Progress on economic investment in the Basin Plan

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Murray Darling Basin Plan

- **3d(i) to ensure the return to environmentally sustainable levels of extraction for water resources that are overallocated or overused";**
- **3d(ii) "to protect, restore and provide for the ecological values and ecosystem services of theMDB."**
- **With regard to social, and economic development impacts**

- **Allocated AUD10 billion over 10 years to support:**
- Water infrastructure subsidies (AUD5.8 billion), Sustainable Rural Water Use Infrastructure Program (SRWUIP).
- Water entitlement purchases (AUD3.1 billion), Restoring the Balance (RTB)
- **later increased to AUD12.9 billion**

Murray Darling Basin Plan

- Original recommendation by scientist 3,856 GL (-38% smdb diversions) environmental re-allocation
- Guide to the proposed Basin Plan recommended 3,000–4,000GL diversion reduction (MDBA 2010).
- Some scientists (Wentworth Group 2010) stated Draft Plan for water reallocation was inadequate,
- Some irrigators and their communities were vehemently opposed

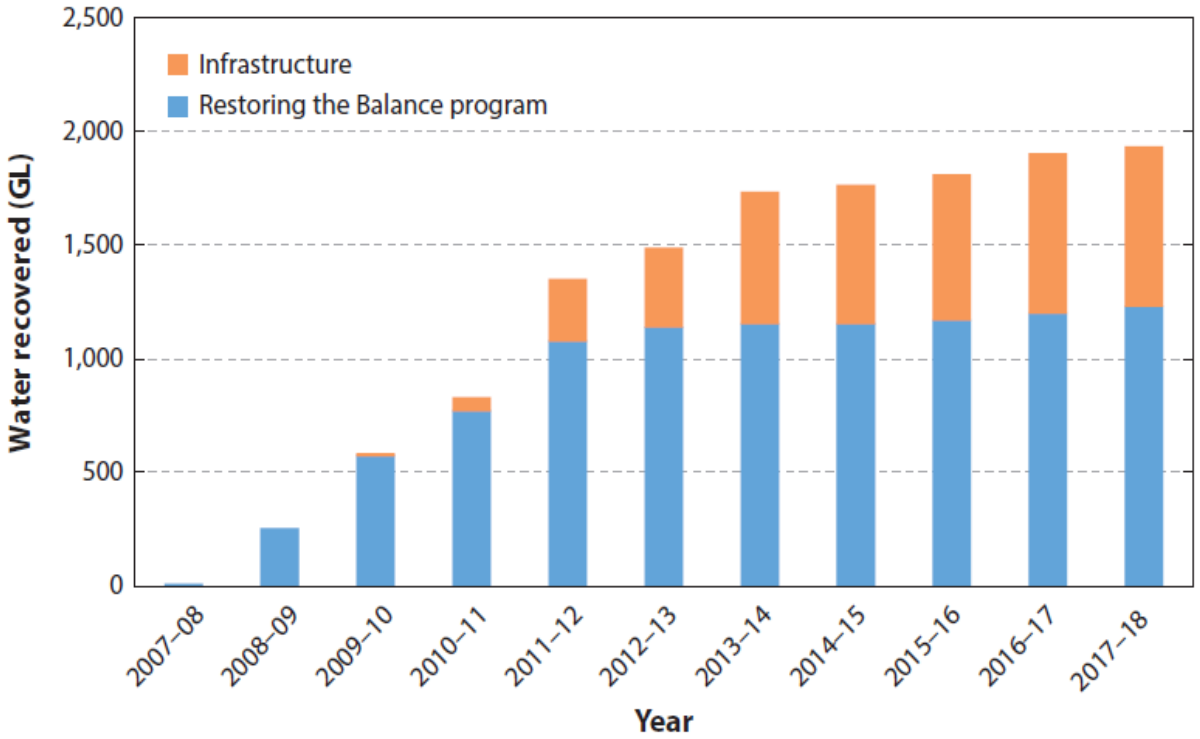
Murray Darling Basin Plan

Response to debate about environment economy trade-off:

