Economic Review of Wairarapa Water's Application for Stage 2 (Feasibility) Funding from the Irrigation Acceleration Fund

A Paper for Fish and Game (Wellington Region)

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Purpose

1. The purpose of this paper is to provide *Fish and Game* (F&G) with an assessment of:

    a. the credibility of the economic analysis employed by *Wairarapa Water* (WW - formerly the *Wairarapa Water Use Project* [WWUP]) in support of its 2016 application to the *Irrigation Acceleration Fund* (IAF) for $821,500 of stage 2 (feasibility) funding
    b. the feasibility of the scheme and the resulting economic benefits
    c. the rigour of the Ministry for Primary Industries' (MPI) review of WW's IAF application.

Executive Summary

2. The economic assessment in WW's IAF funding application is based on analysis from a 2014 report by Butcher Partners[1] (the 'Butcher Report'). This report assumed a long run farm gate milk price of ***$7.07 per kilogram of milk solids*** (kgMS), which leads to a further assumption that ***55% of the irrigated area will be intensive dairy farms or dairy support***. Whilst a long run milk price above $7.00 kgMS was questionable in 2014, given changes in international dairy markets it is a completely unrealistic basis for decision making in 2016.

3. Given the pivotal role dairy conversions play in terms of the economic feasibility of WW's application, ***it is my professional opinion that MPI should have returned the application to WW for revision and possible resubmission***. It therefore follows:

    a. ***Questions need be asked regarding the rigour of MPI's assessment process*** (and compliance with the IAF's assessment guidelines)
    b. WW must stop using this outdated material and any future IAF funding application ***must employ updated analysis*** (with credible sensitivity analysis)
    c. Any future application ***must also include an actual, indicative or hurdle water price*** - as any objective assessment of the merits of a water storage project is meaningless in the absence of a water price.

4. At current and prospective farm gate milk prices irrigated dairying is simply not viable in the Wairarapa - ***even if the water is free***. This means the entire proposal quickly unravels; implying the circa 1,110 jobs promised as a result of the project become vapourware.

5. A theoretical counterfactual based on a 'dairy lite' scenario is developed as a planning exercise using an area equivalent to the 10,000 ha Tividale scheme. In this scenario, land area devoted to dairy is fixed at status quo levels whereas horticulture and arable/mixed farming are 'scaled up' to cover the 'hole' left by irrigated dairy. The result is a scheme that

[1] Butcher Partners Limited, Regional Economic Impact Analysis of the Proposed Wairarapa Water Use Project *(report commissioned by Wairarapa Water Use Project)* Final Report 19 October 2014

becomes entirely dependent on horticulture for job creation - as WW's own analysis suggests arable/mixed and sheep and beef farming ***shed jobs under irrigation***.

6. Slightly fewer jobs are (theoretically) created under the counterfactual proposal compared to the WW proposal - though still a material number. However, it must be remembered horticultural labour requirements are typically seasonal in nature with a high presence of migrant workers. The number of fulltime local jobs generated may therefore be relatively modest - especially as the Butcher report assumes any further processing is done elsewhere.

7. Finally, the theoretical 'dairy lite' counterfactual also reveals a mismatch between means and ends - because it is illogical to irrigate 10,000 ha of land if all the job growth stems from only 427 ha. If horticulture is a climatically and economically viable land use in the Wairarapa then a micro-scheme based on circa 500 ha appears much more sensible.

Background

8. The IAF is part of a policy troika that includes the *National Policy Statement on Fresh Water Management* and the *Fresh Start for Fresh Water Clean Up Fund*. The purpose of the IAF to support the development of irrigation proposals to an 'investment-ready' stage.

9. On 16 August 2016 MPI released, under the *Official Information Act,* WW's stage 2 IAF application to F&G. Rōpere Consulting was commissioned by F&G to evaluate the economic analysis employed by WW in the IAF application.

10. WW's current proposal is based on a two site option that is projected to irrigate almost 30,000 ha when fully developed. The two sites are summarised thus:

    a. *Black Creek*: based on two dams (located on the Wakamoekau and Black creeks respectively) with a 46M m3 reservoir located 11 km northwest of Masterton. This proposal can supply 67M m3 of water and irrigate circa 20,000 ha of land via a gravity-fed pipe network.

    b. *Tividale*: based on a single dam situated on the Taueru River with a 29.2m m3 reservoir located 23 km northeast of Masterton. This proposal can supply 30.2M m3 of water and irrigate an area of circa 10,000 ha. Distribution is via a combination of run-of-river delivery (a third of total) and a piped network (the remaining two-thirds).

