

## Assessment Schedule – 2015

### Agricultural and Horticultural Science: Analyse a New Zealand primary production environmental issue (91532)

#### Assessment Criteria

Achievement	Achievement with Merit	Achievement with Excellence
<p>“Analyse” involves:</p> <ul style="list-style-type: none"> <li>explaining the environmental issue arising from the primary production management practices</li> <li>explaining potential courses of action to mitigate the negative impacts of the management practices</li> <li>Recommending sustainable production practices.</li> </ul>	<p>“Critically analyse” involves:</p> <ul style="list-style-type: none"> <li>explaining, in detail, the environmental issue arising from primary production management practices</li> <li>evaluating potential courses of action to mitigate the negative impacts of the production management practices</li> <li>Recommending sustainable production management practices that best address the issue.</li> </ul>	<p>“Comprehensively analyse” involves:</p> <ul style="list-style-type: none"> <li>justifying courses of action to support sustainable production management practices that best address the issue, including environmental, economic, political and /or social considerations.</li> </ul>

#### Evidence descriptors

N1	N2	A3	A4	M5	M6	E7	E8
Attempts to describe the positive economic and social impacts, and the negative environmental impacts, that irrigation and irrigation schemes may contribute to, but several errors are apparent in the description.	Describes the positive economic and social impacts, and the negative environmental impacts, that irrigation and irrigation schemes may contribute to, providing some accurate information. <i>OR</i> Explains the use of water storage schemes as a course of action over other irrigation options, with reference to	Explains the positive economic and social impacts, and the negative environmental impacts, that irrigation and irrigation schemes may contribute to. <i>AND</i> Explains the use of water storage schemes as a course of action over other irrigation options.	Explains the positive economic and social impacts, and the negative environmental impacts, that irrigation and irrigation schemes may contribute to. <i>AND</i> Explains the use of water storage schemes as a course of action over other irrigation options, with reference to either their environmental, social and/or	Explains the positive economic and social impacts, and the negative environmental impacts, that irrigation and irrigation schemes may contribute to. <i>AND</i> Explains in detail the use of water storage schemes as a course of action over other irrigation options, with reference to more than one stakeholder viewpoint.	Explains the positive economic and social impacts, and the negative environmental impacts, that irrigation and irrigation schemes may contribute to. <i>AND</i> Explains in detail the use of water storage schemes as a course of action over other irrigation options, with reference to more than one stakeholder viewpoint.	Explains the positive economic and social impacts, and the negative environmental impacts, that irrigation and irrigation schemes may contribute to. <i>AND</i> Evaluates the use of water storage schemes as a course of action over other irrigation options, with reference to more than one stakeholder viewpoint.	Explains the positive economic and social impacts, and the negative environmental impacts, that irrigation and irrigation schemes may contribute to. <i>AND</i> Evaluates the use of water storage schemes as a course of action over other irrigation options, with reference to more than one stakeholder viewpoint.

	stakeholder viewpoint.		economic impacts.	<p><i>OR</i></p> <p>Attempts to justify water storage schemes in terms of ONE of the following: the environmental, the social, OR the economic impacts of irrigation schemes compared to other natural water sources.</p>	<p><i>AND</i></p> <p>Attempts to justify water storage schemes in terms of ONE of the following: the environmental, the social, OR the economic impacts of irrigation schemes compared to other natural water sources.</p>	<p><i>AND</i></p> <p>Partially justifies the impacts of irrigation schemes as a course of action compared to other natural water sources.</p> <p><i>AND</i></p> <p>Also considers at least ONE other factor from social and/or environmental implications.</p>	<p><i>AND</i></p> <p>Comprehensively justifies the impacts of irrigation schemes as a course of action compared to other natural water sources.</p> <p><i>AND</i></p> <p>Also involves a consideration of BOTH the social and the environmental implications.</p>
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**N0** = No response; no relevant evidence.

## **Sample evidence**

### **Appendix – Excerpts from NZEIR, Irrigation NZ News, and other relevant sources**

(Indicative only, showing some of the issues that may be referred to by candidates)

#### **Economic impacts**

The contribution of water to the national interest takes many forms. The socio-economic value of irrigation is only one of them. There are also very important conservation, environmental, recreational, and cultural values of water. The use of water for irrigation can affect all these values in various ways, some positive and some negative. Development and management of the irrigation farming system can have a significant bearing on the impacts of irrigation on these other values.

The net contribution of irrigation to GDP at the farmgate is estimated to be in the order of \$920 million in 2002/03. This is over and above GDP that would have been produced at the farmgate without irrigation.

The above 2004 report estimated the net farmgate GDP contribution of irrigation at \$0.92 billion in 2002/03. Using the same methodology, we have estimated this net contribution at \$2.17 billion in 2011/2012. This increased contribution resulted from improved farm gross margins and the expansion in irrigated land area (from 457,700 hectares to 721,400 hectares) during the last decade.

