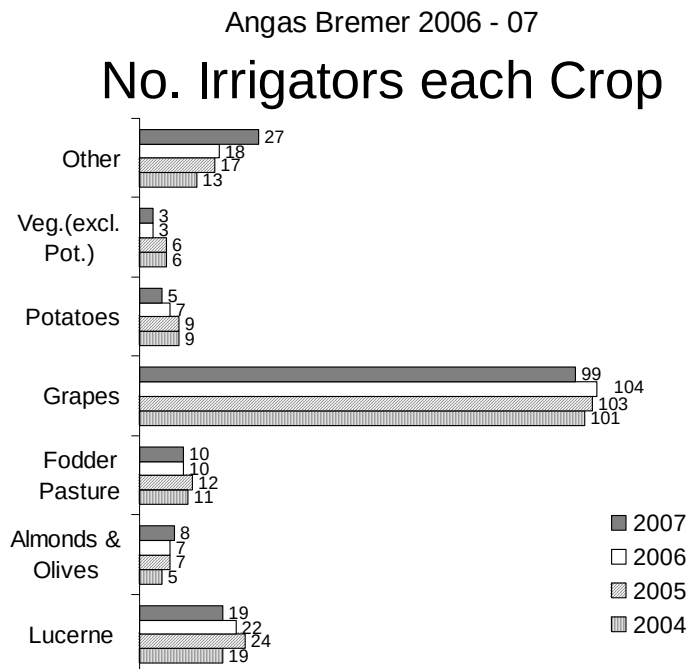


Chart 5. Number of Irrigators for each Crop: - Almonds and Olives have been grouped together on this chart rather than Olives being included in 'other'.



Data from 13 irrigators not yet provided

Chart 6(a). Average irrigation in millimetres applied, per year, to each crop in the irrigation years indicated:-

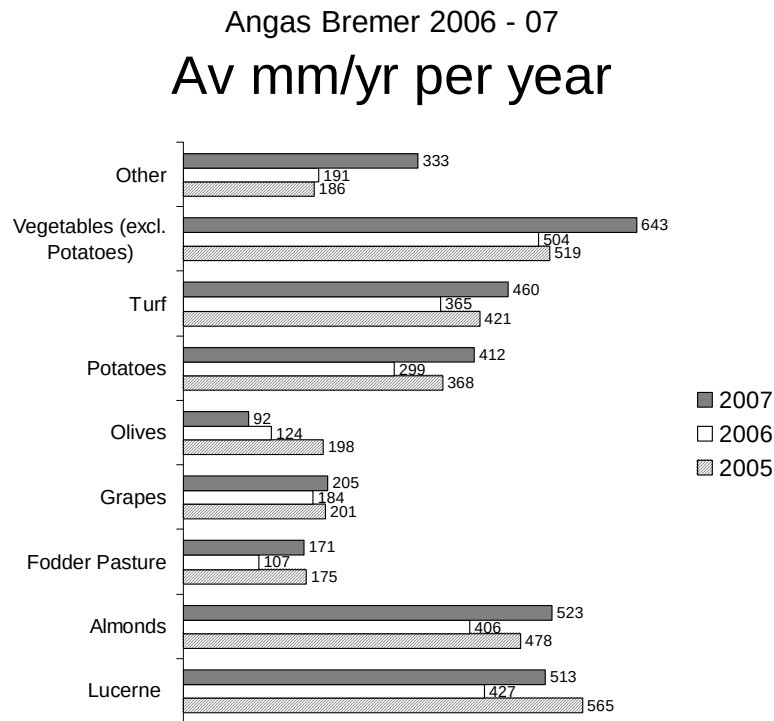
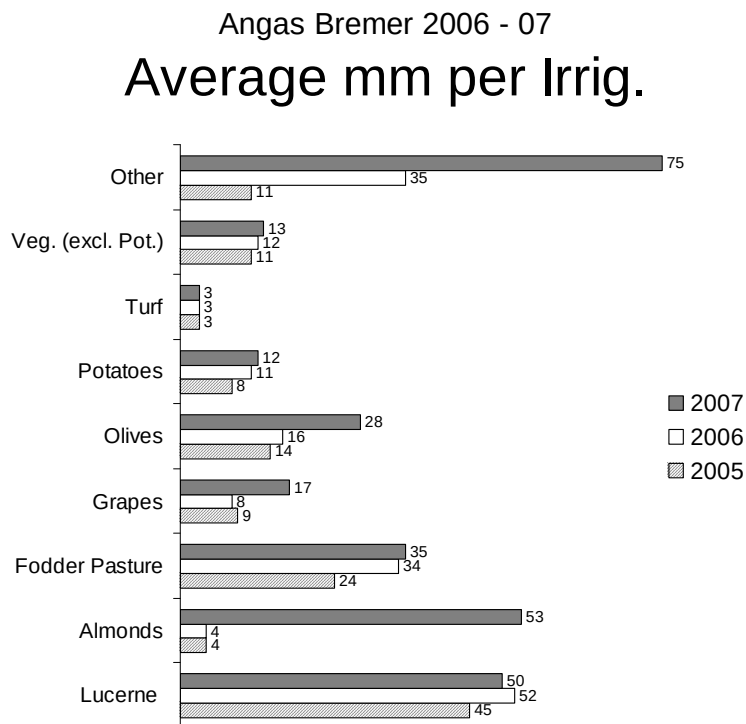


Chart 6(b). Average millimetres applied to each crop type per irrigation for the years indicated:-



Data from 13 irrigators not yet provided

Chart 7. Number of Soil Moisture Monitoring devices in use:-

'Capacitance' includes, Agwise soil moisture probes, Agrilink C- probe, Dataflow Gopher, Sentec Diviner and Sentec Enviroscan

