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# Agriculture

## Application

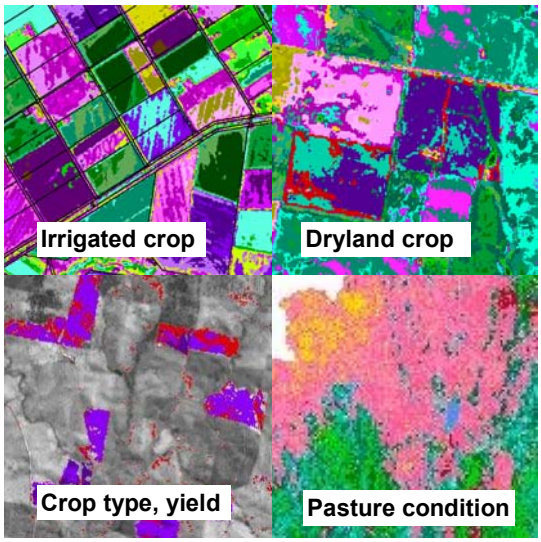
The profitability and sustainability of agriculture can be improved by improving the management of existing enterprises or introducing more profitable activities. With existing land uses the need is to obtain information to improve management and production. When introducing new activities the question is whether the land is suitable for the intended purpose by way of production and environmental sustainability.

Some information needs are common to both, as with the requirement for improved knowledge of the climate and soils for the landholding. However, introducing new activities increases the uncertainties. Identifying new opportunities benefits from additional information on the likely suitability and potential of the proposed land use.

Many decisions with enterprise development are pragmatic largely because of deficiencies in the applicability and availability of information. The resource intelligence needed for an informed decision either does not exist or is dispersed and difficult to assemble and use.

The ERIC product range provides information to identify potential opportunities and identify the best locations for given activities. The scope can be broad, such as mapping areas of Australia climatically best suited to high value tree species, or highly specific, as with identifying the sites best suited to viticulture and the most appropriate grape varieties.

**Crop Monitoring**




This capability statement is directed at products and services for improving outcomes with existing landholdings. Investment opportunities are addressed in the Enterprise Assessment capability statement.

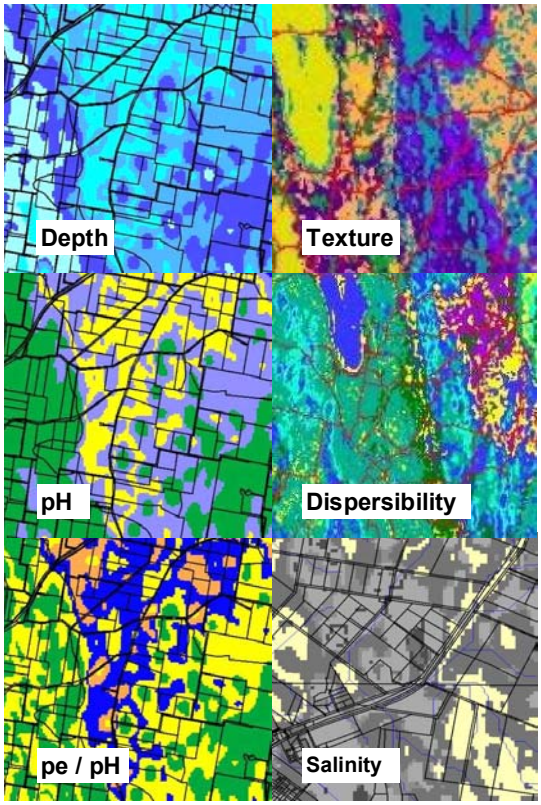
## Approach

Spatially detailed information on the natural, resources is developed, integrated and analysed to provide intelligence to improve planning and management. Modern technologies are used to provide high quality and reliable information and reduce costs. Support is provided to ensure effective uptake and application of the detailed information.

A comprehensive range of products and services addresses a wide range of developments and allows clients to select products that best meet their needs. The information is provided as digital maps in GIS to ensure effective and efficient access and

facilitate application. This also allows rapid production of purpose specific reports and maps.