Note that our \$2.17 billion estimates tend to undervalue irrigation, due to the weather and prices in 2011/2012, and that the dairy payout used was \$6.59/kgMS.

Irrigation contributes to New Zealand economic activity in a number of direct and indirect ways:

- It lifts agricultural production, which boosts farmgate returns.
- This additional production draws in additional inputs such as agricultural services and transport.
- The extra on-farm volumes also lead to more activity in the primary processing sectors.

Irrigation is also felt more widely through higher employment, wages, and returns to capital and land, all of which boost household spending on other goods and services.

#### **Social impacts**

These areas have traditionally suffered from severe soil moisture deficits during summer, and periodic droughts.

The social impact of irrigation has generally received less attention than the physical changes to land use and farming practices; yet the implications can be significant, and far-reaching. The social impacts of irrigation will vary over the life cycle of the project (from initial planning and construction through to the project being an embedded part of the community). This means that communities can experience structural and demographic change for an extended period, potentially more than a generation.

The irrigation developments will have implications for water quality, water-based recreation, and visual amenity (i.e. the construction of canals and reservoirs). Changes to amenity and recreational values occur gradually with irrigation projects, but have significant implications for social life (cohesion).

Irrigation brings land use change and younger or differently skilled farming families. This affects the social structure of the hinterland, as well as rural settlements and small towns. It affects work patterns and social interactions.

#### **The social implications of change**

Water in any form is fundamental to settlement, social, and economic development in New Zealand. The increased inter-dependence of economic and environmental indicators contributes directly or indirectly to our understanding of social issues, in terms of such factors as the availability of water for domestic supply, irrigation, land use intensification, job creation, and minimisation of production risks.

The concept of healthy communities and social well-being and their link to water – in particular, irrigation – identified four indicators of major significance. The existence of neighbouring farms (the community); the retention of a balanced population structure; the retention of a primary school roll (young family retention and social activities to attract all farm families); and the existence of sports clubs (watch and support).

## Wages

Without irrigation, currently irrigated lands would have remained at lower production levels, while both on-farm irrigation capital and employed labour would reallocate towards other industries. Table 2 shows that this reallocation would drive down wages and capital returns, thereby resulting in further impacts on the rest of the economy.

Table 2 shows that if irrigation had never occurred, factory owners would earn lower wages (-2.1%) and receive lower returns on their capital investments (-1.8%). Lower exports result in a 2.6% depreciation of the real exchange rate. This currency depreciation also increases the domestic price of imports.

## Māori

30 January 2013

Ruataniwha Water Storage Scheme will help wellbeing and mauri

A respected Māori leader believes the Ruataniwha Water Storage (RWS) Scheme could have huge potential for Māori in Hawke's Bay. Professor Roger Maaka is Dean of the Māori Faculty at EIT. He lives in Takapau and speaks for the four marae in the catchment area of the proposed dam. He has been a member of the RWS Leadership Group for the past two and a half years and continues to work closely with those driving the scheme. He's taking a long-term view of the scheme, looking to the future at social and economic opportunities for Māori and others in the community, with an equal view to improving the well-being or *mauri* of the Tukituki River. "Māori have a lot to gain from this scheme, provided the environment and mauri of the river are not damaged, and at this stage the science I've seen indicates that both will be enhanced," says Prof. Maaka.

## Protection

Prof. Maaka says that for Māori, protecting the mauri of the Mākaroro River, as well as the Waipawa and along the length of the Tukituki rivers, is paramount. "So far, the science has shown that while there will be effects from the scheme, they can be countered, and I am anticipating a considerable improvement overall in the health of the rivers." Roger Maaka says the other protection Māori want is an assurance that the benefits from the scheme will be felt locally. "What's good for Māori locally is good for the whole community. We don't want any monopolies to come in and establish just one industry or one type of agriculture. We want a mix of uses. We don't want one large organisation to come in and take everything over, taking the benefits away from our local communities. We have a very sad level of unemployment, particularly in our younger generation. There is a seasonal nature to the work for Māori in central Hawke's Bay, and also many of our young people leave the region to seek work elsewhere around the country or overseas." He is working with local authorities and EIT to look at the possibility of developing programmes to prepare the local population for the jobs that will be available when construction starts. "In addition to those construction jobs, we want to see our people in trades and professional areas coming out of this scheme. There will be miles of piping to be laid to distribute the water to irrigation sites; we need to train people to provide and sustain these types of new services to the farming community."

## Storage schemes

Drought adds urgency to irrigation and storage plans

By Jamie Gray

5:00 AM Tuesday Feb 17, 2015

The dry conditions highlight the need for water storage solutions such as the Opuha Dam at Fairlie.

