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Beyond ranking: exploring relative preferences in P/RRA

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• Introduction

In this paper we argue in favour of moving beyond simple preference ranking when exploring preferences in PRA or RRA. The main reason for this is that ranking actually tells us little about preferences. This is often less than we think, because so many of us misinterpret ranking data. But even when interpreted correctly, ranking is not enough. Scoring systems are better, and some are described here, but we shall also introduce two new techniques which help to provide better information about preferences.

• What's wrong with ranking?

Preference ranking has become a common technique in P/RRA. We have reviewed 15 examples, mostly from previous issues of *RRA Notes* (Annex 1). The most common format involves setting up a matrix, with things being considered (tree species, fertiliser types, income-earning opportunities) on one axis, and characteristics differentiating them on the other. A group or individual is then asked to rank the items according to each characteristic. A typical example is shown in Table 1.

Of course, an exercise like this is very useful. It enables participants to define their own criteria for discriminating between items and provides a large amount of information about preferences. However, there are two problems.

Adding-up

The first problem is that the ranking table does not give an overall preference order. Sometimes this does not matter because there are no choices to make, or only limited ones. For example, people may want different trees for different purposes and prefer a mix rather than a single species. Sometimes, however, it may be useful to establish an overall preference ranking, for example if alternatives are mutually exclusive.

A seemingly obvious way of generating overall preference is to add up the ranking scores in the table. In Table 1 for example, *Eucalyptus* would score five, *Grevillea* 12, and so on. Unfortunately this simple solution is impermissible. First of all, it assumes that each of the criteria has the same weight, so that 'speed of growth' is just as important as 'kitchen smoke' in the opinion of the respondent. This is very unlikely to be the case. More important, it is statistically illegitimate to add up ranking scores[1]. This is because the spacing between ranks is unknown. This is discussed in more detail below.

It is perhaps worth noting that of the 15 ranking exercises reviewed, four added the ranks in this illegitimate way. In one additional case, criteria were weighted before adding-up, which overcomes the first problem but not the second. There are better options. The most common method has been to ask participants to give a subjective, overall ranking themselves, listing the trees or whatever from best to worst. This overcomes the problem of weighting different criteria, but again leaves the difficulty of interpreting the gap between ranks. Subjective ranking was used in seven of the cases we reviewed.

[1] For a clear discussion of the advantages and disadvantages of different kinds of data, see Siegel, S. 1965. *Non-parametric Statistics for the Behavioural Sciences*. McGraw-Hill, Tokyo.

Source: PLA Notes (1995), Issue 22, pp.28–35, IIED London

Another alternative[2] has been to ask participants to allocate a fixed number of points between all the items being considered. For example, 100 points might be allocated between the four trees in Table 1, to give an idea of the optimal mix of trees desired.

The relationship between ranks

The second problem has already been mentioned and is in our view the more important. It is that ranking provides no information about the spacing between ranks. Thus, the gap in growth performance will differ from one tree to the next, as discussed above. So will the gap in firewood performance. And there will be no way to compare the gaps in growth performance with the gaps in firewood performance. In technical terms, ranked data are an ordinal scale in which the ratios between any two intervals are unknown. A good example of an ordinal scale is the following sequence: minister, permanent secretary, night watchman. There is a hierarchy, in salary if nothing else, but the intervals differ.

As mentioned above, it is illegitimate to add ordinal data. The reason for this can easily be seen by considering that *Sesbania* might grow only a little faster than *Mululusia*, but *Mululusia* in turn might grow a great deal faster than the next ranked tree, *Eucalyptus*. If this is the case, simple adding-up would give misleading results. We think this provides a real problem when interpreting ranking data. Can it be overcome?

· Approaches using scoring

Scoring is certainly a topic that deserves more attention. Several variants of the scoring method are possible, and all provide more information than simple ranking. Possibilities include:

- *Restricted scoring by column/row*: Allowing a fixed number of points per column or row, for example 10 points for *"speed of growth"*, to be divided between the four trees in Table 1. This will give a good indication of the interval between choices, though it also raises some problems of interpretation. The problem of weighting different criteria also remains.

- *Open scoring by column/row:* Allowing an open-ended number of points per column or row. This may improve measurement of difference within columns or rows, but does not solve the problem of weighting different criteria.

- *Restricted overall scoring:* Allowing a fixed number of points for the matrix as a whole, and not per column or row. Thus, 50 or 100 points could be distributed between all the cells of Table 2. This would enable weighting to be incorporated in the analysis, with more points being allocated to more important criteria. It is likely to be complicated, however, and rather time-consuming, especially for large matrices.

- *Open overall scoring:* As above, but with an open-ended number of points. This will give the strongest statistical result, but again is a complicated exercise.

