ADOPTION AND INFLUENCE: INDUSTRY EVALUATION OF THE GRASSGRO[TM] DECISION SUPPORT TOOL

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Abstract

The GrassGro Decision Support tool (DS tool) (Donnelly and Moore, 1999) was released for commercial use in Australia with a training package in late 1997. An assessment of its adoption was made by a survey of 53 registered users in March 1999. An evaluation of the software and training package was made at training workshops by 92 users between 1997 and December 1999. The response rates to the survey and the evaluation were 62% and 82% respectively. Seventy six percent of survey respondents had analysed at least one problem with GrassGro and 27% had applied GrassGro to five or more problems encountered in the management of grazing enterprises. Users valued training highly and on completion were confident in their use of GrassGro; 63% of repondents had extrapolated the results of their analyses to a district or regional level.

Keywords: Decision support, grazing systems, simulation, modelling, evaluation, survey, adoption

Introduction

GrassGro is a DS tool developed by CSIRO Plant Industry's GRAZPLAN group to examine whole enterprise production risk for grazing enterprises in high rainfall temperate

zones of Australia (Moore, Donnelly and Freer, 1997). GrassGro simulates pasture growth and predicts the intake of herbage of ruminants and their productivity using daily weather inputs and user-specified descriptions of soil type, pasture species and livestock. For any specified site users can analyse grazing management systems in terms of pasture and animal production, gross margins and year-to-year variability.

GrassGro was released with a commercial partner, Horizon Technology Pty Limited in November 1997. The target clientele was the network of advisers, consultants, researchers and tertiary educators servicing the grazing industries. By January 2000, 148 licensed copies of GrassGro had been distributed to 52 sites in Australia for use by extension officers and consultants (44%), researchers (32%), tertiary educators (18%), primary producers (2%) and agricultural policy makers / other (4%). GrassGro was sold with a training package because it was novel and because potential users had variable computer literacy and gaps in their knowledge of grazing systems beyond their specialist discipline. This paper reports an assessment of the adoption of GrassGro based on a survey and training evaluation to show whether the client group found GrassGro useful and if, after training, the group members felt competent to use it (Donnelly and Moore, 1997).

Material and Methods

Survey - In March 1999 (16 months after release) all recipients of licensed copies of GrassGro were surveyed. Fifty three questionnaires were sent by email and responses were returned by email or post. Users were asked three questions about training and five questions about their use of GrassGro. Five further questions asked the user to rank on a Likert scale of 1 to 5 (Alreck and Settle, 1995) their agreement with statements about their confidence in using GrassGro and agreement with lists of issues that enhanced or impeded its use. Users were asked to make comments or suggestions.

Training course evaluation -Training comprised a two-day workshop followed by a one-day workshop about two months later. Users had phone and electronic access to a technical team. Between workshops users were asked to apply GrassGro to a grazing management issue. By March 1999, 51 users had been trained and by November 1999, a total of 92 users had been trained in 14 workshops at 10 locations.

Formal evaluation of training commenced in mid 1998. At the end of each workshop participants were asked to complete and return anonymously a one-page questionnaire. Fifteen questions investigated the confidence of users in operating GrassGro, their opinion of the adequacy of the training package, their understanding of the limitations of the DS tool and the availability of technical assistance using a Likert scale of 1 to 5. The same questionnaire was used at both initial and follow-up workshops to record any change in user response over the training period.

Results

Survey - Thirty three questionnaires were returned (62%). Results are summarised in Figure 1. The proportion of repondents who had used GrassGro intensively (five or more problems) was 27%. The types of problems analysed were diverse and reflected the range of user occupations. In 39% of cases the problem analysed referred to a single farm or site and 57% referred to more than one farm. Sixty three percent of respondents extrapolated the results of a GrassGro simulation to a district or regional level.

