

THE CONVERSATION



Damming northern Australia: we need to learn hard lessons from the south

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Northern rivers could increase Australia's irrigated land by 50%. But we need to think about the environmental impacts. Robin Hutton/Flickr, CC BY-NC-ND

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The push for development in northern Australia is gathering momentum, with the government recently releasing a draft of its Northern Australia Infrastructure Facility to help finance large projects.

The development of northern Australia will crucially depend on harnessing the north's abundant available water resources. Over the next five years the government will develop plans to manage these water resources.

However we have to get these plans right from the start to ensure the north's waters are developed sustainably. To do so, we can start by looking south.

Full steam ahead

In June 2015, the federal government released its long-awaited northern Australia White Paper. Among commitments to agriculture in northern Australia, the white paper targets more efficient use of water resources across the north.

Over 60% of Australia's total surface water runoff occurs north of the Tropic of Capricorn. A 2014 CSIRO review indicates that this could potentially support up to 1.4 million hectares of irrigated land, increasing Australia's irrigated area by 50%.

Reaching this potential, however, would come at the financial and environmental cost of

around 90 new dams and many weirs and other infrastructure.

The white paper promises sustainable development, but the problem is the timeframe. The paper commits, over the next two years, to assessment of the water resources in the initial priority catchments, and within five years, to the development of water resource plans. These plans will include a cap on water use, and a water market to trade water allocations.

But the paper is silent on what we know about northern ecosystems and how water infrastructure might affect them, and makes no allowance for climate change.

Learning from the south

There is much to be learned from the current implementation of the Murray-Darling Basin Plan, which will result in upgrades to existing water plans in Queensland, New South Wales, South Australia, Victoria and the Australian Capital Territory.

The past 20 years have seen almost continual reform in Murray-Darling, demonstrating how hard it is to achieve sustainability when water resources are over-used.

Australia is currently spending over A\$13 billion to restore the Murray-Darling Basin catchments to something approaching the minimum needed to maintain the ecological health of the system.

Avoiding this will avoid a major overhaul in the future and provide investor confidence.

Managing this risk to wildlife

Northern Australia is home to 301 nationally threatened species, as well as the iconic Great Barrier Reef, already under threat.

In 2004 one of us (Barry) looked at environmental risks of new irrigation schemes then proposed for the north.

He identified four factors for sustainable irrigation, including urgently better understanding the north's freshwater ecosystems, and developing a risk-based approach to making decisions on infrastructure.

Over the past decade we've considerably improved our knowledge of northern ecosystems, for example the Ord river system in Western Australia, Kakadu and the Daly river in Northern Territory, and the Mitchell, Burdekin and other coastal rivers and wetlands in Queensland. Although we know more, this knowledge needs to be synthesised before it can be used for planning.

We still don't know exactly how irrigation projects might affect these ecosystems. To deal with this we suggest adopting an ecological risk-based approach to planning.

It is trite, but true, that one needs to know the risks before one can set about managing them. Ecological risk assessments assist in identifying the risks, assessing their relative importance, and identifying possible ways to mitigate the risks. This sort of process is a basic component of the requirements for plans being developed as part of the Murray-

Darling Basin Plan.

Dealing with dams

The White Paper clearly sees new on-stream dams as part of increasing water use in northern Australia.

The planning process will set a cap on how much water can be used. But current evidence regarding the impact of dams on river flows shows that this will not be enough.

From the start, plans need to include environmental flow: sufficient water at the appropriate frequency and duration to support ecosystems. As well as a cap, this might mean creating legal rights for water held in the storage for the environment.

One of the intractable problems caused by dams in southern Australia has been **seasonal flow inversion**. River flows are higher in summer and lower in winter than the ecosystem needs.

In the north, flow inversion may occur with higher flows occurring in the dry season rather than in summer when the bulk of the rainfall occurs.

To avoid this, new water infrastructure in the north could be built off stream. This system is currently used in the Queensland section of the Murray-Darling Basin. But, unless planned for at the outset, these alternatives are extremely difficult to retrofit to an existing system.

Figuring out the sustainable level of water extraction for an aquatic ecosystem depends on considerable technical work (hydrological, ecological and modelling). This technical work needs to be guided by a clear set of objectives for each development, including the value the community (including Indigenous Australians) places on the local ecosystems.

The water market

The Murray-Darling Basin demonstrates that water markets are a highly efficient means for ensuring that the available water resource is effectively used. Additionally, the water market is also an efficient means for **recovering water** for the environment (although the overall process remains costly), and can also increase efficiency of **environmental water management**.

But to make the most of the opportunities created by water markets, the environment needs the institutional capacity to enter the market. In the south, the **Commonwealth Environmental Water Holder** owns and manages large volumes of water across the Murray-Darling Basin. At the state level, the **Victorian Environmental Water Holder** has also proved effective at streamlining decision-making and using the market to manage its holdings.


If environmental water in the north is to be managed efficiently in the context of a future water market, establishing a **legal entity** with the capacity to hold water, enter contracts and make decisions will be an essential piece of the puzzle.

The White Paper is a bold vision for developing northern Australia. Australia has learned many lessons about sustainable water allocation the hard way, at the cost of a great deal of

time, money and ecosystem degradation.

We need to apply these lessons from the south to the north. Failing to adequately invest in new water resource development plans in northern Australia is effectively planning to fail. And we should know better.

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