



Environmental Research &
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Research & Development

Application

ERIC undertakes R&D to improve the quality and cost effectiveness of information and the application of information to achieve business and environmental outcomes.

ERIC has developed a business advantage through research and development but maintenance of this leading position depends on ongoing research and development. Research represents the means of achieving continuous improvement in performance and is fundamental in environmental as well as business management. For example, with remote sensing research will always be required to establish the potential for the application of new forms of imagery.

Research projects are formulated and conducted within a business framework that addresses the return on investment associated with project outcomes. Projects are assigned priorities that reflect commercial realities with priority given to fully funded activities.

Research is often conducted collaboratively to increase the range of skills. Collaborators include individual scientists as well as similar companies to ERIC, such as Sustainability Science..

Remote Sensing / Image Analysis

The ERIC business was developed around the numerical analysis of remotely sensed data to

provide information for land use and management. The SoilMap technology was commercialised by ERIC and is still the most cost effective means for mapping soils to address land use and management.

The R&D skills are used to adapt existing methods to more cost effectively address client needs with outputs being tailored to meet specific requirements. Techniques previously developed mapped the clearing of native vegetation, remnant grasslands and the abundance of the weed prickly acacia. More basic research is investigating the remote measurement of plant health that is examining fluorescence as well as reflected radiation.

The identification of a distinct salinity signature in airborne gamma radiation data by ERIC personnel is a significant development.

Environmental Analysis

The information developed from remotely sensed data is integrated with other spatial data, such as climate, to identify business opportunities, improve profitability, address environmental compliance and reduce risk. Combined with the image analysis capabilities, this provides a broad and comprehensive capability to develop methods to evaluate land condition and other address other such monitoring requirements.

Research is conducted to improve the quality



and applicability of information from ‘traditional’ sources, such as climate and topography. Issues include the reliable identification of frost risk where this involves the prediction of patterns of cold air drainage from topography. The method also maps areas of drainage accumulation to identify areas of sedimentary soils susceptible to waterlogging.

ERIC personnel have identified a ‘new’ mechanism for global warming based on water vapour. As with recent research by others it identified the apparently anomalous decrease in potential evaporation with increase in temperature as being associated with increased atmospheric water.

The mechanism involves a symbiotic relationship between plants and bacteria whereby bacteria in stomata are ‘evaporated’ into the atmosphere. The bacteria are highly effective in seeding clouds. This provides a mechanism whereby the removal of perennial vegetation can decrease rainfall.

If correct this effect has broad practical and political ramifications. It would mean that the establishment of perennial vegetation has a greater effect on global warming than just

carbon sequestration and it would also provide local production and environmental benefits..

Soil Analysis

As part of a much broader initiative involving others, ERIC is developing methods for evaluating the health of soils. A method has been developed to provide a new measurement of the ability of soil to bind water. The measure is analogous to Cation Exchange Capacity but is physically better defined and much easier to obtain.

The measurement varies markedly between reactive and non-reactive clays and with different levels of soil organic matter. It provides a cost effective means of identifying the geological origin of soils in regional surveys, of characterising their agricultural potential, and for assessing the impacts of land use and remediation.

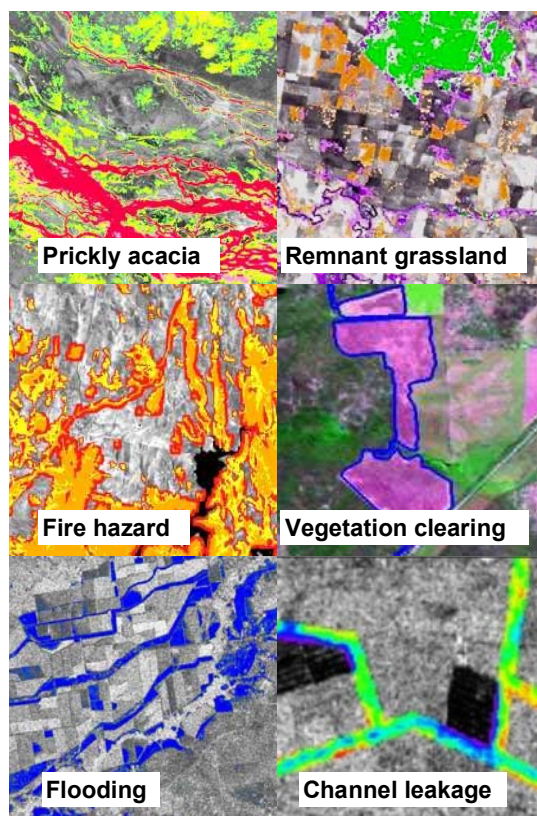
Methods are being developed to assess the biological health of soils to supplement physical and chemical analyses. These are designed to assess remediation requirements and the effectiveness of remedial treatments. This links with other research developing materials for soil remediation from wastes.