    It has been previously disclosed by WWUP that Black Creek has an indicative cost range of $138-$205m (with a midpoint estimate of $171.5m) whereas Tividale has an indicative cost of $71-$105m (with a midpoint of $82m).

11. WW provide the following land use table showing approximate existing and prospective land uses in the absence and presence of irrigation.[2]

[2] Wellington Regional Council, IAF application *Wairarapa Water Stage 2 Feasibility Phase Investigations* Undated, page 21; also found in Butcher (2014) page 12

	Existing Dry Land		Irrigated	
	%	30,000	%	30,000
Dairy	22	6,600	45	13,500
Arable & mixed	40	12,000	30	9,000
Sheep and beef	24	7,200	12	3,600
Dairy support	14	4,200	10	3,000
Horticulture	0.0	0	3	900
Total	100%	30,000	100%	30,000

12. As indicated in the table above, the net effect of irrigation in terms of land use change is a dramatic increase in intensive dairying [inc. dairy support] (from 36% to 55% of the irrigated area - a 50% increase). This is primarily at the expense of sheep and beef (a halving from 24% to 12%) and arable (falls by a quarter, from 40% to 30%). Interestingly, horticulture (which is typically a high value land use under irrigation) is minuscule - at only 3% of total irrigated land use.

13. In terms of economic impact, WW directly quotes[3] the 2014 Butcher Partners report:

    Wairarapa GDP will increase by a one-off $25 million as a result of on-farm investment associated with the conversion of 10,000 ha. Associated with that will be an extra one-off $19 million in household income and 360 job-years of work. Wellington region (including, Wairarapa) GDP will increase by $30 million with an associated $21 million of household income and 390 job-years of work. These impacts will be spread over several years, and exclude the impacts associated with off-farm construction. Development of irrigation on 30,000 ha will have impacts which are three times as great.

    Wairarapa district GDP will increase as farms convert to irrigation and, once 10,000 ha is being fully irrigated, regional GDP on farms and in industries that directly and indirectly support farms will increase by $49 million per year. Associated with this increase will be an additional $17 million per year of household income 369 Full-Time-Equivalent jobs. Impacts of irrigation over 30,000 ha will be three times as great.

    Regional economic impacts will be greater, both because of the greater self-sufficiency in some inputs at the regional level than the district level, and because multipliers at the regional level are greater. Taking all these factors into account, regional GDP will increase by $52 million per year. Associated with this increase is will be an additional $18 million per year of household income, and 403 Full-Time-Equivalent jobs. Impacts of irrigation of 30,000 ha will be three times as great.

14. The economic benefits and job creation numbers are summarised below:

	Output ($m/yr)		Jobs (FTEs)		Value -Added ($m/yr)		Household Income ($m/yr)	
Ha	10,000	30,000	10,000	30,000	10.000	30,000	10,000	30.000
Dairy farming direct	38	114	90	270	21	63	4	12
Other pastoral and arable direct	10	29	-32	-95	7	21	-1	-2
Horticulture (or similar)	18	53	142	425	8	25	5	14
Subtotal - Direct Farming	**65**	**196**	**200**	**600**	**36**	**109**	**8**	**24**
Farm support in Wairarapa	23	68	169	510	13	37	9	27
Total Wairarapa impacts (rounded)	**88**	**264**	**369**	**1,110**	**49**	**146**	**17**	**51**
Farm support elsewhere in Wellington	8	25	34	100	3	11	1	4
Total Wellington impacts (rounded)	**96**	**289**	**403**	**1,120**	**52**	**157**	**18**	**55**

[3] *Ibid*. WRC page 26; Butcher pages 4-5

Analysis

Approach

15. The 2014 Butcher Report is neither scheme nor proposal specific and simply focuses on the potential economic outcomes of irrigating Wairarapa land in 10,000 HA increments (measured in terms of annual GDP increases and jobs created). As a modelling approach this is reasonable. In the absence of examining the underlying modelling it is not possible to determine whether the indicative figures are reasonable or not. However, given the nature of the figures presented there is no obvious reason to question them.

