NAIF NEWS

Northern Australia Irrigation Futures e-Newsletter

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Welcome

Welcome to NAIFNews number 8.

NAIF activities the last few months have involved increased focus on the lower Burdekin, a key case study site (Regional Irrigation Partnership) for NAIF and the CRC for Irrigation Futures (CRC IF). This has included further study of groundwater and salinity processes in the lower Burdekin and formalising the Lower Burdekin Water Futures group who are now driving a long-term, strategic, whole-of-system approach to understanding and managing the lower Burdekin water resources and associated systems. The first major project being led by the LBWF involves further development and implementation of the Lower Burdekin Knowledge Platform.

Key Stakeholders discussing surface water / groundwater interactions in the lower Burdekin

At the higher level we are starting to see ramifications of the 'financial meltdown', and it will be important to keep reminding ourselves that we must not take our eye off water, irrigation and salinity issues, which might not seem urgent given the current financial situation, but which are critically important to our long term future. The markets and economy will recover, but unless we keep focusing on improving the way we look after our water and associated environmental assets, there won't be much left to base our economic future on.

In this regard the National Program for Sustainable Irrigation (NPSI) and the CRC IF are both due to end in June 2010, and that has the potential to leave Australia without any major national entity focussed on water and irrigation research, development, extension and adoption (RDEA). Irrigation Australia Limited (IAL), NPSI and CRC IF recently held a workshop in Canberra to highlight the issue and develop a strategy to address this looming deficiency. In my view Australia needs to seriously consider establishment of a National Institute for Water and Irrigation or some similar entity that serves as a focal point for RDEA associated with irrigation and water management within a catchment context. Done in the right way, this could serve as an integrator of the many different but often related components of work that are currently undertaken by various organisations around the country, and as an 'attractor' of the best people from around the world to work on some of the more challenging and important problems of our time.

Groundwater pump in the lower Burdekin

We have also recently seen successful delivery of the Murray Darling Basin (MDB) Sustainable Yields project, and establishment of the MDB Authority, both of which will hopefully help the basin move towards a more adaptable and resilient future. The current predicament in the MDB has also ensured continued interest in development of land and water resources in northern Australia. We have also seen changes in both the membership and terms of reference of the Northern Australia Taskforce, the Western Australia government rethink and reinvest in Ord Stage 2, and the Federal Government commit substantial dollars to support further economic development in the East Kimberley Area. This is to be preceded by an assessment process that will consider the long term economic viability and environmental sustainability of irrigated agriculture for the region. NAIF has developed considerable knowledge and experience through its work in the north over the last several years and is well placed to provide input (knowledge, tools and processes) to help governments and northern communities meet their ecologically sustainable development (ESD) objectives.

As the year draws to a rapid close, I want to take this opportunity on behalf of NAIF to wish everybody a happy and relaxing Christmas break and all the best for the New Year. No doubt 2009 will be another busy and challenging year for everyone working in the water and irrigation sectors.

Keith L. Bristow – Project Leader

Leadership Excellence Acknowledged

Keith Bristow, NAIF Project Leader, and Jeff Camkin, NAIF Sustainability Specialist, were presented with the "Leadership & Excellence" Award at the 2008 Co-operative Research Centre for Irrigation Futures (CRC IF) Annual Research Forum held in Canberra from 9 to 11 September.

Geoffrey Kavanagh (C), Emerald-based irrigator and CRC IF Board Member, presenting the award to Jeff Camkin and Keith Bristow
Photo courtesy of Olivia Louis (CRC IF)

The Award acknowledged the foresight, commitment and excellent leadership qualities displayed by Keith and Jeff as they led Northern Australia Irrigation Futures (NAIF) Project to establish and deliver new knowledge and thinking about irrigation and the future of northern Australia, which is now a major national priority for Australia.

Keith and Jeff's strong emphasis and commitment to integrating science, policy, management and community needs highlighted the importance of developing a system-wide understanding of irrigation in northern Australia (NA) and a shared vision for its future.

Keith and Jeff built a skilled research team, supported team members to achieve project objectives and fostered their personal growth.

Under the leadership of Keith and Jeff, the NAIF project delivered the first major collaboration between the Australian, Queensland, Northern Territory and Western Australian Governments in addressing water and irrigation across NA.

