27 Daly River Catchment: *regional perspective*

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The Daly River supporting (left to right) peanuts, wetlands and melons
Photos: CSIRO

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1. KEY POINTS

1. The Daly region's soils, water availability and proximity to supporting infrastructure in Katherine and Darwin make it the most likely site for further development of the Northern Territory's primary (agricultural) industries. This is likely to be based on intensification of existing enterprises and could contribute $100m to the Territory's Gross Value of Product.
2. Water availability is likely to be the factor limiting expansion of existing and new industries. Water Allocation Plans are in place or under development to ensure that the region's water resource makes provision for Indigenous use, the environment, and current and future consumptive use.
3. The people of the Daly strongly support the protection of the Catchment's conservation values. The maintenance of the region's high natural and cultural values has been identified as critical to its future, for ecological, economic, social and cultural reasons. Clearing more or less ceased in 2003, via a moratorium, and licences are required to extract groundwater other than for stock and domestic use.

Promoting and capturing the benefits of sustainable development will require:

4. Management of the Catchment as a whole unit, in recognition of the interdependencies within and between Indigenous interests, surface and ground waters, biodiversity and social systems
5. An adaptive management approach to resource management and use, involving joint responsibility between government, managers of particular resources and the community. It will require a process of determining goals and targets for achievement, recording activities and their outcomes, reporting the impacts of activities, reviewing the consequences of these impacts and responding to them in an appropriate way
6. Informed community engagement, currently achieved through DRMAC, and a sense of responsibility for maintaining the health of the Catchment
7. Provision by Government of policy and legislation regulatory frameworks to guide vegetation clearing, water allocation plans, regional development and land and water rights; and compliance with the National Water Initiative
8. That water for Indigenous cultural use be provided a distinct allocation, to enable the use of land and soil resources required to support Indigenous wellbeing and livelihoods. Indigenous people can see avenues for creating income and return on their natural resource assets. This requires the resolution of significant issues, both Indigenous and commercial, as well as some outstanding legal issues.

2. INTRODUCTION

The Daly River Catchment is located approximately 200 km to the south of Darwin with an area of approximately 52,500 square kilometres. Major rivers include the Katherine, Dry, Flora, Fergusson, Douglas, Fish and Daly (1).

The Daly Catchment has a population of population approximately 10,000 people, 27% of whom are Indigenous (1). There are at least nine Indigenous language groups whose land and water are within the Daly River Catchment. The people live in larger groups in Katherine, Nauiyu Namiyu and Wooliana and at a number of other locations in smaller family groups. The uses and management of

their places are predominantly for livelihood and cultural purposes. The land and water are used for harvesting food. Sites and places are maintained and used for ceremony and cultural reasons. There is economic use of some places, particularly for tourism in the Nitmiluk National Park (Katherine Gorge) and agreements for visitors to certain sites, such as the Douglas Hot Springs.

Tourism and recreation are important activities in the Daly. The Catchment has a number of iconic and well known places which attract significant numbers of tourists and visitors. Chief among these attractions are Nitmiluk National Park (and Katherine Gorge), the Douglas-Daly area and the lower Daly River. The attraction is based on scenic beauty, bush walking, wildlife plants, animals such as crocodiles, boating and fishing. The Daly River is one of the most popular fishing areas in northern Australia.

Mining has a significant presence in the Catchment. Historically, goldmining was an extensive and lucrative enterprise in the early days of settlement. There are a number of mines in the Catchment, the largest being the Mt Todd goldmine. They have cycled through periods of intense activity and inactivity, depending on the price of the mineral and difficulties associated with mining.

The Daly River Catchment is also home to major Australian Defence Forces activities. The Tindal airbase is located near Katherine and the Delamere bombing range is a major centre for Defence training.

The Catchment's people are atypical of much of northern Australia. More than 80% of the households own a motor vehicle and more than 60% have internet connection; high percentages for northern Australia. About 80% of people speak English only at home, compared to a regional average of about 60%. The percentage of people purchasing or owning homes is also higher than the northern average (1).