Food preferences in Merti-Jeju, Ethiopia

In the following example from Ethiopia, we illustrate the scope of scoring and introduce some alternatives. The examples here are taken from an assessment of a food-for-work programme in Merti-Jeju District[3]. The work was carried out with groups of women in two villages and was designed to investigate food preferences, so as to help choose appropriate commodities for the food-for-work programme.

[2] Kailash, B. et al. 1991. *Tree Preference Ranking - Women - Sajankav*. Mimeo. Robert Chamber's collection, October. IDS, University of Sussex.

[3] For details see, Maxwell, S. and Herbinger, W. 1992. Notes on a rapid assessment of food-for-work in Merti-Jeju Awraja, Arsi Region. In: Maxwell, S. *Next Steps in Food for Development: Report on a Visit to Ethiopia.* Appendix 3. Mimeo. World Food Programme, Addis Ababa.

Restricted scoring

The first exercise was a restricted scoring exercise, allowing ten points per criterion. The results are presented in Table 2. A group of women was asked to identify the main characteristics differentiating six different grains, giving the list of factors across the top of the matrix. They were then asked to allocate ten points per column, giving the figures in the body of the table. Finally, the group was asked simply to rank the six grains, taking into account the relative importance to them of the six criteria they themselves had identified. This ranking is given in column seven.

The data here do provide more detail than simple ranking, but they are not unproblematic. A score of four is obviously higher compared to two, than two is to one. However, it is not obvious that the relative preference implied by similar relative scores is the same in each column. For example, on the criterion of cheapness to buy, barley scores three and sorghum two. On the criterion of multiple use, barley scores 3 and maize 2. Is the relative preference implied by the ratio 3/2 the same in both cases? Furthermore, the zero entries in the matrix certainly do not indicate a true zero. For example, the zero rating for barley and millet under cash value cannot mean that those cereals have no commercial value, because they clearly do.

It follows that neither the scores in individual columns, nor the final summary rankings are clear indicators of the size of relative preferences It is not possible to say anything precise from the matrix in Table 2 about how much respondents prefer one grain over another. If doing this again, it might be interesting to try open scoring. Instead, however, a different approach was tried and two new techniques were introduced.

Quantified preference

To take the discussion forward, women were asked to indicate choices between different quantities of grain as in a kind of modified pair-wise ranking. For example, would they prefer one kilo of teff or 1.5 kilos of wheat? This was again done as a group exercise so that the results represent a consensus. We did not try all possible combinations but learned enough to suggest that the technique would yield useful information to complement the ranking. One set of results is given in Table 3.

Source: PLA Notes (1995), Issue 22, pp.28–35, IIED London

Table 1. Extract of ranking of characteristics of four tree species by Mrs Zena Ibrahim, Kakamega District, Kenya[4]

Characteristics	Tree species			
	Eucalyptus	*Grevillea*	*Sesbania*	*Mulusia*
Speed of growth	3	4	1	2
Firewood	1	4	2	3
Kitchen smoke	1	4	2	3

Table 2. Scoring of grains in Merti-Jeju

Characteristic / *Crop*	Cheap to buy	Easy to make *njeera*	*Makes you strong*	*Multi-use*	*Best for bread*	*Cash value*	*Rank*
Sorghum	*2*	*2*	*0*	*1*	*0*	*2*	*3*
Wheat	*0*	*1*	*3*	*3*	*6*	*3*	*2*
Barley	*3*	*1*	*3*	*3*	*0*	*0*	*5*
Millet	*3*	*1*	*0*	*0*	*0*	*0*	*6*
Teff	*0*	*4*	*3*	*1*	*2*	*3*	*1*
Maize	*2*	*1*	*1*	*2*	*2*	*2*	*4*

Table 3. Relative preferences

Option	Selection
1 unit of teff or 1 of wheat	teff
1 teff or 1.5 wheat	teff
1 teff or 2 wheat	teff
1 sorghum or 1 wheat	wheat
1.5 sorghum or 1 wheat	sorghum
1 barley or 1 sorghum	barley
1 barley or 1.5 sorghum	barley
1 millet or 1 sorghum	sorghum
1.5 millet or 1 sorghum	sorghum

4 Source: Chambers, R. 1988a. Direct matrix ranking (DMR) in Kenya and west Bengal. RRA Notes 1. IIED, London.

Table 4. Results of a shopping exercise

	Good year		Bad year	
Grain Choice	**No. purchases**	**%**	**No. purchases**	**%**
Teff: 1 unit	9	50	2	20
Wheat: 2 units	6	33	5	50
Maize: 2 units	0	0	0	0
Barley: 2.5 units	3	17	2	20
Millet: 2.5 units	0	0	1	10
Sorghum: 1.5 units	0	0	0	0
Total	**18**	**100**	**10**	**100**

Source: PLA Notes (1995), Issue 22, pp.28–35, IIED London

These results show that teff is strongly preferred over all other grains, which confirms the ranking exercise. Barley is marginally preferred to sorghum (which contradicts the subjective ranking) and millet is unpopular. The exercise provides more information than the ranking exercise.

