

Information needs for the development of northern Australia

Peter Stone^a, Cuan Petheram^b

^a *Land and Water Flagship, CSIRO, PO Box 2583, Brisbane, QLD 4001*

^b *Land and Water Flagship, CSIRO, GPO Box 1666, Canberra, ACT 2601*

Email: peter.stone@csiro.au

Abstract: Northern Australia's economy is growing in scale, richness and complexity – it's much more than just agriculture. Tourism, mining, energy and defence are already well established, and make a >\$25 billion contribution to the north's GDP. Each of these industries is dependent on water and climate in different ways and, as a consequence, their water and climate needs differ. The corollary is that the information needs for development of northern Australia cannot be specified without first identifying the type and scale of development that they seek to support. This, in turn, implies that climate and water scientists must be closely engaged with the full spectrum of the development agenda if they are to make a material contribution to development decisions.

Our engagement with the agricultural and other sectors has identified a range of climate and water knowledge needs. The sparseness of water data in northern Australia is a clear impediment to agricultural development - which is particularly water-dependent - not only because it's not clear how much water might be available for agricultural use, but also because the consequences for other uses and users of diverting water to agriculture are not well understood. Climate data is much less spatially and temporally complete in northern Australia than elsewhere, but is not as crucial in informing development decisions.

To support investment and regulation decisions in northern Australia, climate and water information needs to be able to broadly address the following questions:

- How much water is there in different parts of the catchment?
- What is the quality of the water in different parts of the catchment (particularly important for groundwater)?
- When is the water available, and how does this relate to potential demands?
- Is water storage likely to be required (in most instances, 'yes'), and if so how could water be economically stored and with what degree of reliability could the storage supply a given volume of water?
- In the case of groundwater, what are the key recharge and discharge mechanisms and what is their magnitude? What are the lateral groundwater flow paths?
- Are there other consumptive users of water in the catchment and how may they be impacted by a new development, or more likely, how would the presence of existing users impact on the reliability with which water could be supplied to a new development?
- How would key hydrological surrogates of ecological health such as i) persistence of waterholes during the dry season (i.e. important refugia during the dry season); and ii) connectivity of wetlands to the main river channel during flood events vary under different levels of development?
- In the case of an irrigation development, are there salts in the landscape and is there a mechanism by which those salts could be redistributed?
- While the data required to support investment and regulation decisions are essentially the same in northern Australia as elsewhere, in northern Australia there are very little existing data to address any of these questions even at the catchment scale.

Keywords: *northern Australia, development, irrigation, streamflow, climate.*