The largest employment sector (about 35%) is government administration or services. Although percentages of people employed in construction and retail are small, they are nonetheless higher than regional averages (1).

The region is relatively well surveyed and thus hosts a number of registered heritage sites. Around 60% of the land is under agricultural production, while about 30% is classified as "under traditional Indigenous use" (1).

Figure 1. Location of the Daly Catchment (Source, NT Government: www.nt.gov.au/nreta/water/drmac/images/DalyRiverCatchmentMap.jpg)

3. A HISTORY OF AGRICULTURAL DEVELOPMENT IN THE DALY RIVER CATCHMENT

The Daly River Catchment has long been an area of productive livelihoods and rewarding lifestyles. The catchment has supported the health, food, family, culture and enterprises of at least eight Indigenous language groups for thousands of years. It now also supports productive families and social communities and businesses involved in pastoral, tourism, agricultural, horticultural, recreational, mining, defence and cultural endeavours. And through all this, the river has never stopped running in the memory of people who have lived there. We have an important and valuable resource with a healthy legacy to maintain.

Historically, water in the Daly River Catchment has been used for cultural, recreation, stock and domestic purposes. Utilisation of the water resources for agricultural and industrial purposes has occurred only relatively recently. A timeline of agricultural and related developments includes:

- 1879-1882 - sugar cane: first agricultural commodity attempted in NT – 40,500ha cleared along the Daly River, Adelaide River and Cox Peninsula
- 1959/60 – the Forster Report – prospects of agriculture in NT – setting up pilot farms in the Daly River region with a strong emphasis on agricultural activities upon Tippera Soils
- Late 1960s – major clearing commenced within the Daly River region
- 1967 – first large scale clearing project – Tipperary Station by the Tipperary Land Corporation – clear 79,000ha over 5 years for sorghum production – project failed due to poor management and seasonal influences
- 20,000ha cleared for agricultural production on Scott Creek
- Early 1970s – 48,600ha cleared on Willeroo Station, with 16,000ha being farmed
- 1975-1995 – most of the clearing activities occurred in the Daly River region
- 1981/82 – Agricultural Development and Marketing Authority (ADMA) formed to assist private cropping developments – lead to further clearing upon Tipperary Station

- 1988/89 – development of the Douglas Daly Research Farms
- Early 2000s – clearing for pastoral production with improved pastures – Stray Creek Blocks
- December 2002 – Interim Development Control Order (IDCO)12 commenced under the Planning Act
- November 2003 – moratorium declared on clearing in the Daly Region
- December 2007 – Daly moratorium extended
- March 2008 – Daly moratorium formalised under IDCO 17
- Clearing statistics from satellite imagery show that the proportion of cleared land in the catchment has stabilised at a little over 5% of its 5,265,910 ha (Table 1).

Table 1. Land clearing in the Daly Catchment, 2004-2008. (Source, DRMAC.)

Year cleared	Total Area (Ha)	Total Area (km2)	Area %
2004	266341.96	2663.42	5.06
2005	268273.16	2682.73	5.09
2006	272020.22	2720.20	5.17
2007	278817.23	2788.17	5.29
2008	281242.73	2812.43	5.34

Prior to the declaration of the Katherine Water Control District in1992, there was limited regulation of groundwater extraction in the Daly region. This was in line with a relatively low level of extraction for purposes not requiring regulation (i.e. less than 1000ML of total groundwater extraction per year for irrigated agriculture across the Daly Basin). The Katherine Water Control District was updated in 2002 in recognition of increasing groundwater use in the Katherine region. In 2008 the Katherine Water Control District was superseded by the Daly Roper Water Control District as a result of increasing agricultural development across the Basin. This district covers the Daly and Roper River Catchments and any groundwater extraction for purposes other than stock and domestic within the district now requires a licence.