- **2012 reduce diversion reduction from 3250 to 2750 GL**
- **2014 Additional AUD 1.77 B for 450 GL/year of additional water through efficiency and infrastructure (3200 GL)**
- **2015 limited the purchase of water entitlements to 1,500 GL**
- **2017 MDBA proposes to reduce the water that would otherwise have been acquired for environment by 605 GL/year (2145 GL?)**

MDB Plan spending and outcomes to date

- **1,931 GL LTAAY at Dec. 2017 (77% of 2750 GL)**
- **64% through water entitlement buyback ($2.5B spent to date)**
- **36% (i.e., 700 GL) through infrastructure grants and subsidies ($3.5B spent to date)**



What's working (from an economic perspective) – water entitlement buyback

- **Entitlement buyback cost less than water from infrastructure**
- **$2k/ML versus $5k/ML (possible much more – to follow) for purchases to date**
- **Is fair to irrigators – they are fully compensated**

What's working (from an economic perspective) – water entitlement buyback

Less water doesn't have much adverse farm revenue impact

Small % loss of revenue compared to %ΔΔ available water

- **Why? – water trade avoids losses for highest value crop, input substitutions (e.g. dairies buy in grain instead of irrigate) – source: Kirby et al., (2014)**

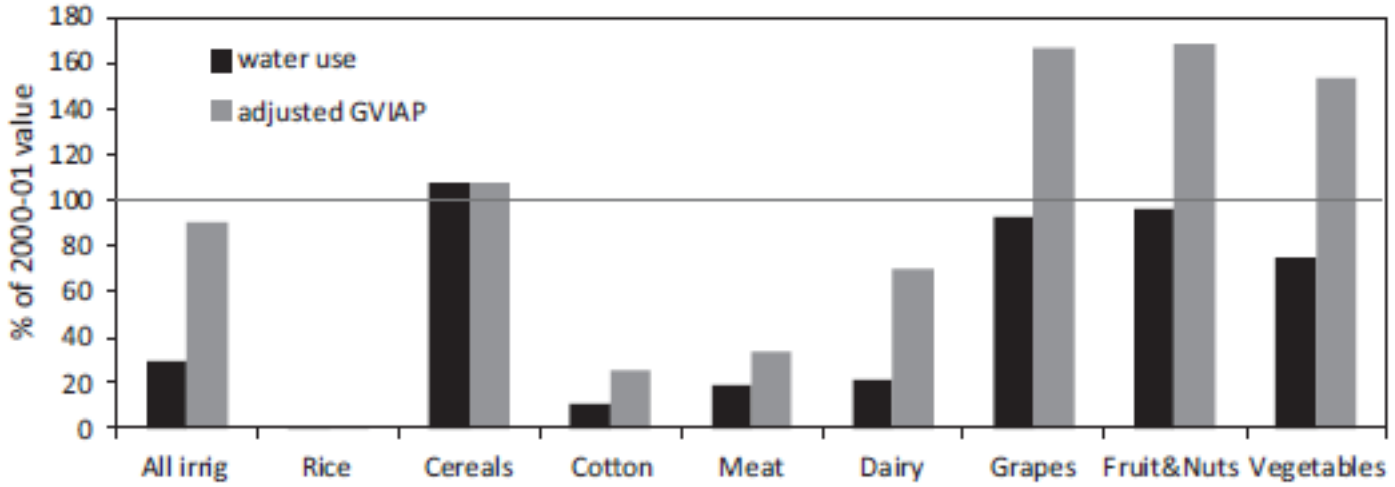


Fig. 4. Water use and adjusted GVIAP in 2007–2008, expressed as a percentage of the 2000–2001 value, for irrigation overall and several major commodities. (Note the gross value of fruit and nuts and vegetables are the nominal values).