'Resistance' includes Gypsum Blocks

'Dig hole' covers dig stick, spade, auger and post hole digger

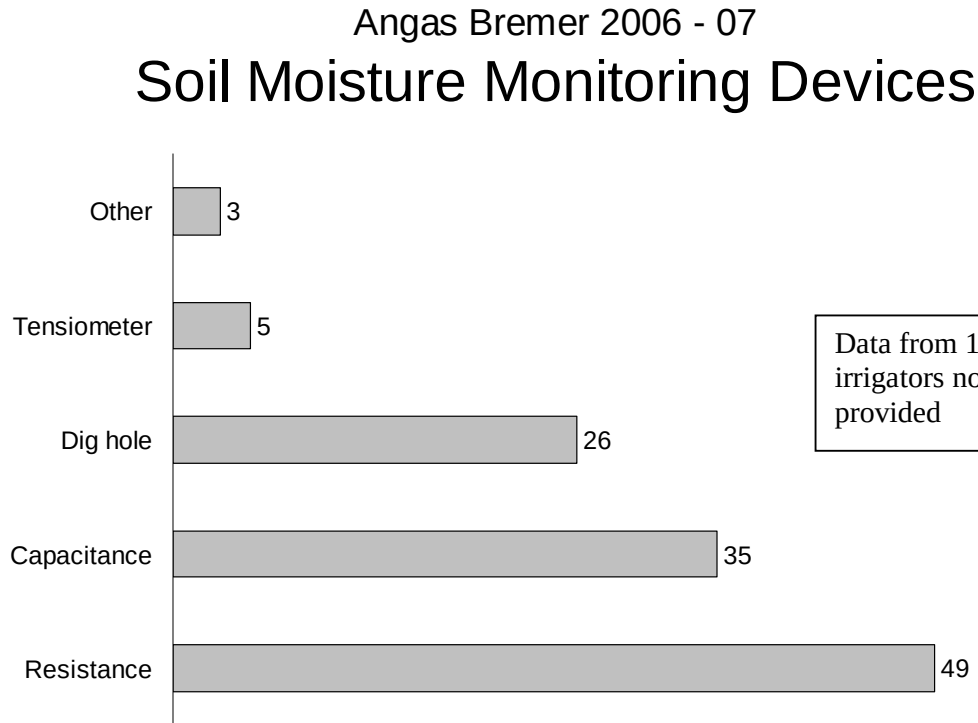
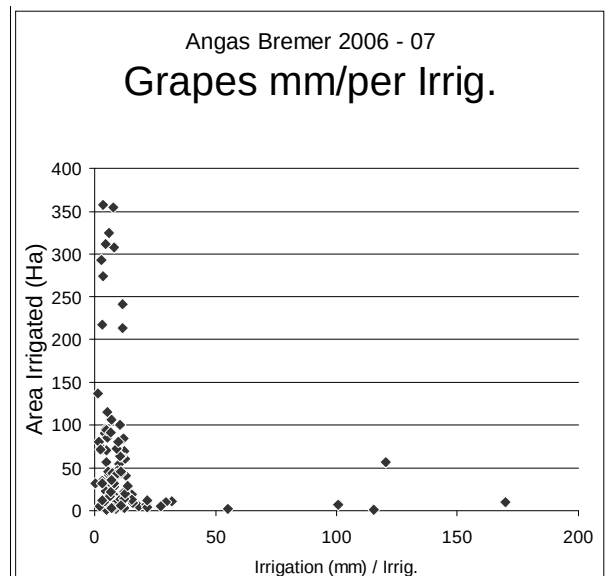
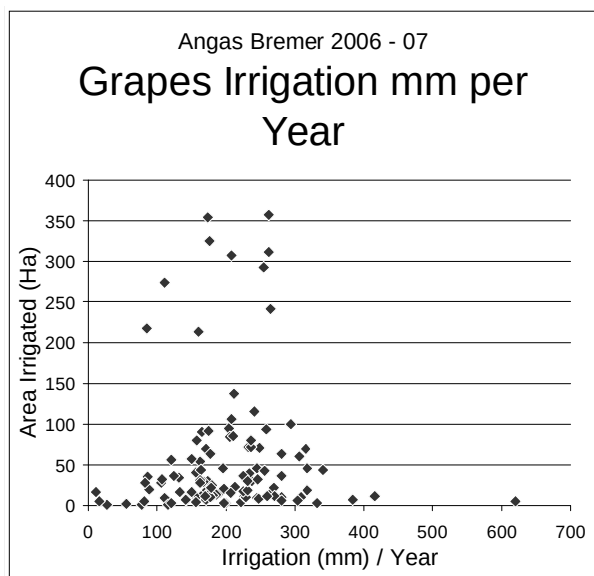
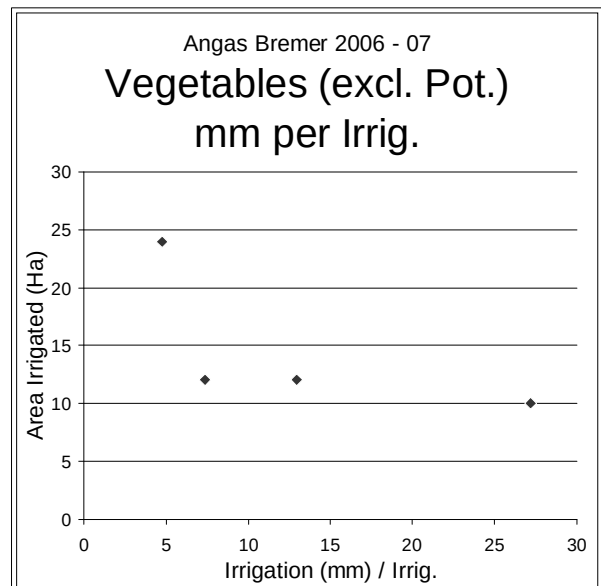
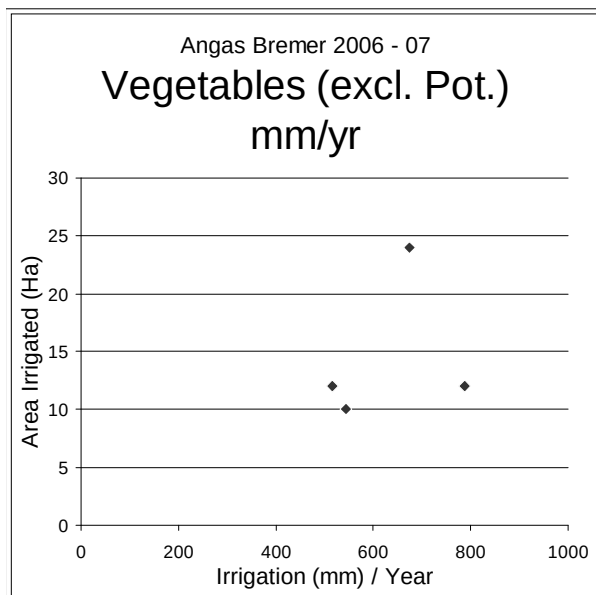
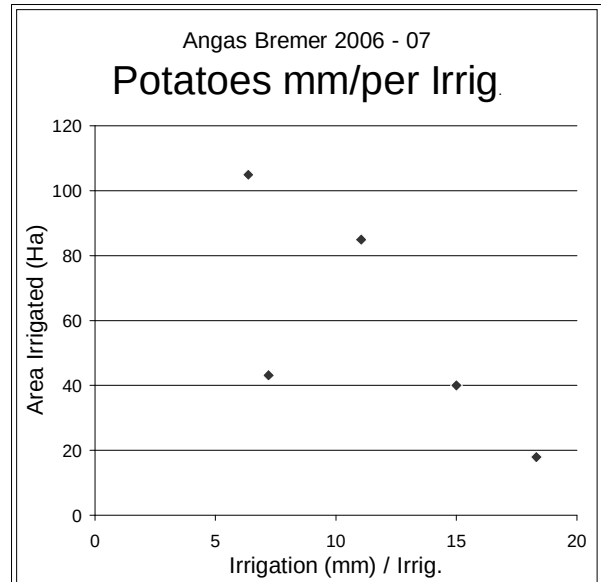
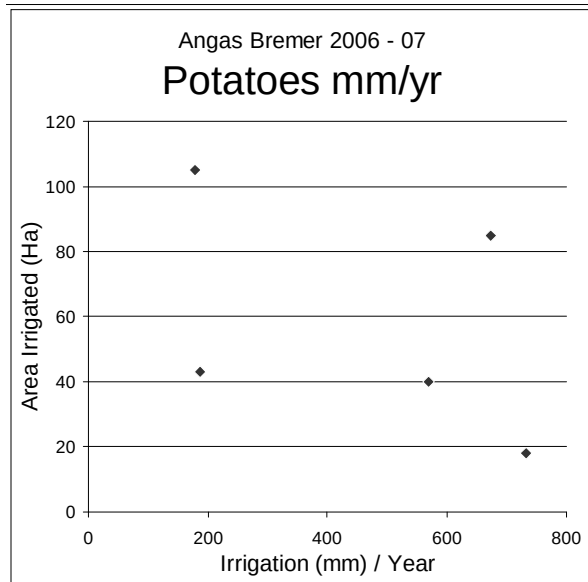
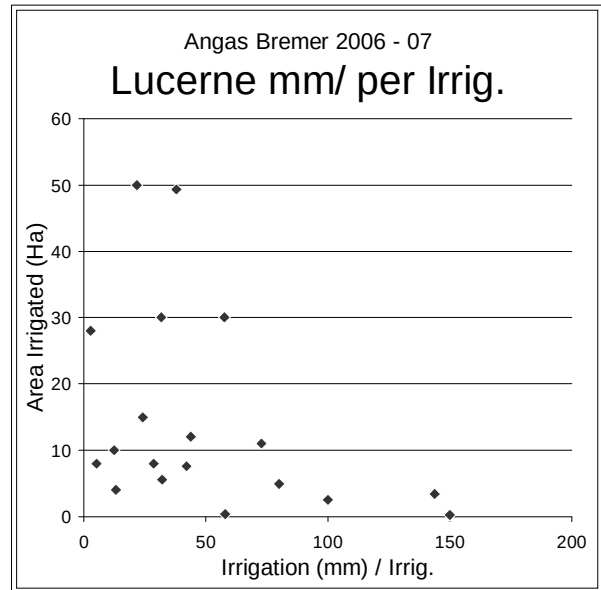
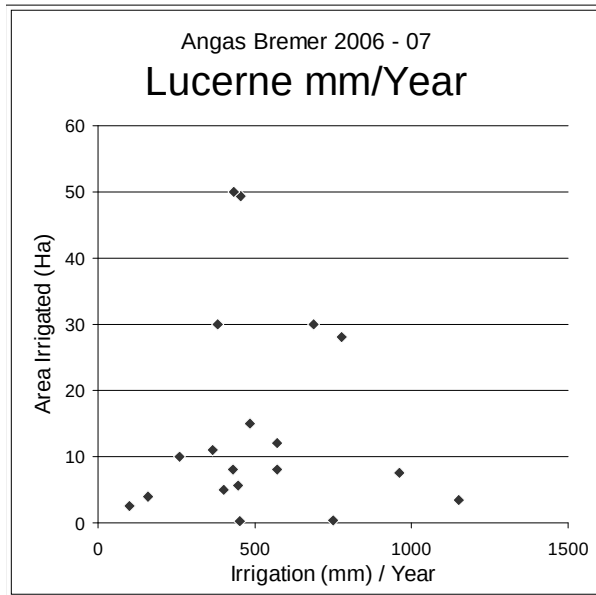


Chart 8. The following 14 'scatter' charts show the irrigation in mm per year per crop and mm per irrigation per crop. You will see in the 'Grapes mm/irrig. chart (below right)' some large mm per irrigation. Each irrigation above 50mm was applied by sprinkler or flood.

The final 2 bar charts show the irrigation in mm per year and mm per irrigation for the crops previously labelled as "other".





