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# Matrix ranking: a means to discussion

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## • Introduction

Matrix ranking was discussed by Simon Maxwell and Claude Bart in *PLA Notes* 22 (1995) in terms of its numerical outcomes. However, they suggest that *'the discussions that take place while the matrix is being drawn up can be as illuminating as the matrix itself'*. This paper is an account of that statement.

I conducted MR exercises with graziers[1] in the semi-arid rangelands of western New South Wales (NSW), Australia. I used the method as part of semi-structured interviews (SSI), and later as part of two dialogue meetings between graziers, researchers and advisers.

I wanted to achieve an active process that not only aided my research, but also to begin a thinking process with the participants which would provide them with new insights.

## • The matrix ranking exercise: a thought process

Important plant species were selected while discussing the vegetation in different paddocks on the property. In the year of the interviews, western NSW was in a drought and only perennial shrubs could be observed in the field. Therefore, instead of driving a transect on the property, the discussion was held 'at the kitchen table', aided by a simple map of the property. The plant species mentioned by the graziers were written on blue cards. Criteria mentioned during the discussion were written on pink cards.

First, the blue 'plant cards' were ordered by the grazier in a general order from best to worst and so formed the top horizontal row of the matrix to be formed. Each plant was ranked for each of the criteria mentioned. The plant ranked highest for a criterion received a card with *number 1*, the plant with the next highest rating received a card with *number 2*, etc. Overall, the top five plants for a criterion were ranked from one to five and the bottom five plants were ranked from 16 to 20[2].

Plants that ranked somewhere in-between did not receive a numbered card to prevent the procedure from becoming too time-consuming. The numbered cards represent relative, rather than absolute importance.

During the MR, the participants explained why they put their cards in their positions. Perceptions were expressed about characteristics, conditions needed and values of plants and the importance of each criterion. The discussion which developed during the ranking was taped and later transcribed.

An important observation was that the MR attracted other people present in the house who initially did not participate in the SSI. Frequently, an interview was held with a grazier (usually male) at the kitchen table, while his wife was busy doing housework and listening to the conversation. During the MR she often joined in by commenting on the ordering of the cards, adding plants and/or criteria.

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1 'Grazier' is the Australian term for pastoralist.

2 For practical reasons, no more than 20 rangeland plants were included in a matrix ranking and therefore 20 was taken as the number for the lowest scoring plant

- **Ranking in combination with semi-structured interviews**

An informative discussion does not always occur during a ranking session. The SSIs, of which the ranking was part, aided in building an environment of confidence to make the ranking successful. The MR was always introduced toward the end of the SSI, while the first part of the SSI built up a relationship between the interviewee and the interviewer.

A MR on its own may be unsatisfying for the participant, because there would not necessarily be an opportunity to bring up important issues. An advantage of SSIs is that the participants get the space and time to steer the interview into directions they prefer.

- **Evaluating and analysing the matrix rankings**

The finished matrix was evaluated by the participating grazier by looking at the numbered cards each plant had received, not by counting up the total score. Sometimes cards were re-ordered, if plants appeared to be ranked too high or too low.

To analyse the matrixes made by the 11 participants, the plants ranked with cards numbers 1 to 5 were given the value 'high' and those ranked from 16 to 20 were given the value 'low'. Plants with no card were given the value 'moderate'. The combined matrixes were presented with the six most frequently mentioned criteria (drought resistance, fattening quality, cattle feed, sheep feed, winter feed, summer feed) and the combined 'general' ranking on the horizontal axis. The vertical axis presented the value (high, moderate or low), with the plant species filling in cells of the table (see Table 1).

- **Ranking as part of a dialogue meeting**

MR was also used as part of a dialogue meeting. This meeting was organised for graziers and advisers to meet in an environment of safety[3] to discuss vegetation, vegetation

management and alternative industries[4]. One proposed programme point at the meeting day was matrix ranking.

At one meeting, there was initial reluctance to rank important rangeland plants, because participants presented different land systems. Nevertheless, the participants felt the ranking would provide them with a useful discussion and they decided to rank plants of a sample paddock and concentrate on the criteria for evaluation. Again the discussion during the ranking was more important than the final matrix formed.

- **Interpretation and feedback cycles**

Information from MR discussions was ordered into themes and presented in the form of a booklet and audio tape to the participating graziers (Kersten 1993). A second round of visits was initiated and graziers were invited to comment on the information presented in the booklet and/or on the tape.

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3 Dialogue is different from debate. In debate, people have to defend themselves and the environment is often threatening. In dialogue, the environment is safe and participants are invited to express their understanding and listen to each other to build together 'richer pictures'.

4 'Alternative industries' are industrial diversifications of the activities undertaken on the properties, such as eco-tourism, or kangaroo harvesting. Most properties are primarily wool growing enterprises.

**Table 1: A way of presenting analysed matrixes from different participants**

| VALUE | CRITERIA | | | |
|---|---|---|---|---|
| | GENERAL | CRITERION 1 | CRITERION 2 | CRITERION 3 |
| HIGH | Plant A<br>Plant E | Plant B | Plant A<br>Plant B | Plant Q |
| MODERATE | Plant F | Plant D | Plant C | |
| LOW | Plant B<br>Plant G | | | |

The graziers were pleased to have access to the information provided by other graziers. They commented that most researchers pass by and are never heard from again. The option for graziers to comment on the written material was a way of giving participants ownership over their information. They were asked to comment and give their agreement, before third parties would have access to the information. After this, a revised version of the booklet was written.

