# Financial Assessment

## (NMDB Configuration)

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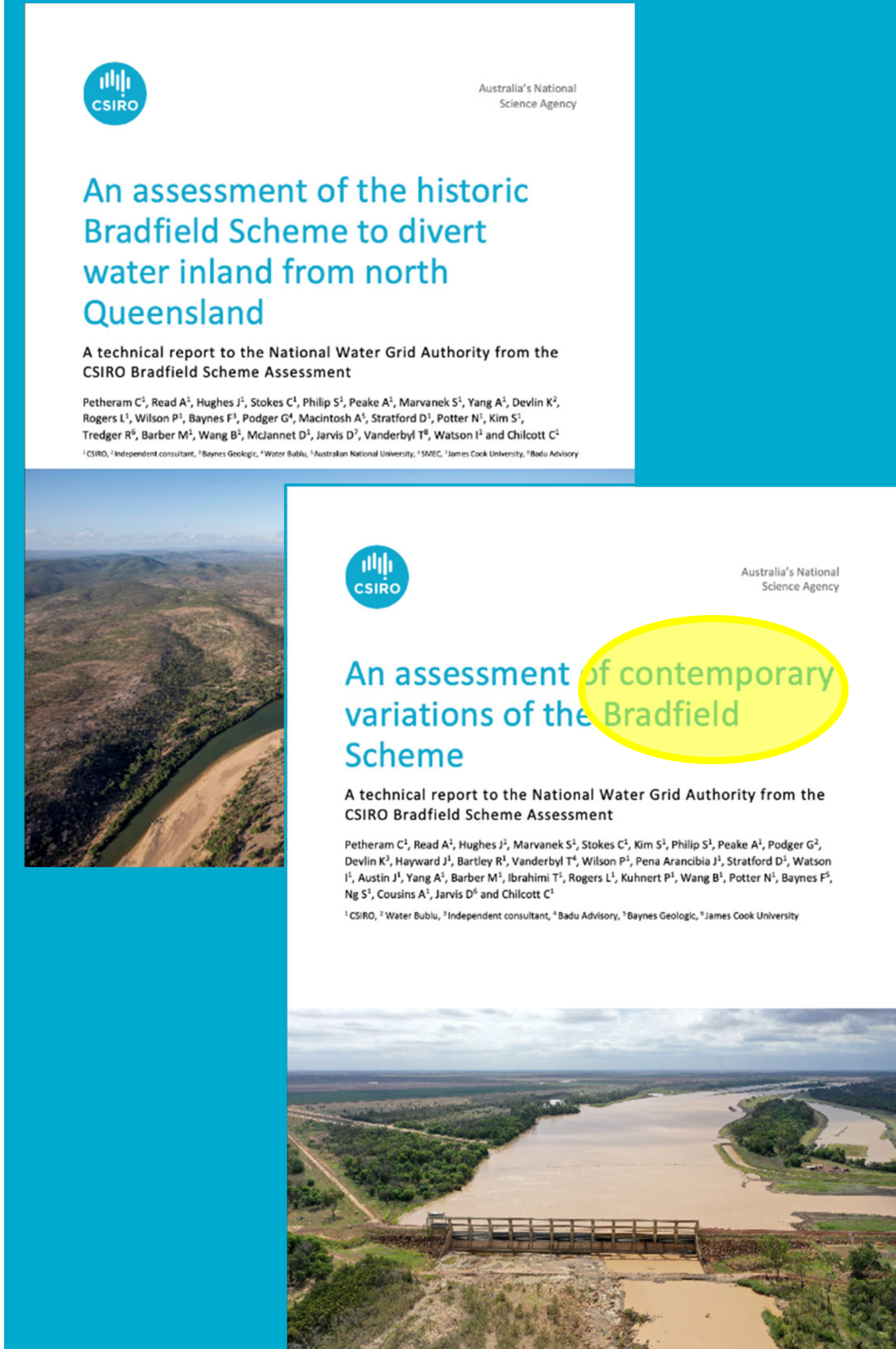
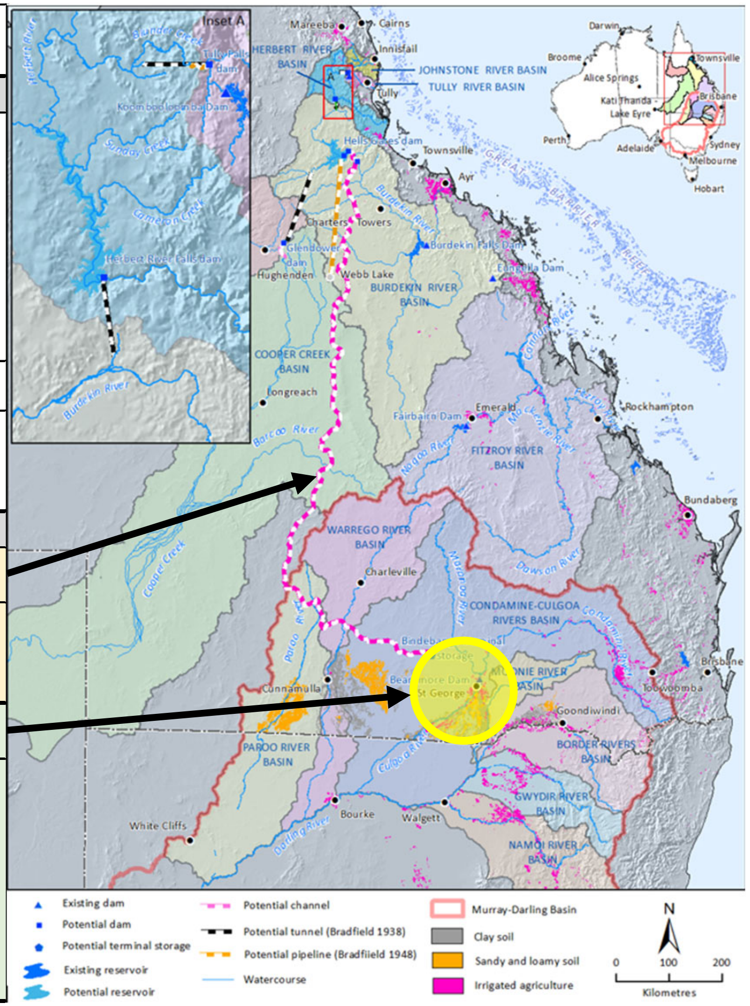