16. The key issue, therefore, is the rigour of the assumptions that underpin the economic modelling rather than the modelling itself (which appears credible). Given the dairy centric nature of the economic analysis (and from that, one can reasonably deduce, WW's proposal) the single most critical assumption is the farm gate milk price; closely followed by an indicative water price - as the former determines whether dairy conversions will happen whereas the latter determines whether they are profitable.

17. The analysis that follows is therefore structured as four distinct - but interrelated issues. The first two deal with the milk and water pricing questions, and finds large scale irrigated (and intensive) dairy conversions are not economically viable in the Wairarapa at prospective milk prices *even if the water is zero priced*. It naturally follows an already difficult situation becomes dire once an indicative water price is added. The result is a 'cascade effect', in that the failure of the initial milk price assumption triggers the ongoing failure of subsequent assumptions so the economic logic of the entire project unravels. This leads directly to the third issue: the collapse of the job creation estimates. To readdress this, a 'dairy lite' counterfactual is developed as a planning exercise via a proportional redistribution and scaling of land use data. The counterfactual suggests that a broadly equivalent number of jobs can be [theoretically] created, but WW's proposals are an unnecessarily complex and expensive way to achieve them.

18. Finally, the role of MPI as administrating agency for the IAF is considered in terms of the quality of the assessment undertaken and its compliance with IAF guidelines. This is found wanting.

Issue 1: Unrealistic Milk Price Assumption

19. Given the dairy centric nature of the WW proposal, the most critical assumption is the long run farm gate milk price - as that drives both the speed and magnitude of land use change (which itself drives the GDP and job creation numbers). In this respect, it is distressing to see WW continuing to rely on the 2014 Butcher Report in an unrevised form, therefore employing a 2013 long run farm gate milk price assumption of $7.07 kgMS.

20. A long run milk price assumption above $7.00 was questionable even in the context of 2013-2014 (i.e. prior to the international dairy price re-alignment of the past two years). For

example, in 2014 WWUP also commissioned Baker and Associates[4] to conduct farm profitability modelling under irrigation and the milk price assumption Baker and Associates employed was $6.50 kgMS - with a sensitivity analysis of +/- 50 cents kgMS.

NB: This was a reasonable assumption at the time - indeed, $6.50 kgMS remains an accepted industry 'rule of thumb' when modelling the feasibility of dairy conversions. It is therefore relevant to note Butcher uses a milk price even beyond the upper bound of the Baker analysis.

21. Over the past two years there has been significant turbulence in international dairy markets, with near record low prices. It is my view there has been a structural change in international dairy prices, driven the following:

    a. The end of EU milk quotas, which means Europe is now an unconstrained dairy exporter with the intention to 'grow with the market'
    b. The emergence, over the past decade, of the US as a formidable dairy exporter - especially in terms of skim milk powder (SMP)
    c. China promoting import substituting domestic production
    d. Very low stock feed costs making feedlot production internationally competitive.

22. In terms of the long run farm gate milk price, an industry consensus on the 'new normal' is yet to emerge. My best professional estimate of a credible medium to long milk price assumption is $5.00 kgMS +/- $1.00. Whilst there is an exchange rate issue to consider, the intuition is a product mix price below $4.00 is unlikely to be economic for the majority of dairy producers internationally (so represents a market 'bottom') whereas prices in excess of $6.00 will attract 'swing' producers (such as the USA) into the market (thereby providing a 'top' - because at that price feedlots are internationally competitive and production can be quickly expanded).

23. Whilst prices will occur outside of this range, they are most likely to be examples of markets under or over shooting due to exogenous shocks (i.e. a drought in a pastorally-based supplier such as Australia or New Zealand). It is therefore foolhardy to assume sustained farm gate milk prices outside of the $4.00-$6.00 range.

24. The corollary is *continuing to employ a 2013 milk price assumption of $7.07 kgMS in 2016 is simply not credible*. This problem becomes even more pronounced as the entire proposal is critically dependent on that very assumption. The result is a highly misleading portrayal of the scheme's economic feasibility.

