

## AGMAPS LAND MANAGER “UNEARTHING LAND RESOURCE INFORMATION”

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### **Abstract**

Sustainable development is now the principal goal for strategic land use and natural resource management planning. Land managers, land users and regional planners need enabling institutional and economic environments, resources, information, knowledge, education and skills to progress towards this goal. Information and knowledge about the land resource is essential for developing ‘land literacy’ (Campbell 1992) and improved decision-making and development of improved methods for extending this information to all those involved with land development and management should therefore be a priority.

This paper describes how a catchment planning decision support tool (AGMAPS Land Manager) has been developed to improve the extension of interpreted land resource information to users. It briefly describes the features and benefits of the product and its role in empowering a wide variety of people with improved knowledge about land resources and how they should be used and managed, which is an essential requirement to achieving more sustainable patterns of land use.

Additional Keywords: soil, land use, land capability, risk management, planning, decision support tool

### **Introduction**

Traditional methods for extending land resource information consists of printed, paper based reports and maps. Several recent studies (Imhof, 2000; Maschmedt, 2000) suggest that these traditional approaches are being under-utilised. With calls for improved accessibility to land resource information (AFFA, 1999; AAS, 1999) and improved learning strategies for land managers to enhance the adoption of sustainable management practices that are geographically applicable (Cary *et al.*, 2001), together with advances in digital document storage and data presentation, an interactive digital geographic data system was a logical step to pursue.

Consequently, a small team from the Department of Agriculture, Western Australia initiated the AGMAPS project with the aim of improving the extension of land resource information and related management and technical information to land managers, land users and regional planners. The initial underpinning philosophy was that there were a wide variety of potential markets for land resource information and that with value adding and use of readily accessible, 'mainstream' computer technology, it could be extended to these markets.

The vision was for a product that enabled users to view a map, identify relevant map units, click on a map unit and be linked to the underlying land unit, land quality and capability information. The product also had to be inexpensive to develop and require little or no training to use.

In 2003 an AGMAPS Land Manager CD-ROM was produced to compliment a rapid catchment appraisal activity in the Frankland-Gordon area, located about 350 km south of Perth, Western Australia (Overheu, 2003). The evaluation and feedback from the release of the CD indicated that there is a definite market and need for this style of decision support tool for extending land resource information to the rural community.

### *What does AGMAPS Land Manager do?*

AGMAPS is a range of computer based, land planning decision support tools that enable information on agricultural development and land management to be matched to the planning and geographic needs of users. Non-expert users can view land resource and land use capability maps and information for regions and individual properties and then access publications on relevant management and development techniques (Kininmonth, 2003).

AGMAPS Land Manager CD-ROM is one of three products in the AGMAPS series. It packages agricultural resource spatial information with a decision support tool for selecting optimum agricultural land uses and management practices. The data on the CD provides a ‘snap shot’ of information on the risk and impact to agricultural production and natural resources for a selected catchment area and also identifies some of the best or most suitable options to manage the risk. The focus is to link land use and management to land capability (from a database of land use (crop and pasture) options together with local expert collaboration). Also contained on the CD

are detailed soils information, maps, technical reports, representative photos and web links to assist with planning and decision-making.

### Materials and Methods

AGMAPS Land Manager has been developed to run on IBM compatible platforms under the Microsoft Windows operating system. The technology on which AGMAPS is based is called "Data Binding" associated with Internet Explorer browser versions 5 (or above). Data binding allows for the separation of the land resource data from the Hypertext mark-up language (HTML) structure.

A combination of Internet tools including JavaScript, Dynamic HTML and Cascading Style Sheets (CSS) is used to create a local Land Management database system which extracts data, in real time, which then through the data binding process recompiles these in to a HTML template for viewing by the user. JavaScript is used to allow more interactivity on each HTML page.

An Access database is used to prepare the knowledge management system, which is the foundation for the AGMAPS Land Manager CD-ROM. The knowledge management database system (figure 1) catalogues and stores the collective relevant and local focus information. Such information includes land management publications prepared by various government departments, local governments, catchment and farming groups, which are catalogued against geographic criteria such as applicable climatic zone, land use, soil type, landscape position, land quality or management strategy.

