AGRO-PASTORALISTS’ TRAIT PREFERENCES IN N’DAMA CATTLE: PARTICIPATORY METHODS TO ASSESS BREEDING OBJECTIVES

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INTRODUCTION

Until recently, indigenous breeds have been rather neglected in livestock intensification due to the believe that their exploitation would be little rewarding due to a low production output, poor response to management intervention and uncertain genetic potential. Policy focused on the introduction of high-yielding temperate breeds (FAO/UNDP, 1998). But the value of indigenous livestock breeds is underestimated when only marketable output are considered and the multitude of functions and performance sustainability is left aside (Mendelson, 1999). Moreover, adaptation to unfavourable production conditions is a unique attribute of many indigenous breeds. Particularly in marginal environments, costs to adjust the production environment to the conditions required by high performance breeds may well exceed that of the improvement of locally adapted breeds (Wagner and Hammond, 1999).

Unfortunately, Animal Genetic Resources are negatively affected by agricultural change and under severe threat of erosion (Wagner and Hammond, 1999). Recognizing their imperative value the international community agreed on concerted efforts to halt their further depletion (FAO/UNDP, 2000). The strategic concept is that of in-situ conservation through utilization ensuring that indigenous breeds remain functional parts of production systems. This promises to be a sustainable and cost-effective approach, provided that indigenous breeds remain or become economically attractive for their owners (Rege, 1999). To achieve this end community-based genetic breed improvement programmes are suggested (Wollny, 2001).

Nevertheless, it appears unlikely that advanced breeding systems can successfully support AnGR management, when attention focuses primary on genetic problems. Methodological consideration needs to be given to aspects such as the organizational nature of breeding initiatives, institutional demands, socio-economic factors and the cultural identity of the people who keep livestock (Payne and Hodges, 1997). Community-based plant breeding has proven extremely successful, using participatory approaches whereby farmers and breeders benefit from the integration of systematized indigenous knowledge into scientifically based breeding strategies (Jarvis et al., 1999). The investigation and evaluation of livestock raisers’ breeding knowledge and breeding strategies remains a challenge where no formal breeding infrastructure and no written recording system exists. This study aims at identifying appropriate participatory methodologies that facilitate a better understanding of agro-pastoralists’ interest into indigenous cattle breeds and their preference for production and functional traits and that can be applied in breed improvement programmes and AnGR management.
MATERIAL AND METHODS
A sequence of different survey techniques is employed to identify and evaluate breed preferences of agro-pastoralists and to make them available for the definition of breeding objectives. In a step-wise procedure important traits and other aspects of traditional breeding systems, such as breeding practices and production objectives are assessed in a largely participatory survey. It was aimed at simultaneously facilitating the exchange of relevant breeding knowledge and experience between researchers and agro-pastoralists. Matrix rating, a well established analytical tool in research and development (Waters-Bayer and Bayer, 1994) and lately used to investigate breed preferences (Tano et al., 1998), forms the final survey step producing quantifiable data of preferences for different breeds and their traits. Descriptive statistics applied use commonly available software packages. ANOVA and Bartlett tests, additionally paired t-tests are recommended to derive at meaningful comparisons of preferences (Tano et al., 1998).

Survey techniques and data collected. Focus group discussions in 7 villages served as an explorative tool to investigate agro-pastoralists breeding strategies, including breed and trait preferences, and breeding practices. Subsequently, a baseline survey involving 171 herd owners and owners provided quantitative data on various aspects of production systems and cattle breeding, including criteria that agro-pastoralists use to evaluate N’Dama cattle. Frequencies of the collected criteria indicate importance of traits in terms of their priority for agro-pastoralists (CIRDES/ILRI/ITC, 2000). This information was used in the implementation of the final survey part, which involved a matrix rating exercise. Matrix rating and a questionnaire to generate data on breeding practices, production objectives, and factors determining breed preferences was carried out with a sub-sample of 90 herd owners.

