

**IN THE MATTER** of the Resource Management  
Act 1991

**AND**

**IN THE MATTER** of Notices of Requirement by  
Central Plains Water Limited

**AND**

**IN THE MATTER** of Applications for Resource  
Consent by the Central Plains Water Trust

## **Supplementary Report of Geoffrey Vernon Butcher**

### **1. INTRODUCTION**

In February 2008 I provided a S42A officer's report, on behalf of Selwyn District Council, on the economic aspects of the Central Plains Irrigation Proposal. This report was a supplement to the primary s42A report provided by Dr Brown, who was unable to continue with this assignment. Our reports raised a number of queries relating primarily to the economic efficiency calculations presented by Mr Donnelly and based in part on the farm budgets of Mr MacFarlane. We concluded that we were unable to confirm that the proposed irrigation scheme was an efficient use of resources – the s7 (b) test.

In April 2008 Mr MacFarlane and Mr Donnelly both provided responses to our reports, and they subsequently gave evidence to this hearing. I attended the hearing to listen to the evidence of Mr Donnelly and Mr MacFarlane, and also to hear the evidence of two other economists, Professor Hazeldine and Mr Copeland and to listen to the questions asked of these experts by the commissioners. I have also read the evidence of Mr Dennis.

### **2. SCOPE OF THIS EVIDENCE**

My objective in this evidence is to summarise the economic evidence which has been presented to the commissioners, to give some guidance as to the substantive issues that remain, and to provide a conclusion regarding the economic efficiency of this project. I deal in successive sections with the effects of the project on the national economy (balance of payments and GDP), the likely regional economic impacts and the relevance of estimates of these to the economic efficiency of the project, and the Cost Benefit Analysis of the project itself. With regard to this latter issue I will consider the shortcomings of the existing analysis as regards prices, production efficiency changes, the opportunity cost of water, the release of water rights, the costing of environmental outcomes and the uncertainty about some of the parameter values used. In my discussion of production efficiency I will refer to the additional evidence provided by Mr

Ford. I also consider the different ways in which benefits may be described (the project life-time approach of Mr Donnelly and Mr Copeland versus the single year snapshot presented by Professor Hazeldine), and the reasons for the differences between the net benefits calculated by Mr Donnelly and Mr Copeland.

### **3. FORMS OF EFFICIENCY**

There were questions raised by Mr Donnelly as to whether the relevant type of efficiency under the RMA relates to technical, allocative or dynamic efficiency. I agree with Mr Copeland that all aspects of efficiency are relevant under the RMA. On the face of it your decision may seem to be primarily related to allocative efficiency (where should water be used), but in fact what makes allocation of water to this project an apparently efficient use of water is the presumed level of technical efficiency in each land use under dryland, bore irrigation and irrigation from the CPW scheme. Since it is the presumed changes in technical efficiency which underlie Mr Macfarlane's budgets and hence Mr Donnelly's analysis, it seems to me that Mr Donnelly can hardly say that technical efficiency is not relevant. I do not think the debate as to exactly what sort of efficiency you are to consider has a significant impact on the conclusions<sup>1</sup>.

### **4. EFFECTS OF THE PROJECT ON NATIONAL BALANCE OF PAYMENTS AND GDP**

In his original evidence, Mr Donnelly argued that the increase in exports arising from increased production on CPW farms would enable expansion of the economy, and used some calculations to suggest what that expansion might be. Professor Hazeldine disputed the conclusions. In my view most economists would share Professor Hazeldine's reservations. While the immediate effects of CPW on exports would be positive, the long term net impacts on the balance of payments and GDP will be far smaller than those suggested by Mr Donnelly, and may well be trivial. This is because when extra resources go to CPW, they come from elsewhere in the economy, and the entire economy adjusts to compensate for this. One could try and model the net impacts on the economy by use of a Computable General Equilibrium model of the economy, but to use the approach taken by Mr Donnelly is not credible, and the figures he has produced are of little value to the commissioners, and should be given minimal weight.

### **5. ECONOMIC IMPACTS**

Mr Donnelly produced estimates of economic impacts generated by the scheme, although he did not say how you should interpret them or what weight you should give to them. He certainly did not suggest you should add them to his base case analysis results, but he clearly thinks they imply that the scheme will generate additional benefits over and above those given in his Cost Benefit Analysis.