Table 2. The current status of groundwater extraction licences issued in the Daly Basin (Source: DRMAC)

Resource	Region	No. of Licences	Total licensed extraction volume (ML)
Tindall Aquifer	Mataranka	13	3719
Tindall Aquifer	Katherine	73	34503
Tindall Aquifer	Douglas	1	656
Oolloo Aquifer	Daly	15	24851
Jinduckin Aquifer	Daly	18	2401
Daly River	Daly	2	170
Edith River	Daly	3	483
Katherine River	Daly	20	9422.8*
Douglas River	Douglas Daly	1	87.2

** includes Katherine Town Water Supply 4500ML from Donkey Camp Weir*

4. FUTURE AGRICULTURAL DEVELOPMENT PROSPECTS IN THE DALY RIVER CATCHMENT

The Daly Region is the most prospective region for further development of the Territory's primary industries, including the pastoral, cropping, irrigated agriculture and horticulture industries.

This development potential is based on the assessed capability of soils suitable for improved pastures, cropping and irrigated agriculture, together with the areas of high rainfall and water resource potential for irrigation. It is close to Darwin, Katherine and Darwin Port.

Agricultural and pastoral development for the foreseeable future is likely to follow existing patterns and involve:

- More intensive utilisation of pastoral leases through infrastructure improvements, larger areas of improved pasture and better cattle management practices
- More intensive irrigated agriculture and horticulture development in the Douglas Daly and Katherine areas, subject to the availability of water and occurrence of suitable soils
- Subdivision of pastoral leases for smaller mixed farms, subject to the necessary approvals and clearances.

There are many difficulties involved in tropical agriculture. These include land speculation, under-capitalisation, getting too big too quickly, failure to properly consider the wet-dry tropical monsoonal farming environment and market fluctuations. Farming in the tropics requires particular skills. Skilled farmers have been few in number to date. It is critical to achieve sufficient size, in both area of land and the number of knowledgeable farmers, for sustainable industries, and their support industries, to develop and survive. The availability of labour of suitable skills and in sufficient quantity continues to be less than is required for desirable rates of development and management.

Government has sought to address these issues in various ways, in particular by trying to build a concentrated area of farms and farmers.

4.1 Potential development trajectories and impacts on the Daly River catchment

The following trajectories and impacts have been identified by the catchment community and relevant government departments.

There are no specific or statutory plans for development in the Daly Basin by the Northern Territory Government. Several schemes have been supported by government in the past, including the ADMA scheme in the 1980s and the Stray Creek subdivisions in the early 2000s.

A Water Allocation Plan has been declared for the Tindall Aquifer around Katherine. Water Allocation Plans for the Oolloo Aquifer and the Tindall Aquifer around Mataranka are currently being developed to ensure that future development is sustainable. Assessment of water availability as part of these planning processes has shown that while there is room for further development, water availability is likely to be a limiting factor for future expansion of existing and new industries.

Likely patterns of agricultural development are outlined in the previous section [4].

Tourism and recreational resource use has increased over the past few years. It is probable that the number of tourists and recreational resource users will continue to increase. This will place location specific demands on particular areas of the Catchment, including Katherine Gorge and Nitmiluk National Park, the Douglas-Daly River area and the Daly River below the Daly Crossing.

Economic development of land and water is a matter of ongoing interest to Indigenous Traditional Owners and community groups. In addition to cultural and social uses of land and water, Indigenous people can see avenues for creating income and return on their natural resource assets. This involves

the resolution of significant issues, both Indigenous and commercial, as well as some outstanding legal issues.

Timber production has increased significantly in the past few years. This has largely been driven by Investment Management Schemes and tax incentives. The recent financial demise of two of the main companies involved in the Catchment will probably see some changes in this area of primary production. The sustainability of timber enterprises in more difficult economic circumstances will now be tested.

Reservation of areas of conservation significance is important for ecological, economic, social and cultural reasons. Many people and businesses depend on the availability of and access to areas where high conservation values are protected. The people of the Daly have strongly held views supporting the need for the protection of the conservation values of the Catchment.