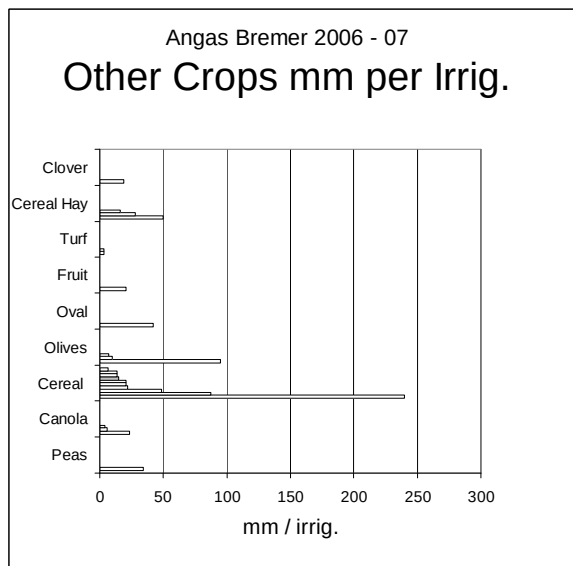
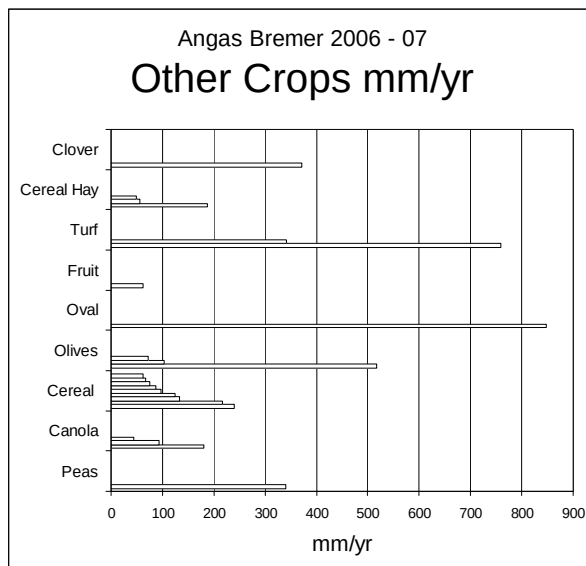
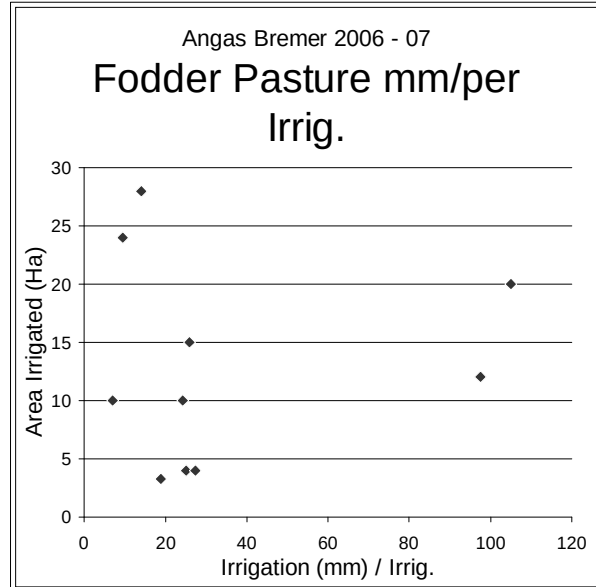
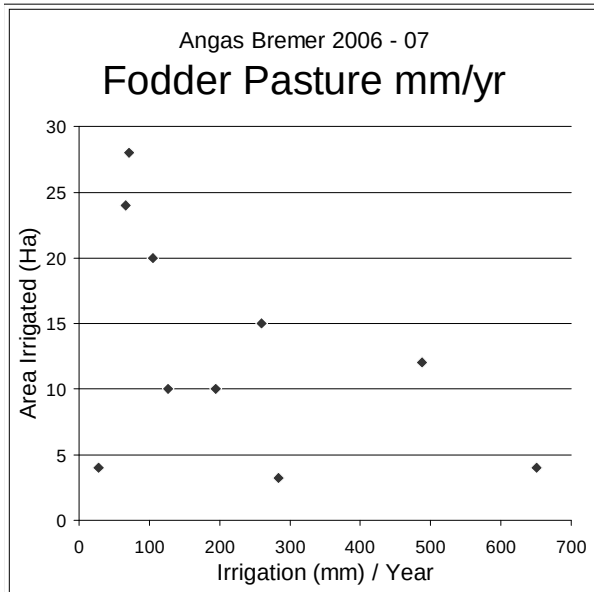
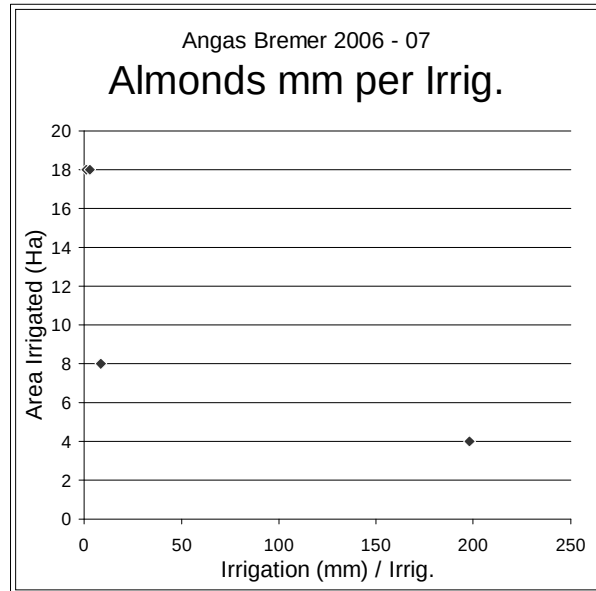
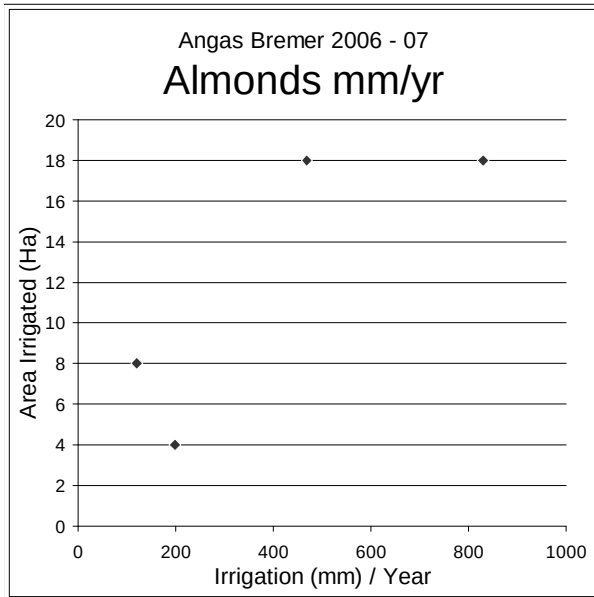


Chart 9. Aquifer Storage and Recovery (ASR):- This graph shows the total water stored for ASR for the years 1984 to 2007.

In 2006-7 a total of 27 irrigators held permits for ASR. While most of the 2,377ML of ASR water came from Lake Alexandrina, 5.5ML was sourced from the Bremer River and 65ML from the Angas River.

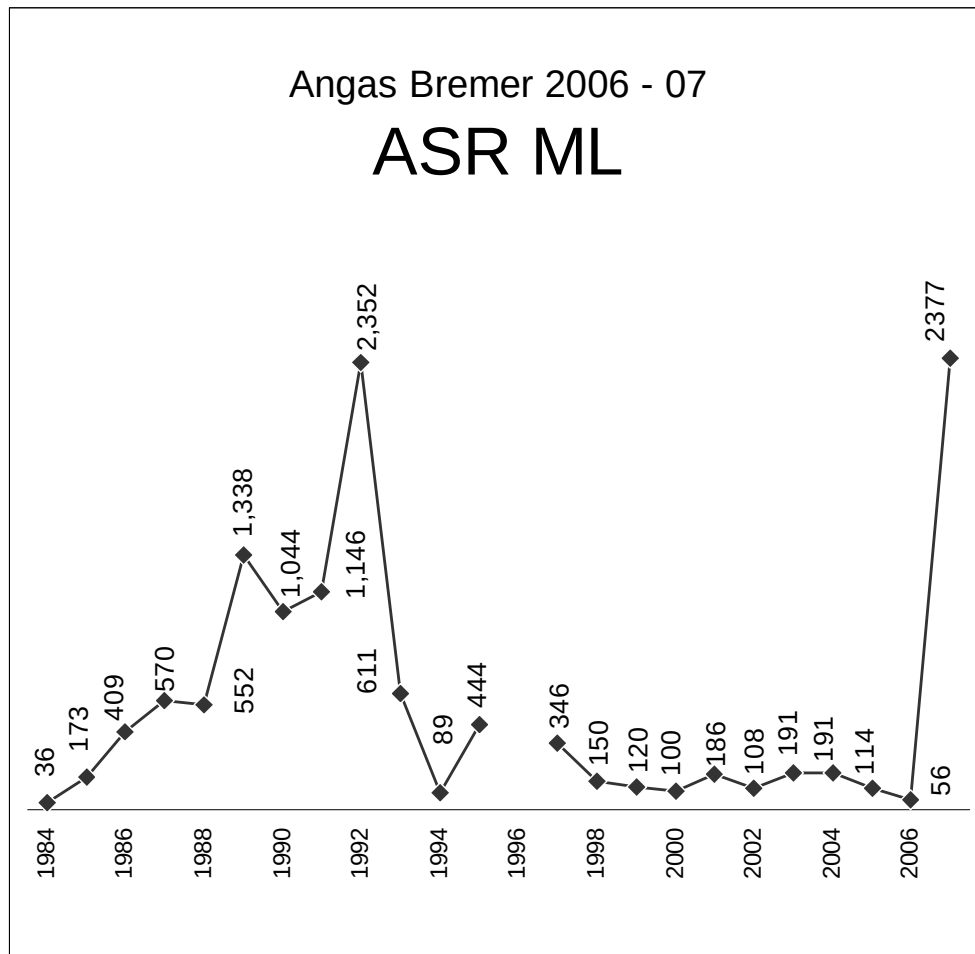
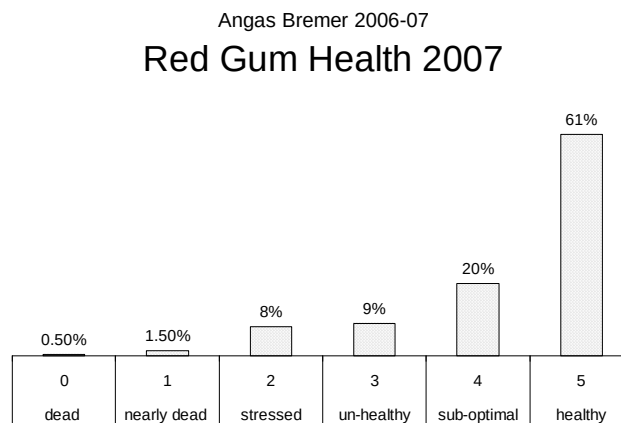


Chart 10 Red Gum Health:- 44 irrigators reported on the health of the Red Gums on their properties. The chart shows the % of the Red Gums in each health category.



31 irrigators reported no change in their Red Gums health while 6 irrigators have noticed change. The trees are looking better according to 5 irrigators and several other irrigators say the trees are under stress due to the lack of water for the past couple of years.

Chart 11. River diversions from the Angas and Bremer Rivers:- The table (below) shows the diversions of water from the rivers from 1/7/06 to 30/6/07.

