



Sustainable management of globally significant endemic ruminant livestock in west Africa (PROGEBE) Summary for decision making—the Gambia

Abdou Fall, Augustine Ayantunde, Carlos Quiros, Isabelle Baltenweck, Jane Poole, Jemimah Njuki, Karen Marshal, Lokman Zaibet, Mohamed Said, Nabintu Sanginga, Nancy Johnson, Nicholas Ndiwa and Samuel Mburu

1 Background

Livestock contributes significantly to livelihoods of rural populations in west Africa. A significant area of the region (humid and subhumid zones) however is highly infected by tsetse flies, a vector of trypanosomiasis, which affects both livestock and livelihoods. The use of endemic ruminant livestock (ERL), such as N'Dama cattle, Djallonké sheep and West African Dwarf goats, is seen as a better option to overcome the trypanosomiasis problem. In fact, these livestock breeds are well adapted and productive in tsetse infested areas. They also have low nutritional and husbandry requirements which, along with their disease resistance, can be seen as pro-poor options.

The Gambia has one of the highest livestock densities. Livestock ownership for the average rural farmer in the Gambia is a store of wealth, provides a buffer stock, and an effective hedge against income fluctuations (Fafchamps et al. 1995). Profits from agricultural or non-farm activities are used to purchase livestock. Women play a major role in small ruminant production, representing 52% and 67% of the owners of sheep and goats, respectively, and 43% in the ownership of both small ruminants (Itty et al. 1997). Although the numbers of N'Dama cattle, Djallonké sheep

and West African Dwarf goats are still high, their future is uncertain. The threats to these populations include i) destruction and degradation of endemic ruminant livestock habitat, ii) crossbreeding between endemic ruminant livestock and Sahelian breeds, and iii) abandonment of these breeds due to production and market constraints.

This study has been conducted in the context of implementing the sustainable management of globally significant endemic ruminant livestock in west Africa. The project aims to remove existing barriers to the in situ conservation of these breeds. It supports development and implementation of community based models for conservation and management of critical habitats, so as to demonstrate strategies for preserving the unique genetic trait-habitat complexes that are of global significance. The project is funded by two major financiers, the Global Environment Fund (GEF), and the African Development Bank (AfDB) and is implemented by the United Nations Office for Project Services (UNOPS) with UNDP for facilitation and operational procedures.

The project specifically centres its activities around the following outcomes: (i) conservation and increase in productivity of ERL; (ii) promotion of market development and incentives; (iii) promotion of greater sustainable management of their ecosystem (iv) facilitation of the implementation of policies, legal and institutional frameworks favourable to their development, (v) improving cooperation, knowledge management and information sharing at the national and international levels.

At the beginning of the project implementation period, a baseline survey was done in each of the three project sites in the Gambia. The purpose of the surveys was to benchmark key indicators relative to ERL population, productivity, marketing and livelihood, and to identify constraints faced by ERL producers and market agents, as well as opportunities that the project could take advantage of.

The report provides a summary of the findings of the baseline surveys with a focus on key recommendations regarding project implementation.

2 Methodology for the baseline surveys

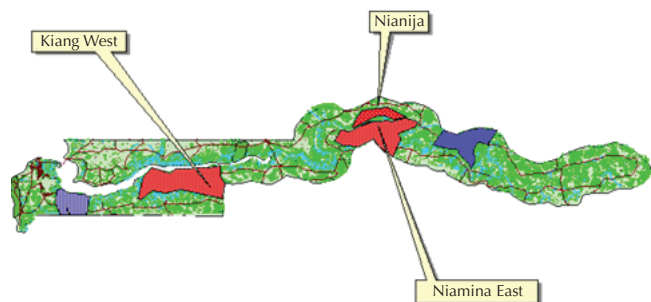
Villages in the three primary project sites; Kiang West, Niamina East and Nianija were selected (more details about methodology are found in ILRI Research Report 28). Four interlinked surveys were carried out as part of the baseline studies.