What's working (from an economic perspective) – water entitlement buyback

- Whilst buyback means less irrigation revenue spent in MDB
- Many farmers who sell water stay in farming and reinvest compensation in farms
- Many farmers production does not change – because of surplus/buffer water; groundwater substitution; allocation trade; and other adaptation measures substituting for water use
- Lots of the $2.5B compensation spent locally (Wheeler and Cheesman 2013)
- Compensation spending may even offset irrigation revenue losses, buyback maybe net gain to MDB (Banerjee, 2015)

What isn't working – efficiency investment

SRWUIP

How its implemented either:

- **Wiers, control structures are installed to create more inundation with less flow – I won't comment on this, or**
- **Irrigation or conveyance infrastructure is upgraded to reduce losses;**
- **half of reduced loss becomes environmental entitlement, half stays with farmer**

Why it's not working

- **The MBDA claimed water volumes aren't actually all returned to environment, net flows to environment likely less than claimed**
- **Cost for environmental outcome is much higher**

why efficiency investment isn't returning claimed water to environment illustrated

"Extreme" Example "Save" 40GL line ditch + irrigation efficiency, split savings 20 irrigation, 20 environment, lose 30 GL net flow to drain fed wetland

before

40GL
Crop water use

100GL divert

20GL
Return flow

60GL
ditch leek

Net:
80GL
To Environ.