# Detailed Multi-component Financial Model (NMDB)

- (Market) Costs, Benefits, & Resource use over lifespan (100y)
- Accounting by Components (& transfers: capacity to pay)
- Comprehensive framework for anticipatable risks

| | |
|---|---|
| **SCHEME** | *= All infrastructure and costs for capturing and diverting water, establishing a new irrigation area, and growing produce … to farmers receiving payment for produce* |
| **Scheme accounting (accounted for in each component below):** | |
| **Costs:** | Initial capital costs of developed assets |
| | Renewal/replacement costs of assets (based on lifespans) |
| | O&M costs of assets (reccurent - annual) |
| | Other recurrent costs for each asset (pumping, net loss in hydro power generation) |
| | Annual production costs (for each source of revenue) |
| **Revenue:** | Gross revenue payed to farmers for all agricultural produce |
| **Resource use:** | Water use (and transfers between components) each year |
| | Area of farmland in production (using water and generating revenue) each year |
| **Scheme structure / Investment components:** | |
| **BACKBONE** | *= Everything for water storage and diversion down to point of discharge* |
| **Dams** | *= Dams and associated infrastructure other than tunnels and channels* |
| **Inter-basin diversion** | *= Tunnels and channels used to transfer water between river basins* |
| **IRRIGATION AREA** | *= Point of water extraction to farmers receiving payment for produce* |
| **Off-farm** | *= Roads and transmission lines to connect new irrigation area* |
| **Farms (4 types)** | *= Water extracted by farms … to farmer receiving payment for produce* |
| | Capital costs of farm development |
| | Farm set up (buildings, machinery, equipment, machinery, other structures) |
| | Crop growing costs (excluding costs of water supply) |
| | Sale of farm produce |



