SPECIAL TRIBUNAL ACTING UNDER DELEGATED AUTHORITY ON BEHALF OF THE MINISTER FOR THE ENVIRONMENT

Under	the Resource Management Act 1991
In the matter	of an application for a Water Conservation Order pursuant to s201 of the Act
By	**THE NEW ZEALAND & NORTH CANTERBURY FISH & GAME COUNCILS AND THE NEW ZEALAND RECREATIONAL CANOE ASSOCIATION**

STATEMENT OF EVIDENCE OF CAROLINE SAUNDERS ON BEHALF OF THE HURUNUI WATER PROJECT

2009

Introduction

1. My name is Caroline Mary Saunders. I graduated from the University College of North Wales in 1979 with an honours degree in Agriculture and Agricultural Economics and from the University of Newcastle (UK) in 1987 with a PhD in Agricultural Economics. I was employed at the University of Newcastle upon Tyne firstly as a research associate then as a lecturer from 1984 to 1994 and then 1995 to 1996. I was employed at Lincoln University in 1994 to 1995 as a senior lecturer and then from 1996 to date. Since 2001 I have been Professor of Trade and the Environment at Lincoln University and director of the Agribusiness and Economics Research Unit.

2. Over the last 27 years I have been engaged in a number of research projects relating to the economics of agriculture. I have published extensively on the development of agricultural economics and cost benefit of land use options and I have over 100 publications.

Purpose and scope of evidence

3. The purpose of my evidence is to: evaluate the potential direct, indirect and induced benefits of irrigation in terms of increased revenue and employment from agriculture in the context of an application for a Conservation Order on the Hurunui River.

4. I understand that one of the relevant factors for consideration by the Tribunal is the needs of primary and secondary industry. This evidence is directed at the economic benefits of arising from a potential development of the river's resources. The certainty provided by a reliable supply of water can also have social impacts on a community and increase the range of options to increase diversification in the rural community but these issues are outside my sphere of expertise to comment on.

5. Estimating the contribution of increased revenue from irrigation here includes the calculation of their direct, indirect and induced impacts on the local economy. The **direct effect** is simply the change in farms own output and/or employment levels. For the purposes of this study the output is measured in dollar terms as product passes beyond the farm gate. It is accepted that secondary processing of the product (such as conversion of milk to milk powder)

may occur but these additional economic benefits have not been incorporated into the study. By the same token employment may be generated off–farm for every addition kg of milk fat produced but the direct effects to employment in this study reflect only the added employment opportunities on-farm.

6. The **indirect effects** are the output and/or employment generated by other firms servicing the farms in the local area, such as input suppliers. An example may be that as production intensifies, further specialist expertise, transport services, refrigeration specialisation, farm management consultancy, for example, will need to be engaged for successful development of the additional production associated with irrigation. These services or outputs are quantified as indirect effects.

7. The **induced effect** is the impact on output and employment resulting from the increased household expenditure, in the local area, flowing from the direct and indirect effects. The sharemilker who visits a cafe in Amberley or the electrician who purchases goods from the local supermarket are two examples of induced effects arising from the added production associated with irrigation development.

8. The source of this information is the input/output tables for Hurunui and Waimakariri

Scenarios for Irrigation development

9. The two scenarios involve either a 15,000 hectares or 40,000 hectares to be irrigated of which 15,000 hectares and 35,000 hectares are potentially extra irrigated land. The first is a reduced water availability scenario, whereby only partial resource consent is allowed. For example, if consent was gained for only one of the two water storage sites. In this case, it is assumed in this study that the new irrigable area will be 15000 hectares.

10. The second is the assumption that Hurunui Water Project is able to gain resource consent for both storage sites to allow for irrigation within a wider command area. This would assume a potential irrigable area of 40,000 hectares, of which 5,000 is already partially irrigated through the Amuri Scheme, and has been ignored for the purposes of this study, as many of gains have already been realised.

11. I accept that irrigation may be established on parts of properties which will produce economic benefits for the whole property – but these issues have not been evaluated within the time permitted. My analysis focuses simply on the additional outputs which are derived from each new hectare of irrigable land.

12. The irrigated land of course has many different uses however for the purposes here this will be assumed to go from the current use of dryland sheep and beef farming to dairy. The assumption here of conversion to dairy is for simplicity, given the time frame and data availability, where in reality maybe only half the area will be converted into dairy and the rest into other irrigated farming types (specialist cropping). In the MAF study they predicted that of increase in irrigated area in Canterbury that 65 per cent would be converted to dairy with the remaining 35 per cent into high value arable production (MAF 2004). Data on high value arable returns is more difficult to obtain and can vary enormously depending upon the crop and often data is confidential. The results therefore compare the value of the increase in revenue from dairy compared to sheep to estimate potential increase in revenue from irrigation. It then estimates the employment from this increase in revenue that would be generated for the farming sector and local economy.

13. Dairy returns are almost invariably above sheep returns by usually over $4000 per hectare. The increase in revenue per hectare from dairy does vary and this ranges from between $4000 to $9000 depending upon the returns from 2002/3 to 2007/8 (however the $9000 does reflect the particularly high pay out for dairy in 2007/8). The data is for North Canterbury. The data does compare with other estimates of the increase in revenue from irrigated land with results from the MAF study showing returns to dairy were $4802 per hectare compared to dry land intensive pastoral returns at $962 per hectare. Assumptions are based on a milksolids payout of $3.7 per kg ms in 2003[1]. They also compare with a study on the Hunter Downs irrigation schemes which shows per hectare revenue from dairy was $5597 compared to $979 for dryland pastoral production[2].