NAIF Leaders appointed to CRC IF System Harmonisation Program

Irrigation enterprises and environmental sustainability have to date been managed as two competing enterprises under separate and divergent control. There is increasing support for a "harmonised" approach to sustainable use of our land and water resources. The System Harmonisation™ (SH) program of the Co-operative Research Centre for Irrigation Futures (CRC IF) is identifying opportunities for improved management of business enterprises together with the land and water resources to meet environmental and productive objectives in catchments with irrigation industries. This is being addressed through four key research areas:

- Water Cycle Management
- Markets & Productivity
- Social, Cultural, Institutional and Policy Frameworks
- System Harmonisation Evaluation and RIBPs

NAIF Project Leaders, Dr Keith Bristow and Jeff Camkin have been appointed joint Program Leaders of the CRC IF SH Program. More information on the SH Program is available on the CRC IF web site at
http://www.irrigationfutures.org.au/programs.asp?ID=6

CRC for Irrigation Futures Annual Research Forum

Held at Australian National University in Canberra, the 2008 CRC for Irrigation Futures Annual Research Forum provided the opportunity for researchers and students from across the country to come together and share research activities and outcomes.

The emphasis of the forum this year was “Bridging the Science-Policy Divide” with specific objectives being:

- Developing and strengthening delivery of CRC IF outputs into Federal and State water policy and planning processes.
- Providing an insight into the role, operating environment and processes of water policy makers and bureaucrats and how research can contribute.
- Building the collaborative research culture required to deliver against the CRC’s mission.

Steve Marchant & Lucy Reading in the cane fields of the Burdekin

NAIF research was profiled throughout the forum. NAIF PhD Student, Lucy Reading, presented her research on tropical groundwater systems through her presentation, “Understanding the impacts of sodic soil amelioration in the lower Burdekin”. Steve Marchant, NAIF PhD student, gave a presentation on his research entitled, “Decision making on irrigation development – New ways to make better decisions“. Matt Lenahan, a CRC IF Post doctoral appointment with CSIRO and NAIF, presented on “Salinization of a tropical coastal groundwater system”.

Jeff Camkin gave an overview of the activities and findings of the NAIF Project and also presented a poster on frameworks to support irrigation decision making in the lower Burdekin developed through NAIF.

Dr Keith Bristow highlighted the NAIF research into irrigation mosaics through the poster “New approaches to irrigation in northern Australia”.

The forum, with approximately 150 participants, again provided a great opportunity for NAIF research to be highlighted and discussed.

NAIF receives international recognition

On 11 June, Jeff Camkin (NAIF Sustainability Specialist) presented on the NAIF project at the Sustainable Irrigation 2008 Conference in Alicante, Spain. The paper, "Designs for the future: the role of sustainable irrigation in northern Australia" received a Hromadka Award 2008 Diploma “in recognition of an outstanding scientific contribution”. A copy of the paper can be obtained by contacting Jeff.Camkin@csiro.au. To view the abstract on line, go to http://library.witpress.com/pages/PaperInfo.asp?PaperID=19163

Jeff Camkin

NAIF Project facilitates exchange between South Africa and Australia on water resource management

The report of a visit to Australia by Dr Mark Dent, facilitated through NAIF, has been released.

Dr Keith Bristow & Dr Mark Dent visiting a field site in the lower Burdekin

Dr Mark Dent is a bio-resources engineer and management development professional who co-ordinates the Masters in Environmental Management program at the Centre for Environment, Agriculture & Development at the University of KwaZulu-Natal Pietermaritzburg, South Africa.

During February and March 2008, Dr Dent presented seminars and participated in workshops and meetings in Perth, Adelaide, Sydney, Canberra, Brisbane, Townsville and Ayr. The main focus of discussion was South Africa's Water Reform Program and comparisons to Australia's own initiatives.

Dr Dent's experience suggested that most water management failures are the result of mismatches between:

- The nature of the water resources
- The institutions that manage them
- Policy goals and capacity to implement, and
- The scientific and policy instruments used

The following organisations provided assistance and support to make this trip possible: the International Centre of Excellence in Water Resources Management (ICEWarm), the Co-operative Research Centre for Irrigation Futures, the National Water Commission, the Natural Resources Commission of New South Wales, the Western Australia Department of Water, the Australian Water Association, CSIRO Water for a Healthy Country, CSIRO Land and Water, the University of KwaZulu-Natal.

