

# The economics of new water supply infrastructure for irrigated agriculture

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# The economics of new water supply infrastructure for irrigated agriculture

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## Introduction

The State is considering expansions of irrigated agriculture schemes in Queensland. This is of particular concern to WWF as the economic success of previous irrigation developments is questionable at best, while there have been significant externalities that have typically not been included in the analysis and decision making processes.

## Lessons from the past

When we consider the potential expansion of irrigated agriculture in northern Queensland, it is worthwhile considering what are the lessons from the past that can inform future decisions. For example, have the previous developments been commercially viable for infrastructure owners? What is the potential value of environmental costs to the GBR?

We have undertaken some basic economic analysis of a sample of previous developments (Burdekin and Paradise) to elicit some lessons for future irrigation developments.

We have then undertaken some high level economic analysis of two potential developments to ascertain their commercial viability and external impacts on the GBR.

## Approach

Our approach to assessing the broad costs and benefits of more dams has been to use a benefit costs analysis framework over a 30-year timeframe. We have undertaken two sets of broad analysis.

- The economic viability from the point of a commercial investment in a farm (i.e. would it make sense for a farmer to invest in a new irrigation enterprise?). This includes covering all water charges including a rate of return on the assets.
- A broader assessment of the costs of externalities, particularly those impacting on the GBR. These can be estimated by using estimates of agricultural pollutant loads multiplied by the costs of abatement that would be avoided if the irrigation expansion did not proceed. *“The estimated abatement cost per tonne of sediment from grazing varied between \$42 and \$2,600. Similarly the estimated cost of DIN abatement for cane varied from \$22,000 to \$117,000 per tonne across regions.”* (Australian Government 2014)

It should be noted that this analysis presented in this report is based on limited publicly available information, limited time and other constraints. Therefore, the outcomes of our analysis should be treated as purely indicative.

However, our findings do demonstrate the need for robust and transparent analysis of new water supply infrastructure to enable informed decisions to be made.

### Paradise Dam

Paradise Dam was the last major irrigation infrastructure investment by the State and was completed in 2005. The intention was that the dam would be used for a number of purposes, predominantly irrigated agriculture (improving reliability of water for existing producers and expanding the area of production). Some quick statistics relating to the infrastructure are shown below.

**Table 1: Paradise Dam – quick statistics**

Indicator	Measure	Comments
Dam capacity (ML)	300,000 ML <sup>1</sup>	
Dam expected yield (ML / annum)	124,000 ML <sup>2</sup> (medium priority). 20,000 ML high priority.	Focus has always been irrigated agriculture
Irrigation water sold or leased	11,229 ML (sold) 3,279 ML (leased) <b>Error! Bookmark not defined.</b> 14,508 ML total	Significant under utilisation of service
Key crops	Sugar as dominant area. Horticulture crops include tomatoes, rockmelons, watermelons, capsicum, zucchini, beans etc.	Development and diversification of cropping has not matched initial expectations.
Dam capital cost	\$300 million in 2014 dollars <sup>3</sup>	
Other infrastructure – estimated capital cost	\$50 million in 2014 dollars <sup>16</sup>	

While there are some higher value crops, the areas under these crops have been constrained by market opportunities. The dominant crop is sugar, with a supplementary irrigation requirement of 4-6ML/ha if the objective is to maximise profitability, which based on current prices would deliver an annual gross margin in the range of around \$1,000 to \$1,270 per hectare. (Bundaberg Regional Irrigators Group 2013)

Whilst the original economic analysis of the project was relatively positive (NECG 2001), more recent studies have been significantly less positive. (Utting 2012)

We have conducted a high-level benefit costs analysis of the infrastructure. For our base case we have assumed:

- A 30-year timeframe for the analysis. A real risk adjusted discount rate of 7.7% is applied to water supply infrastructure costs and externalities. A discount rate of 13.1% is applied to operating surpluses accruing to farmers.