Drought throughout much of the South Island, and dry conditions in parts of the North Island, look set to add urgency to water storage and irrigation schemes that are either underway or on the drawing board. "The declaration by the government that parts of the South Island have been affected by medium-scale adverse events has highlighted what a nor'wester can do, now that all the 'easy' water has gone," says Irrigation New Zealand chief executive Andrew Curtis.

ANZ estimates the current dry spell will shave at least 0.5 per cent off GDP growth. "This year has definitely highlighted what a nor'wester weather pattern does and how important the alpine rivers remain," Curtis said. "There are a few projects on the drawing board that need pushing forward at a more rapid pace. Dry conditions in Marlborough are only worsening and, like South Canterbury, this highlights the need for sustainable water storage solutions in susceptible areas, so that in a bad year no one has their water cut off." Getting water storage up and running involves environmental challenges, and there are issues of land-use change once a project is

complete. Then there is the cost and the challenge of getting all the irrigators on board. “All the run-of-river water has gone,” Curtis said. “Water taken directly out of a river or from groundwater – in those parts of the country where water is an issue – has been fully allocated. So the only way that we can create new water is through a storage and distribution network, and obviously this comes at a cost,” he said. “When you start looking at that cost, it always stacks up over the long term. Our challenge is the initial capital hurdle that is involved in putting these together.”

In the North Island, the controversial Ruataniwha Water Storage Scheme in central Hawke’s Bay is awaiting the outcome of a board of inquiry. The Wairarapa Water Use Project, aimed at tapping into the tributaries of the Ruamahanga River, is still sitting on the drawing board. In the South Island, the Lee Valley Dam in Tasman has gone to a consent process. In the key grape-growing region of Marlborough there is a proposed Flaxbourne Community Irrigation Scheme. Further south, in Canterbury, there is the Hurunui Water Project near Culverden. And in mid-Canterbury, stage one of the Rangitata diversion race is already underway.

### **Waimea Dam approval “great news” for Nelson/Tasman region**

27th February 2015

Today’s confirmation that consent for the Waimea Community Dam has been approved is “great news” for the Nelson/Tasman region, says IrrigationNZ. “The Waimea Community Dam addresses the long-term future of this region by guaranteeing surety of water for urban residents, commercial users, and irrigators, and by keeping rivers healthy in dry summers,” says Nicky Hyslop, chair of IrrigationNZ. However, IrrigationNZ has warned that a big challenge now is ensuring that the dam can be funded. “To get this project off the ground there needs to be an appropriate split of public-private financing which adequately reflects the public benefits of the dam,” says Ms Hyslop. “The project will bring multiple economic and environmental benefits for ratepayers, residents, and communities in the top of the south. These include reliability of water for growers, ‘downstream’ benefits for support businesses, and solutions to a range of environmental issues, which include augmentation of the Waimea river to guarantee minimum flows that will help remove algae build-up. The Waimea Dam holds the key for the Tasman region’s future, but to move it from consent to construction there needs to be pragmatic discussion around the table as to how this community infrastructure – with all the good it will bring – will be fairly paid for. It is particularly important that clear and realistic precedents are set around the funding of this infrastructure as more water storage projects develop around the country, such as the potential project in Northland announced today and welcomed by IrrigationNZ.”

### **Calls for greater dairying control**

By Lynda van Kempen on Sat 21 Mar, 2015

The regions: Central Otago

Dairy conversions in Central Otago should be singled out for closer attention and controls imposed in the revised district plan, the district council has been told. Twelve out of 108 submissions on the discussion document, which signals potential changes to the district plan, are concerned with land use intensification.

Eight of those submissions say the council should be making it harder to establish dairy farms.

In the discussion document, the council has said that despite concerns expressed by some people about the impact of dairying, there were no plans to introduce rural land-use rules that singled out dairying from other forms of farming. It noted there were concerns about the impact of dairying on soil conservation, water quality, landscape, and biodiversity, but said the Otago Regional Council was the agency best resourced to address soil conservation and water quality issues in connection with dairying. Dairy farming was a permitted activity in the current district plan and should continue to be so in the revised district plan, the council said.

The submission by Ann Rutherford, of Alexandra, was one of eight which opposed that view. “I feel the Central Otago District Council needs to show more leadership when it comes to the issue of dairying and the negative effects it is having on Central Otago’s landscapes and waterways,” she said. “The landscapes and waterways are being ravaged by dairying, and the council should stop pretending that dairying is no different from other forms of land use when that is patently not so.” Another submission, by Tom Lamb, said that dairying should be a discretionary land use activity, to manage the threat to the environment from the increased use of nitrogen and phosphates.

