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Ranking of browse species by cattlekeepers in Nigeria

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· Background

The Subhumid Zone Programme (SZP) of the International Livestock Centre for Africa (ILCA) has been involved in livestock systems research in West Africa since 1979. The SZP has been carrying out long-term observations of livestock management by agropastoralists and arable farmers in selected case study areas in central Nigeria, parallel to testing and refining innovations in animal husbandry and nutrition in collaboration with the livestock keepers. Rapid appraisal techniques have been periodically applied to gain a preliminary understanding of certain elements of the livestock production systems. An example is the ranking of browse species used within the agropastoral system.

A study of the grazing behaviour of cattle kept by settled Fulani agropastoralists in two case study areas - a farming region and a grazing reserve, had revealed that browse was an important forage resource, particularly in the late dry season (Bayer, 1986). Whereas other forage resources such as natural range or crop residues had already been studied in detail, little was known about what constituted 'browse': i.e. which trees and shrubs were most commonly eaten by the cattle. Closer observation of a grazing herd revealed that numerous different species were being browsed. In order to identify whether and how this forage resource could be improved, it was necessary that the pattern of browse usage be identified and the relative importance of the various browse species be assessed. To this end, the following quick study was carried out.

· Interview with key informants

A list of browse species in the study area was compiled on the basis of observations of grazing cattle and interviews with key informants. The SZP enumerators and herdsmen were men from the main ethnic groups in the area (Kaje, Kamantan, Fulani, Hausa) and had a good knowledge of the local vegetation. With their assistance, a preliminary list of browse species was compiled according to the species' local names. This list was checked with some Fulani agropastoralists who were collaborating with the SZP in on-farm ('in-herd') trials, and additional names of the browse species were added. The resulting list was arranged alphabetically and each browse species was given a number (code) in order to facilitate recording of the ranking results. My field assistant and I then prepared small cards with one species name (and the corresponding number) per card.

· Ranking interviews

We took these cards to six Fulani cattlekeepers in each case study area and, in individual interviews, asked them to rank the browse species according to their importance as feed for their cattle. As cattle herding is a male task among the Fulani, only men were interviewed. The procedure was as follows:

1. The plant name on each card was read out to the Fulani man (none was literate) and he was asked whether he knew the plant and whether cattle eat it. If he did not know the plant, the card was set aside. If he knew the plant, the card was laid down on the ground in front of him.

Source: RRA Notes (1988), Issue 3, pp.4–10, IIED London

2. In the case of each subsequent card, the man was asked whether the plant named on the card was known to him and, if so, if it was more or less important as cattle feed than the plants named thus far. This was done by pointing to the cards which had already been placed on the ground and asking: it is more (less) important than this one (reading out the name of the plant) ...than this one (ditto)... and so on.

3. After all the cards had been laid down in order of importance, the plant names in order of ranking from most to least important was read back to the Fulani. He could then change the order of the cards if he wanted to correct the ranking.

4. The man was then asked whether he knew of any other tree or shrub species in the area which was eaten by cattle but had not been mentioned thus far on the cards. If he named additional plants, the name of each was written on a card and he was asked to place the card as above.

5. We recorded the ranking by each man by writing down the card numbers (rather than the plant names) in the order of ranking. For example, if species No 5 was ranked as most important, species No 12 as second most important, species No 7 as third most important etc., we recorded the sequence 5, 12, 7 etc. Additional information given by the Fulani about the browse species during the course of the ranking exercise, e.g. about the plant parts preferred by the cattle, was also noted.

6. As new plant names could be added during each interview, the first Fulani interviewed did not have the chance to rank all the species mentioned by the time we had interviewed the 6th man in each case study area. In order to give each man the opportunity to rank all the species, a second round of ranking interviews was done with the same people. In this second round, no additional species were mentioned by the pastoralists.

7. Tables of species ranking (one for each case study area) were compiled by calculating an average from the rankings given by the pastoralists (see Table 1). A pocket calculator was used for this purpose.