<sup>1</sup> DERM (2010) , p. 109

<sup>2</sup> QCA (2012a), p. 14

<sup>3</sup> Water-technology.net (2014)

- For simplicity, all development of the infrastructure and farms occurs immediately. This will actually overestimate net benefits, as benefits rarely occur immediately, while capital costs do.
- Cane is the dominant crop. Based on an irrigation supplement rate of 4/ml/ha, dam yields would enable an additional 31,000 hectares of cane.
- Consistent with industry information, a gross margin of \$1,250/ha is assumed and this includes all water service provision charges.
- Dam and associated infrastructure costs are consistent with estimates outlined in Table 1.
- The major externality to the GBR is DIN. We have assumed DIN discharges into waterways at 7.2/kg/ha/annum, and abatement costs at the lowest end of the estimates from Reef Rescue for the industry.

The results of our analysis are shown below.

**Table 2: Paradise Dam – indicative benefit cost analysis (base case)**

<b>Benefit / cost</b>	<b>Present value (\$)</b>
Gross margin to farmers (incorporates all water charges)	\$288,437,383
<b>Costs</b>	
Capital cost - dam	\$300,000,000
Capital cost - roads	\$49,800,000
Capital costs to farmers	\$323,175,000
Cost of externality	\$56,667,112
<b>Total costs</b>	<b>\$729,642,112</b>
<b>Net benefits</b>	<b>-\$441,204,729</b>
<b>BCR</b>	<b>0.40</b>

We estimate that the net present value of the project is significantly negative, with a benefit cost ratio (BCR) of around 0.40 under the base case assumptions. The project should have a BCR of at least 1 to be economically viable.

The present value of benefits to farmers based on gross margins is around \$290 million under the base case scenario and assumptions. For the project to be viable, gross margins (\$/ha) would need to be approximately \$3,200, twice current local expectations.

The present value of cost of the damage to the reef (based on a cost of abatement) is around \$57 million, even where the most efficient abatement costs are used. If a mid-point of the range of relevant abatement costs from Reef Rescue is used, the estimated cost to the GBR is almost \$180 million in present value terms.

Furthermore, if the cost of the indirect externality from the use of the water (i.e. DIN discharges) was incorporated into the price of water, water charges would increase by at least \$40, and around \$125/ML is the mid-point of abatement costs was used.

**The bottom line**

Available information would indicate that the project should probably not have proceeded in the first place as assumptions underpinning the original analysis were overly optimistic, and the costs of the externalities were not properly incorporated.

**Burdekin Falls Dam (BFD) and the Burdekin River Irrigation Area (BRIA)**

The Burdekin Falls Dam and the Burdekin River Irrigation Area was the last of the major irrigation developments established by the State in northern Queensland. While the focus of the development has always been broad-acre irrigated crops, the dominant crop has always been sugar. This scheme is often seen as the ‘jewel in the crown’ of irrigation schemes in Queensland. But is it commercially and economically viable? If Government’s had their time again and were rational investors - would they build it now?

Currently water service pricing for irrigators primarily covers operations, maintenance and asset renewal costs (called lower bound pricing). Prices are only marginally above lower bound and do not provide any meaningful return on the capital investment for the BFD or the BRIA. In 2000, the QCA estimated that the Depreciated Optimal replacement Cost (DORC) of the BFD was about \$248 million, which is approximately \$360 million in current terms (QCA 2003). Of this, around 79% is attributable to irrigators.<sup>6</sup>

Furthermore, the distribution assets were valued at \$173 million (\$251 million in current terms) (QCA 2003). Combined, the current value of the SunWater assets that are providing services to irrigators is around \$611 million. The QCA analysis (QCA 2003) indicates the road infrastructure and other infrastructure investments are around \$49.8 million in current terms.