Tarras resident Bruce Lambie highlighted his concerns about “industrial scale” dairying in his area. “Large numbers of trees have been felled to make way for pivot irrigators on a massive scale ... there is no doubt that this large-scale dairying has had a detrimental effect on the landscape, as have these pivot irrigators, which draw vast amounts of water from aquifers,” Mr Lambie said. In her submission, Lynne Stewart, of Clyde, said that land use changes from sheep and beef farming to dairy or dairy support should require resource consent, to protect waterways. The council’s hearings panel will meet for three days, starting on Tuesday, to hear submissions.

Other topics raised in submissions included support for the council's moves to set design guidelines for buildings within heritage precincts, calls for a focus on wilding pines in the area, and several submissions object to the noise pollution from gas guns, wind machines, and bird-scaring devices on orchards and vineyards. Having read Grenville Christie's "Talking Point" (*Hawke's Bay Today*, Friday, March 20), I feel I need to respond. Two years ago, while HBRIC Limited prepared its case for the Board of Inquiry, the regional council was accused of attempting to "kill" the Tukituki River. Mr Christie has added "theft" to the apparent list of crimes perpetrated by the backers of the scheme. As readers no doubt know, I am all for correcting an injustice. But it seems to me the real injustice here is not what harm the irrigation scheme might cause to the environment.

The real crime is against the future prosperity of the Hawke's Bay region from the serial attack through hyperbole and overstatement consistently levelled against the project. The signal that yet more court resources and time will be consumed on the case (Mr Christie referring to "a major fight that will delay the scheme") is even more disturbing. I seriously doubt whether Hawke's Bay has the stomach or appetite for that, or would see any credibility in yet another round of appeals or legal challenges to the consents granted by the Board of Inquiry for the dam. As someone born and bred in Hawke's Bay and who has hopes my children might find a future here, I simply cannot understand why there is so much negativity surrounding what is a great social and economic opportunity for this region. No doubt some of the very detractors to this scheme bemoan the lack of political action to tackle Hawke's Bay's unhappy social indicators (health, education, employment), but then knock a genuine attempt to reverse the trends. Let them tell the Ruataniwha farmers currently depending on water that depletes the Tukituki to "turn the tap" off, and front up to those that lose their jobs and livelihoods as a result.

Sure, there are risks (as Mr Christie points out). But humankind has taken risks for centuries. The port at Napier was a risky venture. Napier and Hastings were not built after the earthquake without risk. We now know more about the consequences of our decisions than ever before, enabling prudent decisions to be made, as we are better informed than ever before. The Board of Inquiry evaluated 29,000 pages of evidence. It decided that the social, economic, and cultural case for the scheme outweighed any risk. I am not going to second guess that. Mr Christie, I suggest you read the decision. It found that fears over coastal erosion or from earthquakes were unfounded. It found, after considering all the facts, that the public and Maori had been extensively and appropriately consulted, despite subsequent claims to the contrary. I understand that two very experienced international consortia have since pored over the detail of this proposal and a preferred bid on a fixed price contract involving a \$270 million investment just needs the green light. That green light so far as the regional council is concerned (investing \$80 million of cash assets to secure better than a bank rate return) will only be given if farmers and the private sector themselves consider the risks reasonable. This would be a cash investment. The port is not at risk, not one jot. I understand nearly 80 per cent of those who submitted to the Long Term Plan on this issue last year supported the decision to invest in this way.

Returning to the point about sensation, and to Mr Christie, I say the offer by HBRIC Limited to donate to DoC five-and-a-half times more land than they seek in exchange is about as far from "theft" as I could imagine. The department (and therefore the people of Hawke's Bay) will get a larger forest park. Additionally, HBRIC is offering 35 years of pest control over some 2,700 hectares of public and private land, including the 145 hectares it will be giving to DoC in exchange for the 22 hectares it receives. I am told one submitter to this process suggested the 145 hectares of land HBRIC was offering would be such a valuable addition to the Ruahine Park, DoC should take it anyway, but keep its 22 hectares. Now, wouldn't that be theft? I also understand that the one threatened plant (mistletoe flower) found on the 22 hectares of DoC land in question was, when the ecologist returned to that site for another visit, gone, likely eaten by a possum. New Zealand's leading bird ecologist advised the Board of Inquiry that New Zealanders needed to get over the idea that simply locking up vast tracks of public land protects the native plants and animals that live within the DoC estate. It doesn't. We end up with damaged forest canopy and no birds. The HBRIC proposal is one where people, the environment, and the economy can come together to produce an overall better and more sustainable outcome.

Don't let one-sided debate (or worse, more delays in endless and costly court battles) kill the single greatest opportunity for the future of this region we may ever see.

– Hawkes Bay Today.

**Cut Scores**

<b>Not Achieved</b>	<b>Achievement</b>	<b>Achievement with Merit</b>	<b>Achievement with Excellence</b>
0 – 2	3 – 4	5 – 6	7 – 8