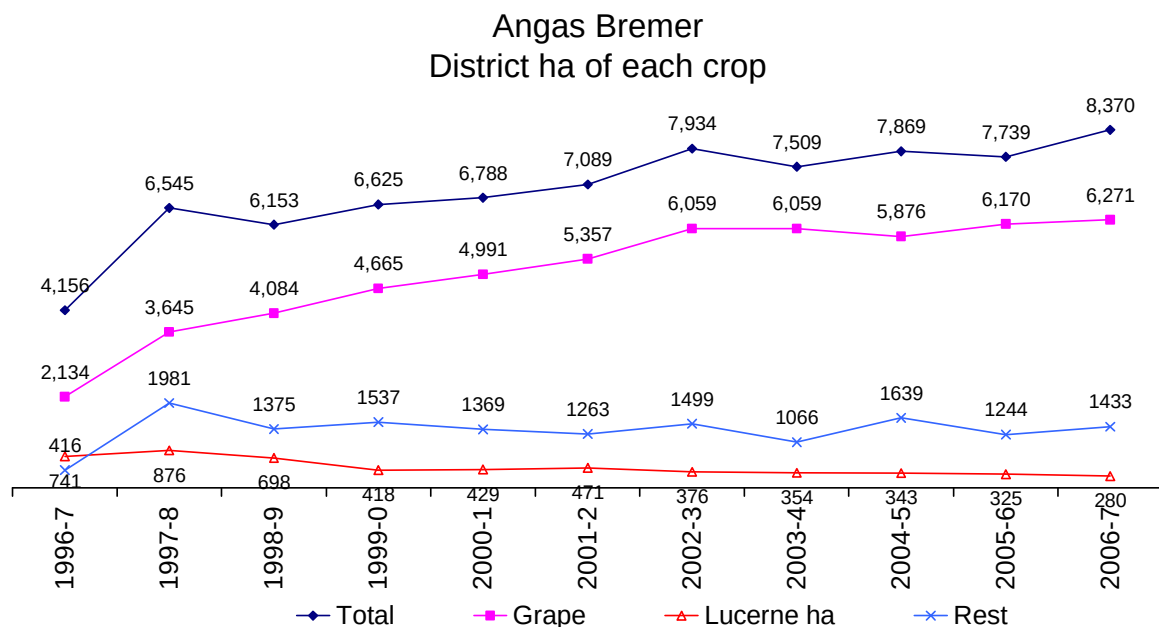
month/yr	pondered hrs	approx. kl/hr	ha flooded	depth of water	approx. ML
July 06	100	420	12	150mm	42
July 06	10	not shown	3	375mm	11
July 06	50	not shown	20	1000mm	200
July 06	24	not shown	12.14	600mm	73
July 06	16	1000	3.2	150mm	5
July 06	15	not shown	6	700mm	42
July 06	48	not shown	100	400mm	400
June 07	23	900	12	270mm	21
Year	not shown	not shown	into dam	not shown	59

Chart 12 Average ML/ha per crop per year:- The next table shows the average ML/ha of irrigation water applied to different crop types and compares 2007 with previous years.

Year	Grape	Lucerne	Other	Vegetable	Potato	Pasture	Almond	All Crops
1996-1997	2.0	3.4		4.0				2.7
1997-1998	1.6	4.2	2.6	3.9		4.1	2.4	2.5
1998-1999	2.2	5.1	1.3	4.5		3.8	2.0	2.7
1999-2000	2.1	6.0	1.7	6.3	3.7	3.7	2.8	2.6
2000-2001	2.1	4.8	2.4	5.7	3.6	4.7	3.1	2.6
2001-2002	2.1	4.4	1.7	5.1	4.0	3.3	4.5	2.5
2002-2003	2.2	6.8	2.4	6.0	3.8	4.3	4.0	2.61
2003-2004	1.97	4.5	2.5	8.8	3.5	2.7	4.2	2.28
2004-2005	1.99	5.22	1.69	5.18	3.67	2.74	4.79	2.25
2005-2006	1.8	4.23	1.53	5.04	2.99	1.00	4.06	2.95
2006-2007	2.04	5.13	1.05	6.43	4.12	1.7	5.23	3.67

Chart 13 ML used and ha irrigated comparison chart:-
 Note- prior to 2000 'potato' was included in 'vegetable'
 * 2006-7 data from 13 irrigators not yet provided

	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
Total ML	11,348	16,100	16,509	16,961	17,467	17,428	20,715	17,154	17,719	15,811	20,911
Total ha	4,156	6,545	6,153	6,625	6,788	7,089	7,934	7,509	7,869	7,739	8,370
Grape ML	4,332	6,001	8,864	10,021	10,626	11,159	13,165	11,927	11,688	11,293	12,827
Grape ha	2,134	3,645	4,084	4,665	4,991	5,357	6,059	6,059	5,876	6,170	6,271
Lucerne ML	2,490	3,700	3,526	2,491	2,040	2,051	2,560	1,608	1,791	1,378	1,437
Lucerne ha	741	876	698	418	429	471	376	354	343	325	280
Veg ML	1,446	2,670	2,355	761	769	651	647	605	638	363	373
Veg ha		679	518	121	134	103	108	69	123	72	58
Potato ML				1,812	1,773	1,719	1,504	1,280	1,278	1,171	1,200
Potato ha				485	490	425	394	360	348	392	291
Fodder ML		1,526	906	358	742	316	752	399	505	144	222
Fodder ha	328	369	241	96	157	97	173	146	184	144	130
Almond ML		147	119	164	172	246	188	203	230	195	251
Almond ha	88	61	61	58	55	55	47	48	48	48	48
Other crops ML	3,081	2,248	738	1,354	1,259	1,286	1,899	1,132	1,589	900	2,004
Other crops ha		872	555	777	533	583	777	443	936	588	906

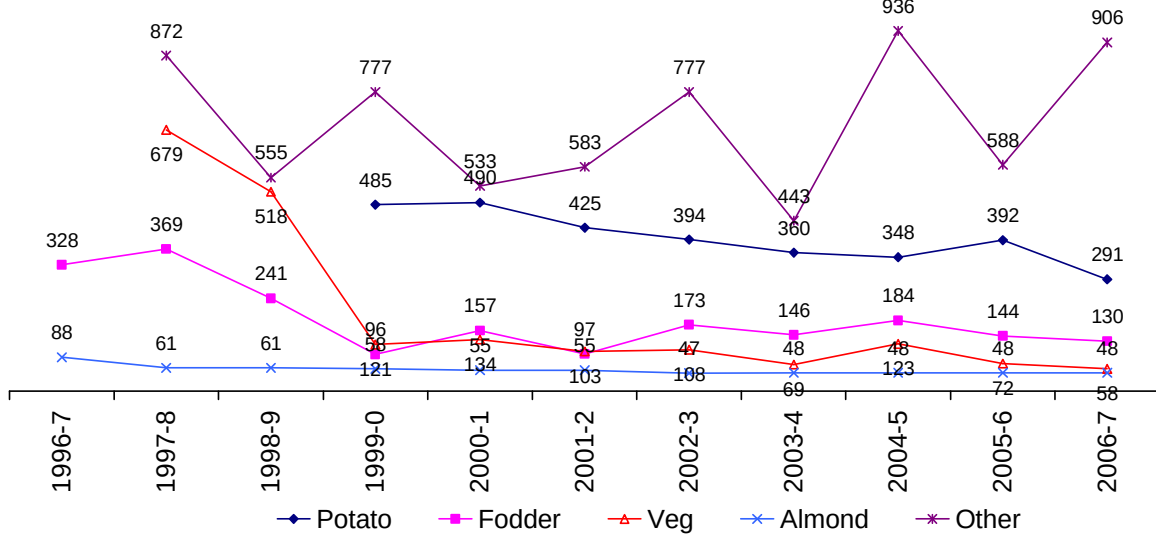


ABiar2006-7Chart13.xls Chart1(9)

Data: Bruce Allnutt

Chart: Tony Thomson

Angas Bremer District ha of Rest of crops

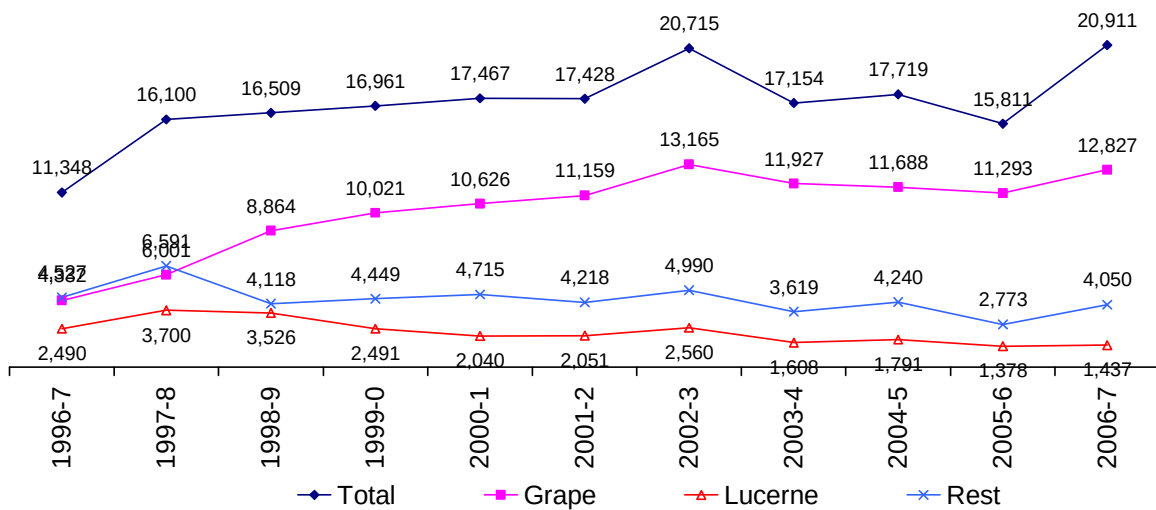


ABiar2006-7Chart13.xls Chart1(10)

Data: Bruce Allnutt

Chart: Tony Thomson

Angas Bremer District ML onto each crop

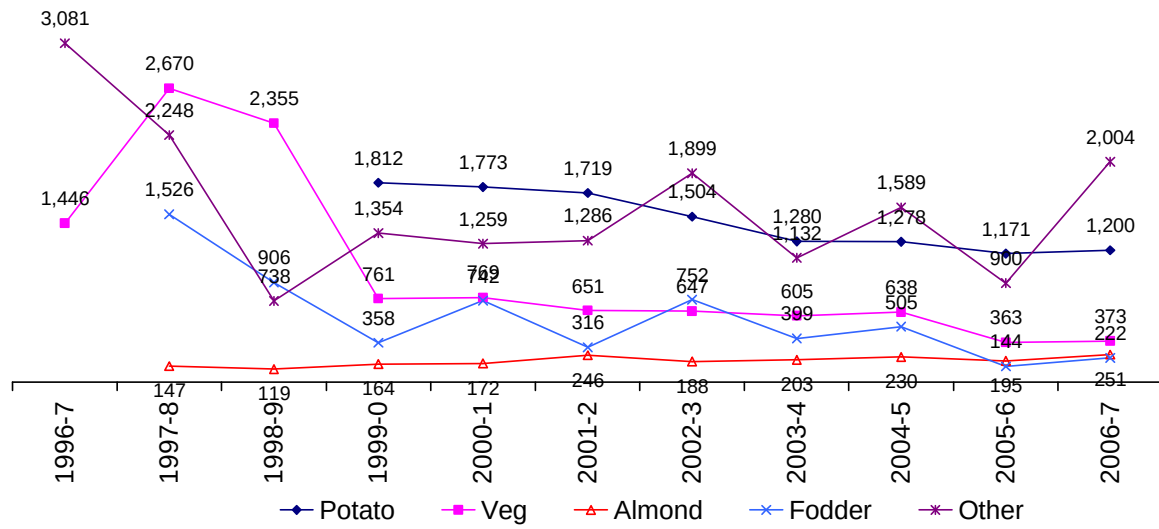


ABiar2006-7Chart13.xls Chart1(7)

Data: Bruce Allnutt

Chart: Tony Thomson

Angas Bremer District ML onto Rest of crops



ABiar2006-7Chart13.xls Chart1(8)

Data: Bruce Allnutt

Chart: Tony Thomson

Data from Growers Monitoring wells

The water levels reported by licence holders for each quarter of 2006-2007 has been combined with the data from the Government Observation wells in the un-confined aquifer and the 4 maps for these quarters can be found in figures “A” and “B” (pages 19 and 20). The measurements taken at the start of the 2006-2007 irrigation season and at the end of the irrigation season (i.e. September 2006 and March 2007) have been put on the same page to show the locations at which irrigation raised or lowered the water table.