after

80GL divert

40+20=60GL
Crop water use

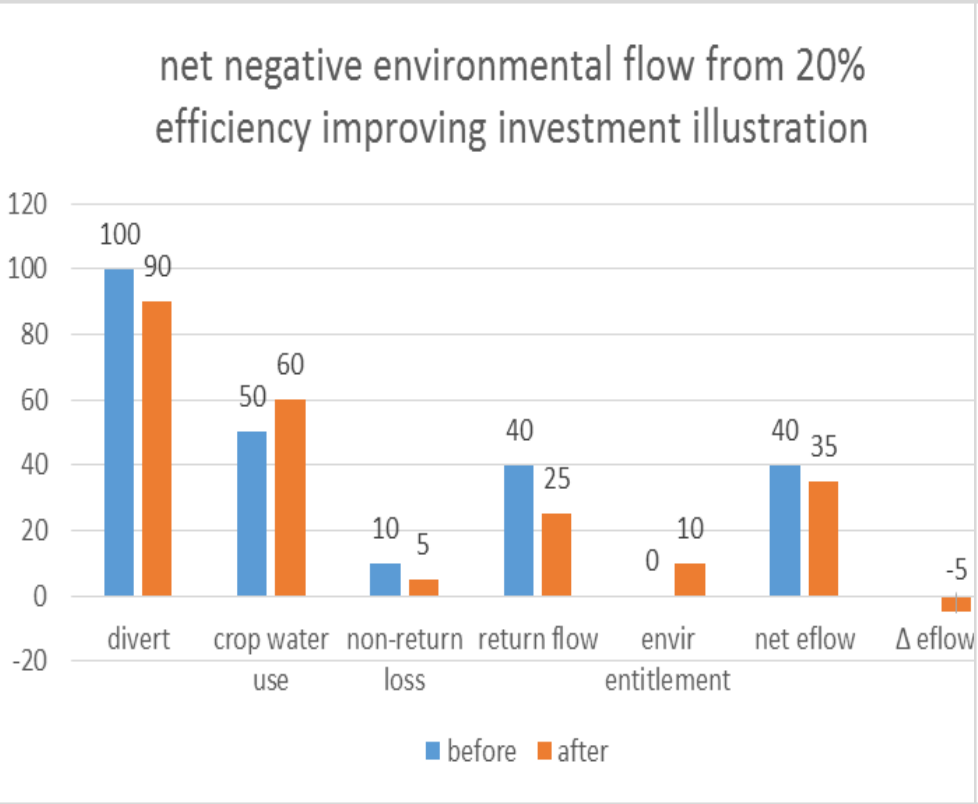
20GL
Environmen
flow

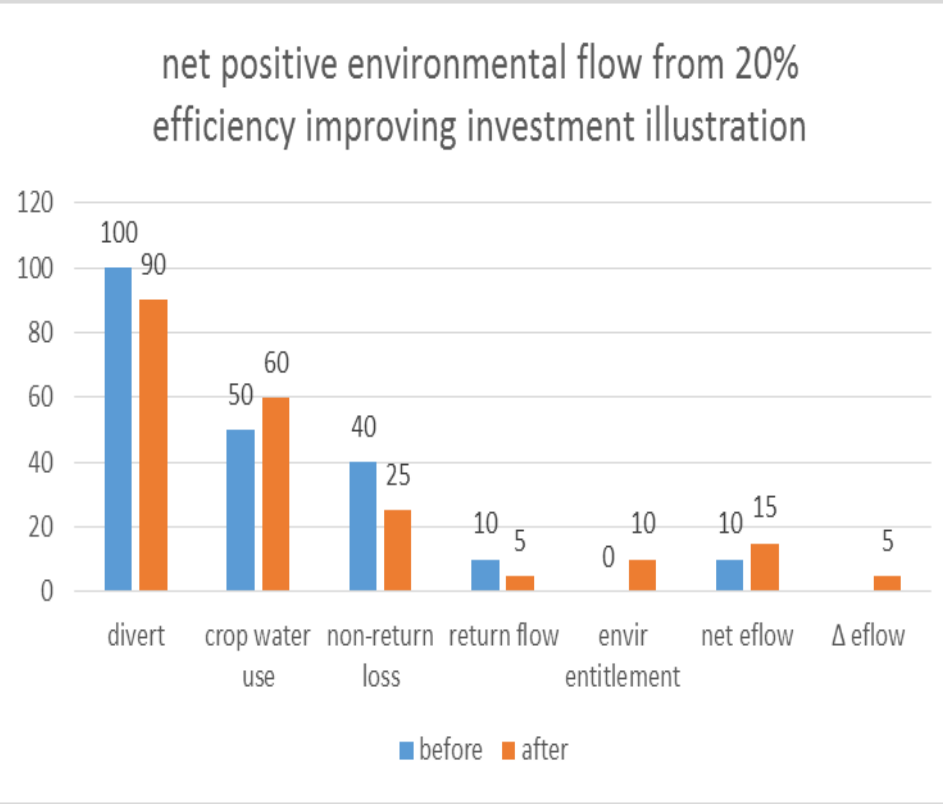
10GL
Return flow

20GL
ditch leek

Net:
50GL
To Environ.

Actual net environmental flow efficiency investment is unknown, should be audited





Actual net environmental flow from efficiency investment is unknown, should be audited

Actual net flow to environment depends on:

- **Efficiency before and after – less environmental net flow from investment in less efficient systems**
- **Whether losses would have returned to surface or groundwater – reducing evaporation or drainage that doesn't return creates net e-flow**

Efficiency investment is less cost effective than buyback

Table 2 Australian government yearly actual administrated expenditure and water recovery listed by program, to September 30, 2017, expressed in long-term average annual yield

Periodw	RTB (AUD million)	Infrastructure (AUD million)	RTB (GL)	Infrastructure (GL)	RTB AUD/ ML	Infrastructure AUD/ML
2007–08	33.1	86.0	14	0	2,299	NA
2008–09	371.7	55.8	243	0	1,533	NA
2009–10	780.2	189.1	311	1	2,511	233,457
2010–11	357.7	221.2	201	66	1,776	3,327
2011–12	540.9	528.6	311	208	1,740	2,547
2012–13	112.9	520.5	56	78	2,012	6,707
2013–14	55.9	492.4	21	233	2,607	2,116
2014–15	60.8	557.1	5	29	12,383	19,344
2015–16	40.0	262.6	9	28	4,689	9,416
2016–17	23.7	522.5	34	58	700	9,012
2017–18 (up to 09/30/17)	116.9	42.8	26	0	4,453	NA
Total	**2,494**	**3,479**	**1,231**	**699.9**	**2,026**	**4,970**