A copy of the report is available at http://www.clw.csiro.au/naif/visitors.html

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Lower Burdekin Water Futures

Burdekin Dam

The lower Burdekin (located some 90 km south of Townsville), the site of some of Queensland's earliest irrigation efforts, is one of Australia's premier irrigation areas with some 80,000 ha under irrigation.

The irrigation industry is fortunate in being supported by a large dam (the Burdekin dam) and an extensive groundwater system, and has developed a reputation for producing some of the highest yields and highest quality sugarcane in Australia. It is

however, also situated in close proximity to environmentally sensitive wetlands, waterways, estuaries, and the Great Barrier Reef lagoon, so it is essential to look after the system as a whole.

This emphasises the need to develop a full understanding of the regional water, salt, nutrient and chemical balances and to ensure proactive management of any surface and deep drainage associated with the irrigation system. In doing this the sorts of issues that need to be addressed include rising water tables, falling water tables, sea water intrusion, salinisation, potential impacts of climate change and sea level rises, etc. This requires a whole of system approach involving integrating science, policy, management and community, and it is for this reason that the lower Burdekin is one of the key NAIF case study sites and Regional Irrigation Partnerships with the CRC IF Systems Harmonisation Program.

Keith Bristow (NAIF Project Leader) played a lead role in initiating and establishing the Lower Burdekin Water Futures (LBWF) group, which was established in 2006 to facilitate a more strategic approach to water management in the lower Burdekin.

The water resources within the region are currently managed by a number of different organisations, often with different and sometimes competing objectives and drivers. The LBWF includes members from most major organisations with an interest in and/or management responsibility for water in the lower Burdekin, and provides a forum that allows for greater coordination and better alignment of their efforts. The LBWF focus is on the water and associated systems in the lower Burdekin, the geographical area being from the Burdekin Dam downstream to the coast, including the near-shore marine environment. The LBWF has a formal mission and objectives aimed at addressing the long term strategic needs of the region.

Keith Bristow chaired the LBWF group from inception until the recent appointment of Cr Lyn McLaughlin (Mayor, Burdekin Shire Council) as Chair and Mr Michael Hoey (Chair, North Burdekin Water Board) as Deputy Chair.

The LBWF works constantly to connect with other organisations with interests in the lower Burdekin, to maintain an ongoing conversation between the various stakeholder groups, and to encourage collaborative efforts that benefit the system as a whole.

Cr Lyn McLaughlin, Chair
& Mr Michael Hoey, Deputy Chair

Lyn McLaughlin adds that “The focus is to have a whole of system approach, with agencies working together rather than independently”.

The LBWF MISSION

To support a long-term, strategic, whole-of-system approach to understanding and managing the lower Burdekin water resources and associated systems, and thereby deliver long-term economic, social and environmental outcomes that ensure the region’s sustainability

11th International River*symposium*

The 11th International River*symposium: A* Future of Extremes was held in Brisbane from 1 to 4 September 2008 as part of the River*festival*, an initiative of the Brisbane City Council and the Queensland Government.
This international forum brought together representatives from industry, environmental organisations and the scientific community to share ideas, knowledge and technology, on the challenges and opportunities for rivers and waterways with particular focus on the pressure of increased climate variability.

RIVER SYMPOSIUM
11th International River*symposium*
Brisbane, Australia
1 – 4 September 2008

Feature sessions included:

- Linking Energy, Water and Climate Change
- A New Vision for Natural Resource Management in Australia
- The Impact of River Activity and Management on Coral Reefs
- The Future of Irrigation
- Focus on the Murray Darling Basin


Justin Story

For the fourth year in succession, the NAIF Project was well represented. This year, NAIF team member Justin Story presented on the important area of Maintaining Food Production, outlining research on the decision frameworks which have been developed through the NAIF Project. Justin's presentation was entitled, "Framework to support irrigation decision-making in complex and changing times".

The 2008 River*symposium* has been used as a preparatory meeting for the 5th World Water Forum, being held in Istanbul, Turkey in March 2009.