First, a participatory rural appraisal/community survey were organized in the selected villages to characterize the context, and community perspectives of the current situation with respect to natural resource management and livestock production.

Second, the community surveys were complemented by household surveys to obtain quantitative household level data on livelihood strategies, livestock production and marketing and other variables of interest related to ERL.

The third one was a market agent survey with the objectives of identifying the market actors (both input and output) in the project sites and identify their capacity and reach in providing services to livestock keepers.

Finally, herd and flock surveys were conducted to carry out a cross-sectional retrospective and estimation of livestock demographic parameters.



Source: PROGEBE (2008).

Figure 1. The study area; Kiang West, Niamina East and Nianija districts.

3 Key findings

The results of the surveys are presented in the following sections based on key findings from socio-economic characteristics and livelihoods, status and management of natural resources, breeding management and herd dynamics, livestock markets and information systems. The implications for project interventions and the way forward are outlined in the last two sections. The results are summarized into 25 key messages. Each section has a key message and a summary of the key findings of the section. The section on implications for project interventions is based on community and national feedback workshops.

3.1 Socio-economic characteristics and livelihoods:

The population in the three sites are characterized by high illiteracy rate and high disparities in land and livestock ownership.

A key distinction between poor and rich is the education level of their children. Children from poor families drop out at lower grades due to low financial capacity and living standards whereas the children from rich families proceed to university. It is found that 70% of the children between the ages of 13 and 19 (assuming at the age 19 pupils have completed primary education and eventually secondary education) dropped out before completing their primary school education. The high illiteracy rate will have implications for the design of project interventions, especially extension and dissemination of information tailored to the specific needs of targeted groups.

Land ownership show high disparity patterns. Seventy-five per cent of farmers have less than 10 ha of land with an average farm size of 4.7 ha. The remaining 25% own farms of more than 10 ha. Cropping systems are diversified. More than 80% of total agricultural land is cropped; 20% is used for fallow and grazing for livestock. Crops include rice (80%), followed by groundnuts, millet and maize. Farming is predominantly extensive, where less than 10% of households use pesticides, 32% use fertilizers and 6% use irrigation. About 50% of the households use hand for cultivation, 38% use animal traction, and 5% use mechanized traction.

In addition to land, livestock ownership, ownership of farm implements, and off-farm income were used by communities as main criteria for wealth ranking. On the basis of these criteria, four wealth categories were identified, namely, the very poor, the moderately poor, the moderately rich and the rich (Figure 2). In Kiang West and in Niamina East, 75% of the population was classified as poor or very poor. In Nianija, 80% were said to be poor or very poor. The very poor do not own cattle; the moderately poor own goats and sheep while the poor have between 1 and 2 heads of cattle. Land access was reported to be determined by the ability to cultivate the land. For the poor and very poor categories, land use was restricted and/or constrained by limited farm implements for adequate production.

Key message 1: The literacy rate is low; more than two-thirds of children drop out of school before completing primary education.

Table 1. Level of education

Education level	<12 years (%)	13–19 (%)
Completed primary, secondary or university	2.7%	28.2

Key message 2: Three-quarters of the farmers have less than 10 ha mostly used for extensive subsistence farming. Farmers use communal grazing land and have little incentives to intensify livestock feed production.

Key message 3: The poor and very poor represent about 75% of communities, they own goats and sheep but no cattle. For these categories although they have access to land, they are constrained by limited farm implements.

Key message 4: Farming is the most important source of livelihood followed by livestock rearing, vegetable gardening and collection and sale of forest products. For the poor categories, given limited access/ownership to resources (land and livestock) livelihoods may depend more on forest products which is not sustainable.

3.2 Livestock populations and contribution of ERL to livelihoods:

In the Gambia, most of livestock (cattle, sheep and goats) are ERL; there are currently no exotic or crossbred animals in these sites. Livestock ownership patterns differ by social group and gender. Although the contribution of ERL to income is not significant, there is a trend of a growing importance in all sites.