**Soils Properties**




## Product Range

ERIC has a core capability to develop new information on vegetation, soils, and groundwater resources from remotely sensed data. New information is also derived from other data, such as climate records. This is combined with existing information and analysed to address specific client needs.

The reference information developed by ERIC includes detailed maps of:

- Vegetation / Land cover
- Soil
- Subsoil constraints

Existing information accessed, compiled and developed to allow for integration includes:

- Terrain
- Climate
- Infrastructure

Products developed from this information include maps of:

- Salinity hazard & risk
- Fire hazard
- Surface water and cold air drainage
- Flooding

Services based on the information include:

- Enterprise site selection
- Risk assessment
- Environmental management information systems
- Groundwater bore location
- Waste water disposal
- GIS development

Services can also be provided on crop performance and land condition monitoring. While these provide paddock level detail projects must have regional coverage to be cost effective.

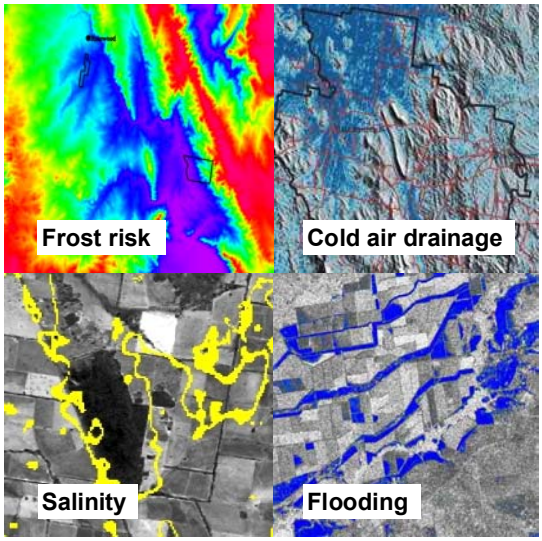
## Products

### Land Use and Crop Performance

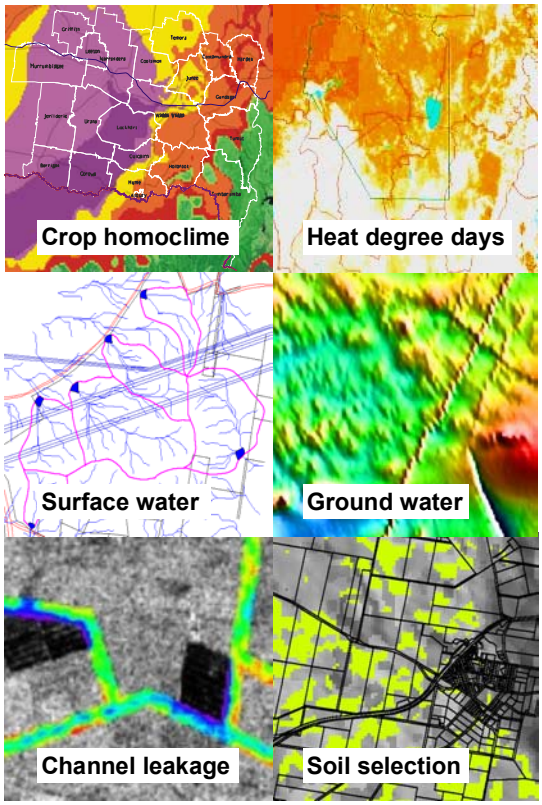
Satellite imagery is used to map patterns of land use and monitor the performance of crops and pastures. Imagery obtained at an appropriate time can be used to discriminate between crops and map patterns of yield variation.

Intelligence derived from such information includes developing understanding the reasons of variations in yields within paddocks and crop failures being associated with the time of planting.

**Enterprise Risks**



**Developed Intelligence**




## Soil Properties

Along with climate soils represent the main constraint to agriculture. However, the soils information is rarely available in the detail and form needed for management decisions. The ERIC SoilSelect method is designed to cost effectively provide detailed information on the soil properties that affect land management and development.

