

Cattle breeding within a pastoral system Is there breeding outside science?¹

Transcript of the presentation given at SOS Sahel Annual General Meeting, Oxford Town Hall, 11th October 2006
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Introduction

I am going to present one of the very few sets of data available on indigenous animal breeding systems. The research is set against the background of the debate on domestic animal diversity conservation or, in the current international policy formulation, the Management of Farm Animal Genetic Resources.

At least since the late 1980s, international concern for domestic animal diversity emphasised the irreplaceable role played by low-input/low output breeds in traditional agriculture, and the need for supporting local breeds *within* their respective production systems². Yet, in practice both policy debate and actual interventions remained characterised by a narrow-focus technical approach, centred on molecular biology, gene-banks and cryo-preservation of genetic resources.

My findings suggest that most of the processes crucial to the *economic* success of cattle breeding in a low-input/low-output system remain outside the theoretical framework of science, in particular the science that plays a major role in informing policies on pastoral resource management and breed development, that is animal science. I looked at cattle breeding amongst the WoDaaBe of Niger, as their high level of specialisation as cattle keepers is well-documented. A major methodological focus of my data collection, has been on herd genealogical history.

¹ Based on 'Cows who choose domestication. Cattle breeding amongst the WoDaaBe of central Niger', ongoing DPhil programme, Institute of Development Studies, University of Sussex, Brighton, UK.

² Cf. FAO Global Strategy: 'much of the world's animal agriculture will remain at low to medium input levels for the foreseeable future' [...] 'the high inputs required by highly specialised [breeds] will generally not be available' (FAO, 1999: 4).

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Breeding of livestock amongst the WoDaaBe

Data analysis using commercial databases enabled detailed yearly cross-sections of the herds in the sample, including kin relationships and basic life history of all the animals, from 1979 to 2004. The WoDaaBe name all calves after their dams. This system groups the animals in the herd along matrilineal lineages, with consequences for herders' decision making on selection.

So, this is what I found...

- Cattle reproduction is strictly controlled.
- Less than 2 percent of the males are used for reproduction.
- More than 95 percent of births result from match-making with selected sires.
- In 92 percent of births the herders were able to:
 - identify the sire and its owner
 - locate along a time-line the main events in the life of the animal in question
- Pedigree sires are borrowed across large networks of breeders, even when a breeder owns pedigree sires of his own. This is done explicitly in order to preserve animal variability within the herd.

Summarising, WoDaaBe's cattle breeding involves two main selective processes:

1. selective mating of cows with matched sires, and
2. out-selection through a marketing policy that targets unproductive cows and 98 of the males

Although WoDaaBe identify several transmissible traits in cattle, these selective processes don't appear to target any of them in particular. Instead, they are orientated towards the preservation of certain cattle lineages, defined as *na'i iririji*, the cattle that have lasted. These are the lineages that have proved capable of prospering under the WoDaaBe's herd management system, and over a long enough period to include episodes of severe stress.

It is helpful, at this point, to take a step back and look at WoDaaBe's cattle breeding within the context of their production strategies.

Production strategy

In Niger, the WoDaaBe share the same ecosystem with Touareg cattle keepers and livestock systems classifications usually cluster the two groups together. However, a close look at their ways of using the environment *for pastoral production*, reveals important differences.

With the on-set of the dry season, Touareg herders move their camp closer to the water point, in order to optimise family water provision. The WoDaaBe, move in the opposite direction, always trying to place their camp in the middle of *prime* fodder, investing a great deal of energy in optimising cattle *nutrition*.

The Touaregs in Niger are more territorial than the WoDaaBe. They are also relatively new to the business of keeping cattle. Freeing labour for activities other than herding is a core concern amongst them. Their cattle breed, the Azawak, needs little care and is docile enough to be handled by anyone. Azawak travel alone to the pasture and graze unsupervised. During the dry season, the herd must cover greater distances from the camp in order to feed. Progressively shorter grazing time leads the animals to feed on whatever pasture they find.

The WoDaaBe, on the other hand, have little control over the territory but great expertise in cattle husbandry. Their breed, the Bororo zebu, is the largest in Niger. With a keen sense of direction, ideally built for long treks and grazing on unbeaten tracks, these animals are selectively docile: dog-like obedient with the herder and very attached to the household, but shy and aggressive towards strangers.

Studies of WoDaaBe's production strategy³, found it based on exceptional inputs of specialised labour and following a simple rule: making sure that all year round the animals eat the highest possible amount of the richest possible diet. The system relies on herd management patterns geared towards exploiting the diversity and variability of the bush, in particular the spatial and temporal distribution of plants' vegetative cycles, due to differences in plant species and soils, and to the erratic rains.

The herders concentrate on three management aims:

- a) keeping the herd always on prime range, where fodder plants are in their state of highest nutritional value;
- b) minimising all kinds of disturbance to animal's feeding; and
- c) favouring a highly diversified diet in order to correct nutritional imbalances which, particularly during the dry season, could keep feeding motivation low by triggering a negative digestive feedback.

When successful, the strategy enables substantial stretching of the nutritional value of the range, as well as of the operative capacity of the animals as feeders.

Selection & culture

Maximising feeding on the best possible fodder in the Sahel is a demanding task for both people and livestock. Animal behaviour studies of ruminants, have highlighted the cognitive dimension of foraging and showed how unfamiliar locations and unknown

³ In particular, the works of Bonfiglioli (1981) and Schareika (2000).

foods result in a dramatic drop in the intake⁴. Apparently, it takes more than ‘presenting’ a cow with a good patch of fodder, for the animal to eat it and do it efficiently.

