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Visit our website at: <http://www.clw.csiro.au/naif/>

Welcome

In considering the future of irrigation in northern Australia it is important to remember that we are dealing with dynamic and extremely complex social-ecological systems.



Whereas natural systems are often characterised by complexity, diversity, variable rainfall, continuity in nutrient cycling, little deep drainage and a net downward movement of salt, man-made systems are often simplistic and uniform in character with a fairly regular water supply once we introduce irrigation. They also tend to display significant discontinuity in nutrient cycling (eg application of fertilizer at the beginning of a season and removal of large amounts of biomass at harvest), excess deep drainage, and in many cases problems associated with salinity.



As it is often easier and cheaper to change a social system than it is to repair an ecological system, it seems that we need to put a lot more effort into making any man-made systems in northern Australia function as much as possible in a similar way to the natural systems they replace.

This requires that we invest more effort in developing a much deeper understanding of (1) the way our northern Australian ecosystems function and the value of the ecosystem goods and services they provide, (2) the way we make decisions and why we make particular decisions, and (3) the potential impacts of our decisions on the function and longer term viability of our northern ecosystems.

In this edition of NAIFNEWS we provide more details about the activities being undertaken through the NAIF project to support debate and transparent decision making about irrigation in northern Australia.

Keith Bristow – Project Leader

Northern river catchments to receive \$8million funding under the Commonwealth Environmental Research Facilities (CERF) Program

The Federal Government has announced the first recipients of funding under its key environment research program to encourage and assist research into current and emerging environmental challenges, bridge knowledge gaps and contribute to the development of environmental policy. The research will give environment managers new tools to improve the sustainability of our agricultural landscapes in Australia's temperate regions.

The research hub for Tropical Rivers and Coastal Knowledge (TRACK) - a group of seven researchers from Western Australia, Northern Territory and Queensland - will receive \$8 million to address environmental issues facing Australia's northern river catchments. The hub will also identify opportunities to develop genuinely sustainable and culturally appropriate enterprises.

NAIF is well connected to the TRACK consortium and we will continue to build relationships with this initiative as it becomes a reality.

NAIF Project hosts visit by Brazilian water expert

NAIF, the CRC for Irrigation Futures, *Riversymposium* and other partners have sponsored a visit by Professor Henrique M.L. Chaves, lecturer in water resource management at the School of Technology, University of Brasilia, Brazil.



Jeff Camkin & Prof Chaves in Perth



Prof Chaves presenting at the Lower Burdekin Water Forum

Professor Chaves is presenting on issues and trends in water resource management, and application of a Watershed Sustainability Index in Brasil, to a wide range of audiences in Perth, Kununurra, Darwin, Ayr, Townsville, Canberra and Brisbane over August and September 2006. Professor Chaves is also participating in numerous discussions relevant to the NAIF project. A report by Professor Chaves on the visit will be posted on the NAIF website soon.

Daly River Management Advisory Committee

The formation and membership of the Daly River Management Advisory Committee was announced by the Minister for Natural Resources Environment and the Arts in July 2006.

The Committee will develop options with local Government for the sustainable use and conservation of natural resources within the Daly River Management area.



Daly River, Northern Territory

For more information please see the Minister's media release at <http://www.nt.gov.au/nreta/publications/mediareleases/pdf/2006/07/scrydaly20060719.pdf>

Lessons from past irrigation and water management experiences



Steering Committee & Project Team members inspecting delivery channels in the Burdekin

Bart Kellett, NAIF & CRC IF PhD student, is currently interviewing a number of key stakeholders from the Burdekin, Daly and Ord River regions. Bart is seeking feedback on their involvement in irrigation and / or water management as well as their ideas on what lessons history and current practice teach us about management across northern Australia in the future. The objective of the research is to explore if and how stakeholders are applying these lessons. The research will be presented at the Australian National Committee on Irrigation and Drainage Conference in Darwin in October 2006, published and incorporated into Bart's PhD thesis.

Bart reports that even though stakeholders are extremely busy, and securing appropriate interview times has been challenging, participation in the interviews has been enthusiastic and stakeholders have been keen to share stories and experiences.