Groundwater Salinity

Data from the Government Observation wells in the Angas Bremer Irrigation Management Zone is presented as maps from for both the un-confined and confined aquifers. Salinity contours are included for 3,000, 5,000, 7,000 and 10,000 $\mu\text{S}/\text{cm}$ (= 1,800, 3,000, 4,200 and 6,000ppm)

Locations Areas where salinity levels are below 3,000 $\mu\text{S}/\text{cm}$ are shown in grey. These maps are in figures “C” and “D”. (page 21) Source Dragana Zulfic DWLBC

Water levels in the Confined Aquifer

The water levels in the confined aquifer shown in metres, above AHD, are mapped in figure “E” (page 22) Source Dragana Zulfic DWLBC

Figure "A" Depth to un-confined aquifer at start (Sept) and end (Mar)

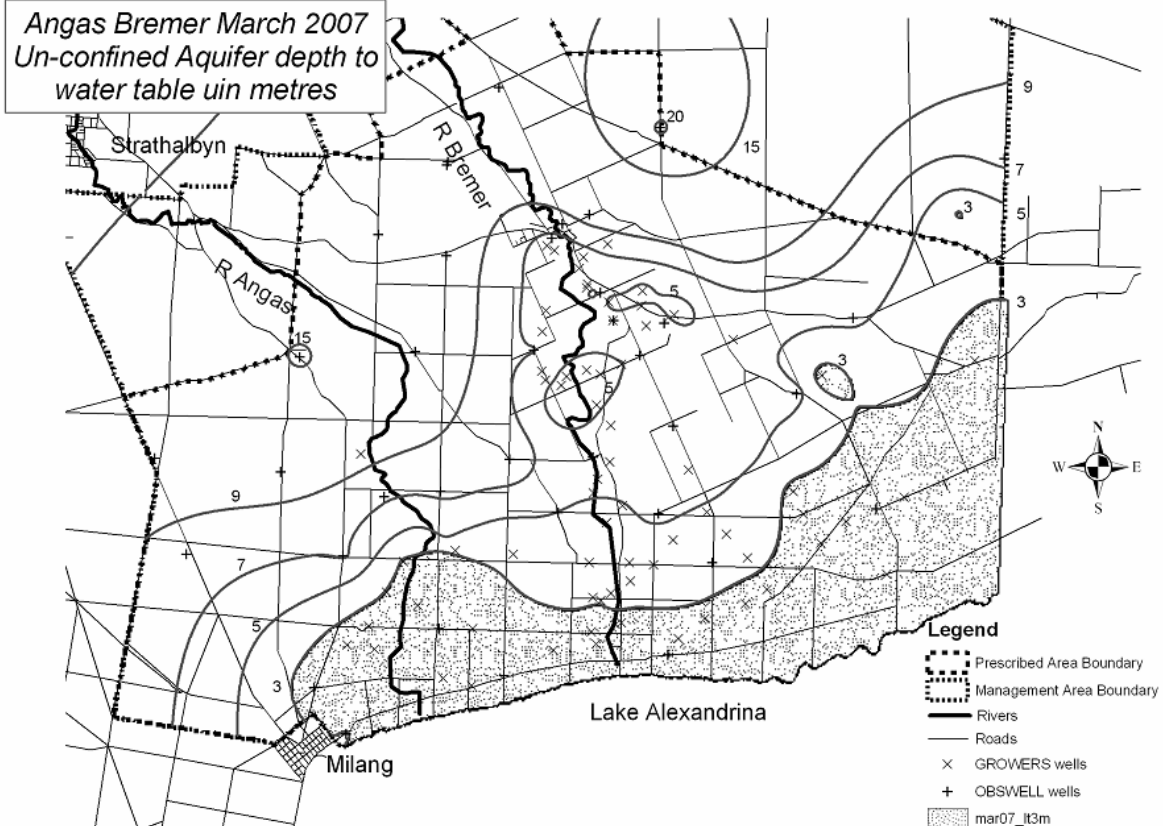
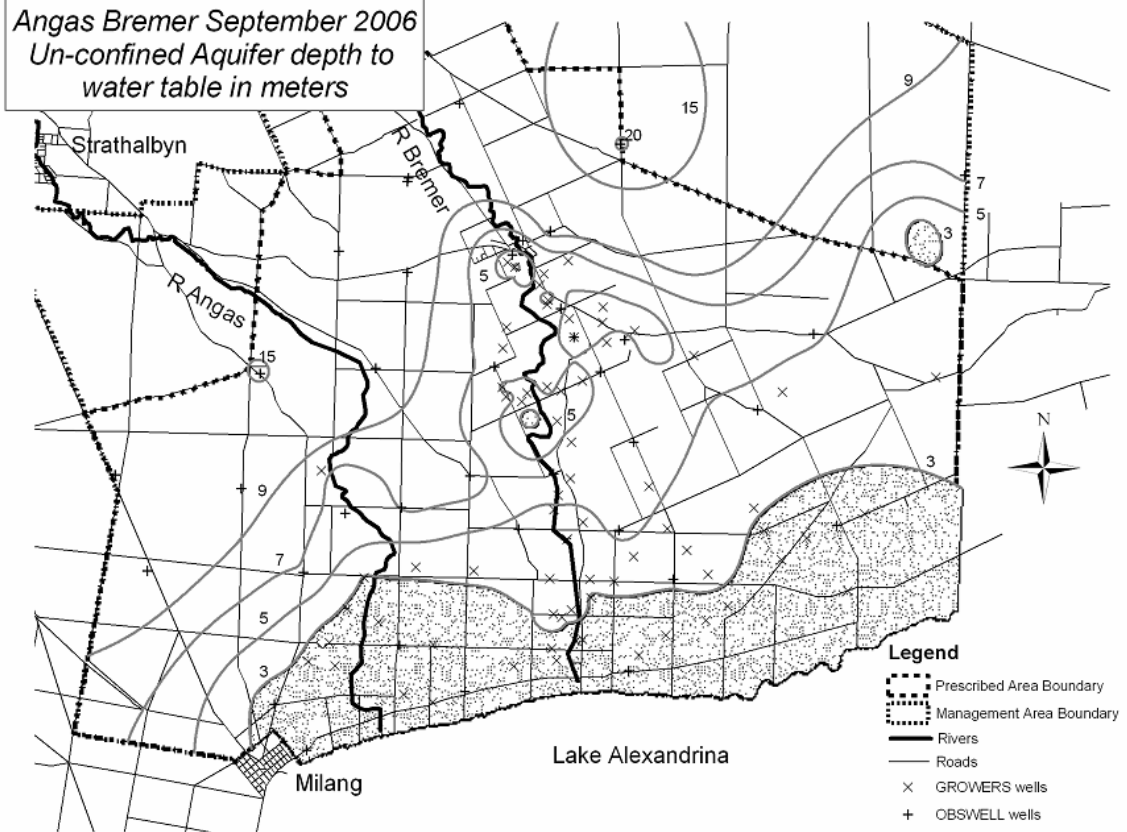
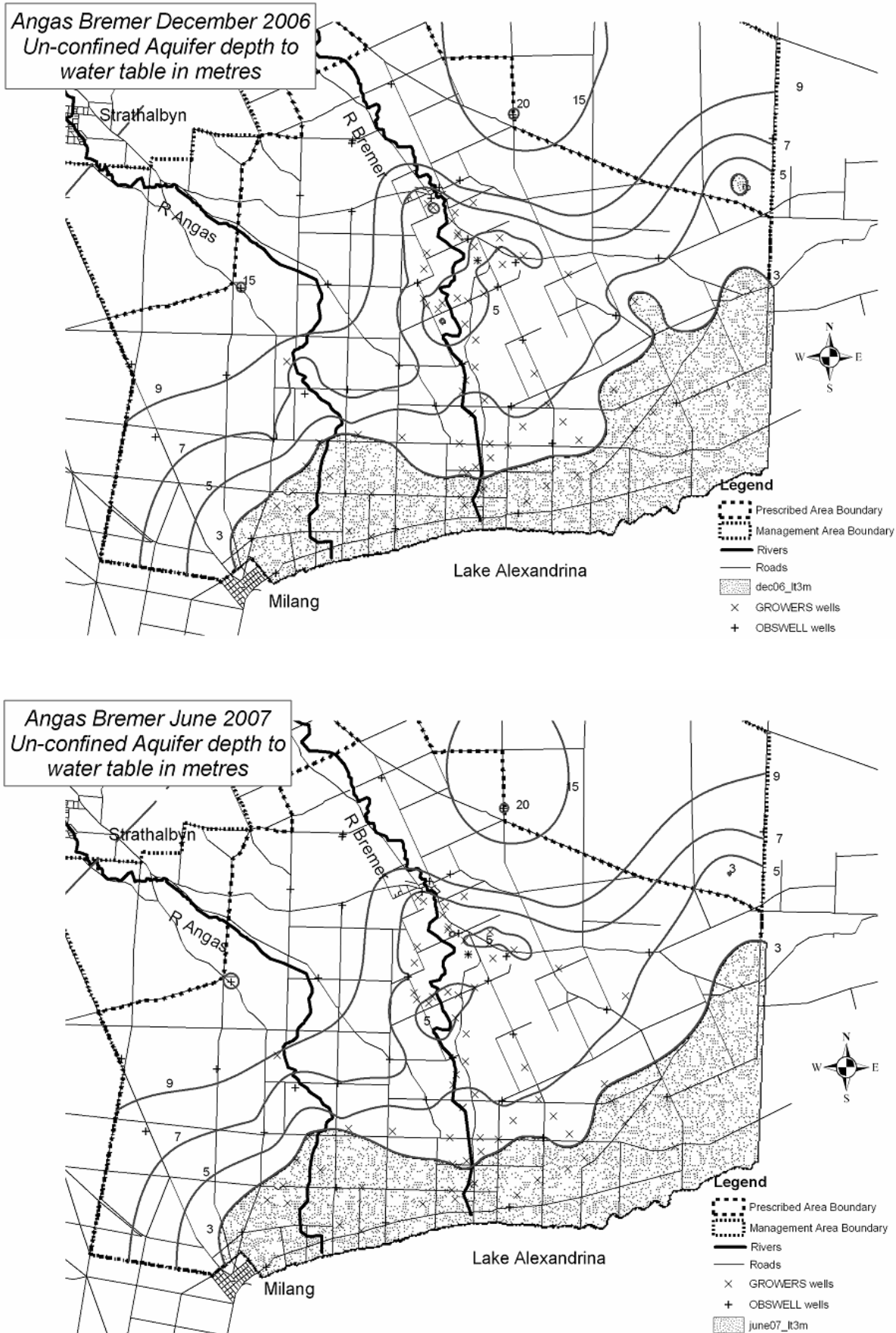