25. The importance of the milk price assumption is neatly illustrated by the Baker and Associates analysis.[5] The following table summarises Baker's assessment of the increase in on farm profitability of dairying due to irrigation. It is important to note:

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[4] Baker and Associates, *Wairarapa Water Use - Land Use Affordability Under Irrigation (report commissioned by Wairarapa Water Use Project)* April 2014

[5] *Ibid*. Barker, pages 18-19

a. A $6.50 milk price (with a sensitivity analysis of 50 cents kgMS 'either side') is used and applied to three different soil types.
b. Baker Associates' sensitivity analysis (e.g. soil type A, $813 per 50 cent change, soil type B $667 per 50 cent change, $810 per 50 cent change in milk price) is then extended to also cover the 'new normal' range of $4.00-$6.00 kgMS.

	Marginal Increase of Disposable Surplus			
Milk price *($kgMS)*	**Soil type A** *($per ha)*	**Soil type B** *($per ha)*	**Soil type C** *($per ha)*	**Comment**
7.00	2,694	1,613	2,774	**WW base assumption**/ Barker upper bound
6.50	**1,881**	**946**	**1,964**	**Barker base**
6.00	1,068	279	1,154	Barker lower bound/revised upper bound
5.50	255	-388	344	
5.00	**-558**	**-1,055**	**-466**	**Revised midpoint**
4.50	-1,371	-1,722	-1,276	
4.00	-2,184	-2,389	-2,086	Revised lower bound

26. The results of the table above are stark: at the modelled price point of $6.50 +/- 50 cents irrigated dairy is *profitable* (that is, *before* the water price is considered) but at the 'new normal' of $5.00 +/- $1.00 it is *not*.

27. It therefore follows the assumption that 55% of the irrigated area will be quickly transformed into irrigated dairy, which may well have been credible in 2014, is simply not believable now. This results in a 'cascade failure' as an unrealistic milk price assumption dooms the land use change assumption which then dooms the employment and GDP assumptions. The entire project then becomes unviable because it does not matter if remaining 45% is profitable when 55% is not.

28. The analogy I have previously used to describe this phenomenon is the role an 'anchor tenant' plays when developing a large format shopping mall. For developments of this type there typically needs to be an 'anchor tenant' (e.g. large stores like Farmers, Countdown or The Warehouse) that boutique and speciality stores can then cluster around (i.e. shoes, handbags, etc.). The key point is this is a symbiotic relationship and the development will fail in the absence of the anchor tenant.

29. In short, at a sub-$6.00 milk price, intensive irrigated dairy is not viable in the Wairarapa - and without intensive dairy the proposal fails as there is no 'anchor tenant'.

Issue 2: Complete absence of a water price assumption

30. A further significant flaw in WW's proposal is that it does not include any water pricing data (e.g. the dairy farm profitability numbers outlined above *exclude* water costs). This is a major omission, as even an indicative or 'hurdle' water price is critical - as it is not possible to make any meaningful economic evaluation of a water storage project in the absence of a water price.

31. A water price plays an intermediary role between funders and users. Put simply, a water price determines whether it is profitable for users to purchase the water - and if so, whether it is commercially viable for investors to fund the necessary infrastructure to provide it (and vice versa). This is critical, because due to New Zealand's topography (i.e. hilly-mountainous with short, fast flowing rivers) and geology (i.e. a country with a high degree of seismic activity) dam building is a complex and expensive exercise. As a result, the maximum water price that farmers can afford to pay is typically insufficient for investors to fund the project.

32. It is therefore critical to distinguish irrigation based on a drawing surface water from a river (potentially with a small amount of storage to buffer in-season use) and those based on storage (i.e. constructing a dam and reservoir to manage inter-season demand); as the latter has a significantly higher price point as infrastructure expenditure is substantially greater (i.e. the cost of building a dam) - in addition to being sunk and frontloaded.

33. Front loaded and sunk costs effect both the relative price of water but also the risk profile of the project - because it is critical to sell substantial volumes of water early; and typically on a 'take or pay' basis (where the user is contracted to buy a fixed volume of water regardless of whether it is used or not). The corollary is that by shifting the purchase risk to farmers, farmers increase their exposure to negative income shocks - such as low dairy prices - thereby fragalising their farm system via the higher cost structure irrigation requires.

