2

Direct matrix ranking (DMR) in Highland Papua New Guinea

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· Introduction

Tools like direct matrix ranking (DMR) become honed down, improved and simplified over time, which is a very good thing. Reading Robert Chambers' piece on DMR in Kenya and West Bengal (RRA Notes No.1), I was struck by how much simpler the technique sounded than the one I used in the Southern Highlands of Papua New Guinea. However, the participatory learning process of eliciting the matrices in each case was very similar.

My objectives were:

- To compare a formal, 'scientific' land evaluation with local people's own evaluation of the same land resources;
- To show how social relations between clans in the area were critical in controlling access to valued land types; and,
- To highlight the differences between clans in access to valued land resources, and to show how this was reflected in disputes over particular land types.

I used DMR for the first of these objectives, to get to know people and let them get to know me, and to break the ice for our later and often sensitive discussions around the other issues.

· Repertory grid analysis

At the time I called the technique I was using 'repertory grid analysis', which should be seen as part of the same family of techniques as DMR. The origins of repertory grid analysis are to be found in the psychological literature on personal construct theory, which as Robert Chambers pointed out, gets complicated and difficult. But strip away the labels like 'mental constructs' and 'semantic differentials', and what you are left with is basically DMR, or so I had thought.

Other applications of repertory grid analysis in the context of rural livelihoods in the South include:

- investigation of the utilities by which farmers evaluate common weeds and local rice varieties in West Africa (Paul Richards);
- farmers' choice of crops in the Gezira, Sudan (John Briggs);
- small farmer perceptions of farming conditions and methods in Trinidad (Barry Floyd); and,
- the perceived worlds of colonists of the Colombian rainforest (Janet Townsend).

· The application in Papua New Guinea

With people from seven different clans or sub-clans, in group discussions, I drew up two sets of matrices, with the objects (land types) along the top and the criteria down the side. One set took local names for (and therefore definitions of) land types as the objects, while the other took the land classes (Land Mapping Units) defined in the formal land evaluation as the objects. Both sets of matrices used exactly the same criteria for distinguishing land types, which were the criteria people used when I asked them to make choices between land types. We did this for three land types at a time: "How is this one different from the other two?" although pairwise comparisons would have done just as well. Tables 1 and 2 are

Source: RRA Notes (1988), Issue 3, pp.11–15, IIED London

examples of the two matrices elicited for one clan.

The discussions all took place in the field on hilltops which overlooked the areas of land we were discussing. The groups were either all men, all women, or mixed, and the number of participants ranged from three to around 10.

· Problems

There were at least two major problems in the way I applied the ranking technique:

- With DMR the objects to be ranked (tree species, crop varieties etc) are often straightforward to define. Land types are not like that. I tried to match outsiders' definitions of land types (largely based on Western soil science) to local people's own names and bounding of the areas. Naturally there is no precise match, so any conclusions based on this comparison could only be circumspect.

  For example, I could not be sure that when we talked about e.g. *poi* or *kul* (valley bottom wetland, in the two local languages) we were actually referring to the same kind of land that the land evaluation classified as 'PB2' or 'WK1'.

  In fact this is precisely what I was trying to find out:

  "How well do the outsiders' definitions of land types match up to local people's own definitions?"

  "How useful is this expensive land evaluation in terms of the ways local people regard their own land resources?"

  "If a land evaluation is supposed to be a tool for decision making about land use, would decisions based on this outsiders' evaluation really be meaningful for local people?"

- The values I entered in the matrices were scores, from 1 to 5, where 1 represented 'best' and 5 'worst'. The numbers were written on cards which people would point to for each object, and according to each criterion, in turn. In other words, we did not the land types at all, in relation to each other, but simply gave each a score in relation to an abstract standard. In this way, many of the land types would be given the same score on particular criteria, in which case they cannot be ranked.

  Looking back on it, I could kick myself for doing it this way! Although it is possible in many instances to rank the land types from the matrices, at the time I did not see the exercise as being primarily a ranking exercise. How important 'labelling' can be: had I thought I was doing DMR rather than repertory grid analysis, the process of 'ranking' would have been uppermost in my mind. Instead, I got people to explicitly rank or make choices between land types only informally, as a means of identifying the criteria they used. This information, sadly, went unrecorded.

Some lessons learnt

- Eliciting the matrices proved to be an excellent ice-breaker and means of structuring discussions.
- The design of the study was complex, which made interpreting the results that much more difficult. However, it was possible to identify which types of land people valued most, and these were by no means always those land types which the formal land evaluation classified as most productive for food crops.
- Perhaps more important - or more interesting - than the intended outcomes of the analysis, were the unforeseen observations. Most notable among these were the differences in the kinds of responses that different groups made:
  - where a village big-man was present in the group, he would almost invariably dominate the discussion. Other people would keep quiet or simply agree with his opinion. This was true only with all-male or mixed groups.
  - in all-women groups, by contrast, it was more common for there to be a lively exchange of opinions from all

Source: RRA Notes (1988), Issue 3, pp.11–15, IIED London

participants, and for the final score to be the apparent consensus view of the group.
- generally men were more confident in their responses giving extreme scores of l's and 5's, while women would give scores in the middle ranges.
- mixed groups of both men and women were unsuccessful as mixed groups, since in such cases the men would not allow the women to speak.