Figure "B" Depth to un-confined aquifer in mid-summer (Dec) and mid-winter (Jun)



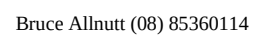
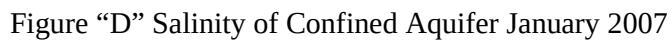
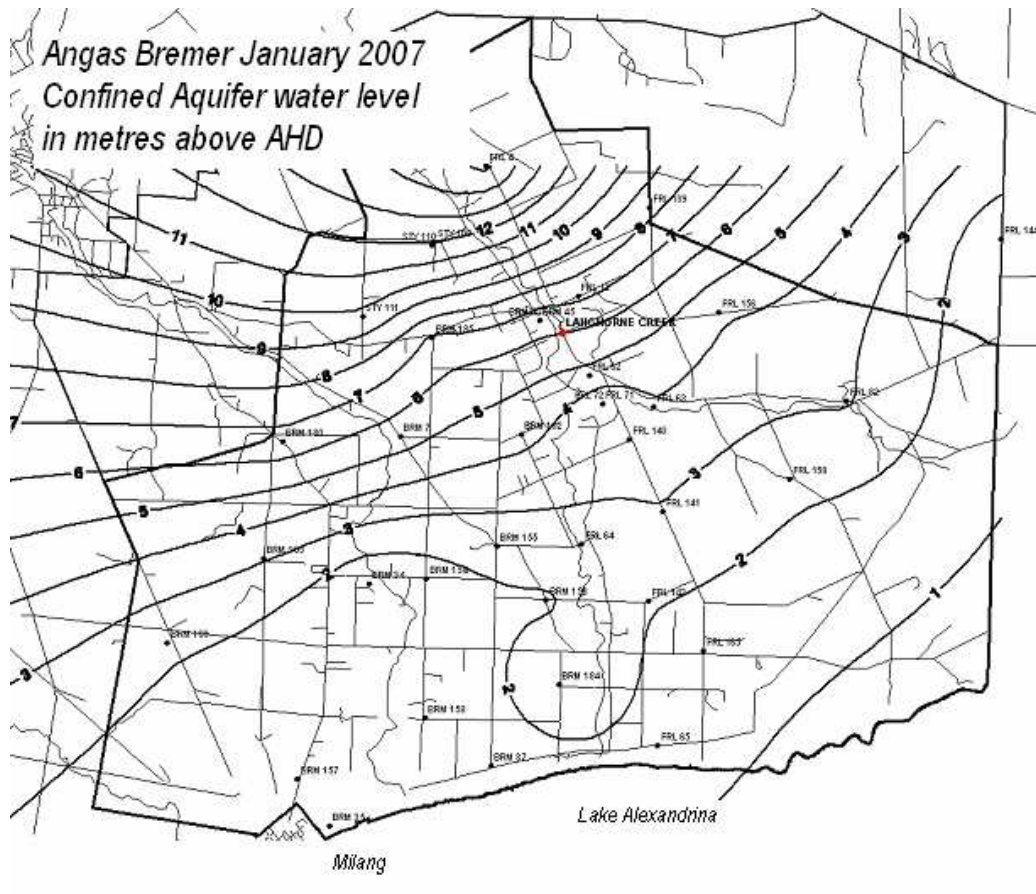


Figure "E" Confined Aquifer water level January 2007



Angas Bremer Water Management Committee Inc.

Minutes of the 2007 Annual Public Meeting held in the Langhorne Creek Football Clubrooms on
Monday the 27th of August 2007

Chairman, Terry McAnaney, declared the meeting open at 1945hrs and welcomed those in attendance with a particular welcome to Bianca Lewis and Cameron Welsh and Michael Cutting from the SAMDBNRM and Jarrod Eaton from DWLBC. Chairman noted that the agenda item “outcomes from groundwater investigations” by Dragana Zulfic would not be presented as Dragana was an apology and that she would make a presentation to the Committee at the September meeting and a public meeting would be held in October at which the data would be presented.

Chairman also noted that the soils book would be available after the meeting

Apologies:- Guy Adams, Lian Jaensch, Craig Willson, Tom Keelan, Diane Davidson and Sarah Keough.

The Chairmen presented his report for 2006-2007 (report attached)

Chairman introduced Michael Cutting from the NRM Board.

Michael detailed the network of weather stations that has been set up in the SAMDB and the two local stations were at Lake Breeze and the other at Currency Creek. When completed the system would be handed over to the Bureau of Meteorology (BoM). A workshop on the weather stations would be held on the 13th of September which will include a BoM representative. The NRM website was then detailed and how to use the menu on the home page. Theoretical crop water requirements were discussed by Michael showing an example for wine grapes.

Fact sheets of the weather station network were available after the meeting.

Chairman thanked Michael Cutting for his presentation and then asked Jarrod Eaton to update the position of the River Murray.

Jarrod Eaton presented a River Murray drought update, how the current situation is better than last year but the outlook for above average rainfall remains low. Water saving options such as lowering pool levels and closing off wetlands and the problems of increasing salinity and algae blooms. Jarrod noted that the snow melt will not contribute significantly to inflows. Low water storage is a problem with the MDB storage position much worse than this time last year, outlook not good.

Jarrod then went on to detail the SA Murray operations, the salinity and water level modelling how the States share has been revised under the water sharing arrangement with the revised rules.

Critical human needs were detailed. Dilution flows essential to control salinity levels. Probability SA entitlement is a minimum of 814GL with a 9 in 10 chance of 1247GL, a 3 in 4 chance of 1255GL and 1 in 2 chance of 1371GL.

The outlook for improvement is poor with a need for a significant increase in inflow.

Jarrod summarised all the points at the conclusion of his presentation.

Chairman thanked Jarrod for his presentation and for his ongoing efforts to keep the community well informed.

Chairman asked Tony Thomson to speak on the Angas Bremer water project.

Tony commenced by speaking of the soils book and explained how to use this valuable resource.

He then went on to explain the map layers on the CD and how additional map layers were being developed and would be available on the Angas Bremer website. FullStop data was interpreted and that more analysis would be done. A computer model is being developed using ground surface flooded, using this model will give the area flooded during flood events. This model will be used in the new groundwater model. With the aid of slides Tony showed how the groundwater works and showed slides of cross sections of the profiles of the confined and unconfined aquifers generating 3 dimensional diagrams of the aquifers.

Chairman thanked Tony and then asked Bruce Allnutt to present the data from the Irrigation Annual Reports.

Bruce Allnutt explained that there were still 30 odd IAR's still to be received and that the graphs and charts presented contain only the data received to date.

A series of charts and graphs were presented to the meeting and several questions were asked about the data presented.

Chairman thanked Bruce.

In the absence of Committee Treasurer the Chairman presented the Profit and Loss Statement for 2006-2007, as there were no questions John Pargeter moved that the statement be accepted, seconded by John Follett, the motion was passed on a show of hands.

Chairman advised the meeting that the Committee had made a small change to the Constitution to facilitate insurance and that the amendment was on the reverse side of the meeting's agenda.

Chairman asked Rob Giles to take the chair for the election of Committee for 2007-2008.

Rob Giles stated that there the four retiring members of Committee (Guy Adams, Terry McAnaney, Colin Cross and Sarah Keough) had renominated but as there was a vacancy on the Committee due to Herb Videka's resignation and he not being replaced, Rob called for nominations from the floor. Phil Reilly was nominated by John Pargeter, Rick Trezona seconded, as there were no further nominations the motion was carried on a show of hands.

Chairman called for general business:-

The question of recharge water not being available for use until the following year was raised. The Chairman replied that the Committee had made representations on this matter to DWLBC and have been informed that the alteration to the WAP was awaiting the Minister's approval.

As there was no further general business the Chairman thanked those present for their attendance and invited all to partake of the supper provided.

Meeting concluded at 2150hrs

ABWMC CHAIRMAN'S REPORT 06/07

Angus Bremer region faces a very uncertain future requiring careful management. The work of past community and committees must be continued protecting the aquifer and environment for the future. Lake levels have failed to recover and salinity is approximately double that of twelve months ago and will probably be unusable by late summer. The outlook for the following irrigation season is grim with a very much above average season required to restore levels and flush salt from the system. Efforts must be made to investigate alternative water resources and to protect the quality of the small amount of basin water available.