While the research is encouraging individuals to reflect on successes, failures, challenges, and aspirations it is also about sharing perspectives and lessons not only between stakeholders in each region, but also north Australia wide. This is just one way the NAIF Project is building capacity for improving decision-making processes and therefore outcomes.

Context Setting

Within the context setting umbrella of activities is a study examining three prominent, well researched irrigation schemes across Northern Australia. The three schemes selected were the Lower Burdekin (LB), the Ord River Irrigation Area (ORIA) and the Katherine Douglas Daly Area (KDA).

These three were chosen from the 11 major irrigation schemes currently operating in Northern Australia because collectively they capture much of the potential variability in tropical irrigation schemes; the LB, is a mature, conjunctive use scheme, the ORIA is a surface water scheme of moderate maturity and the KDA is an immature, groundwater based scheme.



Furrow irrigation in the Burdekin

Numerous investigations and reviews have been undertaken on these three schemes and volumes of literature exist. The aim of this work is to collectively evaluate these three very different irrigation schemes within a whole of catchment context to draw out and highlight key learnings from past and present irrigation in the north. Implications for future design and management will then be discussed. The information will be presented in a non-technical format that will help facilitate its transfer to all stakeholders and the wider community.

Dr Cuan Petheram, Hydrologist with the NAIF project team, is leading this work.

Understanding tropical water systems

Research into tropical water systems is also being undertaken by Dr Cuan Petheram as part of the NAIF Project. As a result of this research, Cuan is compiling a report which will provide an overview of the current understanding of the hydrological systems across the north of Australia. One of the key purposes of the report is to address some of the community perceptions and misconceptions about the hydrology of the north. Particular emphasis has been placed on illustrating the differences between water systems in northern Australia and those found in temperate Australia. Included in this report are discussions on the:

- characteristics and distribution of key groundwater flow systems and drainage basins across the north;
- climatic processes that drive precipitation and the major atmospheric water fluxes in northern Australia;
- the terrestrial water balance of northern Australia; and
- the ecological, social and cultural importance of the highly seasonal water balance across the north and the constraints/opportunities it provides for irrigation.



Yellow Waters Wetland, Kakadu, NT

The information will be presented in a non-technical format that will assist all members of the general community engage in open and informed debate.

Irrigation Mosaics

NAIF research to develop our understanding of the concept of irrigation mosaics, or patchworks of irrigation, in northern Australia has been the focus of a small team led by Dr Freeman Cook. A review of research into mosaics from other areas of science, such as ecology, forestry, meteorology and saline basins has been undertaken to inform an initial report on the state of knowledge about mosaics. Other research has looked at the effects of simple scaling.

Results to date are indicating significant knowledge gaps and areas of further research required to determine whether there is a sound scientific basis to support irrigation mosaics as an alternative to more traditional patterns of irrigation.

An area for further investigation is the effect of advection (heat from the dry land surrounding areas) on evaporation rates and, therefore, water requirements. Other research will consider the existing analytical and numerical models for solute and water flow in: soil, the vadose zone (the zone of soil between the land surface and the groundwater) and groundwater, with a view to reporting on a modelling framework for future research.

Upcoming events featuring NAIF

9th International Riversymposium, Brisbane from 4 to 7 September 2006. NAIF will be featured during the Northern Rivers feature session. Further information available via <http://www.riversymposium.com/>

ANCID Conference 2006, Darwin from 15 to 18 October 2006. The NAIF Project will be presented within the feature sessions on irrigation in northern Australia. Further information available at <http://www.ancid.org.au/>

Your feedback on this issue of NAIFNEWS or the NAIF Project in general is most welcome. Please forward your comments to Di.Popham@csiro.au

NEXT ISSUE

In the next issue of NAIFNEWS:

- Research into the development of the NAIF sustainability framework
 - Report on *Riversymposium*
 - Report on ANCID Conference
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Project Partners

Land & Water Australia

National Program for Sustainable Irrigation

CRC for Irrigation Futures

CSIRO Land and Water

Department of the Premier & Cabinet, Western
Australia

Northern Territory Department of Natural
Resources, Environment & the Arts

Queensland Department of Natural Resources
Mines & Water

Department of Agriculture Fisheries & Forestry



Australian Government
Land & Water Australia



Australian Government
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Fisheries and Forestry



Queensland Government
Natural Resources, Mines and Water



Northern Territory Government