Dr Brown, Professor Hazeldine and Mr Copeland questioned the interpretation of these impacts. Professor Hazeldine says the figures are irrelevant since if the resources are not used in this scheme they will be used somewhere else, and hence impacts will be

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<sup>1</sup> Mr Donnelly (rebuttal evidence) has introduced into the debate a discussion of whether or not the appropriate test of efficiency involves compensation (Pareto versus Hicks-Kaldor). I do not think that any other economist is suggesting that this differentiation is relevant to this debate, or is disputing Mr Donnelly's use of the Hicks-Kaldor approach. Consequently, commissioners can ignore this discussion.

generated somewhere else, so the impacts are gross impacts rather than net impacts, with the latter being the relevant measure and probably being minimal (at least at a national level). Dr Brown takes a similar perspective, saying that the net impacts are likely to be minor, and that any benefits associated with the net impacts are likely to be very much a second order of magnitude compared to those identified in the Cost Benefit analysis. Mr Copeland also draws attention to the fact that the resources will otherwise be used elsewhere and impacts will be generated elsewhere if this project does not proceed. I agree that it is the net effect that is relevant.

There is little doubt that there will be growth in economic activity in the region in which irrigation is expanded, and this has been demonstrated in *ex post* research of other irrigation schemes which I, along with others, have undertaken. We could, for the sake of convenience, call these the gross increase in jobs in the region. However, some of the extra jobs created in the region will be taken up by people who either give up other, presumably less desirable, jobs elsewhere in the region or elsewhere in New Zealand. Once we deduct the offsetting effects of the reduced employment elsewhere, then we have the net economic impacts. The wider the geographical focus of the analysis, the smaller is the net impacts of the jobs. One could estimate the net employment impacts at a national level using a CGE model. This can not be done at the regional level because we do not have regional CGE models. The question is whether for a cost benefit analysis it is the local, regional or national perspective that is relevant.

It is perhaps ironic that Mr Donnelly takes Dr Brown to task for focusing on regional costs and benefits<sup>2</sup> and stated that the need was for a national cost benefit analysis, when it is at the national level that net economic impacts are likely to be most limited, the point which Professor Hazeldine was also making (para 1.9).

It is possible that for projects in rural areas and small centres, the benefits identified by Mr Copeland will be greater than the off-setting costs in the large centres from which resources have come. Dr Brown says that there may be an argument for the potential existence of net benefits from increased employment in the surrounding district if increased employment is referred to as an objective in the district plan (which as far as I know it is not in the case of Selwyn District), but that otherwise there should be no automatic presumption that increased employment is a benefit. Mr Copeland says that there are reasons why councils feel their communities benefit from increased economic activity, increasing the greater use of under-employed or unemployed resources, but that the benefits are far less than the impact values estimated by Mr Donnelly.

I have undertaken many regional economic impact analyses, and I have become ever-more careful to try and get policy makers to focus on net impacts, and to be aware of the difference between impacts and benefits. In the central plains irrigation study, which I helped prepare in 2001, we commented:

*“Note that the value added is not the same as, and is considerably greater than, the benefit, since use of these factors [capital and labour] implies a cost to the community. An alternative measure of benefit is jobs created, and the benefit reflects the value the community places on increasing employment opportunities”.*

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<sup>2</sup> I don't think this was Dr Brown's intention. I believe that the point Dr Brown intended to make was that if economic impacts were to be taken into account, it was probably the net impact at the Selwyn District level that would be relevant.

I continue to hold the view that any significant difference between market prices and social cost are most likely to be related to net changes in employment (rather than value added), that this difference is likely to be small at times of full employment, and that district plan objectives of increased employment would provide evidence that a community placed a value on increased employment.

There is a range of opinion as to just how great the net economic impacts will be at any particular geographic level, and what geographic level is relevant. Clearly the greater the level of currently unemployed resources, the more likely it is that the gross impacts will translate into significant net impacts (as Mr Copeland noted) with some presumed social benefit. In a relatively fully employed economy such as New Zealand currently is, there may be very little net impact, although whether full employment will continue is a moot point. My understanding is that there is no clear guidance as to the geographic level at which impacts should be calculated for RMA purposes. On the one hand "efficiency" is often presumed to be estimated from a national level analysis, but on the other hand decisions are delegated to a territorial authority.