Recharge has been used extensively both from rivers and lake and committee is still waiting for ministerial approval of the increase in the 2500 ML limit to extractions Angus Bremer committee was disappointed to lose representation on committee from DWLBC Murray Bridge with transfer to Berri of administration and hopes staff at the Bridge will still handle local issues.

Committee continues to receive strong support from the NRM board providing approximately \$60000 in support and valuable assistance from Lyz Risby. Completion of the soils book should give irrigators an extra management tool and thanks to Tony Thompson for his assistance with this and many other projects. Outcomes from groundwater investigations will be reported to a special public meeting to be held after committee receives the report. Development of a WAP for the Eastern Mt Lofty is continuing and Angus Bremer will be part of this WAP. Insurance cover has been obtained for the committee. My thanks to the committee for another years work and support and to Barb and Bruce for their dedicated effort.

Terry McAnaney

FullStop at Angas Bremer: December 2006 Update

Richard Stirzaker and Tony Thomson



Government of South Australia
South Australian Murray-Darling Basin
Natural Resources Management Board



Introduction

A small amount of salt is added to the soil with each irrigation, but plants take up very little of it through their roots. Therefore all irrigation areas tend to accumulate salt.

Most irrigated crops get more water than they need, which washes the salt downwards. Sometimes additional leaching occurs naturally with rain or flooding. Salt washed out of the root zone ends up in the groundwater and moves to rivers and finally to the sea. Across much of Australia, the groundwater moves to the rivers very slowly and, on the way, it can rise upwards to cause salt outbreaks on the surface.

Data from the growers' monitoring wells shows that ground-water levels are not rising across the Angas Bremer region. Moreover, a recent study showed that Angas Bremer wines contain much less salt than wines from some other areas of the State. However, it is necessary to proceed with caution because Angas Bremer irrigators use water that can be salty, and they generally apply quite small amounts of water. This means that salt could accumulate in the root zone.

The installation of FullStop's across the region has given Angas Bremer irrigators the opportunity to watch how the salt levels rise and fall within and across seasons. This helps irrigators to know if and when to leach the root zone.

When we combine the FullStop information with other data collected in the region, like well water levels and well salinities, we can get a better understanding of how to manage irrigation for the long term.

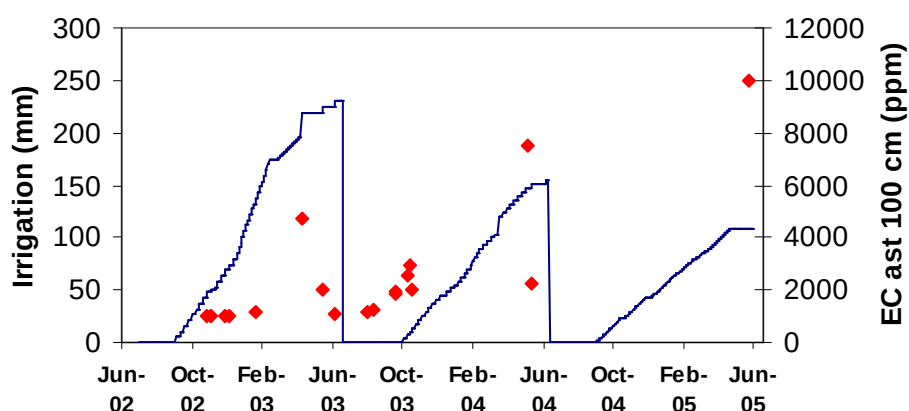
We have learned that the FullStop depths of 50 and 100cm are too deep for some growers and that the way the FullStop was installed does not suit some crop types. However, through the dedication of the growers we have a valuable set of data, and now it's our job to turn that data into something that is useful for the growers.

This report brings you up to date with our thinking. We will be seeking input from growers to help us work out 'where to from here'.

What does the data say?

We can look at the data in many ways. The graph on the next page displays the records from one grower over three seasons. This grower applied 231 mm in 2002-3, 154 mm the next season and 108 mm in 2004-5. The diamond shaped markers show the salt concentration in the 100cm FullStop. The highest reading in 2002-3 was 4,800 ppm, and this increased to 7,500 and to 10,000ppm over the next two seasons.

From this example with small mm per irrigation, it seems that in a year when less irrigation mm/yr is applied, the concentration of salt in the root zone is higher at the end of the irrigation season. In each year the salt concentration reduced after the winter rain.

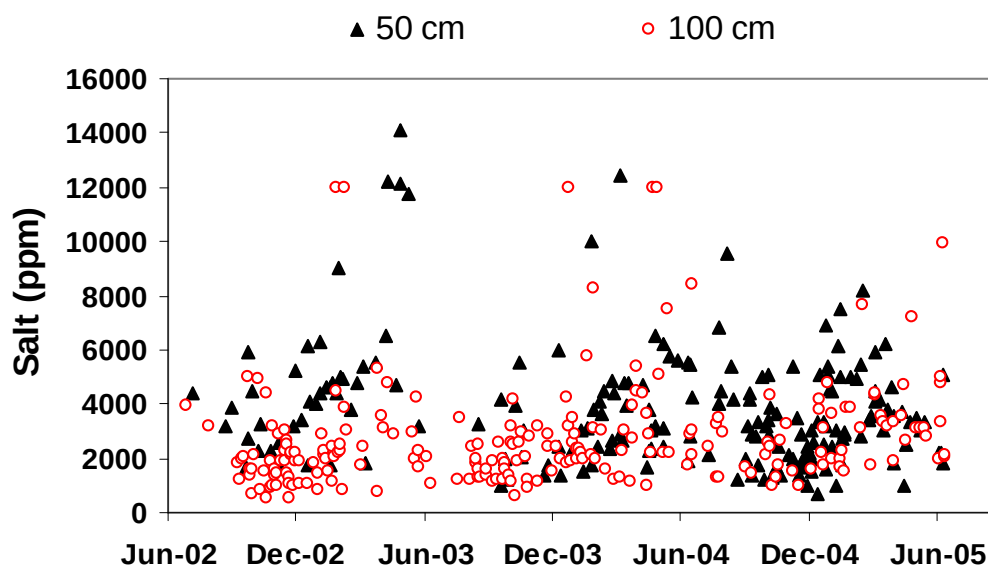


The solid line shows the cumulative amount of water applied during each of the three seasons at one property. The diamond shapes show the level of salt at 100cm depth when the FullStop responded.

Most growers collected much less data from their 100cm FullStop. In fact only half the growers got any response from their 100cm deep FullStop. The depth of soil that is wetted depends on (1) the amount of water applied through a single dripper at one time (2) the initial wetness of the soil and on (3) the type of soil.

The graph below shows all the salt data that was sent to us. It's a bit messy to read, but there are a few important trends. First, the maximum numbers are high (12,000ppm) and at 50cm depth this would not be healthy for most crops.

Second there is a general trend of rising salinity during the irrigation season, as we would expect. Third, the salt drops over the winter, but there is a lot of variability here. Some growers still start the next season with quite high salt readings.



All the salt data submitted in the annual reports to Jun 05. The filled triangles show the salt concentration at a depth of 50cm and the open squares the salt at 100cm depth

What to do next

Angas Bremer is the first region in Australia that has measured how deep wetting fronts move and where the salt is located in the root zone. Therefore we are still learning.

Ninety five percent of grape growers applied less than 300 mm of irrigation per season. Some applied water in fewer than 10 irrigation events over the season, while others applied much smaller

amounts of water in 50 to 100 separate applications. This means there will be a lot of variation in how deep the water goes and in where the salt accumulates.

The following suggestions are for grape growers. We stress that they are only our best understanding to date, and we still do not know the correct salt thresholds.

We can divide the growers into three groups. Please identify the group that fits your data and experiment with the suggestions.

Group 1

Group 1 activated both their 50cm and 100cm FullStop's several times during the season. Some recorded high salt readings at 100cm depth, but this water is leaving the root zone, so we expect high salt – say readings in excess of 4,000ppm. If the readings are less than about 4,000ppm at 100cm depth, then less water could be applied at one time.

Group 2

Group 2 activated their 50cm FullStop's several times during the season and sometimes the deep one as well. If the salt concentration in the 50cm FullStop gets up around 4,000 ppm, it's getting too high. Longer irrigations less often may push the salt down.

Group 3

Group 3 never saw any response at any depth. This occurred with many non-grape growers, but also with about 20% the grape growers. Some growers tried applying more water (40 litres through a dripper at one time) and still got no response. If we assume that these FullStop's are in working order and that they are located directly under a functioning dripper, then it is concerning that wetting-fronts did not get this deep, because salt could be concentrating at a shallow depth.

These growers need an additional new FullStop at 30 cm depth. This has been organised, but the roll-out has been slower than expected. When everyone has FullStop's that are collecting samples our understanding will increase.

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Angus Bremer Irrigators Revegetation Association Inc.,

September 2007

The Angus Bremer Irrigators Revegetation Association Inc. (ABIRA) has had a relatively quiet year. Much of the in fill work, extra direct seeding and a broadening of species at some sites, has been on hold due to the drought conditions.

Generally all the sites have done extremely well with the plantings along the Wellington and Lake Roads providing a great visual boost to all irrigator plantings on the area.

Other than the work above our planting project is complete. There have been no new members seeking revegetated area since we commenced and all that needs to be done is the completion of the legal agreements.

The agreement process has been moving very slowly but progress has been made. An independent solicitor has reviewed the draft agreements the main impediment is that the Water Allocation Plan, the legislation, does not at present support the ABIRA model. This has been known since we commenced and should be amended when the legislation is updated at its review date.

Once this is done ABIRA members will be pleased to sign the agreements and the process will be complete.

Once again ABIRA would like to mention our supporters –

The Angus Bremer Water Management Committee, for the idea and financing the legal assistance in dealing with the Government bodies, along with The River Murray Catchment board.

The National action plan - Salinity, Goolwa - Wellington LAP, E-tree and Landcare, for help with funding the work.

The landholders who have keenly offered land for the planting - The McAnaney family, Guy Adam's Metala, Dennis Elliot and Colin Wilson, Belvidere.

Community groups - Langhome Creek & District Landcare, Langhome Creek EPS R-6 Campus and Strathalbyn Scout Group.

Jeff Whittaker, our revegetation contractor, who has done a great job getting the plants in and growing. Many thanks Jeff for your guidance.

