Case study 1

Biodiversity

Collaborative research on climate change and biodiversity in megadiverse ecosystems

South-west Western Australia and the Cape Province in South Africa are recognised as global biodiversity hotspots; those places on Earth richest in endemic species but most under threat by global change.

The two regions share many characteristics. They have ancient evolutionary links in their floras, (e.g. *Protea* and *Banksia*), similar Mediterranean type climates, very old nutrient impoverished soils, fire-prone ecosystems and plants which share many ecological traits. The regions have also exchanged plant species which have become weeds in their new environments, and both suffer from invasions from other parts of the world.

Increases in atmospheric CO_2 concentrations, projected increases in temperature, declines in rainfall, increases in the frequency of extreme climate events, changes to fire regimes and extensive land transformation will affect biodiversity in both regions and create new opportunities for introduced species to become invasive.

Planning for, and adapting to, the impacts of climate change will require sound scientific advice. Both regions have strong biological science capacity with complementary expertise and because of the ecological similarities are suitable for analytical comparisons and exchange of information.

In recognition of this, the Western Australian Department of Environment and Conservation (DEC) and South African National Biodiversity Institute (SANBI) have teamed up in a project supported by the Australian Government Bilateral Climate Change Partnerships Program.

The project is developing methods and tools to forecast and monitor climate change impacts on biodiversity as a basis for informing adaptive management decisions. Exchange of information and skills is increasing the capacity of both DEC and SANBI to plan for and adapt to climate change.

Research priorities include identifying the most vulnerable species, climate thresholds, improved bioclimatic modeling of species and biomes, interactions with existing stresses, developing management options to reduce vulnerability and the data management systems needed to support these activities.

Comparative modelling and experimental studies of keystone species in *Protea* and *Banksia*, mammal and bird species with contrasting dispersal abilities and mutually exchanged weeds in both regions will provide vital information on the interactive impacts of climate change and other threatening processes on biodiversity in both regions.

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