River*symposium* http://www.riversymposium.com/index.php?page=2008
5th World Water Forum - http://www.worldwatercouncil.org/index.php?id=1842

River*symposium* 2009: Rivers from Source to Sea will be held in Brisbane from 21 to 24 September 2009. Deadline for submission of abstracts is 13 February 2009. To submit an abstract visit http://riversymposium.com/index.php?page=Submissions

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New Publications by Dr Cuan Petheram


Dr Cuan Petheram

Petheram, C., Bristow, K.L. & P.N. Nelson. 2008. Understanding and managing groundwater and salinity in a tropical conjunctive water use irrigation district. Agric. Water Management 95:1167-1179.

Petheram, C., McMahon T.A., Peel M.C. 2008. Flow characteristics of rivers in northern Australia: Implications for development. Journal of Hydrology 357: 93– 111

Irrigation Innovation in a Changing Climate

Looking to the future and its challenges from an irrigation industry perspective was the focus of a workshop held in Canberra on 16 September 2008, which was jointly hosted by Irrigation Australia Limited (IAL), the National Program for Sustainable Irrigation (NPSI) and the Cooperative Research Centre for Irrigation Futures (CRC IF).

The future of irrigation, research priorities, delivery and adoption strategies, were the main topics of discussion by more than 100 participants, consisting of industry representatives, researchers and stakeholders. NAIF attendees included Dr Keith Bristow (Project Leader), Mr Ian Atkinson (Steering Committee member) and Mr Andrew Kelly (Steering Committee member).

The workshop was used to develop the scope, content and process for an industry led strategy to go forward and beyond 2010.

Rudd Government Overhauls Northern Australia Taskforce

Changes to the Northern Australia Taskforce were announced recently (26 September 2008) by the Hon Gary Gray AO MP, Parliamentary Secretary for Regional Development and Northern Australia. The media release is available at

http://www.minister.infrastructure.gov.au/gg/releases/2008/September/GG013_2008.htm

Further detail is available at: http://www.nalwt.gov.au/tor.aspx

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Catchment Detox

Catchment Detox is a new virtual on-line game allowing players the opportunity to manage a catchment.

Players are challenged to make decisions regarding activities to undertake (eg. planting crops, logging forests, building resorts, creating national parks) whilst managing water and environmental issues, the challenges of climate change, and providing food and wealth for the population.

Players get to experience how difficult it is to address all the challenges in a whole of catchment context.

ABC Radio is promoting this new game and have undertaken a series of interviews with industry, community and scientists (including NAIF Project Leader Dr Keith Bristow), highlighting the benefits, issues and challenges when taking a whole of catchment approach. These interviews went to air between 25 August and 5 September.

Visit the website http://www.catchmentdetox.net.au/ to try your skills at catchment management.

TRACK release first newsletter

The Tropical Rivers and Coastal Knowledge program (TRACK) have released their first newsletter, which can be viewed by visiting http://www.track.gov.au/documents/OnTRaCK_Issue1.pdf.

If you would like to subscribe to this newsletter contact the TRACK project team at track@cdu.edu.au

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Executive Summary of Final Report - LWA NPSI CDS23 Northern Australia Irrigation Futures

The final reports of the LWA NPSI CDS23 Northern Australia Irrigation Futures project were approved by LWA earlier this year, with the full reports available on the NAIF web page at http://www.clw.csiro.au/naif/reports.html

The Executive Summary of the NAIF Final Report is included below.

Northern Australia holds an iconic status for many Australians. The interplay between the landscapes, rivers, groundwater and strongly monsoonal weather patterns has resulted in unique and diverse ecological systems that will need special attention to ensure that their integrity is retained if any changes are made to the system. At the same time, with some 60 to 70 per cent of Australia's fresh water discharging from tropical rivers, the region faces significant environmental challenges associated with increasing pressure to develop land and water resources, catchments and coastal environments, as well as managing existing threats, including weeds, pests, feral animals and fire.

There is a unique and historic opportunity to ensure that management and use of Australia's northern land and water resources takes place within a strategic, ecologically, culturally and economically sustainable framework. Deciding on whether to expand irrigation in northern Australia, and if so what irrigation should look like, where it should be located, and how it should be managed, requires improved understanding of groundwater, river and catchment attributes and of the risks and benefits associated with irrigation. The Northern Australia Irrigation Futures (NAIF) project was established in 2003, with initial funding through Land and Water Australia's National Program for Sustainable Irrigation (NPSI) and CSIRO. This is the Final Report for NAIF activities funded through the initial NPSI grant.