**Table 3: Burdekin Falls Dam and Burdekin River Irrigation Area – quick statistics**

Indicator	Measure	Comments
Dam capacity (ML)	1.86 million ML <sup>7</sup>	
Dam expected yield (ML / annum)	Medium Priority: 280,801 ML Medium Priority Distribution Losses: 190,477 ML <sup>8</sup>	
Key crops	Sugar, horticulture	Several other crops were originally considered (e.g. cotton)

<sup>6</sup> This estimate is based on the QCA’s determination that 79% of the renewals cost for the bulk infrastructure is attributable to irrigators (QCA 2014)

<sup>7</sup> QCA (2003) p. 8-9

<sup>8</sup> QCA (2012b) p. 1

Capital cost (Dam, channels)	\$611 million (2014 dollars)	
Capital costs (roads and other infrastructure)	\$49.8	

We have conducted a high-level benefit costs analysis of the infrastructure. For our base case we have assumed:

- Discount rates are the same as all case studies.
- Cane is the dominant crop and the combined area across the BRIA and Water Board’s area is approximately 87,200 hectares.
- A gross margin of \$2,000/ha is assumed and this includes all lower bond water service provision charges.
- Dam and associated infrastructure costs are consistent with estimates outlined in Table 1.
- The major externality to the GBR is DIN. We have assumed DIN discharges into waterways at 7.2/kg/ha/annum, and abatement costs at the lowest end of the estimates from Reef Rescue for the industry.

The results of our analysis are shown below.

**Table 4: Burdekin Falls Dam and the BRIA – indicative benefit cost analysis (base case)**

<b>Benefit / cost</b>	<b>Present value (\$)</b>
Gross margin to farmers (incorporates all water charges)	\$1,298,154,312
<b>Costs</b>	
Capital cost - dam	\$611,000,000
Capital cost - roads	\$49,800,000
Capital costs to farmers	\$909,060,000
Cost of externality	\$412,805,738
Total costs	\$1,982,665,738
Net benefits	-\$684,511,427
BCR	0.65

We estimate that the net present value of the project is significantly negative, with a benefit cost ratio (BCR) of around 0.65 under the base case assumptions. The project should have a BCR of at least 1 to be economically viable.

The present value of benefits to farmers based on gross margins is around \$1.3 billion under the base case scenario and assumptions. For the project to be viable, gross margins (\$/ha) would need to be approximately \$3,000.

The present value of cost of the damage to the reef (based on a cost of abatement) is around \$410 million, even where the most efficient abatement costs are used. If a mid-point of the range of relevant abatement costs from Reef Rescue is used, the estimated cost to the GBR is almost \$1.3 billion in present value terms. Furthermore, if the cost of the indirect externality from the use of the water (i.e. DIN discharges) was incorporated into the price of water, water charges would increase by at least \$40, and around \$125/ML is the mid-point of abatement costs was used.

The QCA have determined the appropriate WACC for SunWater is around 7.7% (real). If this rate of return is applied to all Burdekin infrastructure attributable to irrigators, total irrigation water charges across the entire Burdekin would increase by approximately \$47 million. Based on submissions to the QCA during the last pricing review (QCA 2012b), there is a general consensus that charging upper bound costs would make the scheme significantly less commercially viable to irrigators.

### The bottom line

Despite the Burdekin being the jewel in the crown of Queensland irrigation schemes, available information would indicate that the project would not be economically viable if it was being established under current market conditions.

### Potential new water supply infrastructure

There are also a number of new schemes that have been mentioned in various government documents. Using the same benefit cost analysis approach, we have undertaken an initial assessment of two proposed new water supply infrastructure projects within the Great Barrier Reef Catchment Area.

#### Urannah Dam

The proposed Urannah Dam is located on the broken River near Collinsville in the Burdekin Basin. The infrastructure would be used for a mix of uses, including irrigated agriculture.

