CLIENT FOCUS: LANDCARE UTILISING GIS

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ABSTRACT

The complexities involved in Landcare planning with multiple land owners and communal environmental concerns can create difficulties to the amelioration of land degradation. Geographic Information Systems (GIS) can be used to manage the awkward mix of fine spatial detail with broad Landcare issues. The current focus of the GIS industry with providing products that only display spatial data is often inadequate. Maximising the long term effectiveness of GIS with Landcare activities requires a method that focuses on the Landcare groups operational style. Nine guiding steps are described which can enhance the effectiveness of GIS in Landcare catchment planning. This method is illustrated in the case study of the catchment planning by the Breakfast Creek Landcare Group (New South Wales).

INTRODUCTION

Addressing the increasing range of land degradation issues facing the agricultural community is continuing to be the responsibility of the Landcare movement. With the rapid rise in the number of Landcare projects, resources, necessary to achieve sustainable agriculture, are continuing to be diluted, resulting in strategic allocations of government and private funds (Alexander 1995). The complications with strategic planning involving multiple land owners and shared environments can be impassable. Geographic Information Systems (GIS) has the potential to combine private and common landscape features that can ensure effective Landcare style management. Maximising the effectiveness of technical consultants to assist with GIS utilisation requires the process to be sympathetic to Landcare philosophy. This paper offers a methodology, to GIS consultants and practitioners, when assisting Landcare groups with sustainable land use planning. The application of these approaches is then discussed in the context of Landcare planning for the Breakfast Creek Landcare group.

The emergence of rural groups, across Australia, dedicated to sustainable land management has led to the formation of the Landcare movement (Campbell & Siepen 1994). The underlying approach is for Landcare groups to take responsibility for local land degradation problems and then combine individual resources to provide solutions. The land rectification issues are often a complex concoction of social, economic and environmental factors (Martin & Woodhill 1995). This unusual mixture of environmental concerns with primary productivity has resulted in social structures that facilitate cooperative learning. Group members are encouraged to develop an understanding of the degradation issues so that local initiatives can be developed. The emphasis within Landcare is to empower the group to act on issues that affect the local community (Alexander 1995).

The provision of GIS products, to Landcare groups, often results in short term and limited usages. The planning maps often suffer from inappropriate scales combined with a lack of essential details and rarely succeed in conveying an understanding of the data capture tolerances.

[1] The views expressed in this paper are not necessarily those of Greening Australia or the Department of Natural Resources and Environment

Landcare groups need products that reflect an awkward mix of fine detail such as fence lines with broad environmental themes (Fraser 1992). The end product has to provide a method of integrating inter property issues such as native vegetation networks and practical considerations such as fence alignments. Usually the technical consultant controls the project as much as possible in order to ensure timely delivery of a quality product. However the supply of display products, by itself, is insufficient to achieve Landcare goals. To achieve success, the application of GIS needs to be tailored to match the underlying Landcare approach. Assessment of the client's needs often reveals that peripheral products, such as education, are required. If Landcare groups are involved in the product development then the scope of the project can be greatly extended.

THE LANDCARE GIS PROCESS

The framework for integrating a client focus to Landcare projects utilising GIS requires consideration of nine steps.

1. The technical consultant should focus initial discussions, with the Landcare group, on planning and management outputs not GIS technicalities. The group should not be drawn to the notion that a GIS is the only solution or that production of spatial data is the final output.
2. If the Landcare group is keen to proceed with GIS as part of their planning then the consultant should outline the technical and financial requirements. With any new technology the expectations rarely match the actual usage and groups should be prepared for the technical anomalies of spatial data usage. Consultants should avoid designing a technically orientated product at the expense of a practical solution.
3. The Landcare group should purchase the aerial photos or other data sets directly from the supplier. The consultant may need to provide purchasing guidance but the base information should be managed by the client.
4. When in the process of data capture the consultant should travel to the local area, if practical, and utilise community facilities. Setting up a temporary office in a hall or house creates a non-threatening atmosphere in a convenient accessible site. Asking land managers to travel to a distant office fails to reinforce the local empowerment of the Landcare issues. De-mystifying the complexities of GIS and computers encourages client interaction and promotes critical assessment of the procedures.
5. If the consultant's project involves mapping individual farms then the farmers should be scheduled to spend at least two hours on a one to one basis constructing data sets. The farmers should be encouraged to engage in digitising or other forms of data capture in order to develop an appreciation of the project's accuracy. Incorporating the detailed knowledge of the farmer, in, for example, line construction for fences can result in a far greater accuracy than is usually possible from remote sensed data. The appreciation of the data capture process by the farmer will result in the insightful use of the final product.
6. As the project progresses the consultant should provide verbal progress reports. Avoid presenting draft maps for comment, until virtually finished, as this may cause confusion and disappointment.
7. The consultant should present the final draft to the Landcare group. Face to face interaction is important when engaging in critical assessment of a product. Errors and omissions can be received by the consultant in non-technical language, which may be masked in written comments.