According to the last livestock census carried out by the Department of Livestock Services and the International Trypanotolerance Centre of 1993, cattle population was 278,538 head with 0.4% non N'Dama; sheep was 155,132 head with 0.6% non-Djallonké; while the goat population was estimated at 213,871 head, with only 0.1% non-west African Dwarf. PROGEBE estimation of ERL populations (Herd and flock survey, ILRI) and livestock census (National coordination unit, Gambia) also show predominance of ERL breeds (Figure 4).

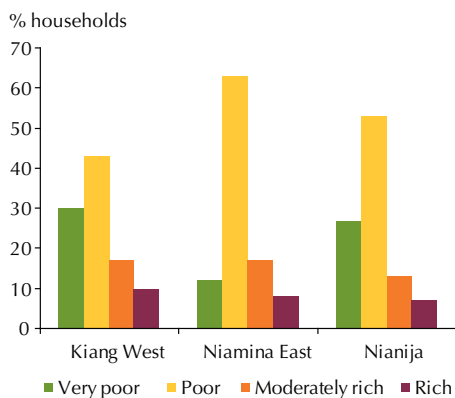


Figure 2. Wealth ranking.

Livelihoods sources are diverse; they were grouped into six categories: farming, livestock rearing, commerce, fishing, collecting forest products, vegetable gardening and other off-farm activities. In Kiang West, farming is an important source of livelihood, followed by livestock rearing, vegetable gardening and collection and sale of forest products which are equally important. In Niamina East the most important source of livelihood is farming, followed by commerce and livestock rearing. In Nianija, farming was the most important livelihood strategy, followed by both fishing and commerce which were given equal weight. Livestock rearing was fourth in importance as a source of livelihood for the community.

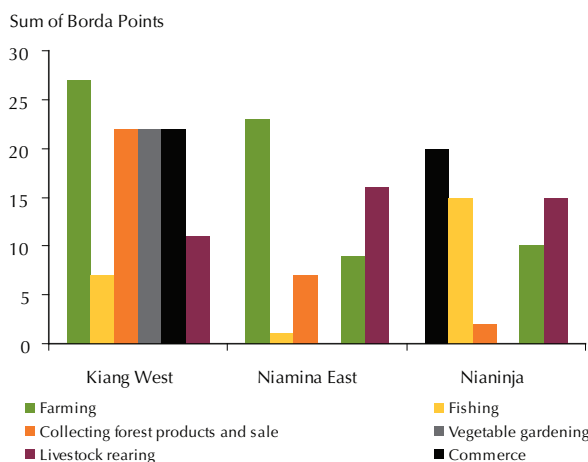


Figure 3. Perception of contribution of different activities to livelihoods.

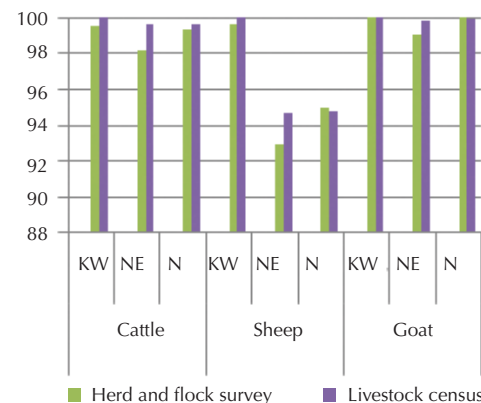


Figure 4. ERL populations in the Gambia.

Cattle are the main criteria of wealth. The poor categories do not own cattle. Overall, 51% of households reported owning cattle, 47% own sheep and 67% own goats. There are significant differences in terms of average number of animals per household. Nianija have the highest cattle numbers at 18.6, followed by Kiang West with an average of 12.9 and Niamina East had the lowest with an average herd size of 6.8. The goat numbers were less variable with an average herd size of 5.9, 6.1 and 7.9 in Kiang West, Niamina East and Nianija respectively.

