NORTHERN AUSTRALIA WATER RESOURCE ASSESSMENT
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Key findings for the Fitzroy catchment

CSIRO has completed, for the Australian Government, an investigation of opportunities for water resource development in the Fitzroy, Darwin and Mitchell catchments of northern Australia. Each study area offers the possibility of irrigation developments exceeding the scale of the lower Burdekin in north Queensland.

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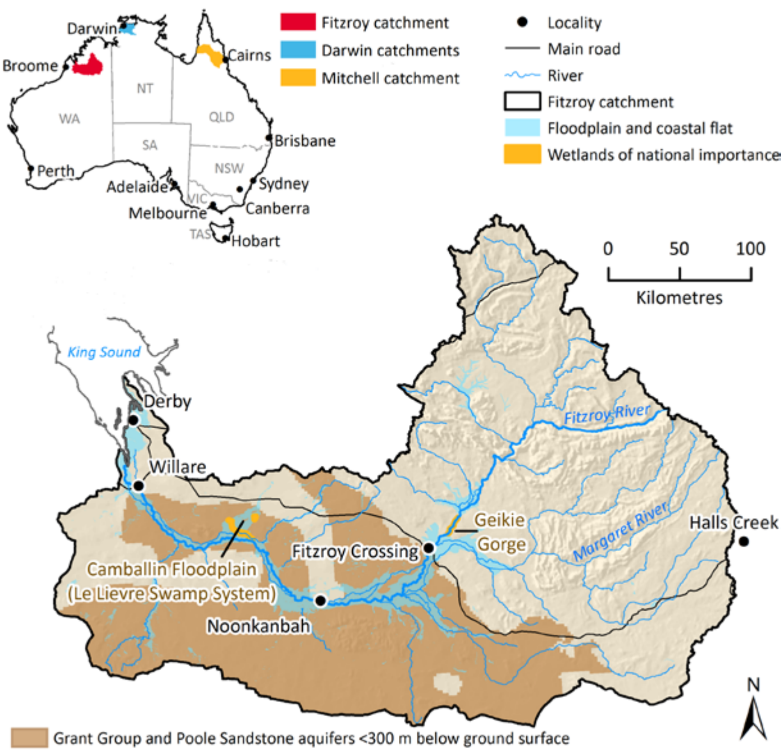
The Northern Australia Water Resource Assessment (NAWRA) has, for each study area:

- identified and evaluated surface and ground water capture and storage options
- provided detailed information on land suitability
- identified and tested the commercial viability of agriculture and aquaculture
- assessed potential environmental, social and economic impacts and risks.

The Fitzroy catchment

The Fitzroy catchment has the potential to support 160,000 ha of a single irrigated dry-season crop in 85% of years. Irrigation on this scale would be based on water stored in on-farm dams, and would require pumping or diverting up to 1700 GL, and 425 ringtanks (on average 4 GL each) to store the water. There are also 170 GL available per year from groundwater that could support up to 30,000 ha of hay production in all years. Groundwater is the cheapest source of water and unlike water harvesting developments, can be sited on soils not susceptible to flooding. The precise area under irrigation will, in any year, vary depending on factors such as irrigation efficiency, water availability, crop choice and risk appetite. Irrigation of this type could be widely distributed across the catchment or concentrated into a smaller number of irrigation areas. There are 55,000 ha of coastal land that are suitable for lined aquaculture ponds.



- The Fitzroy, Darwin and Mitchell catchments differ significantly in their physical and social characteristics and, as a consequence, the extent to, and the methods by which, agricultural development might occur.
- In the Fitzroy catchment, water harvesting (water pumped into farm dams) could support 160,000 ha of irrigation in 85% of years. Independent of surface water, groundwater could support up to 30,000 ha of hay production.
- In the Darwin catchment, a combination of major dams, farm-scale offstream storages and groundwater could support up to 90,000 ha of dry-season horticulture and mango trees.
- In the Mitchell catchment, large instream dams could support 140,000 ha of year-round irrigation. Alternatively, water harvesting could enable up to 200,000 ha of irrigation with one dry-season crop per year.
- If irrigation opportunities were fully developed, they would occupy less than 3% of the Assessment area.
- Indigenous people have continuously occupied and managed the Fitzroy catchment for tens of thousands of years and retain significant and growing rights and interests in land and water resources, including crucial roles in water and development planning and as co-investors in future development.

The Fitzroy catchment

Establishing irrigated cropping is challenging, with high input costs and high capital requirements for new (greenfield) developments. Gross margins between different crop options are highly variable with industrial crops (sugarcane and cotton) and forage hay giving the highest returns. For industrial crops to be profitable, local processing is required, and the scale of development and supply commitment needs to be sufficient to justify the investment in processing facilities. Horticultural crops such as bananas, melons and mangoes are more profitable but the locational advantage of supplying to markets earlier than other regions is critical to viability. Farming systems that have more than one crop a year or are integrated and supplement the dominant beef production systems in the Fitzroy catchment are most likely to succeed initially. Pond-based black tiger prawns or barramundi offer potentially high returns in saltwater near the coastal margin of the catchment.

Large developments for agriculture are complex and costly and it is prudent to stage development to limit risk of early failure and allow for small-scale testing on new farms. Under the development scenarios examined, the aggregated farm revenue from broadacre cropping is unlikely to cover the cost of infrastructure, so value-adding opportunities through processing will greatly assist in improving commercial viability.

Impacts on ecological function would not be confined to the direct development footprint and would warrant further attention, especially immediately downstream, in drier years and for particular habitats such as wetlands, riparian areas, mangroves and coastal salt flats. Understanding how diverse stakeholder, investor and developer perspectives interact will be crucial in building and maintaining an ongoing social license to operate for future water and agricultural developments

Key biophysical characteristics related to irrigation development in the Assessment Area

ITEM	FITZROY	DARWIN	MITCHELL
Climate	Hot semi-arid	Hot humid	Hot semi-arid
Area	94,000 km^2	30,000 km^2	72,000 km^2
Mean annual rainfall	552 mm	1423 mm	996 mm
Year to year rainfall variability	Very High	Moderate	High
Mean annual potential evaporation	1990 mm	1910 mm	1860 mm
Mean annual runoff	79 mm	416 mm	246 mm
Mean annual discharge	6600 GL	11,200 GL	15,570 GL
Median annual discharge	4900 GL	10,200 GL	13,000 GL
Area of soil moderately suitable for irrigated agriculture	5.4 million ha	1 million ha	3 million ha
Most economical source of water	Groundwater	Groundwater and gully dams	Groundwater and gully dams
Potential scale of new groundwater development	170 GL	35 GL	15 GL
Water source enabling largest scale of development	Water harvesting	Major instream dams	Major instream dams
How much water could physically be released for consumptive use	1170 GL	436 GL	2800 GL
Potential area of irrigation	160,000 ha single dry-season crop	60,000 ha single dry-season crop	140,000 ha year-round
Potential area of irrigation as a percentage of the study area	1.7%	2%	1.9%
Reduction in discharge at ocean	25% of mean flow 35% of median flow	<5% of mean flow <5% of median flow	22% mean flow 24% median flow

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