34. To illustrate the importance of water pricing on farm costs it is instructive to consider the volume of water required by irrigated dairying in Canterbury - as Canterbury is often cited as an example of what Wairarapa can aspire to. Canterbury dairy farms apply between 400-700 mm of water per season. Given 1 mm of water over a hectare equates to 10 m3 of water volume, this implies each 100 mm of irrigation requires 1,000 m3 of water.

35. Applying an indicative price of 25 cents per m3 (c/f. Ruataniwha at 27.5 cents per m3) implies each 100 mm imposes a purchase cost of $250 - so in the example above, farmers are paying $1,000 - $1,500 per hectare for water.

36. As a planning exercise, let's assume Wairarapa dairy conversions uses 400 mm +/- 100 mm of water per hectare per season. This implies a water purchase cost of $1000 +/- $250 per hectare. Now let's apply the midpoint of $1,000 figure to the analysis from Baker and Associates using the $6.50 +/- 50 cents milk price range contained in their original report.

	Marginal Increase of Disposable Surplus		
Milk price *($kgMS)*	**Soil type A** *($per ha)*	**Soil type B** *($per ha)*	**Soil type C** *($per ha)*
7.00	1,694	613	1,774
6.50	**881**	**-54**	**964**
6.00	68	-721	154

37. The results are highly instructive - because at $7.00 there is a sufficient farm surplus generated to pay prospective water charges with ease. However, this becomes less so at $6.50 with $6.00 representing the boundary line of feasibility. Critically, at a milk price below $6.00 kgMS irrigation is not feasible at a water price of 25 cents per m3.

38. The analysis above starkly illustrates the critical importance of WW:

    a. applying a credible milk price assumption; and
    b. incorporating a water price assumption

    when considering the economic feasibility of a water storage scheme.

39. Using a sub $6.00 milk price and then applying a water price is dire - because previous analysis shows that irrigated dairying in Wairarapa is uneconomic *even if the water is free*. Applying the same water cost assumption leads to the following:

	Marginal Increase of Disposable Surplus		
Milk price *($kgMS)*	**Soil type A** *($per ha)*	**Soil type B** *($per ha)*	**Soil type C** *($per ha)*
6.00	68	**-721**	154
5.50	**-745**	**-1,388**	**-656**
5.00	**-1,558**	**-2,055**	**-1,466**

40. Given a water price of 25 cents per m3 is uneconomic, it is instructive to undertake sensitivity analysis by discounting the water to 10 cents per m3; thereby changing the midpoint water cost from $1,000 per hectare to only $400.

	Marginal Increase of Disposable Surplus		
Milk price *($kgMS)*	**Soil type A** *($per ha)*	**Soil type B** *($per ha)*	**Soil type C** *($per ha)*
6.00	668	-121	754
5.50	-145	-788	-56
5.00	**-958**	**-1,555**	**-866**
4.50	-1,771	-2,122	-1,676
4.00	-2,584	-2,789	-2,486

41. The table above shows that even at 10 cents per m3 irrigated dairying is barely viable at a $6.00 milk price and not viable at all below that.

42. For completeness, let's invert the question and consider water price from the perspective of a *dam funder* (rather than the *water user*). At what price will investors choose to invest?

43. Answering this question depends critically on three assumptions: project cost, the cost of capital (measured in terms of weighted average cost of capital or 'WACC') and speed of water uptake. In this respect, let's apply the midpoint cost estimate from WW for both projects (accepting that both appear to be understated), a 6% WACC and the simplifying assumption the water is fully subscribed on day 1. Moreover, for simplicity purposes, let's also assume that annual operating costs are zero. The results are summarised below.