8. The consultant should endeavour to provide an output that provides a planning solution. Many technical reports contain maps that are difficult to interpret or are insufficiently described with keys, legends, text and headings. The planning nature of the maps demands thematic simplicity. The danger of GIS is the ability to easily incorporate many layers of information at the expense of cartographic principles (Phil King pers comm). If possible the consultant should provide the relevant data sets in a format that can be used by agricultural GIS programs such as Instant survey.
9. The Consultant should develop a method to receive feedback on the progress of the project. Farming communities, in general, dislike gimmicks and will value the committed long term approach of the consultant.

THE PROCESS IN ACTION

The Breakfast Creek catchment is situated 30 kilometres south of Cowra in New South Wales. In 1993 the Breakfast Creek Landcare Group (BCLG) formed as a response to dryland salinity and erosion. The twenty-two member properties concentrate on sheep and cattle grazing with cropping in the creek flood plains. Initial farm planning has been conducted on large aerial photos with transparent overlays. Although this method of displaying property attributes was successful the group were seeking a coordinated approach. In 1994 the group commissioned an environmental consultant to assist with the development of a catchment plan. The catchment plan outlined the overall strategies for the BCLG at a broad catchment scale. At this developmental stage the BCLG invited the author to speak, on behalf of Greening Australia ACT & South Eastern NSW, about vegetation establishment assistance.

The nine steps, outlined above, were attempted with mixed success and several modifications had to be implemented.

1. The 'introduction to Greening Australia talk' partly involved property planning maps generated by the computer software called Mapinfo. This talk was part of a regular BCLG meeting.
2. Shortly after the talk the president of BCLG initiated further discussions with the author. Technical considerations were described and various outputs demonstrated. Confirmation of the BCLG planning project occurred several weeks later.
3. The BCLG purchased the aerial photos required from the Bathurst Land and Information Centre. The photos were supplied in digital TIFF format which can be utilised directly by Mapinfo. Three way liaison between the BCLG, the Bathurst Land and Information Centre and the author ensured the correct sets of data were assembled.
4. For two days in July 1995 a simple computing facility was constructed at the BCLG president's residence. This proved to be an excellent venue for farmers to develop their farm plans.
5. Each farmer was allocated two hours to construct data for their property. The aerial photos were georeferenced to the 1:25,000 scale topographic maps. Using the aerial photos in the background features such as fence lines, dams, tracks, watercourses and buildings were digitised. All the farmers in the project were able to digitise land features and consequentially developed an appreciation of the tolerances involved with data capture. In addition the appropriate use of data structures such as points for water points, lines for creeks and polygons for paddocks provided insights into spatial data applications. In this session five properties were mapped. The value of the farmer's knowledge in interpreting

the aerial photos proved invaluable.

6. As the property data was prepared, over a two month period, verbal feedback to the BCLG president ensured the continuation of the project. In November 1995 steps 3, 4 & 5 were repeated with four more properties mapped. Other properties were scheduled but due to wheat crop harvesting several farmers were unable to participate.

7. An A3 property plan was produced for each farmer and supplied via the BCLG president. Due to work commitments face to face feedback was not feasible. Several comments concerning line style were received from the farmers. Overall the farmers reported satisfaction with the planning capabilities of the product.

8. Individual property plans were produced in simple A3 format that could be photocopied and used for a variety of farm management situations. The overall catchment plan was printed at A0 and consisted of shaded property fence lines with different colours over a base of roads and rivers. All the digital data that was constructed was supplied to the BCLG in formats applicable for Instant Survey and Mapinfo. Ideally the digital data should be loaded and adjusted on the relevant farmer's personal computers. This would overcome many of the potential difficulties, farmers have, when dealing with unfamiliar technologies such as computers.

9. Feedback on the project has been obtained through a close relationship with the BCLG president. The individual property plans proved a success and a substantial enticement to the planning process for the rest of the Landcare community. Additional properties will be mapped during 1996 and the direct integration of these properties will ensure the catchment maps are continually relevant to the BCLG. The catchment plan is incorporated with salinity hazard data to provide guidance in determining priorities in rehabilitation assistance. To assist the integration with other reports, production of the catchment plan should be at a common scale. Digital data has been used by two farmers on their own computers. The recent promotion of mapping programs by Landcare officers may result in a higher utilisation of digital data in the near future. A community owned personal computer would assist the planning activities of the BCLG.

CONCLUSION

The commitment and involvement of the Landcare members in developing their catchment plan highlights the need to expand the scope of a project to match the clients needs. Focusing on the clients operational style, combining as Landcare does, education with decision making, ensures the development of an infrastructure that continues to expand to meet the clients needs. Landcare is an evolving social structure that requires products such as GIS to embrace change. Static maps, depicting landscape systems, are no longer the complete solution to the active and dynamic planning by Landcare groups.

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