A more careful look at choices in Table 3 shows that teff is more than twice as popular as wheat. Similarly, the table shows that sorghum and wheat are much closer to being substitutes for each other than the scoring would suggest.

Shopping

When we discussed the question further, the women said that their preferred staples were wheat and teff. However, when times were hard, they resorted to barley or millet because they were cheaper. In order to try to quantify this preference, a final exercise was carried out to simulate market choices. The women were offered a choice of grains and real relative prices and were then given two tokens, enabling them to buy up to two piles of grains each. There were nine women so 18 piles were 'bought'. The different size of piles reflected relative prices. For example, wheat was about half the price of teff so for a given amount of money, twice as much wheat could be bought as teff. This was to simulate grain purchase in a good year. The number of tokens was then reduced to one and the exercise repeated to simulate a bad year. An extra woman joined the group, so this time there were ten purchases. The results are shown in Table 4.

The results show that, at current market prices, teff is strongly preferred in good years, followed by wheat and barley. Maize, millet and sorghum find no buyers. In a bad year, however, the picture changes significantly, with a substantial shift from teff to wheat and an increase also in barley and millet preference. Sorghum and maize continue to be the most unpopular grains.

In this kind of exercise voting is used rather than a single group decision. There is a true zero, in the sense that if sorghum, say, receives no votes, that is a realistic outcome. It is also meaningful to talk about barley receiving twice as many votes in a bad year as millet. The data are much stronger in a statistical sense.

The results of the various exercises are not entirely consistent with each other, which suggests that further research may be required. However, there is a strong supposition that barley and millet are technically inferior commodities, whose consumption falls as income rises and vice versa. By contrast, wheat and especially teff are superior commodities. Most important, the additional exercises carried out after ranking provide much better quantitative information than was available after the first round.

· Conclusion

We recognise that it is important in P/RRA not to be blinded by statistics. The process of preparing a matrix is often as important as the product. The discussions that take place while the matrix is being drawn up can be as illuminating as the matrix itself. Nevertheless, we also believe in trying to understand better the techniques we use and in modifying them to generate better information, for both insiders and outsiders.

This work suggests four conclusions. First, while ranking of a traditional kind does provide a great deal of information it also has to be interpreted rather carefully. In particular, ranking results should not be used to make inferences about the size of relative preferences. Nor is it permissible to add scores across rows or columns to obtain an overall ranking. The second rule holds even when criteria receive different weights. If an overall ranking is needed, which is certainly not always the case, a better option is to ask participants themselves to produce a subjective ranking. This will reflect their own implicit weighting of the different criteria.

Secondly, scoring seems to offer an improvement over ranking, particularly if open-ended scoring for the matrix as a whole is possible. In principle, this should give both a true zero and a weighting between criteria, allowing scores to be added and compared.

Thirdly, if a group is involved in the exercise, there is something to be said for voting, rather than consensus. This will give a better picture

Source: PLA Notes (1995), Issue 22, pp.28–35, IIED London

of the range of responses and, again, give greater statistical weight to the results. This could, however, limit the discussions.

Finally, additional techniques need to be used to explore relative preferences. The quantified preference and shopping techniques both provided a useful way to explore real-world preferences in different circumstances. This is important in highly variable situations. The shopping exercise in particular is well-adapted to items with a market value, but also has other uses, wherever there is a constraint on availability. It could be used, for example, to investigate preferences for tree species, taking account of the differential costs of raising different species of seedling in nurseries; or different varieties of grain, taking into account the differential cost of research.

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Annex 1. Results of review of 15 examples of preference ranking

Reference	Subject	Who did it?		Scoring system			Overall ranking	
		Group	Individual voting	Rank in col/row	Score in col/row	Open matrix	Adding-up	By participants
Ashby et al. 1987	Bean varieties	x		x			n/a	n/a
Chambers 1988	Fertiliser types	x		x				x
Maxwell 1988	Income-earning opportunities	x			x			x
Tarapoda Ghosh 1988	Vegetables	x		x				x
Bayer 1988	Browse species	x		x			x	
Pretty et al. 1988	Tree species	x						x
Mearns 1988	Land types	x		x	x			
Joseph 1989	Fodder varieties	x		x				None
Cromwell 1989	Constraints to carpentry		x	x			x	
Pretty and Scoones 1989	Tree species	x		x			x	
Kailash Ben et al. 1991	Tree species	x		x				100 votes
Pimbert 1991	Pigeonpea genotypes	x		x				x
Neefjes 1993	Weeds	x		x			x	
Drinkwater 1993	Finger millet varieties	x			x			x
Chambers 1993	Banana varieties	x				x		None