



ARGOS RESEARCH NOTE: NUMBER 33, JANUARY 2007

How ARGOS uses Geographical Information Systems (GIS)

The Geographical Information System (GIS) is a key component in the ARGOS database structure. The system stores all the geographical relevant information and is linked to the ARGOS Access database which holds all other datasets related to the farms and orchards. This research note outlines the role and potential of GIS within the ARGOS project. The Access database has been outlined in a separate Research Note (No 20, Nov 2006).

Data Capture and Management

ARGOS is using the ArcGIS software which is one of the most widely used GISs. ArcGIS provides a geodatabase designed to store spatial data with its location and its 'attribute' data.

For the ARGOS farms, aerial photos, 'cadastral' data and NZ Topodata has provided an information base. To get more detailed information on a within-farm scale, a baseline field survey was carried out to gather additional information on vegetation, streams fencelines, etc. This survey data was entered into the geodatabase, combined with the existing data from aerial photos and NZ Topodata, and then crosschecked again through a dialogue with the farmers and growers.

These baseline maps of the properties are updated on an annual basis to track changes and provide a time series of detailed land use changes. This information

will show is farming is sustainable, and will calculate efficiency of farming more accurately.

Visualisation

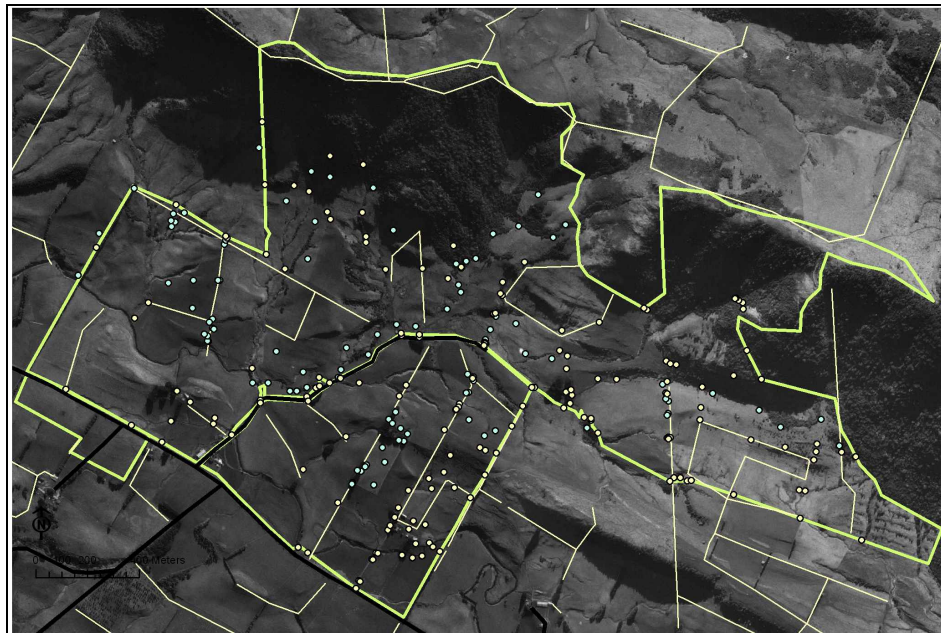
In addition to setting up the geodatabase, another major goal for 2006 was to produce property maps for all participating farmers and growers. The key elements of the maps are the management units (paddocks and Kiwifruit blocks), their area (in hectares) and their names. Woody vegetation, shelterbelts, streams, tracks, roads and buildings finalise the maps.

The farm/orchard maps are important reporting tools and the illustration the maps provide is essential for an effective dialogue between farmers and researchers. The maps can show where the monitoring areas and survey transect lines are, and relate the research results to these visual 'queues'. This is an effective way of communicating the results from our research and has proven invaluable during interviews with you.

Analyses and generation of scenarios

The main strength of a GIS, compared to a more basic mapping software, is its capability to carry out complex spatial analyses. Such an analysis could for example investigate the relationship between the distribution of vegetation patches, shelterbelts, and biodiversity indicator species, e.g birds and spiders.

a)



b)

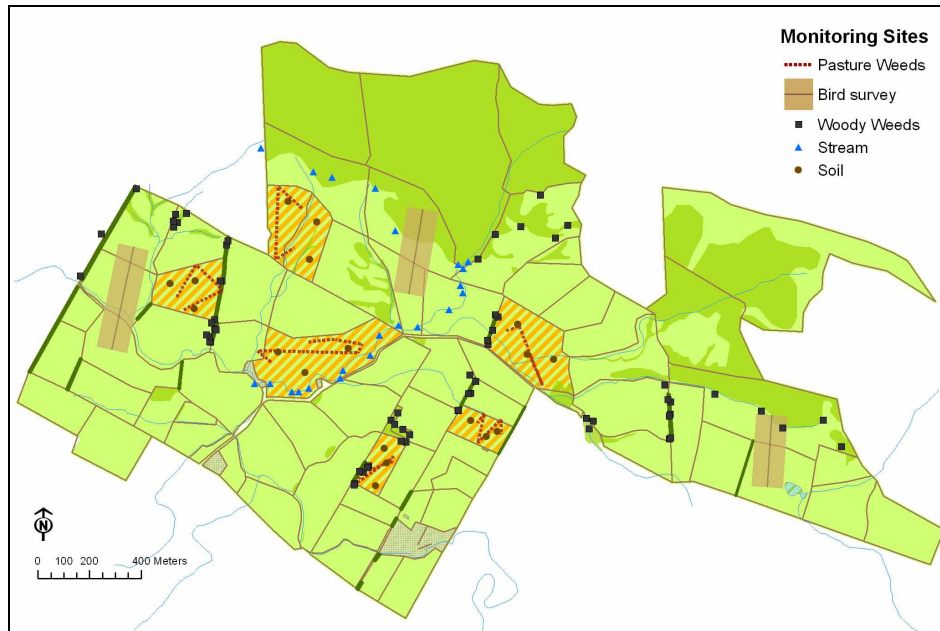


Figure 1. a) base information to generate a farmmap: aerial photo, data such as fencelines, roads and streams from the Topographic Database, School of Surveying, University of Otago and GPS data from the fieldsurveys (points). b) Farmmap with monitoring sites and transect lines of field surveys.

Summary

The ARGOS GIS provides the research team with an ability to see how social and environmental processes interact with landscape patterns at multiple temporal and spatial scales. Combined with all the other ARGOS datasets and research methodologies, the ARGOS researchers stand strong on assessing and validating the sustainability of farming systems within New Zealand.

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