Top 20 Take Home Messages

NAIF has worked closely with the WA, NT, QLD and Australian governments and a range of other researchers and stakeholders, to deliver new knowledge, tools and processes to support debate and decision making about irrigation in northern Australia. Take home messages from this work include:

1. Research processes which effectively contribute to the integration of science, policy and stakeholders are valued highly by a wide range of stakeholders
2. The land and water resources of northern Australia are already being used and decisions are about redirecting these resources to different uses
3. Generating localised short term benefits from irrigation are 'easy'; delivering catchment scale long term sustainability is the challenge

4. We need to develop the capacity to view, understand and manage northern Australia through a ‘northern lens’ which takes account of the national and international context
5. Groundwater can be critical to base flow and maintenance of ecological function
6. Water quality is as important as quantity, especially in meeting ecological needs
7. Irrigated systems are complex systems and we need to accept, understand and manage that complexity
8. Water availability and storage needs for irrigation in event driven tropical systems are poorly understood
9. We need to ensure policies and management strategies make sense for event driven tropical systems
10. Irrigation must be preceded by catchment scale salt and nutrient management plans to deliver on long term sustainability objectives
11. We must set and meet groundwater quantity (level) and quality targets in irrigated systems and adjust management practices to meet those targets
12. “Efficiency” is not the answer to everything; the aim is to build and maintain resilience in irrigated systems
13. Irrigation and water management is an individual and collective responsibility
14. There is growing interest in irrigation mosaics as an alternative approach to traditional large-scale contiguous irrigation systems
15. Irrigation mosaics may have both negative and positive biophysical effects compared with more traditional systems, with a possible net positive impact
16. Further research is required on the biophysical, ecological, social and economic advantages and disadvantages of irrigation mosaics
17. Dealing with complexity, uncertainty and risk in irrigation decision making emerges as a shared need and responsibility for catchment communities, proponents and governments
18. Dealing successfully with the complexity of irrigation in northern Australia to achieve long term ecologically sustainable development will require decision-making and irrigation management systems that better utilise existing and emerging technologies and approaches
19. Implementing frameworks (including catchment knowledge platforms and ESD component tree systems) which effectively integrate science, policy and stakeholders will support more comprehensive, transparent and consistent planning and decision-making
20. Above all else, decisions about the future of irrigation in northern Australia are about people and their relationships with the environment

NAIF has highlighted the importance of developing a system-wide understanding of the context for irrigation in northern Australia and a shared vision for its future. NAIF has also demonstrated that while no single framework can hope to ensure sustainability, it is possible to deliver knowledge, tools and processes that can help governments and catchment communities charged with making decisions about these complex issues. According to the feedback received, NAIF has had significant impact and influence on the thinking about irrigation in northern Australia.

Stakeholder Feedback

Feedback from stakeholders is scattered throughout this Final Report but the following perhaps sums it up best: "*While each of the take home messages are important, it is important not to lose the connectivity between them. Probably the biggest take home message is the complexity of the (irrigation) system and the need to manage that complexity.*" Doug Hall, Irrigation Australia.

Future Directions

Substantial opportunities exist to support implementation of the National Water Initiative and the National Plan for Water Security in northern Australia by building on the NAIF platform: *"The (NAIF) project has already had a significant positive impact on inter-jurisdictional cooperation between the 3 governments in the North but also with community and industry stakeholders and other research programs. The sub-committee agrees that the continuation of this project model would contribute greatly to help to ensure that any expansion of irrigation in the north of Australia is done in a sustainable manner."* Draft NAIF Sub-Committee Communiqué (October 2007).

NAIF CONTACTS

Project Team

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Mathematician/Physicist: Freeman Cook

Hydrogeochemist: Matt Lenahan

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Project Partners

Land & Water Australia

National Program for Sustainable Irrigation

CRC for Irrigation Futures

CSIRO Land and Water

Department of Water, Government of Western Australia

Northern Territory Department of Natural Resources, Environment and the Arts

Queensland Department of Natural Resources & Water

Department of Agriculture Fisheries & Forestry