Mining opportunities exist within the Catchment, some of which are currently being exploited. The extent of mining and its impact on natural resources will be influenced by the price and demand for minerals. This is difficult to predict.

4.2 Benefits accruing to the Daly River Catchment and its people in response to development

The Daly River Community Reference Group Report stated that:

> "Agricultural development in the Daly River Catchment could contribute a further $100 million in Gross Value of Product to the Northern Territory economy, which when multiplied, would stimulate the economy by $250 million and provide an additional 1200 full-time jobs."

Further development of the area will achieve economies of scale in both production and in returns on development of infrastructure and support services.

Agricultural production in the Daly River Catchment is increasingly integrated. For example, mixed farms contribute grazing and hay to allow preparation of cattle for live export as well as extending the supply of livestock for export into the wet season and buffering seasonal effects on animal production. Live export is the largest agricultural industry in the NT and is expanding with new feedlots in Indonesia and development of other markets, such as Vietnam. Further development of improved pastures in the region could make significant contributions to this industry.

Development of primary industry in the area has and will continue to result in population increases and jobs.

Water allocation planning will ensure that water dependent developments are sustainable and provide protection for environmental flows in the Katherine and Daly Rivers.

Local Indigenous people and members of the Daly River Aboriginal Reference Group are exploring further avenues for Indigenous economic development. Sustainable exploitation of land and water resources available through native title, water allocation and other avenues can create significant economies and income streams. The use and management of Katherine Gorge is an example of existing economic development. These developments could create income and jobs without damaging social and cultural values.

Further increases in tourism and recreational use of natural resources are very likely to occur. This will have significant benefits for businesses and communities within the Catchment. It will also require the resolution of a number of resource use issues including management of higher numbers of people, access to resources and recognition of traditional rights. It will also require investment in supporting infrastructure. Development of tourism and recreational use has the potential to significantly improve the livelihoods of people in the Catchment.

4.3 Negative outcomes accruing to the Daly River Catchment and its people in response to development

Any development has the potential for negative and unintended outcomes. In the Daly River Catchment these could include the following.

- Increased pollution and contamination of sites and waterways
- Soil erosion
- Increased trespassing on private or culturally important land and waterways
- Site and amenity damage
- Unsustainable harvesting and depletion of natural resources.

The current water and land planning processes and the participative involvement of the community will significantly reduce the likelihood of undesirable consequences of development.

4.4 Actions, incentives or regulations that will promote positive outcomes

4.4.1 Sustainable development

The Daly River Catchment must be managed as a whole unit because of the interconnection and interdependency of its various parts, places and people. This includes the interaction of Indigenous people with their areas of land and water, the interconnection and interdependency between groundwater and surface water, the relationship of land and vegetation with water recharge and run off, the social relationships among communities and the provision of social and business services, the interdependence of biodiversity within the ecosystems of the region, and the impact of human activity both on-site and off-site and on downstream locations. Sustainability also requires the preservation of places and ecosystems of high conservation value.

4.4.2 Healthy landscapes

The livelihoods and lifestyles of people in the Daly River Catchment are dependent on the soil, plants, animals and water remaining healthy and in healthy relationships with one another. While people with a close involvement with natural resources such as Indigenous people and those involved with agriculture, tourism, pastoralism and recreation have a more direct interest in maintaining healthy landscapes, everyone is impacted when landscapes and their resources are unhealthy.

4.4.3 An adaptive management framework

The government will oversee an adaptive management approach to resource management and use. This will be a joint responsibility between government, managers of particular resources and the community. It will require a process of determining goals and targets for achievement, recording activities and their outcomes, reporting the impacts of activities, reviewing the consequences of these impacts and responding to them in an appropriate way.

4.4.4 Community participation

To enable the whole of catchment approach to be implemented, community participation processes must be inclusive of all sectors in the catchment, and be active, resourced and supported by government. Currently the Daly River Management Advisory Committee (DRMAC) is undertaking this role.

