Environmental Research &
Information Consortium Pty Ltd
(ABN) ACN (81) 055 194 771
Ph 02 4842 8182
Ph 02 6161 3716
Fax 02 4842 8183
info@eric.com.au
www.eric.com.au

FORESTRY

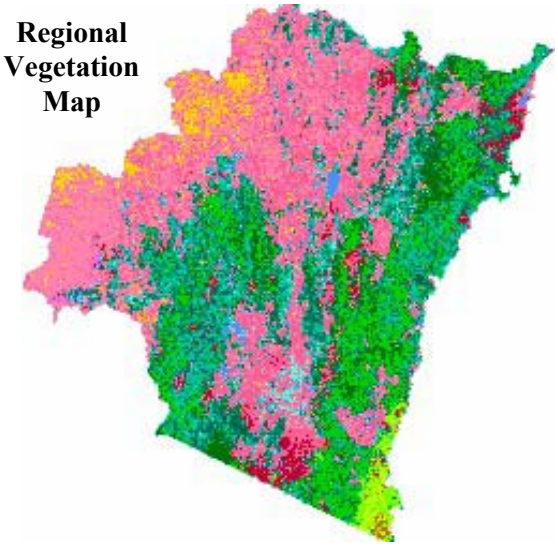
Introduction

Forestry applications addressed by ERIC include regional analysis of the potential for plantation development, native forestry inventory, and plantation layouts. The information addresses climatic, soil, terrain and vegetation constraints to development, risks such fire and frost, and monitoring of planting, harvesting and condition.

Information developed includes mapping existing vegetation, soil properties, terrain, climate, and variations in plant performance. Existing vegetation is used to address timber resources and conservation requirements. Climate addresses suitability by way of temperature and rainfall, and risks such as frost. Soil and terrain identify site suitability.

Plantation development maps are produced that identify plantable areas, addressing requirements such as setbacks from watercourses, retention of native vegetation, and easements for roads and fire breaks. The information can be used to address compliance, assess resources, reduce risk, improve marketing and management, and increase profitability. Satellite imagery is used for performance evaluation and monitoring.

Regional Vegetation Map



Regional Assessment

Vegetation

Vegetation mapping is used to identify the location, nature and extent of the harvestable resource. Combining ground observations with the detailed vegetation maps provides reliable quantitative assessment of the nature and level of the timber resource.

Native vegetation can restrict the areas available for plantation development. Regional land cover and vegetation are cost effectively mapped using satellite imagery to identify areas available for plantation development. The imagery can also be used to monitor plantation development within regions.

Climate

Climate is a prime determinant of site suitability. Factors such as rainfall, water balance and frost risk are mapped from climate surfaces.

Areas with appropriate climates for particular species are mapped from climate surfaces using homoclimes. These use key climatic indices to map the similarity with

areas where the species are known to perform well.

Soils

The broadest level information is given by existing soil maps that represent soil landscapes. More reliable information is derived using a lithological analysis of geology maps. More detail again has been provided by combining analyses of airborne gamma radiation with information from soil databases to identify areas with suitable soil properties. This provides broad information to determine the location and extent of soils suitable for plantation development.

Site Characteristics

Individual site selection and plantation development usually require more detail than provided by regional assessments.

Land Use

Statutory regulations affect the clearing of land for development and water harvesting. Satellite imagery, aerial photography and ground observations are used to determine the available land area. Harvestable water is determined from catchment area and climate.

Aerial photography is used to provide detailed maps of woody vegetation and riparian areas and is spatially referenced to cadastre and the satellite imagery. This spatial adjustment allows the photography to be used to provide accurate plantation layouts. Together with information on slopes it provides accurate estimates of planted areas.

