

# Assessing the suitability of land for irrigation

An activity within the Flinders and Gilbert Agricultural Resource Assessment, which is part of the North Queensland Irrigated Agriculture Strategy

The Flinders and Gilbert Agricultural Resource Assessment will use digital soil mapping approaches (developed by CSIRO and the Queensland Government) to produce a digital soils map of the Flinders and Gilbert catchments.

There are potentially thousands of hectares of soil suitable for irrigated agriculture across northern Australia but access to sufficient water is a constraint to development.

In recognition of these challenges and opportunities facing northern communities and primary producers, the North Queensland Irrigated Agriculture Strategy (NQIAS) commenced in January 2012.

The \$10 million NQIAS is a collaborative initiative, sponsored by the Australian Government Office of Northern Australia and the Queensland Government. It provides a unique opportunity to leverage the resources and efforts of federal, state and local tiers of government, to access world class scientific expertise, and to build on the enthusiasm and resourcefulness of local communities.

The Commonwealth Scientific and Industrial Research Organisation (CSIRO) is conducting one component of the NQIAS, the Flinders and Gilbert Agricultural Resource Assessment. This is a two-year, \$6.8 million project, to be completed by December 2013. Key parts of the Assessment will be undertaken by the Queensland Government and TropWATER (James Cook University).

The Assessment will provide a comprehensive and integrated evaluation of the feasibility, economic viability and sustainability of water resource development. The techniques and approaches that will be developed can be applied elsewhere in northern Australia.

This Assessment aims to answer the following questions:

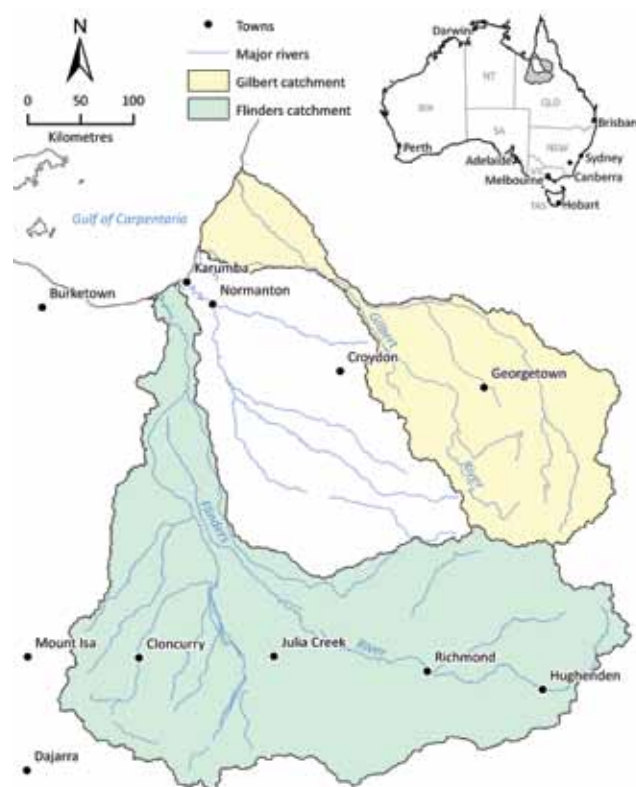
- What soil and water resources are available for irrigation?
- What production opportunities could irrigation support?
- Is irrigation economically viable?
- What are the trade-offs between irrigation and the integrity of the natural environment and local communities?

The Assessment involves 13 different activities. This factsheet explains one of these activities – the land suitability assessment.

## Land suitability assessment activity

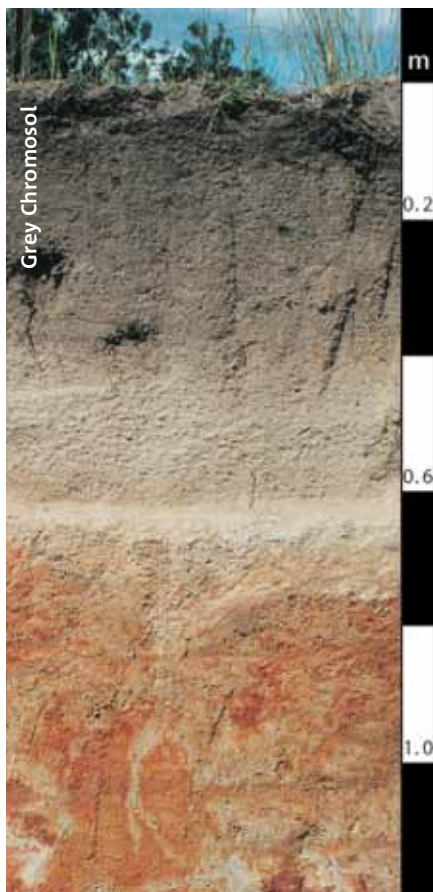
Assessing the suitability of land is critical to the development of productive and economically viable irrigation schemes. This activity will collect information on the soil type, structure, nutrient and salt content, water holding properties and erodibility of soil resources in the Flinders and Gilbert catchments.