The product mosaic identifies soil properties that are routinely mapped at paddock level detail across regions. All of these properties affect the performance of plants and susceptibility to risks such as erosion, waterlogging and salinity. The detailed mapping of surficial salinity allows identification of existing hazards and risks and the potential for change.

The soil properties routinely measured are selected for cost effectiveness. Other properties are generally most cost effectively determined once the main patterns of soils are known. The soil maps provide a basis for improving the value of sampling to address requirements such as fertiliser application.

The ERIC research, along with that of many others, has identified the importance of organic matter and soil structure in determining the health and productivity of soils. ERIC personnel have developed a measurement for a new soil property that quantifies the effect of soil organic matter and of different clays in adsorbing water. The measurement provides a means of monitoring improvements and degradation to soils associated with land management.

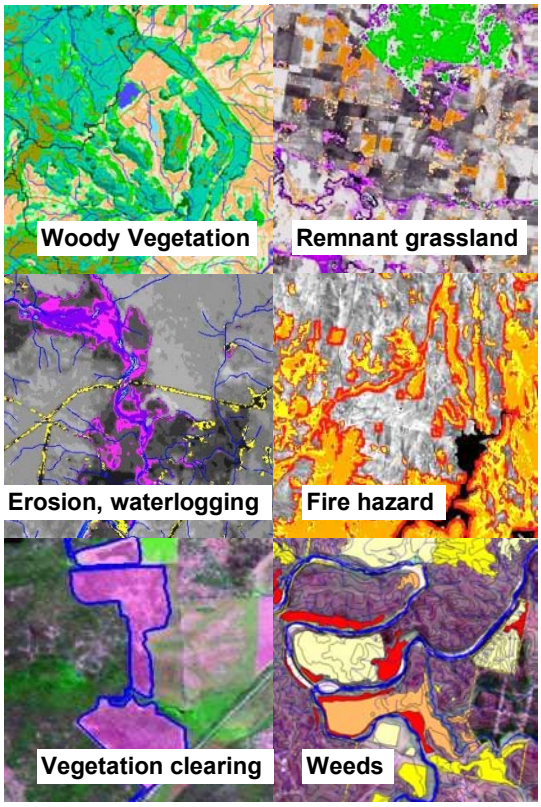
## Enterprise Risks

The enterprise risks identified are largely associated with climate. Frost risk is largely climatically driven but is moderated by cold air drainage. Knowledge of the climatic and topographic constraints can be used when selecting varieties, and choosing planting dates and configurations.

## Development Intelligence

Water is again being recognised as Australia's most limiting resource. Knowledge of potential surface runoff identifies the potential

**Development Constraints**



for harvesting within statutory limitations. The ability to access groundwater can overcome limitations imposed on surface water harvesting. Mapping points of water loss can improve the efficiency of water use.

Climate represents the main constraint to the introduction of new crops. Uncertainty can be decreased using climatic analyses that examine the suitability of proposed crops. Uncertainty is further reduced by access to detailed maps of soil properties. Sites can be selected that best suit the proposed crop.

### Development Constraints

Information developed from satellite imagery addresses many needs. Mapping native woody vegetation identifies land now generally quarantined from clearing while remnant grasslands are also potentially quarantined from development. Impacts such as erosion and waterlogging can be mapped to identify risks and improve land management.

The fire hazard map, developed to a statutory specification, further identifies constraints to development. The cost of weeds is ongoing and often difficult to assess.

### Environmental Management Information Systems

The Generic Environment Management Methodology was designed to cost-effectively address environmental issues. Modules are linked in a feedback cycle to achieve continuous improvement in performance. The ERIC products and services provide the basic components for implementing this management system that incorporate the ISO1404 principles for environment management.

### Risk Management Assessment

A risk assessment methodology that provides a rapid and comprehensive means of ensuring all planning and management issues are identified and addressed. The method pinpoints deficiencies and can provide a statistical evaluation of performance. Such assessment provides the basis for the development of plans and actions essential to demonstrate environmental and management compliance. The risk assessment method allows for self assessment and the quantitative result can be used to monitor performance.

### Environment Management Information System