Economic Implications of not accounting for return flow

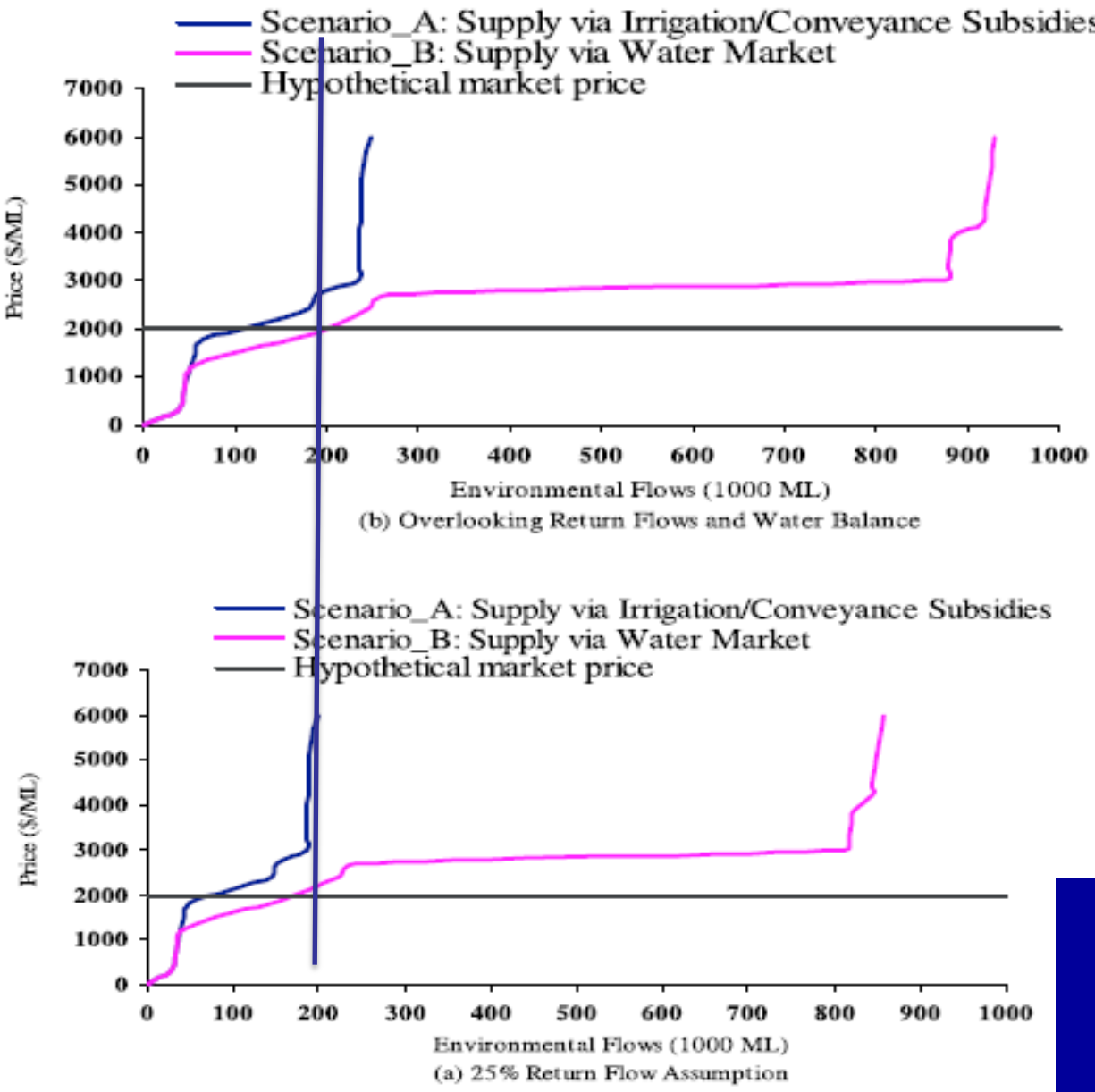
Efficiency investment

To date already $5k/ML,

Could actually have cost double ($10k/ML)