In my opinion, the major conclusion you should draw is that it is only net impacts that are relevant; that the net impacts are likely to be much smaller than the gross impacts that Mr Donnelly has described, particularly at a national level, and that the net benefits are only some relatively small proportion of the net impacts.

## **6. APPROPRIATE PRICE SERIES**

There has been discussion on an appropriate price to be used for commodities and especially milk, with suggestions being made<sup>3</sup> that there has been a major change in the economic environment which makes use of a higher price series appropriate, and that a change in the exchange rate is imminent. This may or may not be the case. The concern which Dr Brown and I expressed was the massive change being made over the passage of a year to an expected long term average price series for milkfat, and the lack of any independent assessment of the figures chosen (e.g. MAF forecasts, a long term real price series, both of which include exchange rates effects). It may be that the prices used in the Donnelly analysis are reasonable, but I note that in 1989/90 the milkfat price was \$5.12 and the following season it was \$3.35; in 2001-02 it was \$6.06 and the following year it was \$4.09 (all prices in 2006-07 dollars)<sup>4</sup>. The point to be made is that one should not get fixated by the current spike, and the Donnelly figure of \$5.50 is 16 per cent above the \$4.74 average for the last 21 years<sup>5</sup>. I note that Mr Ford supports the use of the \$5.50 figure based on available independent figures from MAF (which also take into account current high prices and expected exchange rate effects over the next four years).

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<sup>3</sup> Donnelly (para 7-evidence in response), Hazeldine (3.27) and Macfarlane (para 11-18, evidence in response)

<sup>4</sup> Source: New Zealand Dairy Statistic 2006-07, p34. Livestock Improvement Corporation

<sup>5</sup> See Appendix 1

## 7. EFFICIENCY CHANGES IN DAIRY FARMING

It is clear from an analysis of the farm budgets that what drives the positive Net Present Value of the CPW project is the assumed huge increase in dairy farm productivity that is assumed to result from access to CPW water. Dr Brown and I drew attention to the very strong assumption regarding increases in productivity on dairying land which currently depends on groundwater, and on the apparently high rates of productivity on newly irrigated land. The reasons given by Mr Macfarlane (para 50 of his evidence) include:

- Only top operators will be able to afford the water;
- Technological gains always occur in practice over time;
- Higher profit options will occur over time and assuming high productivity is one way of accounting for this; and
- Lower performing farmers will either not take up shares or will sell to higher performing farmers.

None of these reasons seems applicable for those farmers whose land is already irrigated. The first reason does not apply to them, because they will only convert to CPW if their profitability increases from where it now is, and they obviously can survive at their current costs and efficiency levels. All other reasons could happen regardless of CPW, and the analysis has to be “with and without” CPW rather than “before and after”.

For the balance of new dairying on land under CPW, the first reason is also not convincing. First, it assumes that there are sufficient operators who can achieve this level of productivity, and second Mr Ford demonstrates that the costs of water from the scheme will be less than the costs faced by current farmers for ground water. The second and third reasons will apply, but changes of this sort will also occur on dry land. So the difference in production on irrigated and dry land, which is what underlies the CBA, will grow less quickly than the increase in production on irrigated land.

In my view there has been no adequate response from Mr Donnelly or Mr Macfarlane regarding the assumptions underpinning the increases in dairy productivity which they have assumed in their analyses. Mr MacFarlane contented himself with saying<sup>6</sup> that he is “comfortable with his predicted change in average performances”, that he “does not assume the same farmers will create the increased performance”, and that “history has shown that new farmers can utilize new technology faster”. In response to a question from commissioners, Mr MacFarlane he said he was “very confident on the production side of it”.

These statements and assertions give me little confidence about the change in net income over time, and certainly not about the net impact of the CPW itself. If existing dairy farmers (who occupy 22,000 Ha, or 48 % of the 46,000 Ha of dairy under the CPW scenario) are assumed not to increase their performance, and if the average gross income per Ha is to increase by some 20 per cent, then the increase by the new dairy farmers must be of the order of 40 per cent. As outlined above, Mr Macfarlane cannot appeal to a change in productivity arising from a change in ownership of existing dairy farms. Such changes may well have happened anyway, and as Mr Copeland, Dr Brown and I have all made clear in our evidence, any underlying trend changes, whether due to retiring older farmers or general technological change, should be excluded from the

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<sup>6</sup> Para 23 & 24 of response to S42A report.

analysis of benefits arising from CPW. That is, the comparison has to be between the situations “with and without” CPW, rather than “before and after” CPW.