Women owned cattle in less than 40% of the households. However, in over 80% of the households, women owned goats, and in a slightly lower percentage of households women own poultry and sheep. In Niamina East women have the lowest percentage of households with women owning cattle, while in Kiang West there were more households with women owning poultry than goats but in Niamina East and Nianija, the opposite was true.

Looking at livestock numbers owned by men and women in households where women owned livestock, men owned an average of 10.8 head of cattle compared to women who own 2.4 head on average in Kiang West. In Niamina East, men owned 3.0 head of cattle and women owned 1.28 head (see Table 19). A similar trend was observed in Nianija where men owned on average 11.54 head of cattle compared to women's 4.9 head. Women owned more goats in all three sites, owning significantly more than men in Niamina East and Nianija. Women also owned more poultry than men in all three sites.

In all the three sites, ERL cattle contributed 9.7% to total farm income and 6.5% of total household income (including off-farm income). Looking only at cash income, livestock contributed 10.3% of the farm income in Kiang West, 6.5% in Niamina East and 8.3% in Nianija. Overall, cash from sale of livestock and livestock products contributed 8.4% of the farm income across all sites and 5.5% of the total household income. Similar trends were observed across sites with livestock contributing least to total household income in Niamina East at 1.6% despite contributing to 6.5% of the farm income. This may be due to households in Niamina East having more off-farm sources of income than households in Kiang West and Nianija.

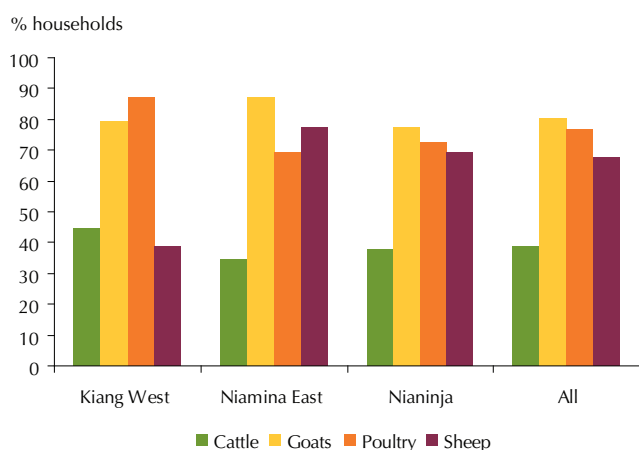


Figure 5. Percentage of households with women owning different livestock species.

Key message 5: Only half of the population own cattle, which is ranked first in contributing to livelihoods.

Key message 6: Women played a major role in small ruminant production, representing 52% of the ownership of sheep, 67% of the ownership of goats and 43% of the ownership of both sheep and goats.

Key message 7: The contribution of endemic livestock to household income is relatively low: about 10% in Kiang West and Nianija and 6.5% in Niamina East. There is also a trend of a growing importance in most of the villages.

Table 2. Percentage contribution of ERL to income

Sites	Livestock income	% to farm income	% to HH income
Kiang West	6181.0	10.5	8.0
Niamina East	1383.8	6.9	1.8
Nianija	9497.8	11.4	9.7
Total	5703.5	9.7	6.5

3.3 Production management and marketing of ERL:

The returns to ERL and their contribution to income depend on current production and management practices as well as marketing orientation and constraints.

Animal breeding aims to improve the genetic merit of animals over each generation. This is achieved by selecting the 'best' animals to be the parents of the next generation. To identify the 'best' animals, the production objectives of the livestock keepers must be known, so animals can be selected in line with these objectives. The most noticeable result is the objective of savings and insurance that scored the highest for all species. For cattle the next highest scoring objectives were draught and manure, followed by (for cows) domestic milk consumption and milk sale, and then ceremonial/dowry. The other remaining traits (including income and domestic meat consumption) received relatively low ratings. For sheep and goats the next highest scoring objectives were income and ceremonial/dowry, followed by manure. The ratings were relatively low for traits such as domestic meat and milk consumption, and milk sale.