Simon Chinner – Secretary ABIRA Inc.

Sub-surface Drainage Trial Kayinga Vineyard

FABAL Agribusiness Management

23rd August, 2007



Introduction

Areas of Kayinga Vineyard are threatened by shallow water tables. Sub-surface drainage has been installed to lower the water table in order to sustain vine growth. Funding from the Angus Bremer Water Management Committee (ABWMC) via the Natural Heritage Trust allowed for a trial of varying drain spacing. The aim of the trial is to determine whether closer drain spacing increases their efficiency in dropping the water table. This is the fifth annual report.

Background

There are 2 main sites at Kayinga Vineyard which had sub-surface drainage installed in 2000. Site 1 covers 5.62ha while Site 2 covers 0.75ha. Site 1 had drains installed every 10m. However in a small section drains were installed every 5m. Site 2 had drains installed every 20m. However, again, in a small section drains were installed every 10m.

In order to measure whether narrower drain spacings have an effect on water table height test wells were installed in the middle of each drain spacing.

Season 06-07

Water table depth is directly related to rainfall. The drought conditions during season 06-07 meant the water table within the drainage areas was at a low level and was never at a depth that would have a negative effect on vine growth.

Figures 1 and 2 on the following pages summarise, on charts, the depth to water table within the various drain spacings for the 10 month period from July 2006 to June 2007 inclusive.

Depth to water table measured in millimetres is on the x-axis and the time that each measurement was taken is on the y-axis.

As the charts show all drains have maintained a water table depth for the 12 month period that is considered adequate for sustainable vine growth.

As the charts also show the narrower drain spacings at each site continue to maintain a lower depth to water table than the wider drain spacing.

Conclusions

1. All drain widths have increased the depth to water table.
2. The narrower drain spacings have a greater depth to water table than the wider drain spacings.

Figure 1. Chart of depth to water table for Site 1.
10m drain spacing are shown by diamonds and 5m drain spacing are shown by squares.
NOTE: Dry depth for 10m drain spacing is 2,050mm and 5m drain spacing is 1,850mm

Season 06-07

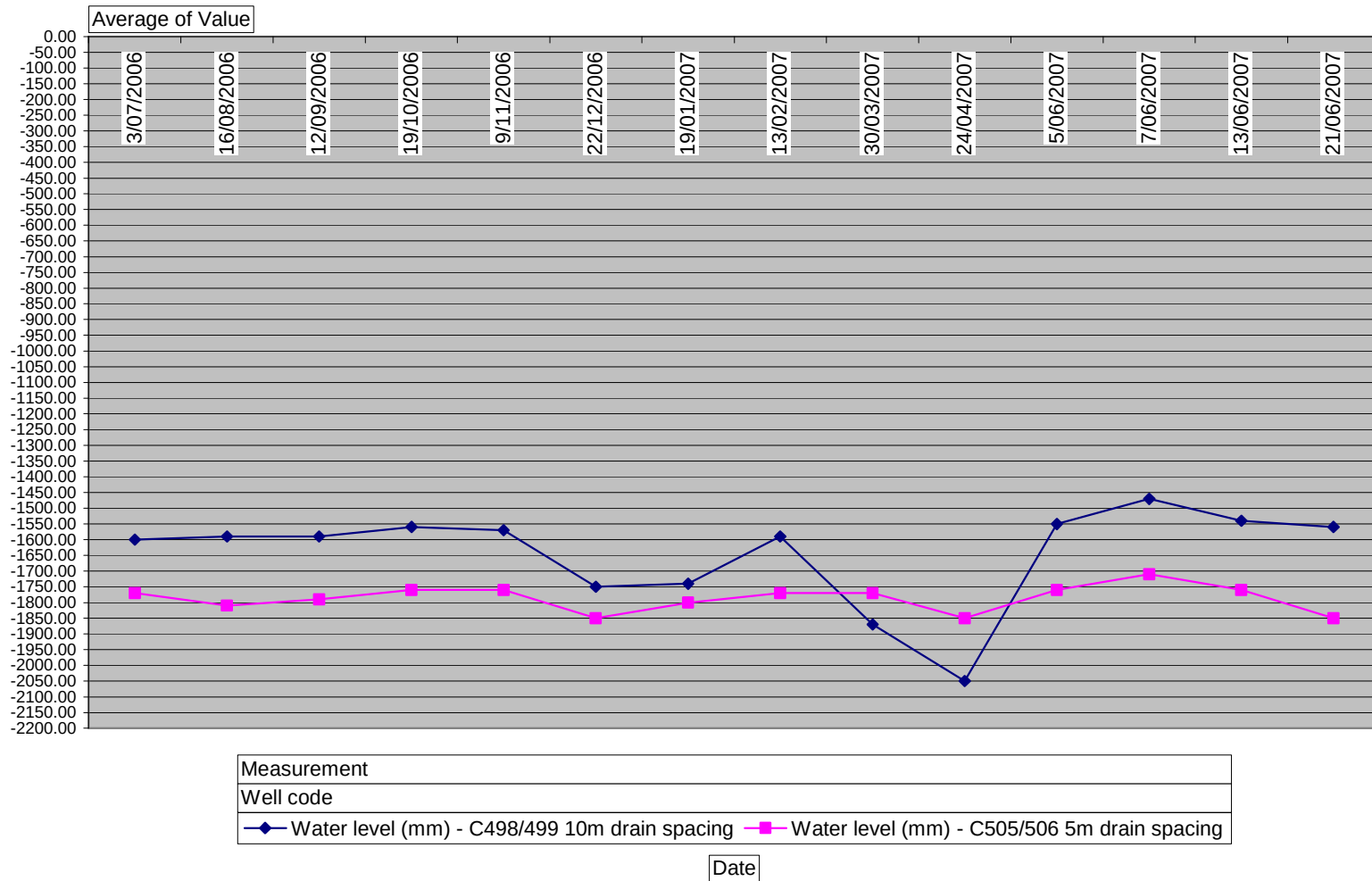
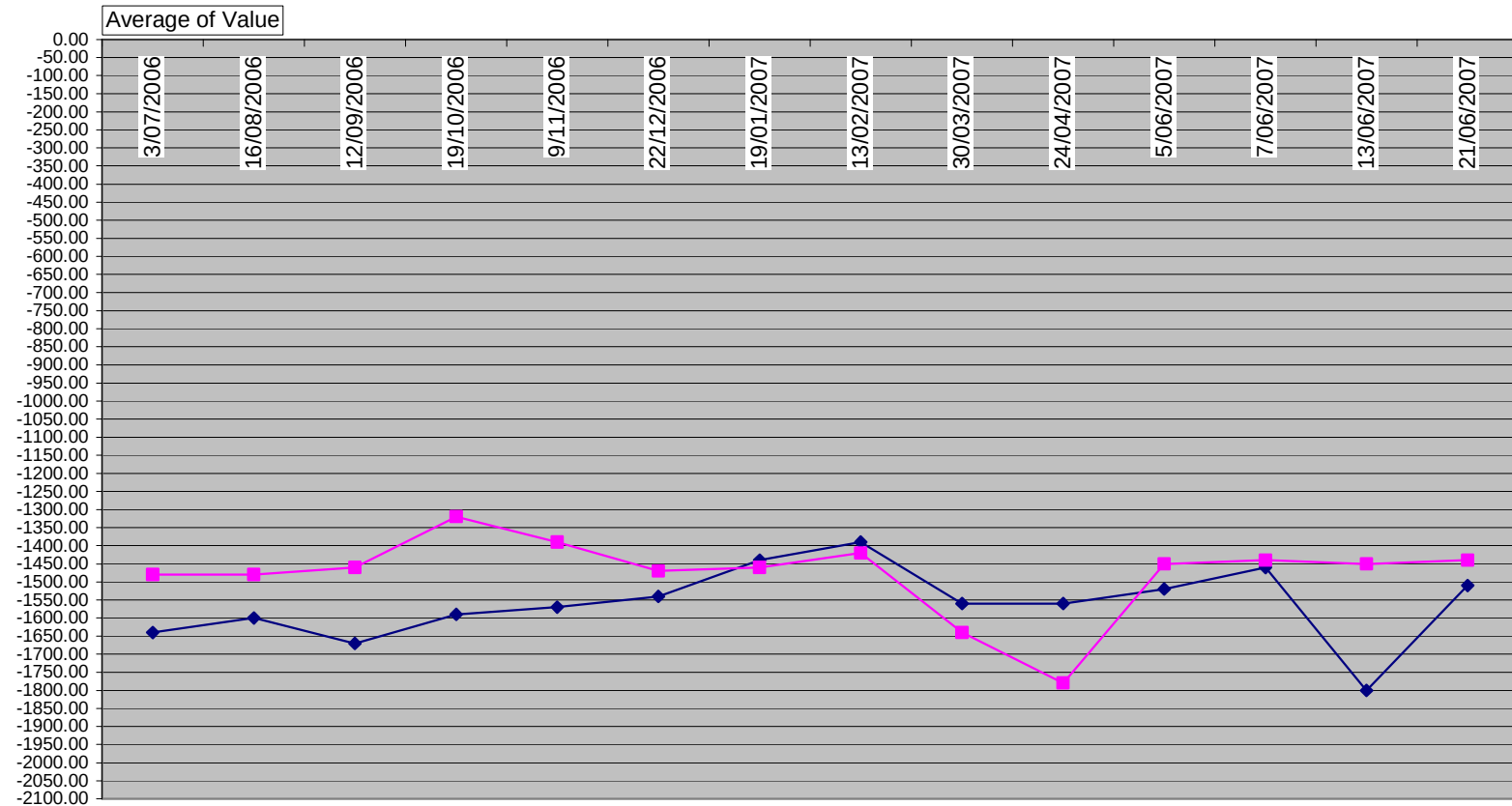


Figure 2. Chart of depth to water table for Site 2.
10m drain spacing is shown by diamonds and 20m drain spacing is shown by squares.
NOTE: Dry depth for 10m drain spacing is 1,800mm and 20m drain spacing is 2,300mm

Season 06-07



Measurement
Well code
◆ Water level (mm) - A1278/1279 Sth end 10m drain spacing ■ Water level (mm) - A1292/1293 Sth end 20m drain spacing

Date