Both Mr Copeland and Professor Hazeldine have expressed concern at the use of Mr Macfarlane’s assumptions regarding both an increase in existing dairy farm productivity (when land is converted from ground-water irrigation to CPW irrigation) and the high level of productivity (compared to current productivity) on newly irrigated dairy land. Mr Copeland presented you with the results of the Net Present Value calculation if productivity on all CPW dairy farms (both converted and new) was the same as productivity on existing ground-water-irrigated dairy farms. Mr Copeland concluded that the result was a reduction in NPV of \$513 million for the project or \$82 million per year at full operation<sup>7</sup>. Using Mr Donnelly’s spreadsheet assumptions, I calculate<sup>8</sup> that removing the increased productivity assumption for existing dairying would reduce the NPV by \$267 million, and removing it for all dairying would reduce the NPV of CPW by \$564 million<sup>9</sup> (at a 10 % discount rate). While Mr Donnelly undertook sensitivity testing, this was not one of the parameters he tested<sup>10</sup>.

Mr Ford in his evidence argues that the assumed increases in dairy production will not arise from CPW for currently irrigated land, and that the assumed high levels of productivity on newly irrigated land will not be reached for perhaps ten years. Mr Ford also identifies some errors on the costs side, correction of which would increase costs by \$155 / Ha. While Mr Ford says that this change would not materially affect the results and conclusions reported by Messrs Macfarlane and Donnelly, I note that it is equivalent to a NPV of \$62 million over the project lifetime, which I regard as significant in the context of a net value reported by Mr Donnelly of \$375 million.

### ***Greater Reliability and the Cost of Achieving This***

Mr Macfarlane mentions increased reliability as a potential source of increased productivity<sup>11</sup>, but does not claim that this is a likely outcome of CPW, a point which I noted in my original S42A report. Nor did he refer to increased reliability in his response to the S42A report or in his presentation to commissioners. I am not aware of any evidence to this hearing about differences in reliability pre and post-scheme, or what level of reliability is assumed in generating the pre-CPW budgets.

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<sup>7</sup> See Table 1. NPV declines from + \$242 million to - \$272 million. Annual benefits decline from \$186.7 million to \$104.4 million.

<sup>8</sup> I assumed that existing dairy productivity and costs would be achieved on all CPW land, except that there would be a saving of \$250 / Ha in electricity and an increase of \$70 / Ha in maintenance once conversion was undertaken.

<sup>9</sup> This is somewhat higher than the \$514 Mr Copeland calculates, because of the different ways in which they have set up their spreadsheets. See section 14 of this evidence.

<sup>10</sup> Professor Hazeldine argued that fewer cows and lower yields would reduce net benefits of the scheme by \$18.2 million per year (a comparison of his column F with column A). However, in his base case he appears to have already stripped out the increase in production per cow, which is why his base case change in farm cash flow is only \$106.8 million per year compare to the \$186.7 million in Mr Donnelly’s base case, which Mr Copeland also used. His “lower yield - fewer cows” sensitivity testing appears to take production back to only 1,140 Kg / Ha.

<sup>11</sup> Para 37 evidence in chief.

Mr Tippler says in his evidence<sup>12</sup> that the prospectus “undertook to provide a maximum volume of water of 376 MCM/yr. This volume was determined to provide a 90 % reliability level”. A few sentences later he said, “The scheme capacity will be designed to provide in the order of 97 – 98 % reliability, but not all this water will be committed to water users as of right. This therefore provides a volume of “un-sold” water that can be made available during dry years. Water users will be able to purchase unused allocations from other farmers, or from the scheme, in those dry years when demand will be higher”.

Mr Ford’s evidence suggests that this design reliability is no higher than that which has been available from ground water in the past or in the future, and hence the scheme will not support higher productivity than has ground water in the past.

It is also not clear whether the additional water “purchase .... in dry years” referred to by Mr Tipler to attain 98 % reliability has been included in the MRB budgets, a point to which Mr Ford draws attention.