Source: RRA Notes (1988), Issue 3, pp.4–10, IIED London

Table 1: Simplified table of browse species ranking according to importance as cattle feed

Species	Local name	Ranking by Fulani in farming area					Rank
		Moh.	Saleh	Adamu	Huss.	average	
Afzelia africana (Mahogony bean)	Kaawoo	1	1	2	1	1.25	1
Khaya senegalensis (Savannah mahogony)	Madaaci	2	3	1	2	2	2
Adenodolichos paniculatus (Fire bean)	Depaji	4	2	3	3	3	3
Oxytenenthera abyssinica (Bamboo)	Gooraa	3	5	4	4	4	4
Mucuna poggei (Cow itch)	Karara	5	4	5	6	5	5
Daniellia oliveri (African copaiba balsam)	Maje	6	7	6	5	6	6
Pterocarpus erinaceus (African rosewood, African teak)	Banwi	8	6	8	7	7.25	7
Cussonia barteri Barter's cussonia)	Tuwon giwa	7	8	10	9	8.50	8
Vitex doniana (Black plum)	Dinya	9	9	7	10	8.75	9
Parinari curatellifolia (Rough-skinned plum)	Nawari	10	10	9	8	9.25	10

* English names according to Dalziel (1937) or Gledhill (1972)

By the end of the ranking interviews, we had a list of about 30 species browsed by cattle. Subsequent evaluation of the ranking results revealed that the l5 most important browse species in both case study areas had already been included in the list after the ranking had been done by the first 3 Fulani interviewed. The 'top 10' species are presented in Table 1. For us, the importance of bamboo as a browse plant is somewhat unexpected.

In the late dry season i.e. during the period when browse is most intensively used, samples were taken of each browse plant for the purpose of estimating its quality as feed.

· Identifying the species

The ranking of browse species was done using local names of the trees and shrubs on the cards. The *lingua franca* in Central Nigeria is Hausa, but this is the second or third language of most of the inhabitants. The Fulani agropastoralists' first language is Fulfulde; the arable farmers in the case study areas, who belong to the Kaje, Kamantan and Ikulu ethnic groups, each speak their own language and have their own names for the local plants. Some Fulani knew certain plants only by the Fulfulde name, some only by the Hausa name, and a few plants were known only in the language of the local farmers. Wherever possible, we noted each plant name in

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Fulfulde, Hausa, and one of the other languages.

To be able to interpret our findings in 'scientific' terms, we then sought the Latin names for each plant. Valuable aids in this connection were Dalziel's Useful Plants of West Africa (1937) and a list of vernacular (Hausa) names of trees and shrubs which had been prepared by the Department of Forestry (Gbile, 1980). A final check of our 'identification/interpretation' work was made by a taxonomist from the National Animal Production Research Institute (NAPRI) in Zaria - 250 km north of the case study areas - who came to the field for this purpose.

· Survey of frequency of browse occurrence

With the aid of the taxonomist, we then made a quick survey of the frequency of occurrence of the different woody species in the case study areas. In each of the main vegetation/landuse types (upland range, fallow land, cultivated fields, riverine areas, shrubland) random quadrats were staked out and each tree/shrub was counted, identified and classified according to height: knee- high, waist-high, nose-high, and higher than the arm stretched above the head. The measuring rule (the author) was 196 cm tall, with an arm-stretch to a height of 2.4 m.

The size of quadrat varied according to plant density; the smallest quadrats were 10 x 10 m for recording shrub vegetation, and the largest were 100 x 200 m to record trees in cultivated fields. The number of quadrats per vegetation/landuse type ranged from 2-6 in each case study area. In locations with few tall trees and a dense understorey, we sampled a larger area for the tall trees (e.g. l00 x 200 m) and then within this area we sampled 3-4 quadrats of 10 m x 10 m to record the species up to 2.4 m in height.

During this quick survey, we found more than 100 woody species, including all but two of the browse species mentioned by the Fulani during the interviews. One species not found was Acacia albida, which is very well known as a browse species by scientists as well as the Fulani but is quite rare in the subhumid zone. The other was a Veronica spp which is planted in household gardens and used for seasoning soups but which is rarely found in the fields. We also found some plants which had not been mentioned by the Fulani as important browse species but which are described in the literature as browse plants in other parts of Africa (e.g. in Le Houerou, 1980).

When we expressed the occurrence of browse plants in percent of total number of woody plants, we found that the percentage of browse plants was higher in fallow and cultivated fields than in natural savanna (upland range). In the case of small plants (less than 180 cm or ca 6 feet in height) even the absolute number of browse plants was higher in fallow fields than in natural savanna. This would mean that the traditional way of clearing fields for cultivation does not reduce the availability of browse to the extent expected. The clearing practices and shrub/tree regeneration in indigenous agricultural systems are worthy of more investigation. Large agricultural development schemes in Nigeria often involve wholesale clearing by caterpillar. Much could be learned from local farmers about tree protection (e.g. species and their uses, techniques of fostering regeneration) to promote sustainable rather than destructive forms of agricultural development.