Compared to buyback $2k/ML

Illustration from Murrumbidgee e-water Investment analysis (Qureshi et al., 2010)



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Much more benefit for local economies achievable with alternative investments

For local job creation "infrastructure upgrades are inferior to public spending on health, education and other services in the Basin. For each job created from upgrades, the money spent on services could create between three and four jobs in the Basin.**" Wittwer and Dixon (2013)**

Implication: If we spent the next Plan money:

$2B for water buyback and

$2B for health, education and other services in the Basin

Rather than $4B for Infrastructure, we'd get:

- more environmental water benefit, and
- Twice the local jobs

Worth the inefficiency to deliver equity?

Advice our own Commonwealth provides in foreign aid investment is:

- Alternatives investments to irrigation return more regional $$, jobs

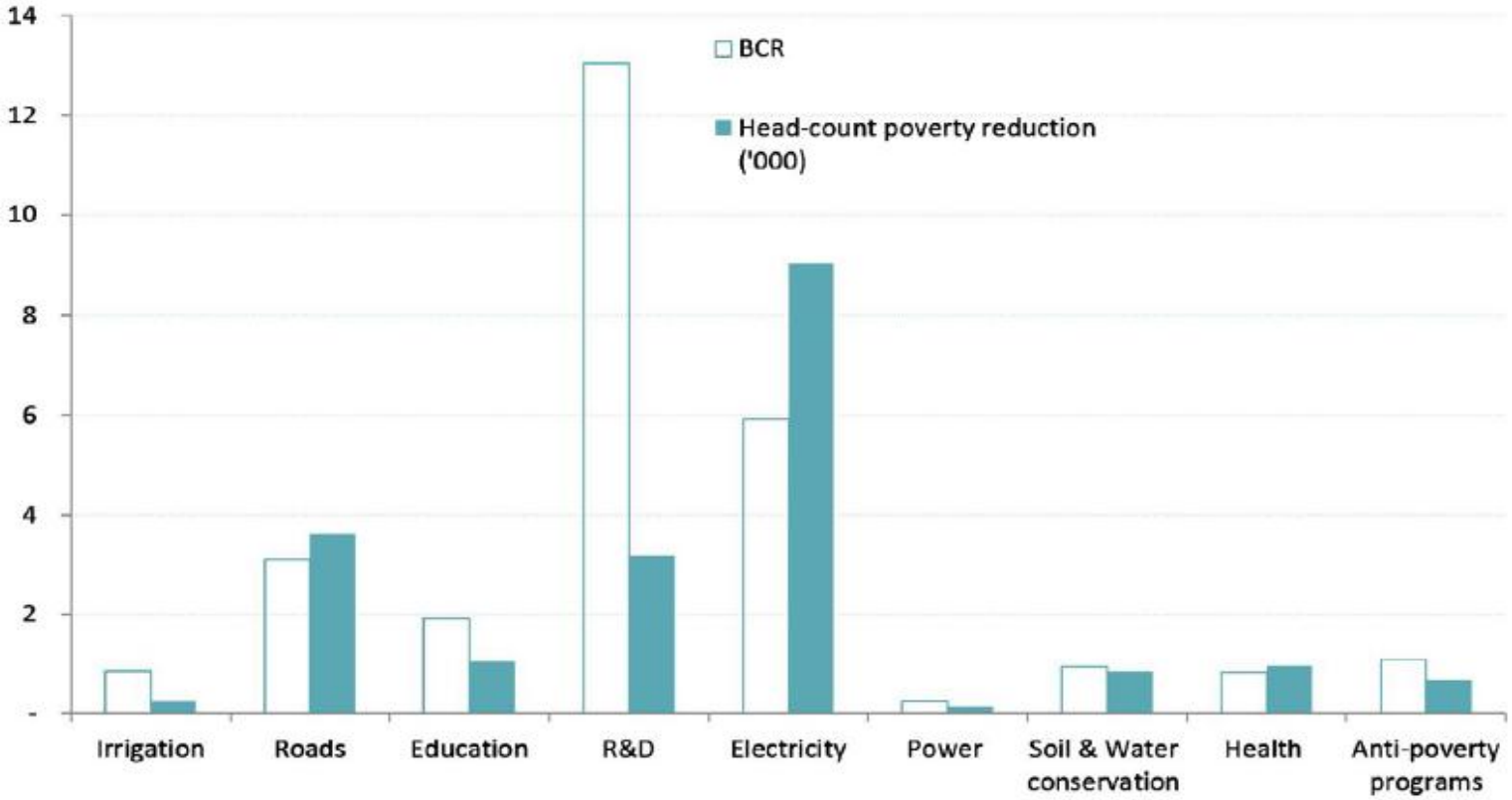

Figure 7. Comparing benefit–cost ratios and poverty head-count reductions from a $1.0 M investment in various sectors.

Source: Kandulu and Connor, 2016

Some additional issues with infrastructure investment

- **Whilst low to zero capital cost for irrigator, leaves a legacy O&M cost**
- **May crowd out and distort private (possibly superior return) private irrigation**
- **May create additional vulnerability for high value crops in drought**

Closing Thought - original MDB Plan rationale: without more flow, cost of next drought could be

Table 2
Mitigation, replacement and adaptation costs, SAMDB and Lower Lakes (1999 to 2011).

Banerjee et al. (2014)

Ecosystem function	Service	Expenditure or estimated loss	Millions of AU$ (2010 base)	Period	Data source
Provisioning	Rural and agricultural water supply	Investment in integrated pipeline system for livestock and domestic uses	120.0	2009	Department of Sustainability, Environment, Water, Population and Communities
	Water supply	Water purchased for critical human needs	88.6	2007–2010	DFW (2011b) and author's calculations
	Food production	Water purchased for perennial plantings	32.4	2001–2010	DFW (2011b) and author's calculations