I understood Commissioner Milne to put the proposition to Mr Copeland that the scheme proposes to deliver 97 – 98 % reliability, and that this may be a significant increase in reliability from ground water. I am not sure if Commissioner Milne was referring to the reliability of ground water at present (which is what determines the pre-CPW productivity), or the expected ground water reliability in future (which is what determines the benefit of the scheme using a “with / without” framework). In any case Mr Ford’s evidence suggests that the future reliability on existing irrigated land will equal or exceed the 98 % reliability expected under CPW<sup>13</sup>.

## **8. TAKE UP BY FARMERS WITH EXISTING GROUNDWATER IRRIGATION AND RELEASE OF THEIR WATER RIGHTS**

The use by other farmers of freed up groundwater is a significant factor in the claimed benefits. On the basis of information provided by the applicant, Dr Brown calculated an operating cost saving to existing irrigators of \$244 / Ha / year, and questioned whether this was consistent with an assumption that this would persuade farmers who currently use groundwater to spend \$6,826 / Ha convert to the scheme. Mr Ford’s evidence suggests that there will be advantages to those who currently pump from bores deeper than about 100 m.

We also questioned the assumption that any farmers who do convert to the scheme will give up their groundwater rights, and that half of the groundwater will be allocated to and taken up by other farmers on currently unirrigated properties. It was our view that farmers could minimise risk by retaining their existing water rights, even if they hoped not to have to use them.

Mr Donnelly and Mr Macfarlane suggested that the ECan might force farmers to give up unused rights or take those rights off them. While ECan might try to do so, I imagine

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<sup>12</sup> Para 45. Brief of Evidence 1 Feb 2008

<sup>13</sup> Existing groundwater supply can be considered as fully reliable ... Instances of low aquifer levels can be addressed ....and .. should not be considered as compromising water reliability. The priority status of existing consents and halt on further allocation will protect the current level of reliability in the future

that removing the rights would be strongly resisted by farmers. There is also no guarantee that CRC would reallocate freed-up water to other users. I understand that the Commissioners have heard evidence from ECan on this matter.

Mr Donnelly has stated that even if uptake is slower, his sensitivity testing suggests that this will not significantly alter the results. However, his sensitivity testing assumed a delay in uptake of only two years. Given that the existing water rights are for anything up to thirty years, this seems to me an extremely mild form of sensitivity testing.

All these questions have huge impacts on whether the proposed scheme will lead to an efficient use of resources - (the s7 (b) test) - , and to date the answers have not been convincing. A change in these assumptions has huge implications for the economics of the CPW scheme.

## **9. OPPORTUNITY COST OF WATER**

Dr Brown and I raised a concern about the lack of an opportunity cost of water in Mr Donnelly's calculations. Mr Copeland and Professor Hazeldine shared our concern, and Professor Hazeldine went so far as to suggest an opportunity cost of water of \$10 million per year, albeit with little supporting evidence.

In essence the absence of a cost for water is what makes it necessary to compare the outcome of this project with the outcome of other projects. Otherwise we could simply allocate the water in an efficient manner<sup>14</sup> by selling the water to the highest bidder. We cannot say what the true cost of water is, because we do not know what anyone else would be willing to pay. What we do know is that treating water as a free good probably leads to a considerable understatement of the economic costs of this project, and therefore an overstatement of the net benefits.

Mr Donnelly has continued to claim that the opportunity cost of water is zero. He justified this during questions from commissioners by saying that water is freely available in some places (I believe he appealed to the ready availability of water at no cost on the West Coast), and it is only the infrastructure to transport it from one place to another that has a cost. I do not think any other economist at this hearing accepts Mr Donnelly's view. The costs of transporting the water from some place of plenty, and the value to other users of the water currently available, is precisely what means water in Canterbury rivers is not a free good.

We also need to consider the opportunity cost of water for in-stream uses. I understood Mr Donnelly to suggest that this is likely to be very small because the hearings which set minimum flows have implicitly accepted that in all probability the value for extractive uses exceeds the value for in-stream uses. I do not think this avoids the requirement to estimate the likely extractive values because the earlier decisions allow for the possibility of extraction; they do not say it will be worthwhile in all cases. Hence all the information before you as to the effects on in-stream values remains relevant.

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<sup>14</sup> Ignoring for the moment differences in environmental and social costs between projects

## **10. INITIAL ALLOCATION OF WATER AND NEED TO LOOK AT ALTERNATIVES**

Even if the commissioners accept that, given the estimated benefits and costs, it would be efficient to extract water for CPW, the question arises as to whether the water might be more efficiently extracted and used for other purposes. What was of concern to Dr Brown and I was that this issue had not been, and still has not been, addressed by the applicant. I recognize the problems in trying to compare the value of water in the CPW scheme with its value in other extractive uses, but this does not remove the need to do so.

