Comparing a DSS and Farmers' Decisions for Rangeland Management in Semi Arid Namibia

D. F. Joubert
Polytechnic of Namibia, Namibia

I. Zimmermann
Polytechnic of Namibia, Namibia

J. Fendler
Polytechnic of Namibia, Namibia

H. Winschiers
Polytechnic of Namibia, Namibia

F. P. Graz
University of Ballarat, Australia

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Joubert D .F .[1] , Zimmermann I .[1] , Fendler , J .[1] , Winschiers H .[1] and Graz F .P .[2]
[1] Polytechnic of Namibia , Private Bag 13388 , Windhoek Namibia , E-mail : djoubert@ polytechnic .edu .na ,
[2] Dept . Environmental Management , University of Ballarat , PO Box 663 , Ballarat Victoria 3353 , Australia

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Introduction Rangeland management in Namibia is largely reactive , with large sums of money being used in attempts to eradicate indigenous bush species that form thickets . A Decision Support System (DSS) for rangeland management with emphasis on preventing bush thickening has been developed in a wiki format and also in booklet form (Joubert *et al* .2005) (http ://chameleon .polytechnic . edu .na/wiki/) . Decisions are of three types : opportunistic or adaptive ; reactive (treating of symptoms) ; and ongoing good management . Workshops were conducted to involve land users in the DSS development . As part of the workshops , the DSS decisions were compared with decisions taken by farmers , in order to develop insights into farmer decision making . This paper reports on this comparison .

Materials and methods A total of 19 farmers in two workshops (Groups One and Two) separated spatially by about 300 km , but both in semiarid savanna , were individually introduced to six scenarios in the field . Farmers provided the decisions they thought would be appropriate for each scenario . Participants' responses to each scenario were recorded and compared with the decisions recommended in the DSS (expressed as ％ of respondents with responses corresponding to suggested decision) (Table 1) . The participants of the two workshops' responses were also compared using the Renkonen Index (Krebs , 1999) in order to determine whether proximity influenced land user decisions .

Results 17 response categories were identified . The greatest variation in response categories (13) was for Scenario 1 , a treatment of a symptom that farmers are most concerned with . This also had the lowest concurrence with our suggested decision (0％) (Table 1) .

Table 1 *Decisions suggested by DSS (abbreviated) and the ％ of farmers with same or similar response .*

Scenario and decisions suggested by the DSS for their management	Respondents
Scenario 1 : Dense stand of healthy mature bushes (bush thickened) with a sparse cover of annual grasses . Decision : Stem burn selectively	0 ％
Scenario 2 : Dense stand of healthy mature bushes (bush thickened) with a dense cover of perennial grasses . Decision : Burn the thickets of high cover and browse after they resprout .	48 ％
Scenario 3 : Dense stand of mature bushes (bush thickened) with sparse cover of annual grasses . Many bushes are dying back as a result of fungal infection and drought . Decision : Do nothing to the bushes .	37 ％
Scenario 4 : Dense stand of mature bushes (bush thickened) with a dense cover of perennial grasses . Many bushes are dying back as a result of fungal infection and drought . Decision : Do nothing to the bushes . Consider a burn to hasten opening up the stand , since bushes are dry and will easily burn .	53 ％
Scenario 5 : Open savanna with scattered trees . *Acacia mellifera* seedlings are present at the end of the dry season (due to two consecutive good rainy seasons) . There is very little cover of predominantly annual grass . Decision : Pull out most surviving seedlings , rest rangeland for remainder of growing season .	11 ％
Scenario 6 : Open savanna with scattered trees . *Acacia mellifera* seedlings are present at the end of the dry season . There is dense cover of predominantly climax perennial grass (due to two consecutive good rainy seasons) . Decision : Burn late dry season , rest for the early rainy season and then graze .	58 ％

Respondents showed the highest concurrence with our DSS decision for Scenario 6 . There was a low ％ similarity *between* groups for decisions for scenarios (ranging from 38 ％ for scenario 1 to 54 ％ for scenario 4) suggesting an influence on decision making by neighbours . Group 1 showed a far greater reliance on herbicides than Group 2 (for 5 scenarios and 1 scenario respectively) . Group 2 generally agreed with our decision for scenarios 4 and 5 .

Conclusions Contrary to the agreement with our DSS suggestion for scenario 6 , an adaptive decision that is required very infrequently (after two to three consecutive high rainfall years) , farmers are in reality reluctant to burn , due to perceived economic losses . The results show that decision making in a similar environment for any particular scenario is highly diverse . We believe an easy to use wiki DSS , if marketed vigorously through extension , can greatly improve communication and debate , and improve consensus in decision making . Currently , farmers are more interested in symptom treating than adaptive preventative measures , partially since a fairly large proportion of land is already encroached .

References
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