The rates of non-use did not differ significantly between trained (5/27) and untrained users (3/6) (chi-square test). Those who were trained felt confident in using GrassGro on completion of training (mean score=4.0) and remained so when they first operated the program (mean score=3.7). Twenty five percent of trained respondents did not feel confident (score of 3 or less) in operating GrassGro when they subsequently used the program. The

highest-ranked improvements suggested by respondents were better default values for soil inputs, validation of GrassGro with data and an broader selection of pasture species. Non-users added the following additional improvements in order of priority: greater flexibility of livestock management options, inclusion of hay production, improved modelling of competition between pasture species, a greater range of climatic sites and expansion of on-line Help.

Evaluation - The mean response rate to evaluation of six paired initial and follow-up training workshops was 82% (Table 1). The proportion of trainees attending the follow-up courses was 79% of the number at the initial workshop. The time elapsed between initial and follow-up workshops ranged from 48 to 145 days (mean =105 days). Table 1 shows the mean of user responses to eight questions. The overall mean response to all questions was 4.4 (range 3.6 - 4.9) at the initial and 4.2 (range 3.5 - 5.0) at the follow-up workshops. User comments indicated a demand for more time in workshops to use GrassGro on computers, greater course structure and specific data for soil and seed banks inputs. Respondents valued the opportunity to discuss grazing systems in a multi-disciplined group.

Discussion

These results demonstrate GrassGro's useability and value to clients who have gained the necessary skills to apply the tool. The range of problems analysed and categories of work to which GrassGro was applied reflect the diversity of client occupations. The value of these applications is indicated by the willingness of users to extrapolate the results of an individual farm analysis to a regional level.

The results of the survey and evaluation endorse the provision of training and support for GrassGro clients. On completion of training participants felt confident in operating and applying GrassGro. Training, documentation, technical support and the forum provided by

workshops to discuss grassland ecology and grazing management issues were highly valued by GrassGro users. Possible sources of bias in these results may be an overestimate of the proportion of users, if those who had applied the program were more likely to reply. Despite the high response rate to the training evaluation, results from the follow-up workshops may have underestimated user confidence if the 80% of original trainees who attended follow-up courses were less confident in using GrassGro than those who were absent.

Training evaluation has assisted the software development team reconcile conflicting demands for simplification of the DS tool from initial users with requests for more complexity by more competent users. The difficulties ranked by non-users suggest that they experienced problems in applying GrassGro to particular environments or types of management. The developers' responsiveness to user concerns has fostered a collaborative relationship with the target market in recognition that software development and user-adoption are mutually evolving processes (Stuth et al, 1997). User confidence will be addressed with further workshops, release of a new version, ongoing formal validation of GrassGro against published data and by on-farm case studies.

It is important that users realise the limitations and potential of a DS tool if it is to be applied appropriately. Periodic re-evaluation of the target market will be required as systems of agricultural education and extension evolve and as producers and agribusiness acquire the skills and knowledge captured in GrassGro. However GrassGro has potential to exert influence disproportionate to its level of "adoption" by these targeted users. The influence of GrassGro in the grazing industries will depend on communication of its ecological and economic principles by users to their clients, the producers (Stuth et al 1997). It is too early to attempt to measure any changes in the management practices of graziers and land managers induced by GrassGro. Future evaluation of GrassGro will attempt this more difficult task.

References

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Table 1 - GrassGro Training Evaluation. Summary and Mean Responses on a Scale of 1 (strongly disagree) to 5 (strongly agree).

Summary	Initial Workshop	Follow-up Workshop
Number of trainees present at evaluated workshops	41	33
Number of trainees who completed evaluation form (response rate %)	35 (85%)	26 (79%)
Number of trainees at each evaluated workshop (mean, range)	7 (5-10)	7 (4-8)
User satisfaction:	Mean Response *	
The course gave me a clear understanding of the principles behind GrassGro	4.5	
The course gave me a clear understanding of how to operate GrassGro	4.2	
The workshop was conducted with adequate time allowed for each component	4.1	
My questions about GrassGro were answered to my satisfaction	4.7	
The workshop provided me with adequate materials to support the training I received	4.5	
User Confidence:		
I feel confident enough to use GrassGro to investigate practical grazing problems	3.8	
The workshop allowed me to see applications for GrassGro in my work	4.5	
I understand the limitations of GrassGro and the types of problems it will not answer	4.1	