Commissioners have made a point of asking the economists whether they thought a scheme with storage would be a more efficient use of water than a run-of-river scheme, and whether a large scale scheme would be more efficient than smaller schemes. In answer to commissioners' questions, Mr Donnelly expressed the view that both the large scale of this project and the associated storage facility meant that Central Plains was very probably the most efficient way of using water (for irrigation purposes). Professor Hazeldine and Mr Copeland were both much more cautious, and said that it depends entirely on the facts of the case, and no such conclusion could reasonably be drawn. I support their view. Dr Brown and I noted in our reports that earlier information on scheme costs had shown that costs per Ha actually increased once the scheme got beyond a certain point, hence calling into question Mr Donnelly's confidence about economies of scale, particularly in this instance.

Mr Donnelly has argued that the first come first served approach of the RMA means that the commissioners do not need to consider the relative efficiency of a given use. They need to consider only whether allocation is more efficient than non-allocation. He then appeals to the Coase theorem, which broadly says that regardless of the initial allocation, resources will transfer to their best use. As Professor Hazeldine points out, this theorem applies only where decisions are freely reversible. Once a huge capital cost has been incurred and becomes effectively a sunk cost, the marginal cost of the water to users becomes very low, and it is most unlikely that the water will transfer to another use, even if an *ex ante* analysis of the two schemes was to show that the latter was a much more efficient use of water.

## **11. CHANGES TO COSTS AND QUERIES**

My understanding is that the applicant has said they would prefer to use the tunnel option for the Waimakariri, and this would add \$23.5 million to the cost, and hence would reduce the NPV of the project by a slightly smaller amount because of discounting over the construction period.

There have been queries as to whether the capital costs include land costs and costs of mitigation. Mr Tipler advises that the capital cost does include land purchases, but not costs of mitigation, because these are not yet known. There have also been queries as to where the \$71 / Ha running costs and \$165 / Ha electricity costs are included in the farm budgets, and whether these costs are for the base reliability of 90 % or for the enhanced reliability of 98 %. I have asked Mr Macfarlane for clarification, but at the time of writing, no response has been received.

## **12. SINGLE YEAR SNAPSHOT VERSUS PROJECT LIFETIME APPROACH**

Professor Hazeldine has taken a different approach to Mr Donnelly in showing a one year slice of the action at full productivity, rather than a single value for a whole of lifetime analysis. What Professor Hazeldine was trying to do was to avoid the problems associated with agreeing on an appropriate discount rate and guessing future prices, and with helping you take a different perspective on the environmental costs. I don't think his approach achieves either of the former two objectives. He has chosen a cost of capital, which is broadly analogous to choosing a discount rate, and he has used a set of prices but invited you to think about how those might change, a process which you might have used equally well with the conventional approach used by Mr Donnelly.

While the lifetime analysis is the normal framework in which a CBA is undertaken, expressing the outcome as an annual figure can aid understanding. People may be better able to conceptualise and comprehend the trade off between an annual net economic benefit and an annual environmental cost, rather than a life-time of benefits with a life-time of environmental costs.

The two approaches are complementary, and Mr Donnelly's figures could be expressed on an equivalent annual basis at full production<sup>15</sup>. A net present value of \$375 million over 35 years could be seen instead as a series of annual benefits at full production of \$49 million<sup>16</sup>.

## **13. COSTING OF ENVIRONMENTAL OUTCOMES**

All the economists agree that the decision makers (the commissioners in this case) need to weigh up any net monetary outcome against any potential environmental and social outcomes. Where possible, economists will try to assist the decision makers by putting a monetary value on an environmental outcome. Professor Hazeldine has provided you with some suggestions about monetary values for environment outcomes such as greenhouse gas costs and water pollution. My reservation about the inclusion of a CO<sub>2</sub> cost is that if CO<sub>2</sub> taxes become part of the world trading system, they may have significant impacts on output prices as well as costs, and my understanding is that Professor Hazeldine has considered only the effect on costs. My concern about the water pollution cost Professor Hazeldine has chosen is that it seems quite arbitrary.

