

Direct Economic Impact of the TANK

A report prepared by Nimmo-Bell for

Hawke's Bay Regional Council

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1. Executive Summary

1. The objective of the study is to estimate the direct economic impacts of proposals for the TANK, the Hawke's Bay Regional Council's look at the best way to manage the waterways of the Tutaekuri, Ahuriri, Ngaruroro and Karamu catchments.
2. Our approach has been to work with Agfirst, Council officers, the TANK stakeholder group and science providers to define the scope and scale of analysis, provide input data for analysis and feedback on draft findings. This report provides the cashflows for the assessment of the wider indirect and induced economic impacts of the policy scenarios. We have relied on the farm budget information provided by Agfirst in emails and discussions, published material along with information provided by the Council to construct the cashflows.
3. Ten farm systems are modelled including five horticultural land uses (kiwi fruit, pip fruit, grapes, summerfruit and vegetables) and five pastoral land uses (summer moist hill, summer dry breeder finishing, summer dry intensive finishing, part time and dairy). Two policy scenarios assess the impact over time of irrigation restrictions plus sediment and nutrient mitigation on the Heretaunga Plains and sediment and nutrient mitigation on the Pastoral Hill Country within the TANK Catchment. These restrictions and activities have been converted into financial (revenue and expenditure) impacts at the representative farm level by Agfirst.
4. Three Horticulture scenarios are evaluated:
Scenario 1 Base case: 79% of Horticulture irrigated area have no bans and 21% of Horticulture irrigated area are subject to current minimum flow restrictions related to Nga 2,400 l/s.
Scenario 2 Future B: 74% of the irrigated area is subject to the 2013 reliability restriction and 20% of irrigators are subject to water restrictions related to Nga 3,600 l/s and 6% related to the Tutaekuri 2,500 l/sec restrictions. Expenditure is increased for agreed mitigations to reduce sediment and nutrients.
Scenario 3 Future C: 74% of irrigators are subject to 9 in 10 year reliability restrictions and 20% of irrigators are subject to water restrictions related to Nga 3600l/s and 6% to Tutaekuri 2,500 l/sec. Expenditure is increased for agreed mitigations to reduce sediment and nutrients.

5. Mitigation for Pastoral farms are modelled with a 30% reduction in sediment for Scenario 2 (MS1) and a 30% reduction in sediment plus 10% reduction in nutrient loss (nitrogen) in Scenario 3 (MS2). Mitigations are phased in over ten years including land use change to forestry. Forestry cashflows are the same for both Scenarios 2 and 3 with planting aligned with the other mitigation changes. There is no forestry in Scenario 1.
6. Cashflows are in current dollars with product price based on the average of the last five years. The cash flow models cover a 30 year period and for Horticulture show three alternate pathways to the limits with the Fast start pathway starting in year 3; Medium in year 5 and Slow start in year 8. The output of the analysis is a series of cashflow sub-models over 30 years. The cashflow models contain two decision variables Net Present Value (NPV) and Benefit Cost Ratio (B/C) with the Treasury standard discount rate of 8% used as the default.
7. To set up the cashflows ready to estimate the indirect and induced effects of the policy options the horticulture budgets provided by Agfirst needed to be fleshed out in more detail. The areas are as follows: Specifying the destination of produce into Export, Local and Process; Identifying the Recognised Seasonal Employer (RSE) Scheme component of wages; Developing the detailed budgets for the water allocation options from the No ban budgets for each crop; Specifying the details of livestock revenue for the Vegetable model; and Incorporating the mitigation activities into the Scenario 2 and 3 budgets
8. The Pastoral budgets provided by Agfirst covered all farm types and mitigation scenarios with more detail required as follows: Specifying the source and destination of livestock purchases and sales as inside and outside the Hawke's Bay Region; Irrigated land on pastoral farms; Translating model farm budgets into TANK totals and phasing in mitigations over 10 years; Compliance, monitoring and verification; and Modifying the forestry model to confirm with other components of the pastoral cashflows.
9. The results in PV terms for Horticulture at the default discount rate of 8% show a Base (Scenario 1) with total Revenue cashflow of \$7,585.8 million. Expenses amount to \$5,478.3 million leaving a net revenue of \$2,107.5 million. Revenue is down by 2% and 5% for Future B (Scenario 2) and Future C (Scenario 3) respectively with Expenditure up 1% in both cases leaving Net Revenue down by 9% and 18% respectively.
10. Allowing Horticulture farmers more time before the policy is implemented has a significant effect in reducing the cost. Compared to a Fast start in year 3, a start in year 5 Net Revenue is improved by 2% for Future B and improved by 3% for Future C. Pushing the start date out to year 8, compared to a start in year 3, Net Revenue is improved by 3% and 8% respectively.
11. The results for the Base (Scenario 1) Pastoral total Revenue cashflow is a PV of \$1,840.0 million. Expenditure amounts to \$1,366.5 million leaving a Net Revenue of \$473.5 million. For MS1 and MS2 Revenue decreases as does Expenditure leaving at Net Revenue at \$452.5 million for MS1 and \$437.4 million for MS2, down 4% and 8% respectively. Forestry