	Food production	Dairying	50.7	2002–2007	DEH (2009)
Subtotal			*291.7*		
Regulating	Water regulation	Repairs to bridges, ferry landings, pipelines and emergency levee repairs	2.4	2006–2010	DFW (2010a)
	Soil retention	Riverbank collapse including property damage	12.8	2009–2011	DFW (2010b)
	Water regulation	Lost expenditure from irrigation upgrades and laser levelling	82.0	2005–2009	DFW (2010a) and Kingsford et al. (2011)
	Biological/water/waste	Salinity damage cost	82.9	1999–2011	Author's own calculations based on GHD (1999) and MDBA (2010b)
Subtotal			*180.1*		
Habitat	Biological regulation	Dredging the mouth of the Murray River	40.0	2002–2010	DFW (2011a)
	Biological regulation	Acid sulphate soil and revegetation works	20.0	2008–2010	Department for Environment and Heritage (2010), Kingsford et al. (2011)
	Biological regulation	Water pumping (Lake Albert to Alexandrina)	14.0	2009–2010	Kingsford et al. (2011)
	Biological regulation	Weirs to prevent acidification	40.0	2007–2009	Kingsford et al. (2011)
	Biological regulation	Environmental water reserve purchase	49.1	2009	DFW (2011b)
Subtotal			*163.1*		
Cultural	Recreation	Tourism	174.8	1999–2011	Sobels (2011) and DRET (2010)
Subtotal			*174.8*		
Total			809.7		

Recommendations (MDB Declaration)

1. **Stop spending on Infrastructure**
   - **We aren't sure how much water it's really returning to environment (possibly little to none)**
   - **It's not cost effective - costs a lot more than buybacks**
   - **If we want to compensate for lost jobs, there are much better return investments**

2. **Audit the investments to date**
   - **assess how much (net) water they are really returning to environment**
   - **assess the full cost per unit (net) environmental water**
   - **assess the full costs and benefits (many have been ignored in recent MDBA commissioned studies)**

3. **Establish** an independent and expert, scientific advisory body to monitor, measure and to public guide all governments to ensure the full achievement of key objects of the Water Act (2007)

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citations

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