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Surface Water

Application

Information to address compliance and land management is developed from a many data sources. The information includes:

- Surface water yields
- Water availability to plants
- Waste water disposal
- Surface & surficial drainage
- Water bodies & waterlogging
- Water application

Approach

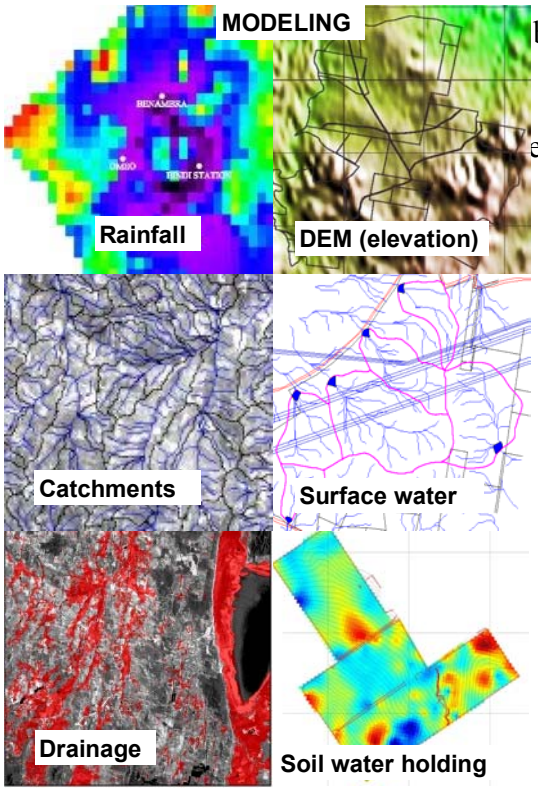
Information to address client needs is derived using the most cost effective and reliable means available. Spatial patterns are mapped using measured data where possible as this identifies reality. The measurements include data from meteorological stations as well as airborne and satellite imagery. Meteorological information is usually incorporated as climate surfaces to allow mapping for the areas of interest.

Modelling is used to address requirements that cannot be cost effectively met by direct measurement. Patterns of soil wetness and surface yield show marked temporal as well as spatial variations and these are best addressed through modelling. The available soil water holding capacity (AWHC) can be derived from measurements of soil water holding characteristics but, as these soil characteristics are seldom measured, the AWHC is generally estimated from other soil properties.

Information and Analysis

Surface water characteristics are modeled from climate surfaces for rainfall and potential evaporation and terrain. This allows derivation of information such as surface water yields and harvestable water.

Integrating soil properties in the analysis improves the prediction of potential yields and identifies the capacity of the soils and climate to sustain different crops. It also provides the basis for calculating the potential for waste water disposal and the irrigation needs for different crops.



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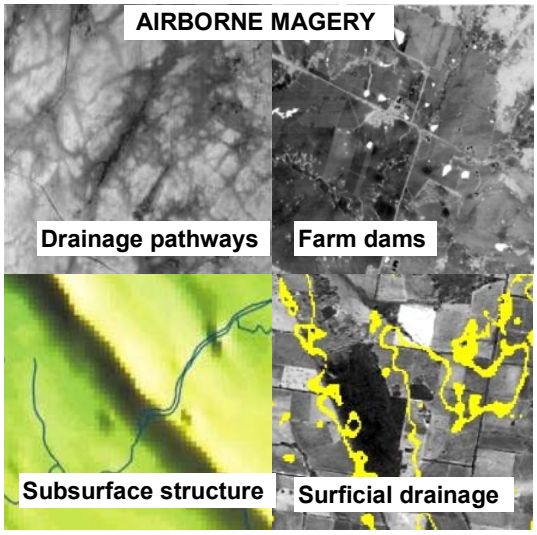
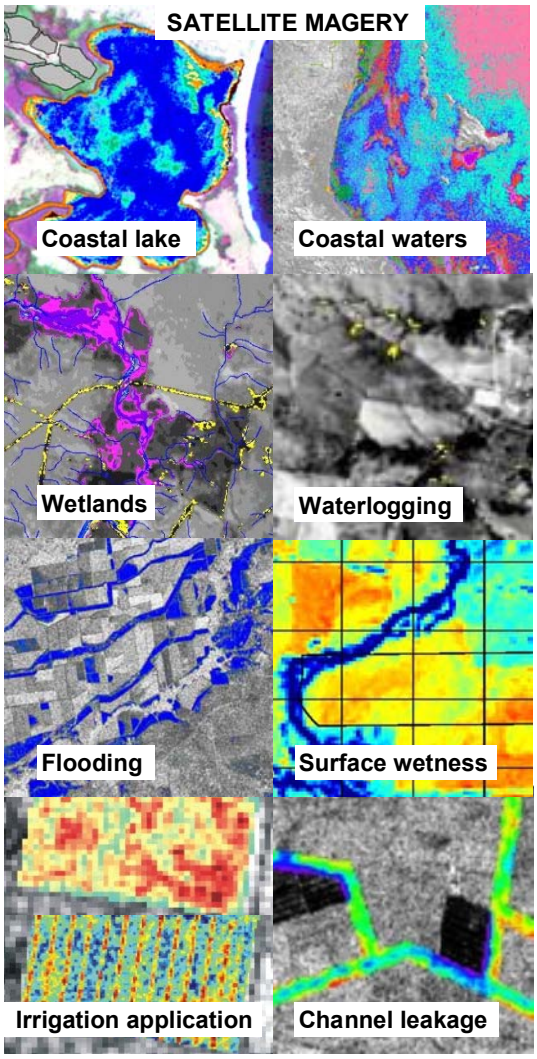
Surficial (soil) water flow patterns are determined by soil properties and subsurface structure as well as the surface topography. Information on how there factors affect patterns of water flow is obtained from airborne geophysical imagery. Nighttime airborne thermal imagery identifies preferred flow pathways, such as fractures, and patterns of accumulation. Magnetics identify major geological constraints, such as a dyke blocking subsurface and most surface flow. Radiometrics can be analysed to identify lineaments indicative of fractures, as is done for groundwater exploration. Nighttime thermal imagery can also be used to provide high resolution mapping of water bodies.



Optical satellite imagery provides information on diverse aspects of surface water. A wetness index identifies patterns of surface wetness. Another analysis allows mapping of waterlogged areas as well as water bodies.

Optical satellite imagery contains considerable information on the properties of water bodies and can be used to map attributes such as wetland type, water depth, turbidity, algal concentrations, and temperature variations. The applications addressed include environmental pollution as well as resource mapping.

Appropriately specified radar measurements directly respond to water on the soil surface and in the surface few centimeters. Satellite radar can therefore be used to detect and map



characteristics such as flooding, irrigation application and leakage from irrigation channels. Due to the pronounced effect of surface topography on the radar measurement such observations are largely restricted to areas of flat terrain. However, for flooding such terrain effects can usually be removed from the results.