# Realistic financial Performance NMDB

Not viable: -1.8% IRR, 8% costs covered, ~$3200/ML
(Hence rationale for 'Upper Bound': Could it ever be viable?)

| ITEM | UNITS | UPPER BOUND | + MODERATE RISKS |
|---|---|---|---|
| **Scheme financial performance** | | | |
| Net present value ($ billion) | $ billion | −11.1 | −16.2 |
| Benefit cost ratio | $/$ | 0.25 | 0.08 |
| Internal rate of return (discount rate at which NPV = 0) | % | 2.0 | −1.8 |
| Proportion of off-farm costs irrigators can cover | % | 25 | 8 |
| **Water pricing (per supplied megalitre)** | | | |
| Metered price supplier would need to charge | $/ML | −2,310 | −3,220 |
| Inter-basin diversion component of water cost ($/ML) | $/ML | −1,920 | −2,690 |
| Combined scheme irrigators can afford to pay ($/ML) | $/ML | 580 | 250 |
| **Water pricing (ongoing entitlement)** | | | |
| Entitlement price supplier would need to charge | $ per ML/y | −28,200 | −37,500 |
| Ongoing service charge | $/ML | −200 | −230 |
| % Off-farm capital costs farm entitlements could cover | % | 18 | 1 |

# ‘Upper Bound’ Over-optimistic Assumptions

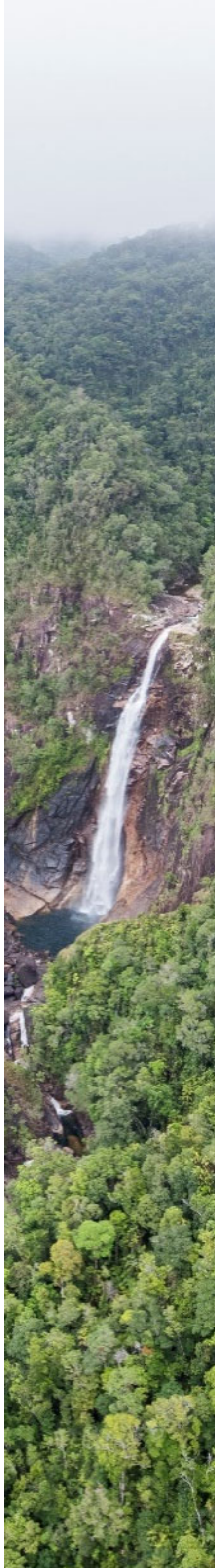
- Rationale: Could a Bradfield-style Scheme *ever* be viable?

- *Export* citrus as outlier >$3000 Gross Margin per ML orchard lifecycle
  Horticulture ~$250 Gross Margin per ML typical/mix (cf. GHD)

- 30,000 ha expansion in 30 years
  - QLD horticulture growth projection by 2050 < 13,000 ha
  - 2.8b/y gross revenue ~+30% current Australia fruit, veg. + nut
  - Currently ~5,300 ha citrus in QLD

- Why would greenfield developers pay diversion premium?
  - ‘Balancing’ scheme losses with ‘altruistic’ investors/farmers

- Ignores anticipatable risks



# Unattainable Upper Bound* NMDB Scheme $

- Infrastructure capital costs estimated at ~$21b (~17b diversion)
- Could irrigate 30,000 ha export citrus*; 80,000 ha new cotton; +shortfall
- Not viable* (7% DR): 2% IRR, 25% costs covered, ~$2300/ML
- Diversion infrastructure alone contributes ~$1900/ML (82%)
- Regional gross benefit (agriculture) ~$6b/y and <11,000 jobs