· Time required for the study

Two days were spent compiling the initial list of browse species and preparing the cards. The interviews (30-60 minutes each) were carried out during normal field visits for monitoring on-farm trials and therefore stretched over a period of about 6 weeks. If we had concentrated solely on the browse ranking interviews, they probably could have been completed within 3 days in each case study area, i.e. in a total of 6 days. Two half-days were spent in the field with the taxonomist in order to verify species identification. Calculating the average species rankings and compiling the ranking tables was a matter of 2 hours in total.

The survey of how frequently the woody species

Source: RRA Notes (1988), Issue 3, pp.4–10, IIED London

occurred required 7 days of fieldwork, followed by 2 weeks verifying species names, entering the data into a personal computer, and calculating species occurrence per unit area in each vegetation/landuse type in each case study area.

The samples of the browse species ranked by the Fulani were sent to ILCA Headquarters in Ethiopia for chemical analysis. After drying, the 30 samples had been milled in one afternoon, but it took almost a year before the results of the analysis were sent back to us in Nigeria. This aspect of the study could not, therefore, be classified as 'rapid'.

· Discussion of the methods

In general, the 'ranking interviews' gave us a fairly good idea about the complexity and importance of browse as a forage resource. Pastoralists were very willing to share their knowledge about browse plants with us and appeared to enjoy the interviews as much as we did.

What we failed to record systematically during the interviews were the other uses of the trees and shrubs in addition to fodder. Here, we managed to collect only incidental information.

Some of the browse species such as the savannah mahogany tree (Khaya senegalensis) provide valuable hardwood. Others such the Ficus spp are used for medicinal purposes. Still other trees such as Vitex doniana are preferred for beehives; they also produce edible fruits, and the leaves are used as vegetables. These multiple uses of trees and shrubs could have been more systematically recorded during the ranking interviews.

Looking back on how we conducted this rapid appraisal of browse use and importance, the questions arise as to whether all parts of the study were necessary and whether we might have conducted some parts of the study more efficiently. The key aspects were the identification of the species browsed and the cattlekeepers' opinions about the relative importance of these species for cattle nutrition.

We chose to do the species ranking from 1 to 30, but it might have been easier and quicker for both the Fulani and us to have grouped the cards into, say, 3 categories, e.g. very important, important, less important. In fact, when we divided the 30 species in the final ranking lists into 3 groups of 10 species each, the 'top 10' turned out to be the plants best known to all pastoralists and were also plants with relatively high nutrient value; the second-best group of 10 were also well known to pastoralists but lower in nutrient value; and the third group included species not known to all pastoralists and of rather mixed nutrient value. Ranking in 3 categories would probably have yielded similar results.

The survey of frequency of occurrence was done to gain more information about 'browse on offer'. However, even a cattle herd kept by settled pastoralists can use forage resources within a radius of at least 5 km around the homestead, i.e. within an area of almost 80 km. To record the woody species with any degree of precision within such a vast area would be quite a demanding task in terms of time and personnel. The rapid survey within a small number of quadrats in the main vegetation/landuse types gave us a rough idea of the diversity of woody species in a subhumid savannah environment, yielded some limited quantitative data about tree and shrub density in different vegetation formation and under different forms of landuse, and clearly revealed which species of trees are left in the fields when land is cleared for cultivation in the traditional farming systems. The rapid survey did not, however, yield figures which could be used to estimate the total amount of browse available. The need for a specialist in taxonomy capable of identifying the great majority of the species in the field and the relatively time-consuming tasks of verifying taxonomic names and data processing may limit the applicability of such surveys.

It is doubtful whether chemical analyses of the browse species were necessary. The results finally produced by the laboratory in ILCA Headquarters agreed well with the values already published in the literature (e.g. le

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Houerou, 1980).

Furthermore, there are considerable doubts as to the validity of standard chemical analyses for estimating the feeding value of browse plants, since substances such as tannins in the plant parts may render certain elements (particularly nitrogen) indigestible in the animal's stomach. As long as these problems of analysing browse species have not been solved, it may be sufficient to use published results of chemical analyses in order to estimate the feed quality of the browse species ranked by the livestock-keepers. Furthermore, the all-too-common delays in processing the plant samples in laboratories can lead to great delays in completion of reports. If results are to be produced rapidly for immediate use, it is probably advisable in most cases of rapid appraisal to avoid dependency on laboratories.

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Source: RRA Notes (1988), Issue 3, pp.4–10, IIED London