**Table 5: Urannah Dam – quick statistics**

Indicator	Measure
Dam capacity (ML)	1.5 million <sup>19</sup>
Dam expected yield (ML / annum)	177,000 <sup>19</sup>
Area irrigated (ha)	28,600 ha <sup>19</sup>
Crops	Sugarcane (16,730 ha or 59%); Cotton (8,210 ha or 29%); Various Horticulture (1,460 ha or 5%) and Mixed Broadacre (1,600 ha or 6%), Lucerne Hay (90 ha or 1%) and Redclaw Aquaculture (510 ha or 2%) <sup>19</sup>
Water pollution emissions (TSS/ ha) after development (assume sugar)	15,000 tonnes/annum (from sugar cane +13,800 tonnes; cotton +115 tonnes; horticulture +766 tonnes; peanuts +766 tonnes; lucerne +1 tonne; redclaw +7 tonnes) 20
<b>Financial</b>	
Dam capital cost (\$M)	\$152 m
Road and other infrastructure cost (\$M)	\$29.5 m based on \$1,100 per hectare (estimated from Burdekin)



We have conducted a high-level benefit costs analysis of the infrastructure. For our base case we have assumed:

- Discount rates are the same as all case studies.
- While multiple crops are proposed, we have based our modelling on sugar as that generally has a higher gross margin than cotton (the other dominant crop). The cropped area will be approximately 28,600 hectares. The purchase and establishment cost is assumed at \$10,400/ha.
- A gross margin of \$2,000/ha is assumed (same as Burdekin) and this includes all lower bond water service provision charges.
- Dam and associated infrastructure costs are consistent with estimates outlined in Table 1.
- The major externality to the GBR is DIN. We have assumed DIN discharges into waterways at 7.2/kg/ha/annum, and abatement costs at the lowest end of the estimates from Reef Rescue for the industry.

The results of our analysis are shown below.

**Table 8: Urannah Dam – indicative benefit cost analysis (base case)**

<b>Benefit / cost</b>	<b>Present value (\$)</b>
Gross margin to farmers (incorporates all water charges)	\$398,974,032
<b>Costs</b>	
Capital cost - dam	\$152,000,000
Capital cost - roads	\$29,480,000
Capital costs to farmers	\$279,390,000
Cost of externality	\$126,871,488
Total costs	\$587,741,488
Net benefits	-\$188,767,457
BCR	0.68

We estimate that the net present value of the project is significantly negative, with a benefit cost ratio (BCR) of around 0.7 under the base case assumptions. The project should have a BCR of at least 1 to be economically viable.

The present value of benefits to farmers based on gross margins is around \$400 million under the base case scenario and assumptions. For the project to be viable, gross margins (\$/ha) would need to be approximately \$3,000.

The present value of cost of the damage to the reef (based on a cost of abatement) is around \$125 million, even where the most efficient abatement costs are used.

### The bottom line

Available information would indicate that the project would not be commercially or economically viable. The incorporation of externalities into the analysis indicates reduces the economic viability even more.

### Nathan Dam and Pipeline Project

The proposed Nathan Dam is located on the Dawson River near Taroom in the Fitzroy Basin. It will potentially store 888,000 ML and yield 66,000 ML of high priority water allocation per annum.

The current proposed purpose of the dam is to provide high priority water allocations to mining, urban and industrial customers. The current business case for the dam has collapsed as mining customers have delayed commencing their projects due to declining global coal prices.

Earlier studies indicate that water supplied from the dam would support approximately 30,000 ha of irrigated cotton production in the lower Dawson Valley. That increased cotton production would generate an additional 420 tonnes of TSS/a and 3 tonnes of DIN/a.

Quick stats for Nathan Dam are provided below.

**Table 7: Nathan Dam – quick statistics**

Indicator	Measure
Dam capacity (ML)	888,000 <sup>20</sup>
Dam expected yield (ML / annum)	66,000 <sup>20</sup>
% of storage used for irrigation	190,000 ML <sup>21</sup>
Area irrigated (ha)	30,000 <sup>20</sup>
Crops	Cotton (30,000 ha) <sup>20</sup>
Water pollution emissions	Cotton: 420 tonnes of TSS and 3 tonnes of DIN per annum <sup>20</sup>
<b>Financial</b>	
Irrigation capital cost (\$M)	Total cost \$361.3 m (2013) <sup>22</sup> Based on potential allocations, cost attributable to irrigation estimated at \$77 million.