This knowledge of soil types (and their potential limitations) will make it possible for scientists to evaluate



the suitability of a range of land uses for different parts of the landscape.

There have been a number of soil and land use assessments carried out over the Flinders and Gilbert catchments in the past, and a key recommendation of many of these assessments was that further soils data were needed before detailed suitability assessments could be conducted, particularly for irrigated agriculture.



Soil samples will be collected to gain information on the type, structure, nutrient content and other properties of soil in the Flinders and Gilbert catchments.

be used. This ensures most resources are used on the more suitable soils.

Following field collection, the samples will be sent to government scientific laboratories in Brisbane and Canberra for a range of chemical and infrared analyses of soil properties.

The existing and new soils data will then be used, in combination with remotely sensed data (collected from satellites) to:

- ◆ Develop a digital soil map for the two catchments (focusing on the four primary investigation areas); and
- ◆ Inform the land suitability assessment on a range of irrigated and dryland agricultural production systems in the Assessment area. This will use land resource information gathered during soil surveys, the results of soil laboratory analysis, and information on flood inundation to assess the suitability options in the defined catchments.

Land suitability assessment is based on the underlying assumption that the most limiting factor is used to determine the overall suitability rating.

The Assessment will evaluate the land suitability of five broad enterprise types of irrigated land including annual crops, perennial crops, rice, forestry and improved pasture. These broad enterprise types were selected because they cover a broad range of establishment, management and harvest practices. Investigation of suitability of specific crop types will also be undertaken. Specific crops may vary between catchments and are likely to include enterprises such as mangoes, cotton, maize, peanuts, rice, timber, wheat and sorghum as well as pasture and standing fodder.

### Outcomes

One of the goals of the Flinders and Gilbert Agricultural Resource Assessment

is to lower barriers to investment in the Flinders and Gilbert catchment by addressing many of the questions that potential investors would have about production systems and methods, yield expectations and benchmarks, and potential profitability and reliability.

The land suitability assessment activity will build knowledge of soil and land suitability to provide all levels of government and current and potential irrigators with an understanding of the irrigation potential for the soils in the Flinders and Gilbert catchments.

The key products from this component of the Flinders and Gilbert Agricultural Resource Assessment will be:

- ◆ A soil map (that will be based on the Australian soils classification scheme). The uncertainty associated with the mapping will vary between locations in the catchment according to sampling density;
- ◆ A land use suitability map (again with variable uncertainty);
- ◆ Soil chemical and profile data (that will be housed within Government data bases and archived for future use). This data can be accessed by landholders at the end of the project on request.

*The Flinders and Gilbert Agricultural Resource Assessment is being conducted for the Office of Northern Australia in the Australian Government Department of Regional Australia, Local Government, Arts and Sport under the North Queensland Irrigated Agriculture Strategy <http://www.regional.gov.au/regional/ona/nqis.aspx> The Strategy is a collaborative initiative of the Office of Northern Australia and the Queensland Government. One part of the Strategy is the Flinders and Gilbert Agricultural Resource Assessment, which is led by CSIRO.*

### What does the activity involve?

The soil survey component of this activity will include the collection of new field observations and samples to complement the relatively small number of existing soils data. The Assessment will also result in the production of detailed new maps indicating the type, condition and extent of soils in these catchments.

A statistical method will be used to identify the best locations to sample soil for the purpose of assessing the scale of the opportunity for irrigation across the two catchments.

To interpolate between soil sampling locations requires an understanding of how the broader landscape formed. This requires soil to be assessed not just in the valleys, but also mid-slopes and ridge tops. When sampling locations that are clearly unsuitable for irrigation, rapid site assessment techniques will

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