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Sorting fact from opinion: the use of a direct matrix to evaluate finger millet varieties

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• Introduction

In September 1991 a workshop on participatory methods of working with farmers was held for the one national and eight provincial teams which comprise the Adaptive Research Planning Team (ARPT) in Zambia. As a training exercise ARPT members were split up into three groups. Each group went to visit one of the village research groups that the Northern Province Adaptive Research Planning Team have now been working with for three seasons. Their purpose was to conduct an evaluation exercise for either the bean or the finger millet varieties that the groups had been testing.

Our group of ten people chose to look at finger millet and to use a direct matrix ranking exercise to evaluate the different varieties with farmers. The exercise turned out to be considerably more stimulating than we had expected, arousing vociferous and intriguing debate amongst the farmers. It became clear during the discussions on different characteristics of the finger millet varieties we were examining, that farmers possessed a range of largely untested, different opinions. Thus key debates during the ranking exercise focused on what 'evidence' speakers could present to back their views and how acceptable the other farmers present felt this to be. As a result, by the end of the session all present, farmers and researchers, had learned a great deal more about finger millet than they knew at the beginning.

• Setting up the matrix

The village research group we visited was in the Mwengwe area of the Central Plateau zone of Northern Province. Finger millet is one of the three main staples found in the area.

Maize, which became dominant during the 1980s, and cassava are the other two. For finger millet, varieties are usually classified into three main categories, white, red and in between. Usually, in a general discussion, farmers will hold the white varieties to be better for making *nshima*, the stiff porridge which is the mainstay of the Zambian diet, and the red varieties to be preferable for beer brewing.

The farmers that we were meeting of the Chumbu research group were no exception to this general rule. When our discussion started, our group of ten people were mixed in with 25 farmers including nine women, around the walls of a large, rectangular *nsaka*, or meeting hut, belonging to the secretary of the research group. After explaining the purpose of the exercise, the first step of the meeting was to find out the main millet varieties which farmers possessed locally. Following this, a 20 to 30 minute discussion focused on identifying the various characteristics which farmers used when making comparisons between the different varieties. Eventually a total of sixteen such characteristics was obtained, and these were listed down the side of a large sheet of paper laid down on the floor of the *nsaka.* Across the top were listed the names of the three main varieties found in the area, with samples of each heaped below the name. One, *mutubila*, was a local white, the second, *mwangwe*, was a local red, and the third IE

Source: RRA Notes (1993), Issue 17, pp.24–28, IIED London

2929 (now Lima), was a newly released, reddish variety brought by the Northern Province ARPT.

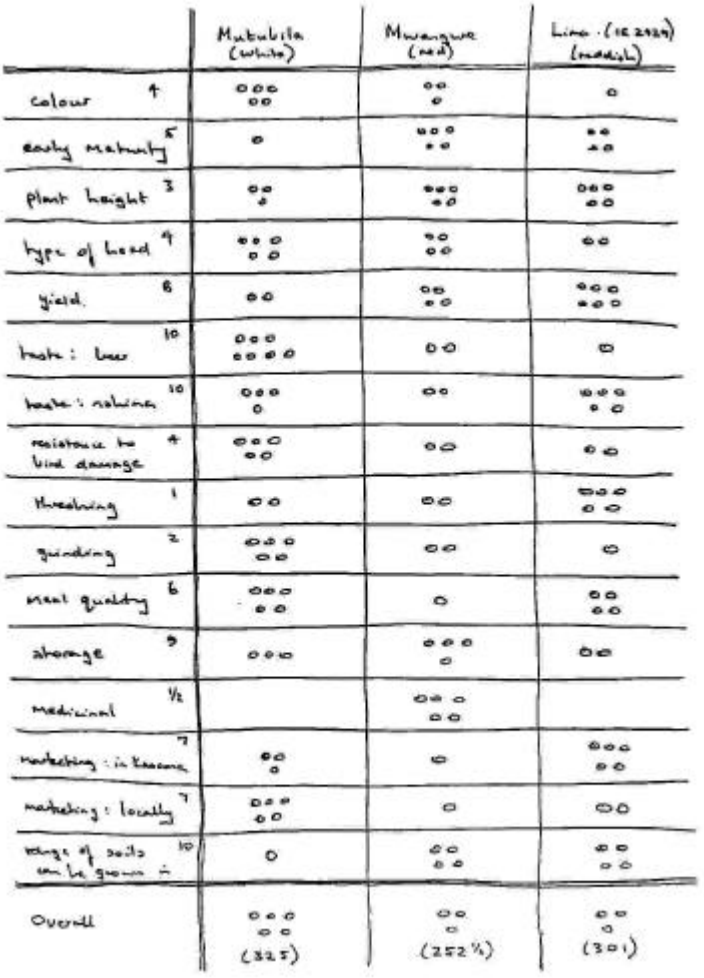
The member of our group chairing the meeting persuaded two women to come forward to start the ranking exercise. Using beans they had to score each variety between one and five for that particular characteristic. If others disagreed with their ranking there was then a discussion until a consensus finally emerged. The exercise proceeded with other pairs of people coming forward, usually voluntarily, to rank each characteristic in turn.

- **The ranking exercise (see Figure 1)**

The whole ranking exercise took a surprisingly long time, nearly two hours, but interest in the exercise showed few signs of waning and a vast amount of information on finger millet emerged. There were a few fascinating debates, and some surprising overthrowing of stereotypes.

The major surprise came when the varieties were ranked for taste. The previous indicator had been that of yield. Here a woman had overridden the 1 to 5 ranking by saying that Lima yielded so much that it should be scored 6. This precedent was then followed when two men came to rank the varieties for their taste when used for beer. One man immediately threw down seven beans on the variety most preferred, not one of the two reds, which farmers normally say are best for beer, but the white, *mutubila*. Then for *nshima*, the reddish Lima scored better than the white, again a reversal of the generally stated norm.