[1] MAF (2004): The economic value of irrigation in New Zealand MAF Technical paper 04/01 April 2004.
[2] Agribusiness Group and Butcher partners (2006): Hunter Downs Irrigation Scheme assessment of the agricultural impacts of different reliability of irrigation water prepared for Meridian energy.

Table 1: Direct Increase in revenue from irrigation scheme ($million)

area	2002-3	2003-4	2004-5	2005-6	2006-7	2007-8
Increase in returns per ha	5164	4734	4203	4402	5000	9034
15000	77.463	71.232	63.058	66.037	75.000	135.510
35000	180.749	165.721	147.136	154.085	175.000	316.190

14. Table 1 illustrates the potential direct increase in revenue from the increase in irrigated land. This shows the range for scenario 1 is between $63 and $135 million and in the case of scenario 2 the benefits are between $147 million and $316 million. These have been calculated comparing the difference between dairy and sheep and beef farming returns per effective hectare using the MAF Pastoral Monitoring report. The difference in returns does heavily depend upon the dairy payout and the payout in 2007/8 was exceptional thus not considered here as a sustainable return. The average return from the increase in irrigation for farm returns is therefore $70 million for scenario one and $164 million from scenario two using average increase in returns excluding the 2007/8 year.

15. The multiplier impact of this increase in revenue is shown in table 2. This shows a slight increase in the flow-on benefits to the economy from conversion of sheep to dairy farming.

Table 2: Direct Indirect and Induced Increase in revenue for the North Canterbury economy ($million)

area	2002-3	2003-4	2004-5	2005-6	2006-7	2007-8
15000	80.562	73.864	65.581	68.678	78.000	140.930
40000	187.979	172.350	153.022	160.249	182.000	328.838

16. Thus table two illustrates the impact of the increase in farming revenue on the wider local economy. This shows an increase of between $65 million and $140 million for scenario one and $150 million and $328 million for scenario two. The average return from the increase in irrigation for the local economy is therefore $73 million for scenario one and $171 million from scenario two using average increase in returns, excluding the 2007/8 year.

17. The increase in returns are highly significant for the local economy given the GDP for Hurunui was $272 million in 2007 of which $131 million was from

agriculture[3]. This estimates a 27 percent increase in GDP from scenario one and 63 percent increase from scenario two. The results do assume all the area is taken up for dairy or similar high value activity. Ideally a sensitivity analysis would be undertaken to assess the time frame for the uptake of higher value farming activities.

18. Table 3 shows the employment impacts of the increase in revenue to farming from the irrigation scheme. This shows that there is an increase of on farm employment of around 25 with scenario 1 and 60 in scenario 2. When the indirect and induced impacts on employment are accounted for to obtain the total impact on employment the figures rise to between 40 and 50 in scenario one and 90 to 120 in scenario 2 (excluding 2007-8 data).

19. The average return from the increase in irrigation in employment on farms is therefore 23 for scenario one and 54 for scenario two. The average increase in local employment, accounting for the indirect and induced impacts, is 54 from scenario one and 105 from scenario two (excluding 2007-8 data).

Table 3: Impact of irrigation scheme on local employment, direct and in total for North Canterbury

DIRECT

area	**2002-3**	**2003-4**	**2004-5**	**2005-6**	**2006-7**	**2007- 8**
15000	26	23	21	22	25	45
35000	60	55	49	51	58	104

TOTAL

area	**2002-3**	**2003-4**	**2004-5**	**2005-6**	**2006-7**	**2007- 8**
15000	50	45	40	42	48	87
35000	116	106	94	99	112	202

20. This evidence just includes the increase in revenue from irrigated land assuming conversion from sheep and beef dryland farming to dairy and the wider impacts of this on the local economy. The calculations have focussed on conversion of sheep and beef to dairy and are based on farm returns. Ideally sensitivity analysis could be conducted cross different types of farming types and returns and also length of time of uptake of alternative land use. The analysis does also exclude the changes in land values which occur with potentially irrigable land.

[3] Infometrics http://www.infometrics.co.nz

21. The analysis also excludes a number of other impacts which are likely from the scheme. Firstly it ignores the capital costs and benefits of developing the scheme this should include the actual cost and benefits of construction of the storage facility and other infrastructure; the costs and benefits of infrastructure on –farm among other associated impacts. These impacts have financial implications but also public exchequer and wider economic impacts which should be included.

22. Another important benefit of irrigation is the impact on the wider wellbeing of the economy. Further analysis could identify these impacts for example after the introduction of the Amuri scheme the deprivation index[4] for Culverden fell from 7th decile in 1996 to 5th in 2001 and 2006 a significant improvement especially when compared to surrounding regions.

23. In conclusion, the irrigation scheme proposed has potential to increase the local GDP significantly. This increase is, assuming all the area transfers to higher value irrigated land , on average $73 million for scenario one and $171 million for scenario two. This is a significant increase of GDP of 27 per cent for scenario one and 63 per cent for scenario two. Ideally the results would include sensitivity analysis to allow for the time taken to convert land into other uses. This would of course imply lower return in earlier years but even if uptake was only 50 per cent this would still be a significant impact on the economy of $36 million for scenario one and $85 million for scenario two. The impact on employment is also significant with extra employment of 54 in the case of scenario one and 105 in scenario two. Further analyses would be necessary to estimate full impact of the scheme, in particular, the impacts of constriction and conversion.

Dated 23 March 2009

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Caroline Saunders

[4] The deprivation index is calculated from each census and attempts to measure the socio economic well-being of communities and includes such factors as income, home ownership, employment and qualifications as well s living space, communications and transport.