In the bush, cattle are faced with a hugely diverse and potentially lethal menu under extreme climatic conditions. Daily foraging time and the capacity of the rumen are limited. The environmental pressure is strong and there is no resting point. Efficient foraging is individually and continuously negotiated between the necessities of nutrition and those of thermoregulation. Animals must be able to discern amongst a great number of fodder plants, many of which are dangerous at some point in the year, but beneficial in other periods. It is up to them to choose what plants or parts of plant to feed on, for how long and how fast, how much time to spend eating or resting, whether to be cooperative with one another or get in each other’s way.

In the light of our current knowledge on cattle feeding behaviour, it is evident that the successful implementation of a management regime like that involved in WoDaaBe’s production strategy requires *particular teams of animals with matching, specialised behavioural patterns*.

Indeed, WoDaaBe herders are fine observers of their animals’ behaviour. Their organisation of the herds in matriarchal lineages replicates the pattern of cattle social organisation in the wild but also enhances or introduces functional traits. Practices that favour calf-dam bonds and the establishing of ‘preferential relationships’ across lineages, particularly between young calves, are embedded in daily management routine.

Favouring the number of bonds within the herd works towards optimising herd nutrition. Preferential relationships between animals diminish low-ranking animals’ stress at grazing. This results in *more even* feeding patterns across ranks, *without* a cost for the high ranking individuals; in other words, a better feeding performance of the herd as a whole. Close supervision of the animals and tight bonds with the human household are also crucial in minimising stress within the herd. Bororo animals are bred anxiously vigilant and selectively trustful, in other words they are bred to relax in presence of the herder and to need such presence in order to relax.

Returning to the general goals of cattle breeding amongst the WoDaaBe, the attention to ensuring the continuity of long lasting lineages should now appear less puzzling. It is essential to their production strategy that *functional behavioural patterns* are acquired and maintained within the herd. Consequently, their breeding system focuses on fostering *social organization and interaction*, within the herd as well as between the herd and the human household. It encourages *sharing of animals’ feeding competence* across large breeding networks of related households and tries to ensure, beyond the level of genetics, the *cultural continuity* of successful cattle lineages.

⁴ Cf. for example Launchbaugh *et al.* (1999); Bouissou *et al.* (2001).

Conclusions

Does such a small-scale study offer any useful insight for natural resource management? The empirical evidence on the ‘making’ of a low-input/low-output breed within specialised pastoral settings appears to fall largely outside the conceptual framework of the science that is used to inform breed development policies and collect local knowledge on resource management within pastoral settings.

I shall only outline three examples.

Breed selection

Breed selection practices that include complex animal behaviour amongst the selection criteria, are critically mishandled by a concept of selective mating focussing only on genetic manipulation. In livestock production systems that harness for their economic goals, animals’ behaviour and patterns of cultural transmission, the social interaction and historical continuity within the breeding population become of crucial *economic* interest. A focus on genetic resources, that understands breeding populations merely in terms of genetic configuration across a set of individuals at a given time, falls helplessly short of grasping the *cultural input* that is crucial to the *economic* performance of this kind of breeding population.

Production environment

WoDaaBe do intensify production. They do so however, not by *sheltering* the animals from the rigour of nature and relying on external feed inputs, but rather by engineering the animals’ *encounter* with the ecosystem through labour intensive sophisticated management. Their production strategy plays a crucial role in the ‘making’ of the breed, in that it leads the animals to encounter *certain* sets of natural conditions, involving *certain* kinds of stress and advantages. In the resulting conditions, some animals prosper and leave a long line of descendants, whilst others struggle and become candidates for marketing. In this way, herders are able to *harness natural selection pressure for their own breeding purposes*. Animal science’s concept of production environment, focussing on technological changes to the material conditions of the environment, proves ill-equipped to describe low-profile, labour-based human interventions focussing on use patterns.

Adaptation

A common and significant consequence of this conceptual inadequacy, is the belief that livestock in pastoral systems are bred in largely *natural* conditions and are therefore the result of *natural* adaptation, perhaps differing in degree but not in kind, from the process shaping wildlife. It should be clear by now that WoDaaBe’s cattle breed is better understood as a *culture-nature combine*, embodying both the animals’ socially transmitted (and human-induced) knowledge and their herders’ strategies in using the ecosystem — including of course negotiating such use within the wider network of *political* and *economic* forces on the territory. It should also be evident, that although the genetic configuration of the breed is undoubtedly an aspect of adaptation, it is an aspect that, by itself, is for the herders of little, if any, economic use.

In all three cases, a cultural input in the human-animal-environment interaction characteristic of pastoral systems, is missed out by the theoretical framework of animal science, based on the premise of a fundamental nature/culture divide. Yet such cultural input appears to be crucial not only to the successful exploitation of natural resources within WoDaaBe's production system, but to their very *coming into existence as resources*.

Environments conceptualised within the nature/culture divide perspective are reduced to their *physical* space, with resources being 'things' that wait for an actor or a new technology to exploit them. But isn't technology an expression of culture?

The analysis of cattle breeding amongst the WoDaaBe suggests that technology is not the *only* cultural input that can expand the world of resources. It also confirms a large front of reflection on the theme of human-environment interaction⁵, outlining the *practical draw-backs* of a nature/culture divide perspective and of a *materialistic* view of resources as 'things' rather than *use-patterns* generated by the means of *cultural inputs*.

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⁵ For an overview of this reflection, Scoones (1999).