Black Creek

***Revenue** (10 cents):*	*67M m3 x 10 cents m3 = $6.7M*
***Revenue** (25 cents):*	*67M m3 x 25 cents m3 = $16.75M*
***Capital servicing cost**:*	*$171.5m x 6% = $10.29M*

Tividale

***Revenue** (10 cents):*	*30.2M m3 x 10 cents m3 = $3.02M*
***Revenue** (25 cents):*	*67M m3 x 25 cents m3 = $7.55M*
***Capital servicing cost**:*	*$82M x 6% = $4.92M*

In both cases, the 'breakeven' water price is at least 15.3 cents per m3

44. In terms of risk analysis, the following must be noted:

    a. **Build costs** - as an increase in construction costs is ***unfavourable***

    *The build costs for both projects appear quite low - for example, the 13M m3 Waimea dam is estimated to cost at least $75M to build (dam only) whereas the Ruataniwha (96M m3) has an indicative cost of circa $150 (dam only) and a further $175M for the distribution system (making a total of **$325M**).*

    *It therefore seems doubtful WW can build three dams over two sites with two reservoirs complete with a distribution system incorporating over 100 kms of pipes for circa **$253.5M***

    b. **Annual operating costs** - given operating costs are excluded adding them represents an ***unfavourable*** movement

    It is difficult to estimate operating costs due to the extremely wide variances between projects (i.e. Waimea circa $500,000 per annum, whereas Ruataniwha is circa $7 million per annum), so applying a planning figure of $2 million appears reasonable (which adds a further 2 cents per m3 to the water price).

    c. **Take up rate** - as any deviation from 100% take up on day 1 is an ***unfavourable*** movement

    Again, the Ruataniwha is indicative, because at a scheme level it has a similar volume of water to sell (104M m3 v 97.2M m3), irrigates a broadly similar area (26,500 ha v 30,000 ha) and also assumes dairy as the 'anchor tenant' (~40% of the water v 55%).

    The Ruataniwha scheme has struggled to sell anything like the volume of water required - particularly to dairy farmers, despite aggressive discounting ('early bird'

price is circa 20 cents per m3), heavy promotion, and numerous deadline extensions. Indeed, the Hawkes Bay Regional Investment Company (HBRIC) has failed to meet its own self imposed target of 45M m3 of contracted sales despite including 8M m3 of highly discount water sales (at 10 cents per m3) to attract existing water users to switch from bore water to Ruataniwha water (so net economic benefit is zero).

45. On balance, an indicative water price of 25-30 cents per m3 seems reasonable. However, this is completely unaffordable for dairy - confirming the hypothesis that a water price that makes sense for investors does not work for dairy farmers.

46. In summary, failing to include credible water price analysis for a water storage project is simply incomprehensible as it makes any assessment of the economic case meaningless. Critically, it also appears that the use of an unrealistic milk price assumption created sufficient 'fat' in the analysis that meant it was unnecessary to provide a water price at all; further confounding the misleading nature of this application.

Issue 3: Jobs analysis

47. A key reason a proposal such as this can garner support - especially at a local government level - is the elusive promise of job creation; in this case, up to 1,110 in the Wairarapa region. This needs to be treated with considerable caution as:

    a. This figure applies when the scheme is 'fully developed' so is based on **both** sub-projects being completed. Given the ability to develop Black Creek and Tividale sequentially (rather than concurrently), it may be many years before all the forecast jobs eventuate - if at all.
    b. Given the flawed milk price assumption triggers a cascade failure of the dairy component of the proposal, the simple fact is the remainder is rendered irrelevant - so the prospective number of jobs is zero as WW's proposal is non-viable.

48. It is useful to dissect the jobs analysis featured in the Butcher report, which is summarised in the following table:

	Jobs (FTEs)	
Ha	10,000	30,000
Dairy farming direct	90	270
Other pastoral and arable direct	-32	-95
Horticulture (or similar)	142	425
Subtotal - Direct Farming	**200**	**600**
Farm support in Wairarapa	169	510
Total Wairarapa impacts (rounded)	**369**	**1,110**
Farm support elsewhere in Wellington	34	100
Total Wellington impacts (rounded)	**403**	**1,120**

49. Three points are worthy of note:

a. Dairy is a generator of about 45% of the on-farm jobs, so without dairy the on-farm job numbers almost half - and that halving will then be carried through to the assumption of the number of indirect jobs created
b. Horticulture is the only other activity that creates jobs - as both arable and sheep and beef have *fewer* jobs under irrigation as they cover a smaller absolute land area (which implies in terms of those land uses, irrigation improves profitability rather than increases employment opportunities)
c. Total job numbers are muted as Butcher (realistically) assumes processing of dairy and produce is undertaken outside of the region.

50. However, as noted above, the actual number of jobs generated is zero as horticulture cannot exist in the absence of dairy - because in the absence of dairy the dams will not be built.

