

Assessing the suitability of land for crop production

We are determining the soil resources that are potentially available for irrigated and dryland agricultural production in the Victoria River catchment, Northern Territory.

The Victoria River Water Resource Assessment

CSIRO is undertaking research across the Victoria River catchment and its tributaries as part of the Victoria River Water Resource Assessment. This work will provide a comprehensive overview and integrated evaluation of the opportunity for agriculture development (including aquaculture) in the catchment as well as the ecological, social and cultural impacts of that development. Beginning in July 2021, we will work with the Northern Territory government, research partners and communities to complete this assessment by June 2024. This factsheet explains one of these activities: the land suitability assessment.

Land suitability assessment in the Victoria River catchment

Northern Australia comprises 40 per cent of Australia's land mass. There are potentially millions of hectares of soil suitable for irrigated agriculture across this region. However, development is constrained by access to reliable water and insufficient knowledge or data on which areas are suitable for development. While some soil and land use assessments have been carried out in the past, key recommendations stated that further soils data were needed before detailed suitability assessments could be conducted, particularly for irrigated agriculture.

For the Victoria River catchment, we will produce maps of soil attributes including erosion risk, soil water holding capacity, permeability and infiltration. These maps will help in management of resources and understanding of development potential. Greater knowledge of soil types and attributes will make it possible to evaluate how different soils and parts of the landscape could be economically and sustainability developed for irrigated agriculture. We have created similar maps in other catchments in northern Australia: <https://nawra-explorer.csiro.au/>



What are the outcomes of the land suitability assessment?

The key products from the land suitability assessment will be publicly available:

- Soils and soil attribute maps. Note that the uncertainty associated with the mapping will also be presented and will vary between locations in a particular region according to sampling density.
- Land use suitability maps for different crops and irrigation types (again, with variable uncertainty).

One of the goals of the Assessment is to lower barriers to investment in the area. We will do this by addressing questions that potential investors have about production systems and methods, yield expectations and benchmarks, and potential profitability and reliability. The Assessment does not seek to replace any planning processes and will not recommend changes to existing plans or planning processes.

That said, the results can be used to inform planning decisions by citizens, local government, investors and state and federal governments. Please contact the relevant government department to discuss matters such as water allocation, clearing, change of land use including required permits, and land development approval processes.

The land suitability assessment will build on knowledge of soil and land suitability to provide all levels of government and current and potential farmers with an understanding of the irrigation potential of the soils in the catchment.

How will we do the land suitability assessment?

- We will survey soils across the Victoria River catchment to collect information on soil attributes such as type, structure, pH, carbon, water holding properties and erodibility. New field observations and samples will complement the existing soils data already collected by the Northern Territory Government. This will result in the production of new maps indicating the type and extent of soils and their attributes across the region.
- 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 area. We will assess soil from the valleys, mid-slopes and ridge tops in order to better understand soil formation and distribution.
- Following field collection, samples will be sent to government scientific laboratories for a range of chemical 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 digital soils and soil attribute maps for the region; and
 - Inform the land suitability assessment on a range of irrigated and dryland agricultural production opportunities.
- A land suitability assessment is based on the underlying assumption that the most limiting factor for each crop and irrigation type is used to determine the overall land suitability rating. The activity will evaluate the land suitability for specific agriculture uses (including aquaculture) within broad enterprise types such as irrigated annual crops, perennial crops and improved pasture. These broad enterprise types were selected because they cover a range of establishment, management and harvest practices.
- We will investigate the suitability of specific crop types such as tree crops, horticulture crops, pulses, grains and fibre crops, fodder crops, etc. Our work in the Victoria River catchment will be similar to completed work across northern Australia which is publicly available at <https://www.csiro.au/en/showcase/nawra>



The Victoria River Water Resource Assessment is an initiative of the Australian Government.

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