We have conducted a high-level benefit costs analysis of the infrastructure. For our base case we have assumed:

- Discount rates are the same as all case studies.
- Cotton is the dominant crop – approximately 30,000 hectares. The purchase and establishment cost is assumed at \$6,000/ha.
- A gross margin of \$800/ha is assumed and this includes all lower bond water service provision charges. (White et al 2012)

- Dam and associated infrastructure costs are consistent with estimates outlined in Table 1.
- The major externality to the GBR is DIN. We have assumed DIN discharges into waterways at 0.1/kg/ha/annum, and abatement costs at the lowest end of the estimates from Reef Rescue for the industry.

The results of our analysis are shown below.

**Table 8: Nathan Dam – indicative benefit cost analysis (base case)**

<b>Benefit / cost</b>	<b>Present value (\$)</b>
Gross margin to farmers (incorporates all water charges)	\$178,645,089
<b>Costs</b>	
Capital cost - dam	\$77,305,180
Capital cost - roads	\$0
Capital costs to farmers	\$180,000,000
Cost of externality	\$180,000,000
Total costs	\$437,305,180
Net benefits	-\$258,660,091
BCR	0.41

We estimate that the net present value of the project is significantly negative, with a benefit cost ratio (BCR) of around 0.40 under the base case assumptions. The project should have a BCR of at least 1 to be economically viable.

The present value of benefits to farmers based on gross margins is around \$180 million under the base case scenario and assumptions. For the project to be viable, gross margins (\$/ha) would need to be approximately \$2,000.

The present value of cost of the damage to the reef (based on a cost of abatement) is around \$180 million, even where the most efficient abatement costs are used. In effect, under the assumptions used, the damage to the environment could be almost equal to the gross margins received by farmers. Note: this excludes any capital costs.

#### **The bottom line**

Available information would indicate that the project would not be commercially or economically viable. The incorporation of externalities into the analysis indicates reduces the economic viability even more.

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## Potential options looking forward

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It is instructive to consider the suite of potential options for moving agriculture forward in Northern Australia. WWF believes any future strategy should be based around some sound economic principles:

- **Profitability and efficiency before uneconomic expansion.** The initial focus should be on facilitating actions that increase profitability and production efficiency for existing production areas before any expanded and new irrigation schemes are considered.
- **Do good without doing harm.** Projects supported by Government should seek to facilitate economic wealth generation (doing good) without adverse consequences to third parties (doing harm). Given the fact that the biggest manageable risk to the GBR is agricultural runoff, and significant runoff occurs even under absolute best management practice, any specific action by Government to promote the expansion of irrigated agriculture will always come at a tradeoff to waterway health and sectors that rely on waterway health (particularly tourism)
- **Robust and transparent economic analysis.** All future irrigation developments should be subject to rigorous and transparent assessments (economics, commercial, environmental, and social)

### Are more dams the answer

It is clear from the analysis presented earlier that the expansion of irrigated agriculture in Northern Australia, in the absence of a major 'game changer' in terms of the crop choice, market access, commodity prices, or local value adding will simply result in more development that is not commercially or economically viable, and greater risks to the GBR.

### Increasing productivity, while doing good for the GBR

There are a number of actions that could be undertaken that simultaneously seem to increase agricultural productivity and profitability, without causing damage to the GBR. These actions should be the focus of activity. There are a number of activities that could be considered.

### Improved intelligence to underpin investment

Investment in agriculture and agribusiness is inherently risky. Better and accessible intelligence about agronomic, economic, logistics, market, and other supply chain opportunities and risks will result in more informed and ultimately profitable decisions and investments.

### **Market access and biosecurity**

Implementing actions to achieve greater access to export markets by improving information to industry and by removing other unnecessary trade barriers (e.g. unnecessary biosecurity barriers to trade).