Plant Analysis

The remote sensing of plant health links with the development of non-invasive ground instruments to measure plant health and fruit maturation. The approaches being investigated include reflectance, fluorescence and EM.

A method has been developed to predict plant development for grape vines that is generally applicable to perennial plants that exhibit phasic development. It does not use an assumed set date for the initiation of plant growth and this date can be evaluated using the method. It provides more accurate results for grape vines than prior methods.

Knowledge of the environmental controls on the phasic development of plants allows better assessment of the appropriate areas for different crops. It also aids management decisions relating to factors such as disease control and harvesting.



Water

Ongoing research is investigating the effects of conditioning treatments on water. Results to date have provided physical measurements of change that differ between conditioning systems and exhibit a linear response to flow. Effects of conditioners can be altered by the use of preconditioning illustrating that the effect of a conditioner depends on the prior state of the water. The conditioners effect a change and there is no change if the water is already in the state caused by a conditioner.

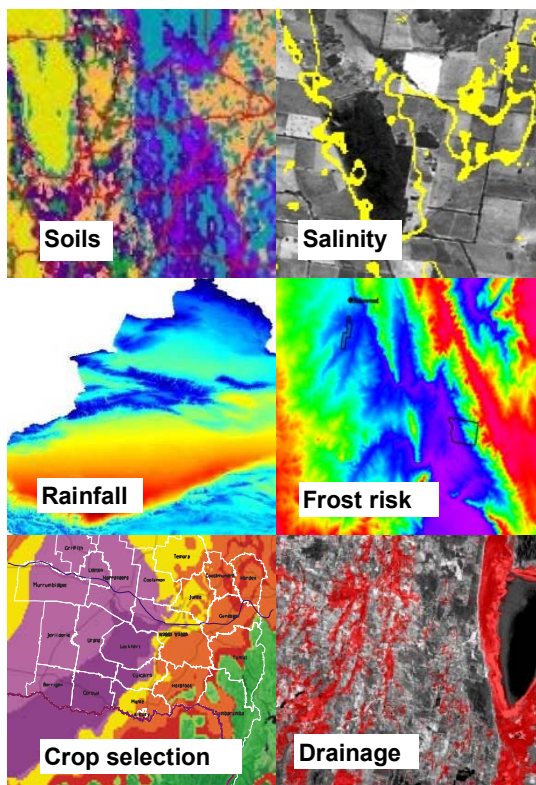
Planning and Assessment Methods

The ERIC methods for planning and assessment have been designed to be comprehensive and cost effective. They can be adapted for self assessment as was done for risk management assessment for insurance purposes.

While the methods are generic, application generally requires tailoring the process to specific needs. This is a normal part of the development process.

Policy Development

Policy development represents a special case of planning and assessment that looks to the



future. The ability to develop comprehensive contextual information and the analytical and planning abilities lead to the development of effective policies.

AWARDS

INNOVATION

Viticulture Site Selection

ACT Research & Development Grants Scheme Awards

Best Emerging Product in Environmental Industries.

Flood Mapping using Radar

Radarsat special recognition award

Special award for the mapping of floods in the Northern Territory using satellite radar.

Business of the Year Award

Canberra Business Centres, Product Innovation and Consolidation

Award for combining technological developments and business outcomes.

SOILMAP[®]

1. Finalist in the 1999 Australian Technology Awards

Finalist in Excellence in the Development of Technology for the Enhancement of the Environment.

2. Showcased by Business Australia and Environment Australia

Special presentations at the Sydney Olympics.

3. Australian Technology Showcase.

ERIC as a current member of the Australian Technology Showcase.

4. Support under the COMET scheme.

Selected under the Commercialisation of Emerging Technologies scheme.

5. Nominated by Murdoch University as a Sunrise Technology

Listed in the Environment Australia report identifying Australia's Leading Edge Environmental Technologies