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The Four Aces

- reducing the Greenhouse Effect
- protecting biodiversity
- reducing salinity
- protecting agricultural land

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Agriculture and biodiversity in south-western Australia are facing two major challenges: climate change and salinity.

These challenges demand new approaches and solutions from science and industry.

Griffin Energy and the Department of Conservation and Land Management are initiating a project to investigate and demonstrate how the impacts of climate change can be reduced, salinity tackled, biodiversity protected and our farming systems made more sustainable.

The Four Aces will commence with a set of pilot projects that embrace the complexity of the natural environmental processes and agricultural activities on which we depend.

Ultimately, **The Four Aces** will produce significant benefits for Australia by encouraging on-going private investment in the revegetation of farmland. This investment in revegetation may come from both within Australia or overseas—anywhere where industry is seeking to reduce its overall Greenhouse emissions through Greenhouse sinks. **The Four Aces** will be a model for Greenhouse sink schemes in dryland Australia, that seek to use private investment to confront multiple environmental problems.

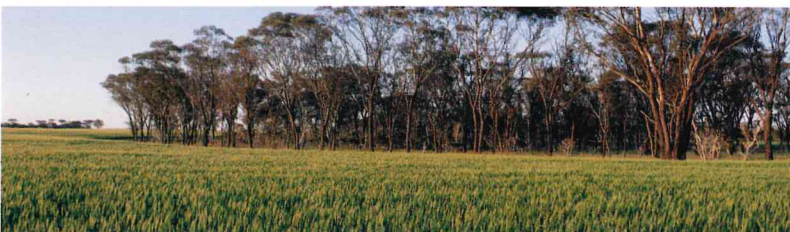


Climate change, often termed the 'Greenhouse effect', is caused by increasing amounts of gases such as carbon dioxide and methane in the atmosphere. Projected detrimental effects of global warming include higher temperatures, changed rainfall patterns, melting icecaps and stronger storms.

Salinity, caused by a rise of salty ground water tables has followed the clearing of land for agriculture. Salinity damages agricultural land, remnants of native plants and animals (biodiversity), water resources, rural communities and infrastructure. Salinity threatens 30 per cent of the productive land including 450 species of native plants and several internationally important wetlands.

This combined environmental assault from climate change and salinity places our agriculture industry and biodiversity at risk. **The Four Aces** is designed to achieve environmental, social and economic benefits by:

- sequestering atmospheric carbon by revegetating farmland with native species,
- restoring groundwater balance and reducing salinity,
- protecting existing biodiversity in remnant vegetation and enhancing conservation by connecting remnants with corridors of native species, and
- protecting agricultural land by restoring the water balance and showing that new agricultural practices can sustain land productivity while maintaining biodiversity.





The Four Aces will focus on two areas of high environmental and agricultural value.

Part One of the project will focus on a Natural Diversity Recovery Catchment identified in the State's Salinity Strategy. This stage could involve using native plants to revegetate up to 1,000 hectares of a 5,000-hectare catchment in the wheatbelt. This revegetation will be integrated with agriculture across the catchment and both protect and expand existing biodiversity values.

Part Two of **The Four Aces** will measure the Greenhouse impact of optimising stocking levels in pastoral country used for raising cattle.

The Four Aces will measure the amount of carbon that is fixed in soil and vegetation, and measure the changes in salinity and biodiversity following revegetation and changed pastoral practices. The carbon associated with these activities can offset net carbon dioxide emissions from burning fossil fuels and mitigate the Greenhouse impact of providing the State's electricity needs.

PART ONE: AGRICULTURAL LANDS

Part One will investigate how revegetating a dryland agricultural catchment should be designed and implemented to most effectively reduce salinity, enhance biodiversity and improve agricultural sustainability while fixing carbon from the atmosphere.

The revegetation will incorporate native species, including woodland eucalypts that may eventually produce timber products on a commercial scale. Replanted areas will be supplemented with logs and woody debris to enhance nesting.

Strips of trees such as oil mallees and eucalypts will be planted across paddocks, between remnant vegetation and in large blocks. Salt tolerant species will be planted in low-lying areas.

Accelerated dewatering using pumps and disposing of the water in evaporation ponds will be studied for its effectiveness in reducing salinity. A similar approach has been advocated to save several rural towns threatened by salinity, and is being used at Toolibin Lake in the wheatbelt.

Research and development for Part One will involve:

- detailed soil, hydrology and vegetation investigations,
- investigations of carbon sequestration in various plant species and soils, and
- monitoring the response of the catchment in terms of biodiversity, salinity and carbon sequestration.

PART TWO: PASTORAL LANDS (RANGELANDS)

Part Two will investigate the amounts of carbon that can be sequestered in rangeland plants and soils following changed grazing practices, feral animal control and the treatment of degraded areas. Part Two will also determine the feasibility of measuring small changes in carbon through on-ground measurement, modelling and remote sensing techniques.





Climate change, The Kyoto Protocol and carbon sinks

The increasing recognition that global climate is being changed due to the accumulation of Greenhouse gases has resulted in national and international research, agreements and action.

The United Nations Framework Convention of Climate Change (UNFCCC) recognised global warming as a problem, and set in process a series of steps to stabilise Greenhouse gas emissions. The 1997 meeting of the Parties to the UNFCCC resulted in the Kyoto Protocol.

The Kyoto Protocol consists of an agreement to reduce global Greenhouse gas emissions from industrialised nations by 5.2 per cent between 2008 and 2012 relative to 1990. While the best-known Greenhouse gas is carbon dioxide other Greenhouse gases include methane and nitrous oxide. The Kyoto Protocol promotes a market based approach to reducing net emissions by both encouraging the trading of emissions ("carbon credits") and also considering that carbon sequestered as a result of re-planting trees on farmland can counterbalance emissions from the use of fossil fuels or industrial processes.

Western Australia is preparing Carbon Rights Legislation to provide certainty for parties seeking to engage in carbon sequestration or trading. This will help promote Western Australia as a secure place to invest in carbon sinks, thereby promoting revegetation and land use changes.

For Further Information

The Department of Conservation and Land Management is responsible for protecting Western Australia's biodiversity and conservation lands. There are particularly large challenges in the wheatbelt, where broadscale clearing and salinity are placing globally recognised environmental values at risk. Climate change will exacerbate these risks and challenges as habitat conditions change. Focussed revegetation is one of the most promising options to protect wheatbelt farm production and regional biodiversity.

Griffin Energy provides around one third of the coal for the Western Australian electricity power-grid and is seeking to determine whether greenhouse sinks combined with other energy efficiency initiatives can provide Western Australia with a secure, sustainable and environmentally responsible means to satisfy its energy needs.

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