- Lifetime discounted *GROSS* farm revenue < infrastructure cost

# Key Weaknesses for Scheme Viability

**PRIMARY:**

- Diversion costs (>$1900/ML) >>> Value added by diversion (<<$300/ML)
  Value add of meeting shortfall in existing vs new/'greenfield' broadacre farms
  Even if scheme *were* viable/subsidised, would be better without excessive diversion

**SECONDARY:**

- Lower crop water use efficiency at inland locations (disbenefit)
- New broadacre farming has no realistic prospect of affording water
  Best case broadacre could afford (~$580/ML) <<< scheme cost (>>$2300 /ML)
- Bigger is not necessarily better
  'Oversized' water infrastructure: demand takes decades to catch up to supply
  High-value water users cannot scale rapidly to use new water (reduced PV)

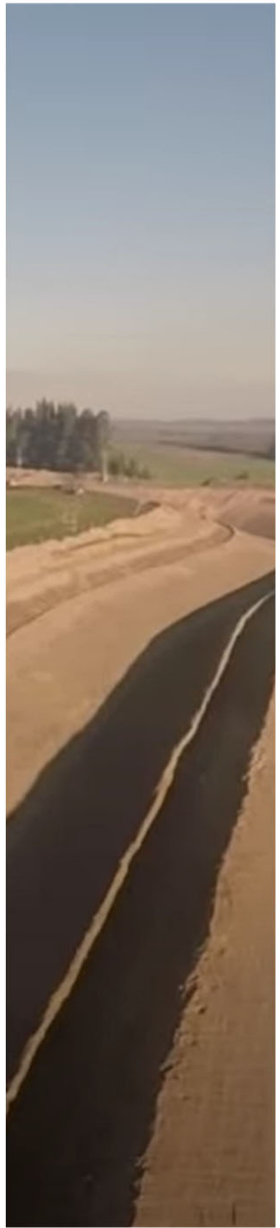
# The Good News

- Quick and clearcut findings
  'Over-optimism' wastes $ & time pursuing inferior options

- Identified principles for better, cheaper alternatives
  Can achieve similar outcomes at lower cost using water in place
  Avoid excessive diversion costs, use limited water more efficiently
  Progressively build supply to meet growing demand
  (e.g., interconnected regional grids (Tom)…)

# Additional Info

- Slides are NOT part of main presentation.



# Alternative configurations (nearer, smaller, staged)

- Using water near source – reduce diversion costs
- Build smaller storages – match supply to lags in ramping up high value users
- Scale and match supply to demand – reduce 'wastage' while markets grow
- Can achieve similar objectives at lower cost and risk

| PARAMETER | UPPER HERBERT | FLINDERS DIVERSION | NMDB DIVERSION |
|---|---|---|---|
| | SMALL, LOCAL | 'BETTER' BRADFIELD | CONTEMPORARY |
| **PROJECT INFRASTRUTURE COSTS** | | | |
| Capital cost ($ million) | 382 | 12,200 | 21,000 |
| **% Capital cost on diversion** | 0% | 90% | 95% |
| Net operating cost ($ million/y) | 2.25 | 157 | 200 |
| **SCHEME PERFORMANCE - MODERATE RISKS** | | | |
| **New gross revenue from agriculture ($ million/y)** | 700 | 2,600 | 2,800 |
| **New gross revenue: capital cost (ratio)** | 1.83 | 0.21 | 0.13 |
| **Cost of supplying water ($/ML)** | 1,940 | 1,350 | 3,220 |
| **Benefit cost ratio** | 0.19 | 0.08 | 0.08 |

# Financial Performance (Bradfield variants)

**Table 14-19 Comparison of costs and benefits (upper bound and after moderate risks) among four water development options**

The new gross revenue from agriculture provides an indicator of the potential regional benefit and is also given relative to the capital cost of the new infrastructure. The benefit cost ratio indicates the proportion of the schemes costs irrigators would be able to cover.