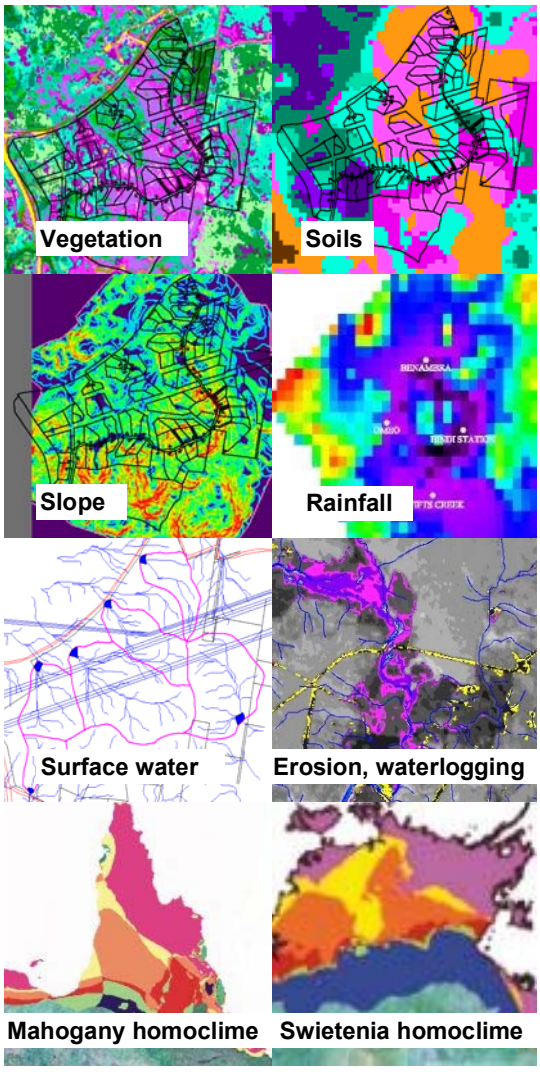
Terrain

Slopes determine the plantable area and the ease of planting and harvesting. Steep slopes, drainage lines and areas subject to waterlogging are excluded. Aspect affects yields where water is limiting. Southern slopes can provide highest yields in marginal areas, and northern slopes where water is abundant.

Soil

Trees grow on a wide range of soil types and in most positions in the landscape, thus there is no single correct answer as to the soil requirements as defined by existing soil maps. The uncertain relevance of soils arises because of the general use of soil type rather than soil properties, and the interaction between soils and other factors in determining the effective environment. Soils moderate the effects of factors such as rainfall and potential evaporation hence the significance of soil properties varies with these factors.

The soil 'property' of universal relevance for trees is drainage. Freely draining soils are highly desirable while waterlogged soils



are normally unusable. Drainage is often inferred from soil texture and colour but the relevant objective measure is redox (pe / eH). The levels of pe indicate hydration and, in association with pH, determine the solubility of ions.

Key factors additional to the above include bulk density and the occurrence of impermeable layers. A good rooting depth is highly desirable where this is linked to drainage and the soil water holding capacity.

ERIC uses a variety of techniques to map soils depending on the available of data but all methods are based on mapping spatial patterns from remotely sensed imagery and collecting field information to characterise the associated soil properties. Maps are derived from airborne radiometrics where these data are available as this can provide paddock level detail for regional mapping.

Combining the field measurements with the radiometric patterns allows mapping of different soil properties, such as texture and pH. Other attributes of interest, such as available soil water holding capacity, can be estimated from the measured properties.

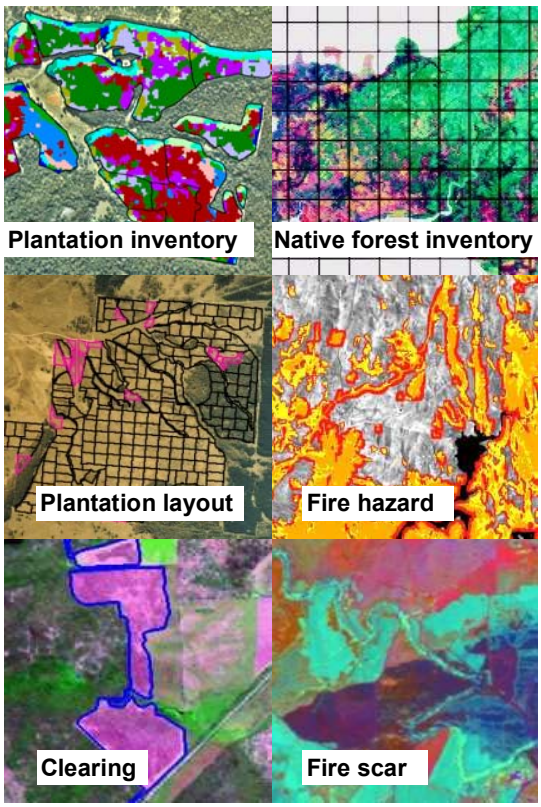
Plantation Monitoring

Satellite and airborne imagery provides opportunities for cost-effective monitoring. The imagery provides general estimates of cover and greenness of the vegetation. Ground observations are used to identify the reasons for detailed patterns and to quantify factors such weeds and as timber volumes. Maps of terrain and soils help determine reasons for the mapped variations in plant performance.

Information Integration

The different forms of information are combined in a GIS. The integrated information is analysed to produce maps that address specific requirements. For native forests, this allows cost-effective assessment of the nature, amount and location of the resources. As the information is mapped, it provides the foundation for planning requirements such as roads, fire control, harvesting, and biodiversity conservation.

ERIC provides support for the implementation of information systems that has included hardware and software acquisition, information development, training in application, and online support and maintenance. The information and technology are integrated within the client's operations to provide the institutional strengthening needed to achieve continuous improvement in business and environmental outcomes.



Benefits of the approach include:

- Provides a reliable assessment and record of the resource.
- Allows monitoring of the resource.
- Allows the development of an effective acquisition strategy.
- Provides information for use in quality control, marketing and corporate reporting.