*. Mean responses to single questions for initial and follow-up workshops did not differ significantly (two-tailed t-test) and were pooled.
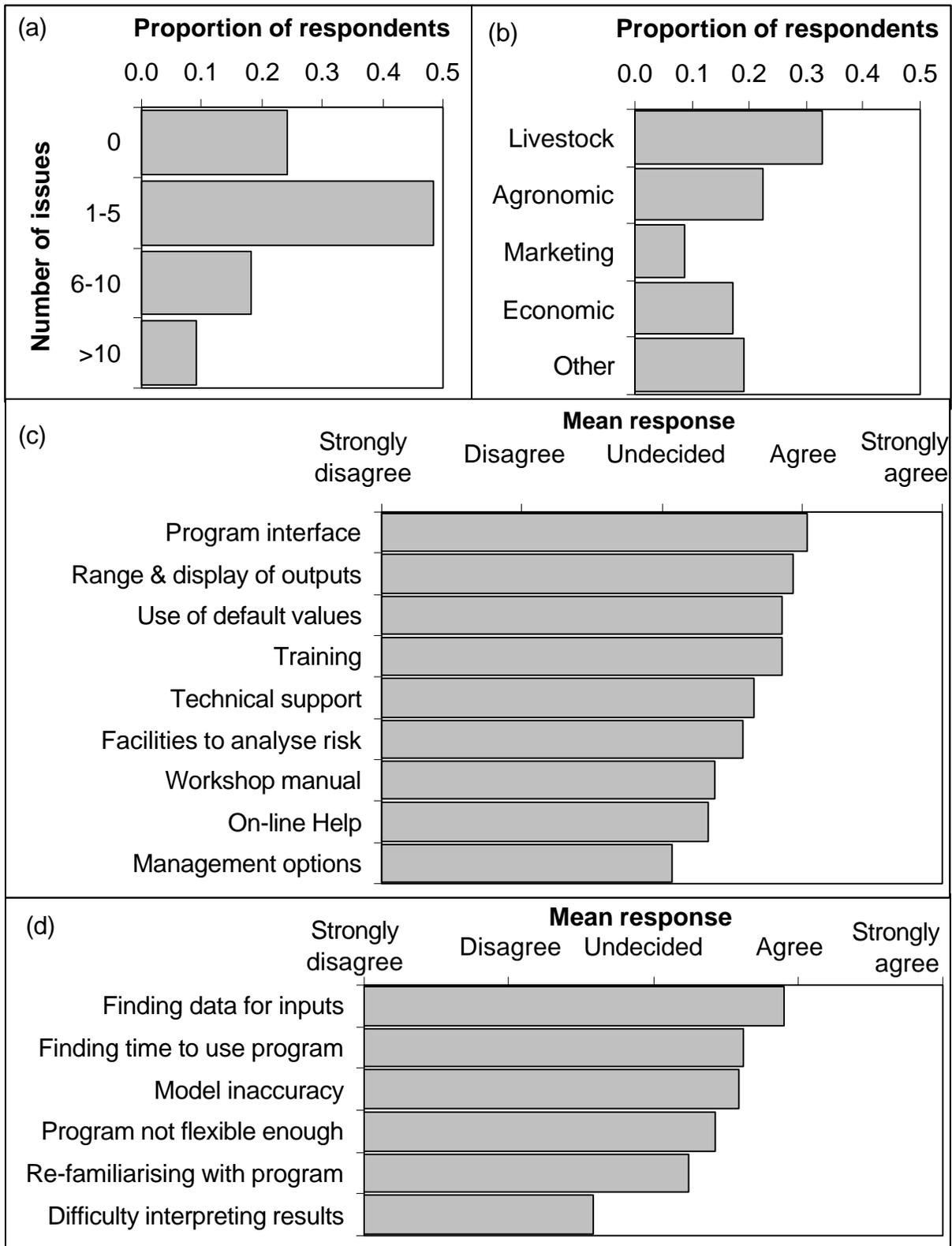
Figure 1 - Responses to survey of GrassGro users. (a) Number of issues analysed with GrassGro (b) Types of issues analysed with GrassGro (c) Features which enhanced use (d) Features which impeded use.