4.4.5 Government leadership

The government will provide guiding policy, legislation and management processes and necessary regulatory frameworks. This will include an approval process for vegetation clearing, water allocation plans and approval processes, land and water rights and regional development policy and funding. Implicit in these policies and practices will be sustainable resource management and use and equitable access to and allocation of resources. Government will provide infrastructure that is of common use and for common good. This will include roads and other transport related facilities, and facilities to protect and sustainably use common access natural resources including rivers and their wildlife. It will also include the provision and management of areas of conservation value.

4.4.6 Indigenous values and development

Indigenous people own and occupy significant areas of land and water in the Daly River Catchment. Land and water are indivisibly related and connected. Environmental flows are essential to the maintenance of landscape health and Indigenous livelihoods. Water related to cultural purposes and uses must be a separate and secure allocation. Indigenous economic development will take time in order to meet necessary social, cultural, capacity and economic requirements. It will involve the utilisation of land and water resources.

4.4.7 Water planning and the National Water Initiative

Water allocation and management will be undertaken in the context of the National Water Initiative while taking into account Northern Territory and Daly River Catchment factors. This will include consideration of conservative rates of use, ensuring annual recharge of aquifers, flexible and variable annual allocations based on estimated and modelled water availability, capacity to respond to climate change and seasonal variability and provision for future resource and economic development.

4.4.8 Community responsibility

Resource users will take an appropriate level of responsibility for the maintenance of the health of those natural resources and landscapes they use and manage. Representative organisations, including those for industry, Indigenous people, communities, recreation and tourism will play an important role in accepting and implementing these responsibilities.

4.4.9 Economic reality

Certain economic principles will apply. The terms of trade for primary industry will continue to decline in the long term, requiring a continual increase in productivity and efficiency and the capability to respond and adapt to varying climatic and price conditions. The Northern Territory has an advantage in this regard as it is in the early stages of resource development with low levels of utilisation and a built-in resilience, supported by current land and water policy, to climatic and economic disruption.

4.4.10 Research and learning

The Daly River Catchment has been a centre of learning and understanding for thousands of years. The Catchment is also a focus for scientific research because of its unique features and importance to the livelihoods and lifestyles of many people. With increasing numbers of people wanting to develop and use the resources in the catchment it is essential that there be good understanding of the impacts of any potential development and exploitation. There is considerable current investment in ecological and social research in the Catchment. Most of this involves community participation, which is enhancing the value of these investigations.

4.5 Actions, incentives or regulations that will discourage negative outcomes

The application of appropriate policy, legislation and management processes is the preferred approach to achieving positive and constructive outcomes. The basic principle underpinning development is having an appropriate regulatory framework for development and utilization of land and water resources.

Emphasis on the principle that the natural resources are a community resource and should be managed with involvement from the community has been shown to increase the level of responsible resource management and use and reduce inappropriate behaviour.

Regulation and sanctions will be necessary to deal with those who wilfully misuse natural and social resources. These should be targeted at miscreants and not in a broad and general way at the population as a whole.

4.6 Critical knowledge gaps

There is information and knowledge to enable careful and sustainable management of the natural and social resources of the Daly River Catchment to be commenced. Research findings together with

Indigenous and experiential knowledge provide a valuable basis for the development of management guidelines and policy. Investigative activities in the Daly River Catchment have incorporated scientific and local knowledge in developing a valid model of surface and groundwater systems. Flora and fauna surveys have given a good understanding of biodiversity in the Catchment.

However, the ability to predict the outcomes of policies, management and human activity across a whole catchment and throughout complex landscapes and communities is limited. While knowledge about discreet parts of the Catchment is known, more research and study of land, water, flora and fauna system interactions in the context of economic development, seasonal variability and climate change is urgently needed. In particular, the relationships between land and water use and the impacts on cultural, environmental and social values need urgent investigation.

