National Cost Benefit Analysis of proposals to take the water in the Waitaki catchment

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Background

There was no water allocation plan for the Waitaki catchment

Over 80 consent applications including:

- Project Aqua; and
- Aoraki Water Trust proposal for irrigation

Government intervened to develop a water allocation plan for the catchment

Established the Waitaki Catchment Water Allocation Board

Waitaki is critical for energy generation

- Provides nearly 20% of national generation
- Provides 27% of renewable generation

Many national interests
Economic - energy generation, irrigation and tourism

- Conservation
- Cultural

Recognising:
there are many competing demands and complementary uses of water; and

- opportunity costs of the use of water

The Ministry of Economic Development commissioned the national CBA

- to determine benefits of different water use
- to provide input to the development of the water allocation plan

Process to develop national CBA
Developed a "Scoping Report" and a model framework

Conducted five stakeholder workshops with sector groups

we got an understanding of the inter-relationships of the many issues; and

- identified data sources

Produced draft report and held 6 community workshops to get feedback

The national CBA was informed by the Concept Consulting report

- Project Aqua: An Evaluation of the Economic Impact

Reports peer reviewed by:

- external reviewers and
- officials steering group

Regional CBA requested by community groups

- commissioned by the Ministry for the Environment

Economic Modelling scenarios

The following scenarios were compared to the base case (status quo):

- Project Aqua with no additional irrigation
- All possible irrigation demands without Project Aqua
- irrigation projects with IRR greater than 5% without Project Aqua
- Project Aqua with new irrigation down-stream of Waitaki Dam
- New irrigation above the Waitaki Dam:
- upstream of Tekapo (including Aoraki Water Trust)
    - upstream of Ohau
    - upstream of Benmore

Findings of the final report

Energy production and irrigation are complementary uses of water

Estimated combined national benefits of $400.0 million (NPV)

- using a 7.5% discount rate

National benefits from energy production are higher than irrigation

The benefits of Project Aqua estimated to be $329.1 million

- without additional irrigation

The benefits of the most likely irrigation scenarios is estimated to be $189.8 million

- without Project Aqua
- using a 5% IRR filter
- irrigating 76,250 hectares

The benefits of all irrigation scenarios is estimated to be $122.5 million

- irrigating 124,250 hectares

New irrigation takes above the Waitaki Dam would:

- reduce the benefits of Project Aqua; and
- impact on existing energy generation.

Takes above Lake Tekapo would impact on national energy production by 0.4 - 0.6 %

- and result in a net cost to the economy of $17.1 million

Net Present Value of Options (7.5% Discount Rate, 30 Year Period of Analysis)				
Irrigation Demand	Irrigation Area (ha)	No Project Aqua	With Project Aqua	Integration with Project Aqua
No Irrigation Demand			$329.1m	
All Irrigation Demands	124,250	$122.5m	$169.2m	
All Irrigation Demands >5% IRR[a]	76,250	$189.8m	$327.4m	
Takes above Tekapo	30,000	-$17.1m	$260.8m	
Takes above Ohau	10,000	-$30.6m	$276.8m	
Takes above Benmore	2,000	-$3.6m	$320.4m	
Takes Below Waitaki Dam	44,500	$140.8m	$361.0m	$400.0m

Summary of Estimated Environmental, Cultural and Social / Recreational Impacts

Criteria	**Incremental impact from Irrigation Development**
Environment	Negative - long-term impacts related to reduced water quality from land use intensification. Changes in aesthetic values (particularly in the Mackenzie Basin). Some potential for mitigation.
Cultural	Negative impacts from agricultural intensification relating to mauri of water and further loss of mahika kai sites. Some potential for mitigation.
Social	Positive outcome related to increased population within the region

	relative to status quo. Also benefits through stabilised regional income.
Recreation / Tourism	Minimal effect from irrigation development on recreation and tourism opportunities across study area

Summary of Estimated Environmental, Cultural and Social / Recreational Impacts

Criteria	Incremental impact from Project Aqua
Environment	Negative - long-term impacts related to reduced water quantity and flow regime change. Some potential for mitigation.
Cultural	Negative impacts on mauri of the river, cultural landscapes and mahika kai, cumulative to previous impacts. Some potential for mitigation.
Social	Disruption to local and regional level populations during construction period relative to status quo. Longer term impacts unclear.
Recreation /Tourism	Reduced amenity in lower catchment related to a reduction in water quantity and change in flow regime. Increased congestion between users and loss of "big river" experience. Partly offset by new recreational opportunities from calmer, more predictable river flow. Minimal change in upper catchment.

Waitaki Catchment Water Allocation Regional Plan

Draft Plan released by the Board in February

Proposes:

- higher minimum flows in the lower Waitaki
- higher minimum lake levels for Lake Tekapo
- restoration of a minimum flow in the Tekapo river

Would impact on existing generation capacity

- in the worst case scenario would mean up to 500 megawatts of alternative generation being built

Whole of Government submission made on the plan

Key issues are:

- Lack of clarity about the rules and policies
- Concern about how rules and policies will be implemented
- No clear justification for proposed higher environmental flows

The submission seeks :

- Minimum flow rate of the lower Waitaiki of 120 cumecs below Waitaki dam
- status quo for flows in the Lower Waitaki and the Tekapo River
- status quo for the minimum lake levels for Lake Tekapo

Conclusions

We consider the national CBA framework will be useful for assessing different uses of water in other catchments

Useful case study for the Water Programme of Action under the:

- Sustainable Development Programme of Action for New Zealand

The study shows there could be efficiency gains by encouraging transfer

Questions we are asking ourselves are:

- How should conflicting values be dealt with?
- Is there a role for central government?
- Are current allocation frameworks maximising value?
- Would water trading improve the situation and/or be publicly acceptable?
- Do current frameworks provide sufficient certainty for infrastructure investment?