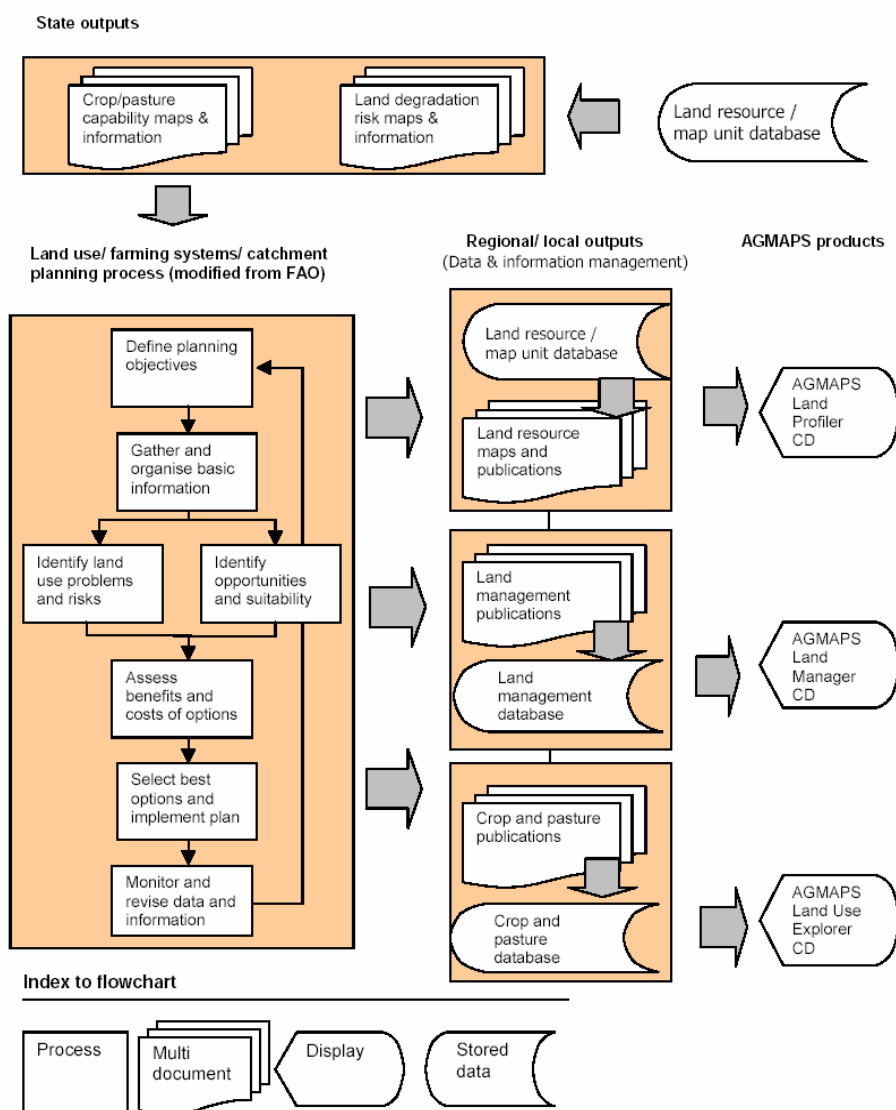


Figure 1. AGMAPS knowledge management system (from Kininmonth, 2003)

The geographic data consists of aspatial and spatial data. The knowledge management component is partially addressed by a number of databases including the Western Australian Department of Agriculture's map unit database, vegetation database and land management publications database. Digital maps are saved in portable document format (PDF) and presented in a frame contained within web browser software.

## **Results and Discussion**

AGMAPS Land Manager represents both a product, a structure for presenting and integrating information and a system for packaging and extending this to users.