adds a net \$6.6 million so that the overall change to Net Revenue for Scenarios 2 and 3 is negative 3% and negative 6% respectively at \$459.1 million and \$444.0 million.

12. When Horticulture and Pastoral including Forestry cashflows are combined the PV of the Net Cashflow for the whole TANK is down 8% for Scenario 2 and down 15% for Scenario 3 compared with Scenario 1.
13. Changing the discount rate affects the magnitude of Present Values (\$m) significantly, however, relativities between Net Revenue PVs (\$m) change very little for mitigation scenarios (Sc2 and Sc3) compared to Base (Sc1). The exception is forestry where the NPV is \$105.1m at 2%, \$13.7 m at 6% and \$6.6m at 8%.
14. Overall the Benefit Cost Ratios vary little between scenarios, although as expected from the PVs Scenario 1 is always higher than the mitigation scenarios.
15. Discussion at the EAWG noted the following points related to the economic analysis:
The economic analysis does not factor in behavioural change, which is likely to reduce the assessed negative impacts as farmers adjust to the new reality.
The analysis does, however, provide a set of baseline financials for individual farmers to assess their own situation and act as a catalyst for change. More importantly it provides a consistent base of financial information that policy makers and the public can weigh up the economic costs to achieve environmental improvement.
The analysis also shows that reducing water allocation by the amounts assumed in Scenarios 2 and 3 have a far larger negative economic impact than the costs of reducing sediment and nutrient inflows into water ways.
As mitigation is expected to be more cost effective than reducing water allocation this should be the area of initial focus for change.
Recent flood events in other parts of New Zealand e.g. Tasman District have shown the vulnerability of land to major damage from forest slash ending up in water ways during the five year period from harvest until the new forest is established.
The size of the difference between Scenario 1 and Scenarios 2 and 3 provides an indication of the quantum that is available to introduce adaptive policies such as augmentation.
Vineyards on Gimblett gravels are potentially the biggest losers from the policy changes that are modelled.
Hawke's Bay is heavily reliant on primary production and the analysis of indirect and induced economic effects will highlight the even greater negative impacts beyond the horticulture and agriculture sectors.
16. Limitations and caveats discussed in the report include:
All models are simplifications of reality.
The past may not be a good guide to future uncertain outcomes.
We assume technology change over time will affect all options similarly and is ignored.
The possibility of climate change over the next 30 years has not been explicitly modelled.
The results are relevant at the regional level and not to individual farm outcomes.

17. Next steps are for the wider TANK consultative group to see the results of this analysis and the analysis of indirect and induced effects. Once this is done there may be an opportunity to revisit the modelling of direct effects. If additional modelling is assessed as needed through an additional scenario, then the following steps are needed: Specify the policy option; Agree on assumptions; Construct model and present; and then Market Economics to assess indirect and induced effects.