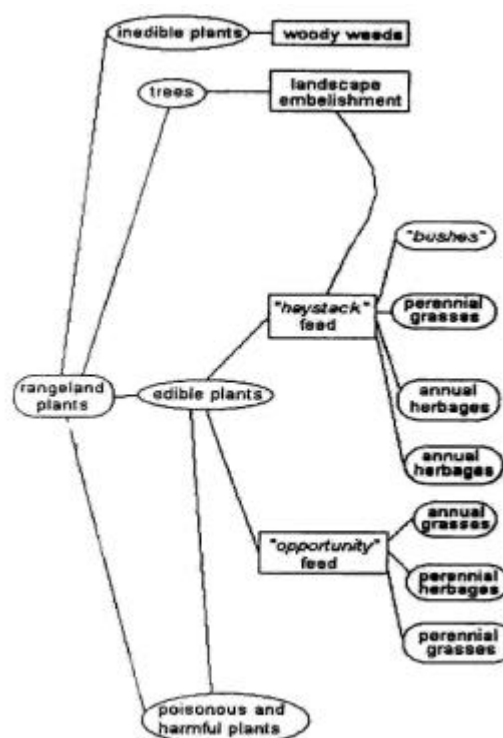- **Comparing plant evaluations by researchers and graziers**

Criteria used by graziers for evaluating plant species were very different from criteria commonly used by researchers[5] for selecting native grasses for domestication (see Table 2).

Graziers focus on the value of plants for their stock. Researchers evaluate native grasses on their ability to survive, perenniality and seed production, independent of their value as stock feed. These different criteria reflect the differences in perception of rangelands by both groups.

Graziers see rangelands as a grazing system of which they are part, while researchers see rangelands as a natural ecosystem presently occupied by graziers. Critically, MR not only provided information about plant species, but also about the perception of the participants of the system they are working in.

The discussion during the rankings led also to a grazier classification of plants (see Figure 1). In the original publication (Kersten 1995) this figure was supplemented with plant species for each category. Each plant species was followed by a letter denoting its value: *H* for high, *M* for moderate and *L* for low value, in the same manner as explained for Table 1.

**Figure 1. Grazier classification of rangeland plants in western New South Wales.**



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[5] Researchers involved in the 'native grasses programme' of New South Wales Agriculture (government department).

**Table 2: Criteria for evaluating plant species mentioned by graziers and by researchers (domestication of native grasses) (Kersten 1995)**

| CRITERIA MENTIONED BY GRAZIERS DURING MATRIX RANKING | CRITERIA USED BY RESEARCHERS FOR SELECTION OF NATIVE GRASSES FOR DOMESTICATION |
|---|---|
| STOCK RELATED CRITERIA<br><br>• Winter feed<br>• Summer feed<br>• flood feed<br>• drought feed/survival<br>• fattening value<br>• palatability<br>• good fodder<br>• reliability<br>• maintenance value<br>• nutritional<br>• nutritional for sheep<br>• nutritional for cattle<br>• sheep feed<br>• cattle feed<br>• wool growing<br>• poisonous<br>• scouring<br>• nuisance<br><br>NON-STOCK RELATED CRITERIA<br><br>• Winter growth<br>• summer growth<br>• drought resistance<br>• reliability<br>• fuel for burning for woody weed* control<br>• soil binding ability<br>• ability to regenerate<br><br>* 'woody weeds' are unpalatable woody shrubs invading the area | MORPHOLOGICAL CRITERIA<br><br>• Seed head architecture<br>• ? type of seed head (easy to harvest)<br>• ? non-shattering seed<br><br>LONGEVITY<br><br>• perennial<br>• Seed longevity and seed bank available<br>• a seed coat that enables the seed to respond to sequences of rainfall and reduces false germination<br>• potential predation of seed by ants<br><br>ABILITY TO ESTABLISH A SPECIES<br><br>PRACTICALITIES FOR THE LANDHOLDER |

Figure 1 and Table 2 suggest that a scientific ordering of plants, according to flower morphology, has little meaning to graziers. This also relates to the book *Plants of Western New South Wales* that is highly valued by graziers as the (only) guide to their vegetation. However, graziers found the guide difficult to use because plants are ordered according to family and genus.

They find plants by going through the book and looking at the pictures. When the picture matches reasonably well, they read the description for more information. This way of identifying a plant is very time-consuming and not always successful. A plant guide ordered according to their plant classification could aid their plant identification.

## • **Conclusions**

MR can be an important methodology in initiating a discussion on the ranked objects. The use of numbers can obscure this by focusing too much on the ranking itself and the final matrix produced, rather than allowing a discussion to develop. MR complements semi-structured interviews as the interview passes from talking to action, which makes the conversation more lively and participatory.

I also found that MR is best undertaken with individuals. With a larger group, consensus has to be reached in order to make a matrix. This might provide a lively discussion, but can also be frustrating if there is a wide diversity of opinion and experience.

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