### **Investment to make it happen – restructure loans**

One of the major impediments to increased productivity and profitability and reducing loads to the GBR is often access to capital to restructure enterprises. (Starr et al 2013 and Van Grieken et al, 2010)

There is emerging evidence of some practice changes that reduce risk to the GBR and are commercially viable. For example, representative economic analysis of a 120 ha cane farm in the Burdekin Delta region indicated that capital investments to move from C class practices to B class practices were probably in the order of \$69,000 (Van Grieken et al, 2010). However, the efficiency gains show that the practice changes are also a very favourable investment, with a present value over 10 years of almost \$300,000.

Furthermore, the scale of the loans market is likely to be >\$200 million. (MainStream Economics and Policy 2014) Options such as structural adjustment loans for existing industry participants may prove to be a more efficient investment.

### **Opportunities for diversification and incremental expansion into high-value ventures and a focus on value adding (capturing benefits within QLD)**

Previous research has shown many opportunities for diversification in the region will rely on incremental growth of markets (e.g. counter-seasonal production of fresh summer vegetable crops during the winter). Given the incremental nature of these markets, a more profitable and sustainable pathway for development is incremental change within existing infrastructure schemes, rather than major new schemes. This will reduce the risk of major demand and supply imbalances (over supply of product) that reduce viability across all regional producers. (Marsden Jacob Associates 2008)

The focus also needs to be on maximising local benefits from sustainable development. This will require greater focus on value adding through product transformation. Currently levels of product transformation in the GBR Catchment Area is relatively low, which is primarily due to a lack of obvious relative competitive advantage (Marsden Jacob Associates 2007 and 2008).

However, there are likely to be competitive advantages emerging, particularly for beef) as incomes and urbanization in South East Asia continues. (ANZ 2014)

### **The bottom line**

There are a number of positive actions that could be undertaken by the State to facilitate efficient and profitable growth that does not adversely impact on the GBR.

## Economically and commercially risky

For decades successive governments have assessed options and often invested in marginal irrigation schemes. This is despite the agronomic and economic risks being very well documented as early as the 1960s. (Davidson 1965 and 1969)

Investment in irrigated agriculture is a risky financial investment given the combination of physical risks (e.g. climate) and market risk (prices, exchange rates), and the relatively high cost of production in Australia. This has limited international competitiveness and growth of irrigated agriculture in Northern Australia. For example:

- **Insufficient competitive advantage.** Studies identifying the region's competitive advantages, costs structures, supply chains and water demand have found that the region generally lack sufficient competitive advantages into key markets to justify commercial investment in expansions of irrigated agriculture (Marsden Jacob Associates 2007 & 2008).
- **Lack of commercial viability.** A recent report by ANZ Banking Group has found that the commercial viability of major irrigation expansion is highly questionable given the region's physical environment (soils, rainfall), access to markets, costs of production and comparativeness into key markets. They found on-farm profitability for beef and grains (two areas where Australia has a competitive advantage) may provide sufficient returns to spur investment (7-13%), but that other investments were not viable unless there was a significant increase in commodity prices. (ANZ 2014)
- **Insufficient returns.** MainStream has calculated an indicative range for an appropriate return on investment for irrigated agriculture in northern Queensland using the weighted average cost of capital (WACC) methodology.<sup>23</sup> This provides an indication of the average return that would be necessary to a rational investor given the inherent riskiness of the investment. We estimate, for an investment in irrigation farming to be commercially viable, annual returns would need to be at least in the range of 12-14% (real). This is significantly higher than rates of return actually being achieved by key sectors such as sugar, grains and horticulture. (ABARES 2014)
- **Excess capacity in existing schemes.** There is already significant excess capacity in schemes such as the Burdekin and Pioneer that could provide for incremental growth in demand for irrigated land. Given the fact that the capital investment in these schemes is effectively 'sunk', these areas are likely to be more commercially viable for expansion compared to establishing new irrigation schemes

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<sup>23</sup> This estimate included a cost of debt based on current real farm indicator lending rates, industry capital structures indicates by ABARES surveys, a rate of return on equity investment based on average returns on the share market (where the asset beta was calculated based on an analysis of the variance of the cane price against the variance of the ASX 200).