*The AGMAPS Land Manager provides users with the ability to:*

- Display a PDF land resource map and use zoom and search functions to identify a property and the applicable soil-landscape systems and phases (i.e. map units)
- Access general information about the land resources, soil landscapes and map unit phases
- Identify land management units and associated soil types applying to each phase
- Display ratings and information on the 25 land qualities and land use capabilities relating to the land management units
- Access detailed information on over 50 soil groups, including soil profile photographs, diagrams and distribution maps
- Display land capability ratings for general or specific land uses for each land unit
- Display PDF maps showing features such as estimated current salinity impact, land form patterns and slope analysis for the assessed catchment area
- Link to PDF publications that relate to use and management of soils
- Cut out sections of the maps for pasting into reports.

*Potential users of AGMAPS Land Manager include:*

- Agri-business / agronomy consultants.
- Land managers, farmers, conservationists
- Government agencies (researchers and extension / development officers).
- Students (upper secondary / universities).
- Special interest groups (rural and new industry development groups / progress associations).

*Benefits of the system include:*

- The ability for the product to be created for other areas by replacing the map files and files containing the text, photographs and figures.
- A structured database of information to which geographically relevant land management and development information can be added.
- An easy and inexpensive product to duplicate and distribute to large sections of the community compared to other methods.
- Delivery of information to users in a form that is easy to understand, thereby facilitating land literacy, informed or better agri-business decision-making
- Assist and encourage land managers to adopt sustainable natural resource management practices where economic and other advantages can be clearly demonstrated.

As stated by Cary *et al.* (2001) recognition of resource degradation problems, in most cases, can be assumed to be a necessary condition, which is a precursor to landholders considering the adoption of sustainable practices. Further precursors to adoption include an understanding of the relative (financial) advantage and geographic applicability of the solutions (Cary *et al.* 2001). Therefore the immediate uses of AGMAPS Land Manager will be for presenting (and evaluating) the risks of land use impacts, identifying development and management issues and locally relevant solutions and identifying general land use potential. This will assist day-to-day decision-making and farm or catchment level planning. It will also be used to assist more detailed land resource assessments where up scaling are occurring and also assist with regulatory reporting on land degradation issues.

A major strength of AGMAPS Land Manager is that it provides a rigorous structure to which detailed land use and management information can be linked. For example, where wind erosion is identified as a risk applicable to a land management unit the user can be linked to strategies and technical information on management as it relates to a

particular land use. Alternatively, where a particular crop or land use, for example Faba beans, is identified as being suitable for a particular area then the user can access technical information relating to development, including enterprise budgets.

The AGMAPS Land Manager product is currently being developed for a number of other regional areas in Western Australia. Digital soil-landscape maps together with a fully attributed geographic land resource database cover most areas through Western Australia, which enables the relative ease of AGMAPS development. Each AGMAPS Land Manager can be simply created by localising the information and replacing the maps and data files for each region together with amending some of the static HTML pages.

While the system can be delivered over the Internet, slow download speeds through some parts of rural Western Australia makes the use of interactive decision support tools frustrating to run. Therefore the best delivery method at this point in time is to distribute the AGMAPS Land Manager system on CD-ROMs. As web mapping technology advances and ISP connection speeds improve, AGMAPS will migrate to an on-line delivery.

### **Conclusions**

AGMAPS Land Manager is one of several computer based decision support tools being released by the Department of Agriculture, Western Australia for managing and extending information that can be used by government agencies to build partnerships with other geographically focused planning groups and to facilitate integrated land use planning. Presented in an easy-to-use and appealing format, users can view maps, zoom into an area and retrieve information on the soil types likely to occur in the area. Retrieved reports, maps and other data can also be printed to assist with property planning.

The product will be a valuable tool for property owners, rural and environmental planners, agricultural consultants, developers, real estate agents and students. It will promote better land use and conservation practices and will be of considerable help to landowners seeking to understand the physical potential and management needs of their land.

The structured map unit database in Western Australia assisted with the development of the AGMAPS Land Manager CD-ROM. However all Australian states have been conducting land resource surveys and reports and maps are available for many regions. Most states also have comprehensive databases containing conventional land resource information at scales useful for regional and local planning. Similarly all states have processes in place that are resulting in the production of development and management information by a variety of organisations for use by land managers and land holders. In principle therefore a slightly modified AGMAPS template could be adapted to suit other regions and local areas throughout much of Australia.

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