Greater investment is required in understanding interactions and impacts between land, water, plants and animals; integrating traditional, experiential and scientific knowledge; and creating models of economic development that meet the needs of people and the environment.

The TRaCK program is studying these issues but more work is needed.

The implementation of the adaptive management framework and approach will provide both knowledge and awareness of the impacts of activities and policy. Any changes in policy and management that need to be made or knowledge gaps that need to be filled will be identified. Adaptive management monitoring and review will provide knowledge on the health and performance of natural resources including the following:

- water use, reserves and recharge
- particular crop and animal production performance
- rates of harvest and recruitment of native fauna including fish
- the status of native flora and fauna
- instances and sources of pollution and contamination
- social, cultural and economic consequences for people in the catchment and beyond.

Additional information and knowledge is needed to improve our understanding of the outcomes of policies and practices in relation to the following issues:

- The selection and allocation of land and water to protect resources of high conservation and cultural value
- Optimum land clearing and land management strategies
- Water allocation for sustainable economic, cultural, social and environmental purposes
- Provision of healthy social environments and support services
- Development of tourism and recreation businesses through the sustainable use of and access to resources
- Subdivision of pastoral leases and freehold land for profitable business development.

Significant gaps in the availability of resources in addition to knowledge gaps will impede the implementation of sound natural resource, economic and social development. They include the following:

- Skills and people, and funding to support them, to implement adaptive management practices, particularly monitoring and reviewing in agriculture, tourism and mining
- Funding, both government and private, for needed infrastructure including soil conservation, roads and community development
- Funding and support for community education and social development.

Development of appropriate ways and approaches to integrate Indigenous cultural and social requirements with mainstream economic development are needed. The meshing of two worlds with different and at times conflicting values has proven to be a major difficulty for Indigenous people. It is a situation often not understood or appreciated by governments, businesses or the community. With opportunities being provided by land and water resource development policies and programs, this issue requires urgent attention and support for Indigenous people.

5. SUMMARY AND CONCLUSIONS

The Daly region's soils, water availability and proximity to supporting infrastructure in Katherine and Darwin make it the most likely site for further development of the Northern Territory's primary (agricultural) industries. This is likely to be based on intensification of existing enterprises, and must overcome the challenges common to many northern agricultural enterprises, such as experience, skills, critical mass and market exposure. Further development on the catchment could contribute $100m to the Territory's Gross Value of Product.

In addition to cultural and social uses of land and water, Indigenous people can see avenues for creating income and return on their natural resource assets. This involves the resolution of significant issues, both Indigenous and commercial, as well as some outstanding legal issues.

Water availability is likely to be the factor limiting expansion of existing and new industries. Water Allocation Plans are in place or under development to ensure that the region's water resource makes provision for Indigenous use, the environment, and current and future consumptive use.

The people of the Daly strongly support the protection of the Catchment's conservation values. The maintenance of the region's high natural and cultural values has been identified as critical to its future, for ecological, economic, social and cultural reasons. Clearing more or less ceased in 2003, via a moratorium, and licences are required to extract groundwater other than for stock and domestic use.

Promoting and capturing the benefits of sustainable development will require:

- Management of the Catchment as a whole unit, in recognition of the interdependencies within and between Indigenous interests, surface and groundwaters, biodiversity and social systems
- An adaptive management approach to resource management and use, involving joint responsibility between government, managers of particular resources and the community. It will require a process of determining goals and targets for achievement, recording activities and their outcomes, reporting the impacts of activities, reviewing the consequences of these impacts and responding to them in an appropriate way
- Informed community engagement, currently achieved through DRMAC, and a sense of responsibility for maintaining the health of the Catchment.
- Provision by Government of policy, legislation regulatory frameworks to guide vegetation clearing, water allocation plans, regional development and land and water rights; and compliance with the National Water Initiative
- That water for Indigenous cultural use be provided a distinct allocation, to enable the use of land and soil resources required to support Indigenous wellbeing and livelihoods.

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