51. This raises the question is whether there is a 'dairy lite' alternative, for example, based on the 10,000 ha Tividale scheme, that is worth considering as a standalone project (because without a viable dairy option it is difficult to see the need for the 67M m3 Black Creek scheme). To answer this question the following assumptions have been made:

    a. Dairy 'stays as it is' and land that would have otherwise gone into irrigated intensive dairy is re-allocated among the other land use types in the same proportion as in the Butcher report
    b. On farm job numbers are calculated as a ratio of hectares per job and scaled accordingly
    c. Indirect jobs generated were calculated as a ratio of direct to indirect FTEs and scaled accordingly
    d. Alternative land uses are assumed to be profitable under the prevailing water price (otherwise, like dairy, the entire exercise unravels).

52. In terms of land use share results are as follows:

	Status Quo		**WW Irrigated**		**Revised Irrigated**	
	%	10,000	%	10,000	%	10,000
Dairy	22	2,200	45	4,500	22	2,200
Arable & mixed	40	4,000	30	3,000	43	4,267
Sheep and beef	24	2,400	12	1,200	17	1,707
Dairy support	14	1,400	10	1,000	14	1400
Horticulture	0.0	0	3	300	4	427
Total	100%	10,000	100	10,000	100%	~10,000

53. Which translates into the following job statistics:

	Jobs (FTEs)	
Ha	10,000	10,000 Revised
Dairy farming direct	90	0
Other pastoral and arable direct	-32	-11
Horticulture (or similar)	142	202
Subtotal - Direct Farming	**200**	**191**
Farm support in Wairarapa	169	161
Total Wairarapa impacts (rounded)	**369**	**352**
Farm support elsewhere in Wellington	34	32
Total Wellington impacts (rounded)	**403**	**384**

54. The key points to note from the tables above are:

    a. As dairy production does not change then the 90 on-farm jobs attributed to dairy sector growth evaporate
    b. 'Others' (basically arable/mixed and sheep and beef) remains a destroyer of jobs because less absolute area is devoted to these activities under the revised plan (5,974 ha) compared with status quo (6,400 ha)
    c. Horticulture ends up becoming the only source of new jobs
    d. The ratio of farm workers to support workers is retained and simply scaled.

55. A number of caveats need to be made:

    a. This exercise is a theoretic counterfactual so I have absolutely no idea whether 427 ha of horticulture is a viable land use change in the Tividale command area - as this is simply a planning exercise
    b. If 427 ha of horticulture *is* a viable land use change option then caution is still advisable around the number of fulltime local jobs generated as:

        i. Horticulture has a very high season labour requirement so expressing jobs as FTE numbers may well be misleading
        ii. Growers are increasing using migrant RSE workers for 'surge' activities such as picking and packing
        iii. Jobs such as picking and packing have long been unattractive to New Zealand workers.

56. There also needs to be a 'reality test' here - in that it is illogical to spend $82 million to build a scheme to irrigate ~10,000 ha in order to generate all the jobs from only 427 ha. For example, if irrigated horticulture was viable in the Wairarapa then a plan based on irrigating 427 ha is considerably more sensible (or, in other words, rather than building a large format mall that requires an anchor tenant in order to open a boutique, you simply find the right location to build the boutique in the first place).

Issue 4: MPI analysis

57. Finally, it is necessary to consider the role of MPI, which is the administrating agency for the IAF. It is therefore useful to briefly consider the guidelines that MPI are required to follow. Sub-sections 3.4.4 and 3.4.6 of the IAF application form seem especially relevant:

    Section 3.4 Criteria

    3.4.4. Describe the direct and indirect net economic benefits resulting from the scheme or stages proceeding, assuming it is successful. Explain how they are expected to occur and who will benefit (e.g. irrigators and other co -investors, other entities in the sector, or entities outside the sector).

    Provide evidence to support the estimate of net economic benefits e.g. estimates of likely economic returns (to irrigators and other co-investors, the sector as a whole, nationally) from increased productivity or new products that may result.

    Specify all key assumptions used and provide evidence to support the choice of assumptions. Where possible give an indication of the sensitivities of the programme outcomes to changes in assumptions.