Figure 1. The Millet matrix



Source: RRA Notes (1993), Issue 17, pp.24–28, IIED London

The most interesting debate was on the subject of the relative resistance of the three varieties to bird attack during the period that the grain is ripening. Following a ten minute free for all during which no consensus looked even likely to emerge, the team intervened. The problem was that whilst every farmer had an opinion on this subject, few of them had any definite evidence to back their opinion. Often farmers planted the red varieties before the white, but as these reds were then ripening at a time when few other grain crops were, evidence of attack at this time was ruled out as an unfair test. Other farmers who had planted all the varieties mixed together had simply not observed very closely the degree to which each variety suffered damage.

In order to resolve the impasse, therefore, several fresh pairs of people were asked to come forward and indicate their ranking. They ranked the varieties as seen in Table 1. None of the first three rankings met with any consensus. Finally one woman got up and provided the fourth ranking, with an argument which was found acceptable by the other farmers..

Table 1. Indicator: resistance to bird damage

Ranking and explanation	Mutubila	Mwangwe	Lima
Ranking 1 White varieties are softer and more easily eaten, whilst red varieties have a tougher husk.	0	000	00000
Ranking 2 White grains are hidden by the head and are not so badly attacked. Red grains are conspicuous against the head.	00000	0	0
Ranking 3 Grains of *mwangwe*, the reddest of the three varieties, are most conspicuous and if harvesting of this variety is delayed there will be nothing left.	0000	00	0000
Ranking 4 Her father mixed the three varieties and they were planted together. When she harvested them she separated out the three varieties and found *mutubila* to be the least damaged, whilst *mwangwe* and Lima were equally damaged.	00000	00	00

Source: RRA Notes (1993), Issue 17, pp.24–28, IIED London

Once all 16 indicators were scored, an overall ranking for the three varieties was obtained: five for the white *mutibila*, three for the red *mwangwe*, and three for the reddish Lima. As a check, farmers then gave the indicators values ranging from 10 to 1/2. This allowed a total 'score' to be obtained for each variety by multiplying the value of the indicator by the variety's ranking for that indicator, and then summing the total. It was interesting that the total scores obtained were not proportionate with the overall rankings the farmers had agreed upon. For, although *mutubila* led with a score of 325, Lima's 301 was a close second and significantly more than the 252 scored by *mwangwe*, with which it was correlated. The reason for this is that until the ranking exercise most people present had underestimated Lima as a variety, as is discussed below.

- **Argumentation and the respective value of the three varieties**

Some interesting results emerged from the final part of the exercise, the valuation of the indicators. The most significant was which three of the indicators were given a value of ten. The taste of the varieties for beer and nshima could be expected, but the third was a surprise. This was the range of soils that the variety can be grown in. What was being shown here was the importance of the red varieties, despite the overall preference for the white *mutubila*, because of two significant attributes of the reds. One, they can be planted in less fertile soils than the white, and two, they can be planted early, as unlike the whites, their heads will not rot if they are ripening during the rains. This makes the reds extremely important for food security purposes, as was then confirmed in a series of food calendar mapping exercises carried out with farmer research groups in Zambia's Central Province.

Later, I had a discussion with the ARPT agronomist, Peter Reid, who had started work on finger millet in Northern Province by first of all undertaking a collection of some twenty or so local varieties. These had then been screened and the best (in terms of yield) spread to other areas in the province and used as genetic material in a finger millet breeding programme in Zambia (a millet breeder is based at Kasama). But the knowledge that the red varieties have a special value for food security because they can be germinated with the first rains, and then harvested from late January to fill the hungry months of January to March, had not yet been realised by the agronomists and breeders.

Storage, another food security related indicator, was also ranked highly. The significance here is that of the three principal grains grown in Zambia, maize, millet and sorghum, millet is the only one that stores across seasons. Interestingly, the introduced variety, Lima, was rated as storing the least well.

The direct matrix exercise thus showed the differential advantages of each of the three millet varieties: each complemented the other and together all three formed a finger millet portfolio that was more resilient and had greater benefits than any single variety could provide. This fact was not fully realised by our team of researchers before the meeting, and was probably less than fully realised by most of the farmers. They mixed and broadcast all the varieties together, so that during cultivation, harvesting and utilisation, often little or no separation of the range of varieties they might have was undertaken. This is a satisfying strategy, but masks the different attributes of each variety.

The process of argumentation that was carried out during the direct matrix exercise, revealed - at least potentially so - to all participants the individual strengths and weaknesses of different varieties. This was, however, only partially picked up by many of our team members at the time. They had concluded that Lima was not a popular variety because many of the farmers who had initially been given it to try no longer possessed it. From watching the reactions of the assembled farmers during the meeting my own feeling was different (and the others agreed in our later discussion).

Rather, what had happened is that after the first season most farmers had merely mixed the Lima variety in with their other millet, as is their normal practice, and thereby 'lost' the small amount of it they had. It simply became part of their red millet. However, the one extended family that was consistently

Source: RRA Notes (1993), Issue 17, pp.24–28, IIED London

responsible for ranking Lima during the matrix ranking exercise, had appreciated its different virtues from their main red, *mwangwe*, and had therefore kept it as a separate variety. It was from this family (who were hosting the exercise), that the other farmers at the meeting learned that Lima had qualities which distinguished it from their existing varieties, and so made it valuable in its own right.

As people left the meeting many stopped to finger a sample of Lima. They looked at the variety, separated out and contained in its own calabash, as though they were seeing it for the first time.

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Source: RRA Notes (1993), Issue 17, pp.24–28, IIED London