## **14. DIFFERENCES BETWEEN COPELAND AND DONNELLY**

I have reviewed and compared the spreadsheets provided by Mr Copeland (in his evidence) and Mr Donnelly (to Dr Brown in 2007). In the "Base Case", Mr Copeland shows net benefits of \$242 million and Mr Donnelly shows net benefits of \$454 million, which he later reduced to \$375 million, presumably because of changes in some assumptions. It seems clear that Mr Donnelly has assumed a faster ramp up of

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<sup>15</sup> Hazeldine assumed that Donnelly has not taken depreciation into account. I disagree. Mr Donnelly has a thirty five year analysis which has only a depreciated capital value at the end of the project life.

<sup>16</sup> Using Mr Donnelly's spreadsheet assumptions regarding the timing of benefits and build up to full production.

production than has Mr Copeland<sup>17</sup> (which explains more than \$100 million of the \$133 million difference) and Mr Donnelly has assumed that all costs and revenues occur at the start of the year rather than the end of the year as assumed by Mr Copeland (which effectively increases the net benefits by a further \$35 million).

## **15. SUMMARY AND CONCLUSIONS**

As Commissioner Milne has said, and I think all the economists have agreed, there is a trade-off to be made of values expressed in monetary terms compared to values which cannot be so expressed, and it is the job of the commissioners to decide if the trade-off is worthwhile.

The economists have tried to help by placing monetary values on the net increase in farm returns, and by showing the results in different ways (single lifetime value or annual value). Dr Brown, Mr Copeland, Professor Hazeldine and I have raised concerns regarding the claimed increases in dairy productivity, particularly on a “with and without scheme” basis; the lack of an opportunity cost for water and the failure to consider alternative uses for the water or a reduced CPW scheme size; the likely rate of uptake by existing irrigated farmers; the availability to other farmers of groundwater which existing irrigators might or might not release; and whether all costs have been appropriately included in the analysis. Those concerns have not been adequately addressed by the applicant.

There is a widely held view that Mr Donnelly’s assessment of the effects of the scheme on GDP ignore offsetting adjustments within the economy, and that aspect of his submission should be given little weight if not ignored.

All the other economists agree that the relevant economic impacts are the net impacts, although there is debate as to the geographic scale at which the net impacts should be considered. Professor Hazeldine believes any net impacts and benefits will be trivial. Dr Brown believes they will be minor compared to the CBA results, and ascribing a benefit to an employment impact should be justified in terms of District Plan objectives. Mr Copeland believes that there may be some benefits at the regional level, but that this depends on economic and social circumstances at the time. I agree with this, and suggest that the net impacts on employment are probably the most relevant matter to consider.

Summing up all the foregoing, it is my continued view that the applicant has been unable to demonstrate that the proposed Central Plains Irrigation Scheme meets the s7 (b) test of being an “efficient” use of resources.

Geoffrey Butcher  
*August 2008*

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<sup>17</sup> Mr Copeland has linear growth over years 3 – 8 (which is consistent with Mr Donnelly’s para 7.13), while Table 4 in Mr Donnelly’s evidence, and the spreadsheet he provided to us, have much more rapid growth.

## APPENDIX 1 Long Term Price Series for Milkfat.

|              | Dairy company payout<br>(2006-07 prices) |
|--------------|--|
| 1987-88      | 3.75                                     |
| 1988-89      | 5.02                                     |
| 1989-90      | 5.12                                     |
| 1990-91      | 3.35                                     |
| 1991-92      | 4.59                                     |
| 1992-93      | 4.96                                     |
| 1993-94      | 4.45                                     |
| 1994-95      | 4.36                                     |
| 1995-96      | 5.01                                     |
| 1996-97      | 4.51                                     |
| 1997-98      | 4.17                                     |
| 1998-99      | 4.39                                     |
| 1999-00      | 4.54                                     |
| 2000-01      | 5.83                                     |
| 2001-02      | 6.06                                     |
| 2002-03      | 4.09                                     |
| 2003-04      | 4.63                                     |
| 2004-05      | 4.86                                     |
| 2005-06      | 4.19                                     |
| 2006-07      | 4.46                                     |
| 2007-08      | 7.45*                                    |
| Ave 21 years | 4.74                                     |

Source: p34, New Zealand Dairy Statistics, 2006-07. Livestock Improvement Corporation