ACCARNSI HONOURS & MASTERS RESEARCH GRANT REPORT

CLIMATE CHANGE IMPLICATIONS AND SOLUTIONS FOR WATER SUPPLIES IN INLAND AUSTRALIA

From the results of this project there are 3 major findings that can be noted which will aid in adapting and protecting Australia's settlements and infrastructure.

MAJOR FINDINGS AND OUTCOMES:

First is the surprising reliability of current Global Climate Models (GCMs) and their ability to replicate the climate of the past. The CSIRO MK 3.5 model was used to benchmark the GCM results and assess trends in climate conditions. GCMs are potentially very useful for water resource modelling within Australia.

The data which supports this result was in 2 parts; first a mean comparison was run. The results are shown below with 1 being a perfect mean match. The results in the table below were obtained by using monthly means from both the historical and GCM data. The results are calculated by summing the means of the GCM data over the length of the site records, then dividing by the summation of the historical data over the period.

Table 1 Mean Based Comparison of GCM and Historical Data

From this the GCM data looks like a good match to the sites, thus giving confidence of the model's ability to project climate change trends into the future. However, just because the GCM works well on a mean based analysis this doesn't mean that it will translate into giving similar results for a behavioural analysis. This next comparison was a better test of the model's accuracy. A comparison of analysis of groundwater dam performance in the past has been used for this purpose..

	Mildura	0	0	92	0	30	96
	Wagga	0	0	25	0	0	0
	Menindee	0	0	0	0	0	0
	Canberra	0	0	0	0	0	0
Monthly 20th Century GCM	Mildura	0	0	121	0	35	267
	Wagga	0	0	0	0	0	0
	Menindee	0	0	0	0	0	0
	Canberra	0	0	0	0	0	0

Table 2 Historical vs 20th Century GCM Predicted Number of Dam Days at Zero Capacity

From the table above the GCM has not performed as well at it did in the mean analysis with most values increasing. This shows how GCMs are very good at mean accuracy but when it comes to perfectly matching data sets they are still not as accurate as they should be.

The second major finding was the evidence that when climate change occurs it will have a negative effect on farm dams. The evidence of this is in the extreme failure of Mildura's case three dam. Even though this is just one case it highlights cause for concern.

Overall the effects of climate change on farm dams in Australia will be negative, causing a reduction in reliability and water security that these dams once provided. But the adaptation in the form of groundwater dams to these conditions is feasible and could provide the extra reliability that is required to ensure security of water resources in Australia's changing climate.

PROJECT SIGNIFICANCE TO ADAPTING AND PROTECTING AUSTRALIA'S SETTLEMENTS AND INFRASTRUCTURE:

The results found in this report will aid in helping Australia's settlements and infrastructure adapt to climate change, by