    Provide a realistic timeframe for when expected benefits will occur.

    3.4.6. ***Provide a brief risk profile of*** *political,* ***economic****, environmental, social, recreational and cultural and other* ***risks that could impact on the achievement of the programme outcomes*** *and/or the eventual scheme benefits estimated above. Include a brief statement of any risk mitigation strategies where appropriate.*

    NB: For ease of reference the relevant assessment criteria are highlighted above.

58. Particular attention needs to be drawn to the need for the applicant to specify and provide evidence to support all key assumptions; in additional to providing sensitivity analysis and risk profile analysis for the same (that is, if they have the potential to impact on programme outcomes). Whilst WW failed to do this, *the wider point is these very issues should have been identified by MPI during the assessment process*.

59. I understand approval was granted for the funding amount requested WW. If this is correct, then it seriously questions the rigour and professionalism of the review process - as the key faults are easy to identify (i.e. an unrealistic milk price assumption, the absence of a water price assumption, no indicative scheme build cost, no sensitivity analysis for the same). *Put even more simply, it beggars belief that in the context of a substantial, prolonged and well document downturn in the dairy industry; the Government's primary agricultural advisor apparently failed to question an application based on substantial land use change to intensive dairying*.

60. MPI should have returned this application to WW for revision and possible resubmission (i.e. update the modelling in the Butcher report) - or rejected it in its entirety. In failing to do so it raises unfortunate questions regarding MPI's technical competence and ability to comply with its own assessment guidelines, which is profoundly disappointing.

61. The situation, therefore, is one of a 'double failure' - whilst WW should have based its application on updated (albeit significantly less flattering) economic analysis, it is a

reasonable expectation errors and omissions of this nature will be identified and addressed as part of the assessment process (as that is precisely the reason assessments are conducted). The fact the obvious flaws in WW's case were not picked up is even the more surprising given the IAF assessment process; which - on paper at least - is very thorough (and even requires individual grants being sign off by the Director-General of MPI). This failure is even more damning as WW has sought and received funding from district councils within the Wairarapa region and it is likely a successful IAF grant application is typically (and reasonably) seen as a sign of a robust business case.

62. There are also wider non-monetary implications associated with the failure to undertake an adequate review. For example, it is difficult to see the likes of the Minister for Primary Industries and local body politicians taking such an active interest in this project if they realised it was premised on a series of unrealistic assumptions that resemble a 'house of cards'.

Recommendations

63. It is recommended, as a matter of urgency, that:

    a. WW:

        i. update the 2014 Butcher analysis so that it reflects the contemporary economic reality (and this is not limited to just dairy assumptions)
        ii. institute a process of ongoing revision of key forecasts and assumptions as prudent
        iii. provide an indicative water price or water price range
        iv. convey the revised economic analysis to farmers, funders and stakeholders

    b. MPI:

        i. review its assessment and quality assurance processes associated with the granting of public monies; starting with the IAF and progressively extending across all industry funding programmes it administers
        ii. institute an internal peer review process for applications above $100,000 and an external review process for applications above $500,000
        iii. institute an external quality assessment process based on a representative and random sample of grant applications (both successful and unsuccessful).

References

Baker and Associates, *Wairarapa Water Use - Land Use Affordability Under Irrigation (report commissioned by Wairarapa Water Use Project)* April 2014

Butcher Partners Limited, Regional Economic Impact Analysis of the Proposed Wairarapa Water Use Project *(report commissioned by Wairarapa Water Use Project)* Final Report 19 October 2014

Wellington Regional Council, IAF application *Wairarapa Water Stage 2 Feasibility Phase Investigations* Undated

Rōpere Consulting Limited

Rōpere is the Māori word for strawberry, which at first glance is a strange name for a consultancy.
A hint can be found in the French word for strawberry, which is *fraise*. *Fraise* was also the name granted to a French nobleman Julius de Berry, who, according to legend, was knighted after giving the King of Normandy a magnificent plate of strawberries out of season – a miraculous feat in time before the advent 24 hour convenience stores.

De Berry's descendants travelled with the King's descendants and fought a particularly noteworthy battle in 1066. The family, however, decided to continue north, and eventually ended up in the Highlands of Scotland – whence they then spread across the globe.

In the process the name was anglicised to *Fraser*.