- Repertory grids were designed to be analysed using sophisticated multivariate statistical techniques, based on multi-dimensional scaling, cluster analysis etc., and most applications of the approach have tended to use such tools of analysis. But this would be highly inappropriate for the kind of information generated by this exercise, which is simply not up to this form of treatment. The use of numbers in eliciting the matrices - allocating scores to each land type on the basis of a range of criteria - means there is too great a temptation to apply sophisticated statistical analysis. It is like trying to drive in a pin with a sledgehammer; more often than not the pin will break.

On reflection I should have used combinations of the symbols +, - , ++, --, 0, etc. to imply the same scoring. The matrices could be re-cast in this way, except that it would be unfaithful to the original information. You cannot be sure that if you use a range of --,-,0,+,++, instead of 1,2,3,4,5, people would give - where they would otherwise have said 2, or ++ for a 5. Better still, I should have tried direct ranking instead of abstract scoring!

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Table 1. Ranking of land types by members of Pim-Pulwoiap clan: Local names

Mendi name	**Poiem**	**Sepiem**	**Sunem**	**Erisonde**	**Tipso**	**Poi**
Imbong'Gu name	**Kul-kala**	**Ga-kala**	**Waru-kala**	**Kondi-kala**	**Konde**	**Kul**
Fertility	1	1	2	1	1	4
Slope	2	3	5	3	5	1
Vegetation easy to clear	3	4	5	5	5	5
Cleared vegetation makes good compost	2	2	2	2	2	4
Soil is easy to work	4	3	2	3	3	3
Well-drained	5	5	5	4	2	5
Productive for sweet potato	1	1	2	1	1	5
Productive for mixed vegetables	1	3	2	1	1	4
Good for pig foraging	3	4	4	4	1	1
Good for gathering karuka*	5	5	5	1	1	5

*Karuka nuts, from customarily owned trees in the natural forest

Scoring: 1 = Very good…… ……5 = Very poor

Key to local names:

Poiem/Kul-kala	Gardens on alluvial or drained swampland
Sepiem/Ga-kala	Gardens from grassland (mainly sweet potato)
Sunem/Waru-kala	Gardens from steeply sloping grassland (sweet potato and mixed crops)

Source: RRA Notes (1988), Issue 3, pp.11–15, IIED London

Erisonde/Kondi-kala	Gardens from forest or secondary regrowth ('greens' and mixed crops with sweet potato)
Tipso/Konde	Lower montane forest
Poi/Kul	Wetlands (alluvial or swamp, undrained)

Table 2. Ranking of land types by members of Pim-Pulwoiap clan: Land mapping units

Land mapping units	FK1	SN1	PB1	FS	SB2	PB7
Fertility	1	2	2	2	3	2
Slope	2	4	4	5	4	5
Vegetation easy to clear	4	5	4	4	5	5
Cleared vegetation makes good compost	1	3	3	3	2	2
Soil is easy to work	3	5	2	2	2	3
Well-drained	5	3	5	1	3	3
Productive for sweet potato	1	2	2	2	2	2
Productive for mixed vegetables	1	4	3	2	2	1
Good for pig foraging	1	4	1	2	1	1
Good for gathering karuka*	5	5	4	5	1	1

*Karuka nuts, from customarily owned trees in the natural forest

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Key to land mapping units:

The land mapping units could be identified in the field from the land evaluation map

FK1 Ki Floodplain, active floodplain area of recent alluvium and collo-alluvial deposits around confluence of Mendi, Ki and Kwi rivers, wetland grasses and sedges, Ishaemum dominant in drained areas, high intensity cultivation of sweet potato and mixed crops

SN1 Nene Spurs, strongly dissected spurs at periphery of Birop Plateau, ridge crests and plateau remnants, brown ash and olive ash soils, Miscanthus grassland, low to medium intensity cultivation of sweet potato and mixed crops

PB1 Birop Plateau, high altitude volcanic ash plain, olive ash soils with brown ash soils on steeper slopes, Miscanthus grassland with patches of remnant forest, low intensity sweet potato gardens with mixed crops on steep slopes

PB7 Birop Plateau, steep river gorges, associated with volcanic ash plain (see PB1)

FS Fault Scarps associated with volcanic ash plains, olive ash and brown ash soils, lower montane forest and derived secondary regrowth, Miscanthus grassland, 'bush' gardens of varying intensity

SB Wambul Footslopes, lower dip slopes and colluvial aprons associated with Tambul Mountains, olive and brown ash soils, sedimentary soils, mixed ash soils, Miscanthus grassland, medium intensity sweet potato and mixed gardens

Source: RRA Notes (1988), Issue 3, pp.11–15, IIED London