Site and sample selection. The survey was conducted among herd owners and herders of 27 villages in three districts in The Gambia. Three study sites capture differences in the level of commercialisation, tsetse challenge and herd ownership pattern. Survey participants were randomly chosen from lists of herd owners provided by the Department of Livestock Services. At all study sites a traditional low input mixed crop-livestock system prevails. Cattle are used as a multipurpose breed providing milk, meat, manure, and traction (Sumberg, 1992). As elsewhere in tsetse infected zones of West Africa exploitation of ruminant livestock is possible due their trypanotolerance and other adaptive features and about 95 % of the Gambian cattle population consists of the trypanotolerant N’Dama cattle breed (CIRDES/ILRI/ITC, 2000). Nevertheless, proximity to the arid savannah climate makes immigration of zebu-type Gobra cattle easy.

RESULTS AND DISCUSSION
Focus group discussions revealed that although N’Dama are the preferred cattle breed, cross-breeding with bordering Gobra finds consideration in traditional breeding strategies. From the baseline data a quantitative description of all criteria that agro-pastoralists use to evaluate the N’Dama cattle was produced. Most frequently mentioned evaluation criteria for N’Dama bulls are size (13,1 %), ‘strength’ (28,3 %), libido (10,6 %) and ‘good offspring’ (12,3 %). The term ‘strength’ is used by agro-pastoralists to describe a combination of vigour and fitness. In N’Dama cows milk production (25,1 %), yearly calving (24,9 %) and ‘strength’ (16,6 %) are
priority criteria. All criteria were grouped into parameters to identify and quantify the importance of functional and production traits depicted in diagram 1. Health status, reflecting disease resistance, is the most important parameter in bulls and very important in cows. Production traits of high priority are milk and reproduction for cows and conformation (size) and production performance for bulls.

Figure 1. Parameters used to characterize N’Dama cows and N’Dama bulls

Based on frequencies of criteria and livestock production objectives six traits depicted in table 1 were selected for the matrix rating. N’Dama received highest ratings for adaptation to dry season stress, traction utility and disease resistance. Gobra received lowest ratings for disease resistance and highest for size and milk yield. Results differ partially significantly between survey sites.

Table 1. Agro-pastoralists’ ratings of cattle breeds in The Gambia

<table>
<thead>
<tr>
<th>Evaluation criteria</th>
<th>Gobra</th>
<th>N’Dama*Gobra</th>
<th>N’Dama</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>4,9</td>
<td>4,3</td>
<td>3,1</td>
</tr>
<tr>
<td>Milk yield</td>
<td>4,7</td>
<td>4,3</td>
<td>3,2</td>
</tr>
<tr>
<td>Calving frequency</td>
<td>2,9</td>
<td>3,1</td>
<td>4,4</td>
</tr>
<tr>
<td>Adaptation to dry season stress</td>
<td>2,3</td>
<td>2,9</td>
<td>4,7</td>
</tr>
<tr>
<td>Utility for traction</td>
<td>2,7</td>
<td>3,5</td>
<td>4,7</td>
</tr>
<tr>
<td>Disease resistance</td>
<td>1,8</td>
<td>2,6</td>
<td>4,6</td>
</tr>
</tbody>
</table>

Possible range for ratings was 1 - 5.
Standard deviations ranged between 0,4 and 1,3. Standard errors ranged from 0.08 to 0.18 and most differences between breeds were significant at p < 0.10.

CONCLUSION
Participatory approaches to AnGR management are vital to identify and evaluate various aspects of traditional breeding strategies and to achieve active involvement of the livestock keeping communities. Participatory survey techniques, such as the matrix rating tool, which yields quantifiable data and facilitates exchange of relevant breeding information between agro-pastoralists and researches appear particularly recommendable. Agro-pastoralists in The Gambia expressed a clear preference for the N’Dama breed, due to traits of disease resistance.
and adaptation. Still, size is an important selection criteria in N’Dama, receives highest ratings in Gobra and a reason for cross-breeding N’Dama and Gobra. This emphasises the need to support genetic improvement of the N’Dama breed in pure-breeding programmes, if their genetic integrity and adaptive traits are to be maintained in the future. Nevertheless, breeding policies should consider regional planning and support site-specific improvement programmes, which in high potential areas may even support cross-breeding endeavours already practised by agro-pastoralists.

REFERENCES