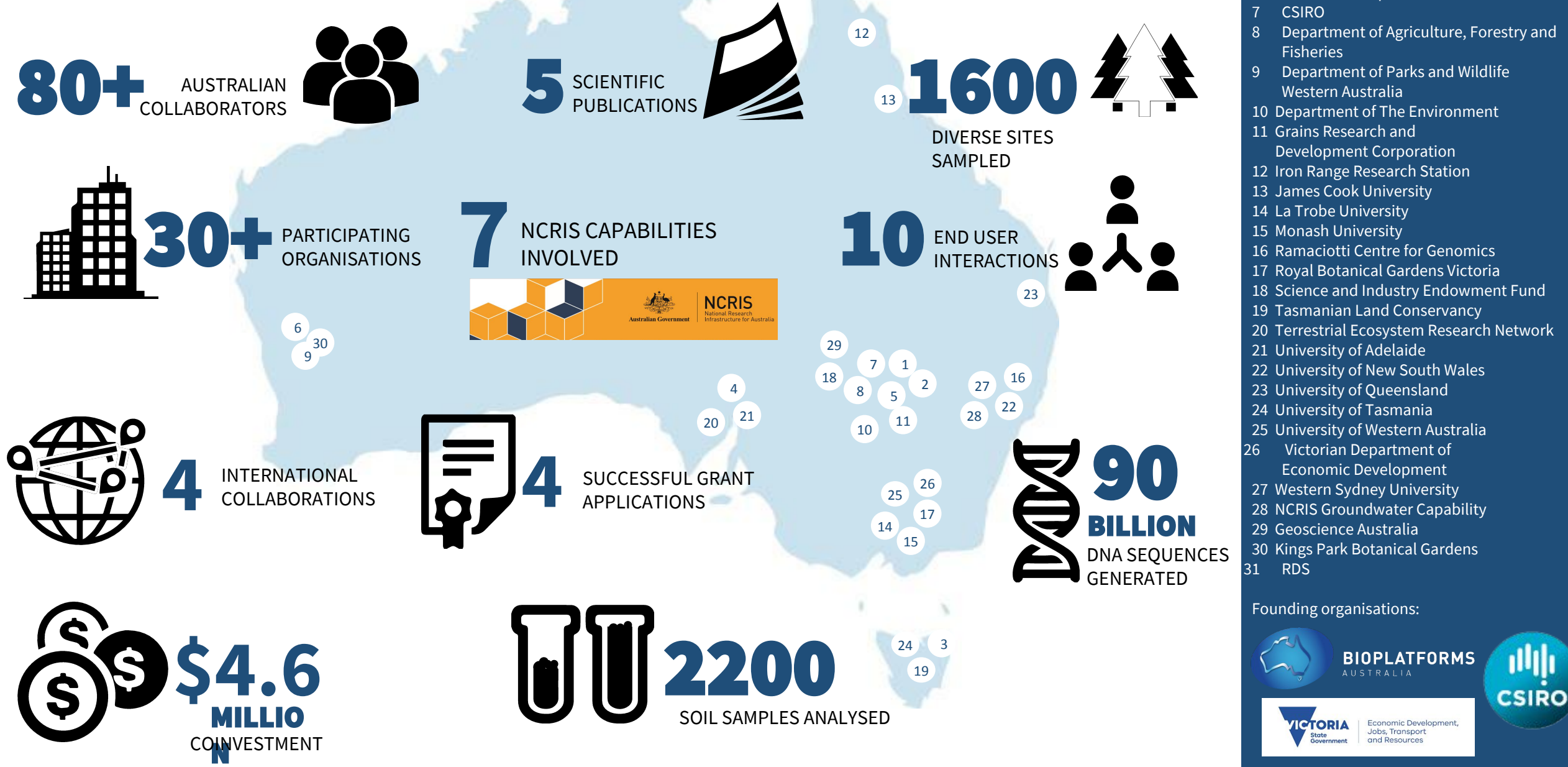


BIOME OF AUSTRALIAN SOIL ENVIRONMENTS



BASE Initiative



Soil microbes are paramount to ecosystem health. The Biomes of Australian Soil Environments (BASE) initiative has used next-generation DNA sequencing to generate a national framework dataset of microbial diversity and associated meta-data across the Australian continent. BASE represents a globally unique resource for research and application in environment, agriculture and biosecurity.

Soil microbes make up 20 to 30 per cent of the biomass of the planet and are one of the most ecologically important communities on Earth. The soil microbiome mediates carbon, nutrient and water cycling and is a primary determinant of soil fertility and agricultural productivity. Soil microbes form symbiotic relationships with plants that are crucial to maintaining species diversity and resilience in natural ecosystems. Microbial communities are, however, impossible to measure in the field and so knowledge about their diversity, distribution and dynamics is limited. This has severely impeded our ability to measure, manipulate and manage microbial diversity and function to achieve positive outcomes both for agriculture and the environment.

The project has directly addressed the challenge of measuring and modelling the biological and functional diversity of Australia's soil microbiome at scale. By combining metagenomic analysis of soil samples from over 1600 sites across the country with geochemistry, vegetation and climate data, the BASE team has delivered the first baseline dataset of an entire continent's microbiome. This dataset has demonstrated value for many and varied end uses including biosecurity, geological surveys, agricultural management and revegetation activities

To generate this national framework dataset, the BASE initiative involved extensive collaboration with the Australian research community, with more than 30 different partners including state and federal government departments, universities, NCRIS facilities (logos below) and international initiatives such as the Earth Microbiome Project. The methods and approach have since been implemented to monitor the marine and estuarine environments.

Australia is now unique in being the only continent with a comprehensive description of its soil microbiome, placing our nation at the very front of the international microbial soil science community.