| PARAMETER | UPPER HERBERT CATCHMENT | DESERT UPLANDS | FLINDERS DIVERSION | NORTHERN MDB DIVERSION |
|---|---|---|---|---|
| **PROJECT INFRASTRUTURE COSTS** | | | | |
| Capital cost ($ million) | 382 | 4,760 | 12,200 | 21,000 |
| **% Capital cost on diversion** | 0% | 75% | 90% | 95% |
| Net operating cost ($ million/y) | 2.25 | 32.4 | 157 | 200 |
| **MODERATE RISKS** | | | | |
| **New gross revenue from agriculture ($ million/y)** | 700 | 2,100 | 2,600 | 2,800 |
| **New gross revenue: capital cost** | 1.83 | 0.44 | 0.21 | 0.13 |
| **Cost of supplying water ($/ML)** | 1,940 | 11,750 | 1,350 | 3,220 |
| **Benefit cost ratio** | 0.19 | 0.04 | 0.08 | 0.01 |
| **UPPER BOUND** | | | | |
| **New gross revenue from agriculture ($ million/y)** | 900 | 2,800 | 3,400 | 3,700 |
| **New gross revenue: capital cost** | 2.36 | 0.59 | 0.28 | 0.18 |
| **Cost of supplying water ($/ML)** | 930 | 3,560 | 970 | 2,310 |
| **Benefit cost ratio** | 2.72 | 0.46 | 0.43 | 0.25 |

# Risks and Sensitives (vs 'Upper bound' assumptions)

- Discount rate: IRR needs to be greater than target discount rate
- 25% lower crop price (or yield): cost covered reduces to 3%
- Modest combined risks: -1.8% IRR; 8% $ covered; +40% water cost (vs 'Upper bound' case : 2% IRR; 25% $ covered; $2300/ML)

- 'Over-Optimism' wastes $ & time pursuing non-viable options

# Risk Analysis

Modest combined risks = (+20% backbone $, -15% farm revenue, 90% water supply)

| NMDB | | | |
|---|---|---|---|
| Risk / Sensitivity | IRR (%) | Proportion of costs irrigators can cover (%) | Cost of supplied water ($/ML) |
| Optimistic assumptions - base (7% discount rate) | 2.0 | 25 | 2,310 |
| Optimistic: 3% discount rate (off-farm investors) | 2.0 | 73 | 940 |
| Optimistic: 5% discount rate (off-farm investors) | 2.0 | 41 | 1,550 |
| Optimistic: 10% discount rate (off-farm investors) | 2.0 | 14 | 3,760 |
| Optimistic: 10% discount rate (farm investors) | 1.5 | 21 | 2,310 |
| Double backbone infrastructure cost | 0.6 | 13 | 4,430 |
| Double backbone construction time | 1.8 | 18 | 3,290 |
| Farms gradually established (10 y and 90 y) | 1.3 | 19 | 2,560 |
| 5-year delay to establish first farms (approvals) | 1.9 | 19 | 3,140 |
| Half suitable land (100% reliability) | 0.1 | 13 | 4,450 |
| -50% water supply volume (10 pctl climate change) | 0.0 | 13 | 4,620 |
| -10% water supply volume (median climate change) | 1.7 | 23 | 2,570 |
| +30% water supply volume (90 pctl climate change) | 2.8 | 33 | 1,780 |
| Initial farm underperformance (learning) | 1.5 | 21 | 2,310 |
| 25% lower crop gross revenue (yield and/or price) | n/a | 3 | 2,310 |
| New technology (-20% crop cost 10 years after start | 2.8 | 31 | 2,310 |
| Early setback/biosecurity (no production for 5 years) | 1.3 | 20 | 2,310 |
| Modest combined risks (7% discount rate) | -1.8 | 8 | 3,220 |
| Modest combined risks (5% off-farm discount rate) | -1.8 | 12 | 2,160 |
| Modest combined risks (3% off-farm discount rate) | -1.8 | 21 | 1,310 |
| Modest combined risks (10% farm discount rate) | n/a | 6 | 3,220 |