Given the likely scale of investments in new irrigation schemes, it is likely that significant private sector capital investment will be required. Investment in irrigated agriculture is inherently risky and there is little evidence to suggest further investment would be commercially viable. Therefore, the likelihood of interest by rational private sector investors is relatively low.

### **The bottom line**

Investments in major expansions of irrigated agriculture in northern Australia are commercially risky both for farmers and infrastructure providers.

### **Inconsistent with trends in finance and investment**

On the face of it, expanding irrigation without major changes to efforts to mitigate and offset environmental social impacts will be inconsistent with current trends in finance and investment.

A number of institutional and broader environmental considerations will need to be incorporated into any financing decision making processes, which include:

- **Equator Principles.** The Equator Principles are voluntary risk management framework adopted by financial institutions. They are used for determining, assessing and managing environmental and social risk from projects financed (Equator Principles 2013). Australia's 'big four' banks are all signatories to the Equator Principles. Unless new irrigation projects are properly assessed and environmental and special risks properly mitigated, private sector financing may be difficult to source
- **International financing standards and guidelines.** The international finance community and formal multi-national organisations such as the World Bank and the International Finance Corporation have established specific standards relating to managing environmental outcomes attributable to projects that are funded through the World Bank group. These standards are influencing financing decisions across a broader cross section of lenders (IFC 2012). Again, unless environmental safeguards are in place, international financing may prove problematic.
- **Trends in private equity markets.** There is a significant trend in private equity investments and institutional investment (e.g. on behalf of superannuation funds) towards greater consideration of environmental, social and governance (ESG) aspects of investment strategies. ESG investments are growing at a faster rate than private sector investment as a whole as investors are progressively demanding investments consistent with ESG and the number of guidelines and accreditations that have been established (MainStream 2014). Given the likely negative impact on the GBR from major expansions of irrigation, securing institutional and private equity investment may be problematic.

### **The bottom line**

Because of the likely environmental and social impacts from expanding irrigation, securing private sector capital may prove problematic.

### **Government and sovereign nation investors as the last man standing**

If rational private sector investment is not forthcoming (as we believe will be the case), any future investment is likely to be highly reliant on investments of governments (Australian or other sovereign nations).

There is no evidence of any 'market failure' that would indicate a rationale for the Australian or Queensland Governments to invest in more irrigation schemes. This is particularly the case as:

- There is a significant opportunity cost of channeling financial capital into infrastructure that provides negligible returns. Both Governments have major debt reduction programs, and investment into marginal infrastructure projects is entirely inconsistent with current fiscal imperatives
- The State already has a significant portfolio of irrigation assets (via SunWater). However, the State is currently seeking to divest themselves of channel assets in eight schemes via the Local Management Arrangements process currently underway. (DEWS 2013) It seems incongruous that the State would seek to divest themselves of low risk established assets and then divert capital to new commercially risky schemes
- Expansion of irrigation, even under best management practice irrigation techniques, will result in an increase in diffuse sediment and nitrogen emissions into waterways. These loads will negatively impact the GBR, and indirectly the Queensland tourism sector. There is a clear tradeoff between two of the economic pillars for the Queensland economy

Other sovereign governments may be interested in investment, particularly where there is a food security rationale. For example, investment houses on behalf of the Chinese Government have made investment in Australian agriculture and irrigation infrastructure in recent years (particularly where the purchase price has been a fraction of the original development cost. (ANZ 2014).

Often these investments in irrigation infrastructure have been made in conjunction with other investments on farming and logistical support, effectively creating a vertically integrated supply chain that is used to supply product directly into the Chinese market. The degree to which such investments have a greater degree of economic "leakage" resulting in less benefits retained in Queensland is largely unknown.

Presumably any investments would need to be consistent with the national interest requirements of the Foreign Investment Review Board. (Australian Government 2013) This national interest consideration should consider the environmental damage and costs to other sectors.

### **The bottom line**



There would appear to be NO economic rationale for government to invest in expanding irrigated agriculture in Northern Australia.

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