Many farmers indicated use of modern methods for disease management but housing animals is not a major concern. About 48% of households indicated they had used some form of treatment for cattle, 44% for goats and 49% for sheep. Most of them used modern methods of disease management and prevention. The vast majority of cattle are housed in open kraals or pens both during the dry and rainy seasons. A limited number of households (8%) use kraals or pens with roofs.

Goats benefit from better housing conditions, especially during the rainy season when 67% of households use kraals or pens with roof or stable with roofs to accommodate their goats.

Almost all households make use of natural pastures to graze their cattle, sheep and goats. Groundnut hay is the second most important feed resources. The most widely used feed concentrate is cereal bran given to cattle, sheep and goats. The use of cakes and other concentrate feeds is not common which reflects a feed regime essentially based on roughages. The other common source of feed for cattle, sheep and goats is fodder from trees and rice stover.

Key message 8: The most important objective for keeping most livestock species is 'savings and insurance'. This means the breeding program should place emphasis on reproductive and survival traits.

Key message 9: Many farmers indicated use of modern methods for disease management but housing animals is not yet a major concern.

Table 3. Percentage use of feeding strategies for ERL

Feeding strategies	Use
Collection and storage of bush hay	17.2
Collective grazing of village animals	40.4
New grazing hours	26.8
Physical treatment of hay and stovers	8.1
Purchase of crop residues	15.7
Storage of crop residues	60.1
Tethering of animals in fallows	25.3

Key message 10: In general, the use of cakes and other concentrate feeds is not common which reflects a feed regime essentially based on roughages.

On market orientation, it is found that cattle are not kept for milk production and that milk sales are important for only few households. Looking at sale of cattle (live animals), it is found that a total of 41 heads of cattle were sold during the 12 months preceding the survey, which corresponds to 2.7% of the total herd size. These animals were sold by 21 households or 16% of cattle keepers. Among these households, cattle sold represent on average 17% of the herd. These results show that very few households sell animals on a regular basis, but for those who do, sale of animals is an important activity.

Key message 11: Generally, cattle are not kept for milk production, but milk sales are important for a few households.

Key message 12: Very few households sell animals on a regular basis, but for those who do, sale of animals is an important activity.

Table 4. Percentage of ERL sold by traders

		Proportion of ERL to total value sold
Cattle	N'Dama	64.0
	Exotic	24.0
	Crossbred	12.0
	Overall	100.0
Sheep	Djallonké	53.7
	Exotic	23.0
	Crossbred	23.3
	Overall	100.0
Goats	WADG	56.7
	Exotic	23.3
	Overall	100.0

Key message 13: Main sources of information on livestock related issues are extension and other government offices, but livestock issues are not discussed in community groups.

While at farm gate farmers indicated that they keep endemic breeds, livestock traders indicated that they also trade in non-endemic breeds. From the surveyed market agents in local markets, the total value of livestock they sold, and the proportion of sales of ERL to total sales were calculated. Of all total value of cattle sales handled by the agents, 64% was from N'Dama cattle while 36% was from exotic and other crosses. This was in contrast to the sales at household level where most of the sales were N'Dama. A similar trend was observed in goats and sheep where 53.7% and 56.7% of the total sheep and goat sales were from Djallonké and WAD. The apparent discrepancies between breeds held by farmers (mostly ERL) and breeds sold by traders raise a question regarding the origin of these non-endemic animals.

An important aspect of production management and marketing is information use and sharing. The main sources of information on livestock related issues are extension and other government offices, but livestock issues are not discussed in community groups. With regard to ERL conservation, it is found that 90% of the households participate in community groups but topics related to conservation of endemic livestock, and livestock in general, are not discussed. On the other hand, most farmers seeking information on livestock practices receive it. The majority of households focus their requests on health issues, followed by breeding and feeding.

3.4 ERL habitat and natural resources management:

Sustainable management of the endemic ruminant livestock breeds in the project sites is inseparable from sustainable management of the natural resources (land, vegetation, water and forestry). Natural resource management includes not only sustainable models for rangeland conservation, feed and water resources management, but also broader habitat protection.

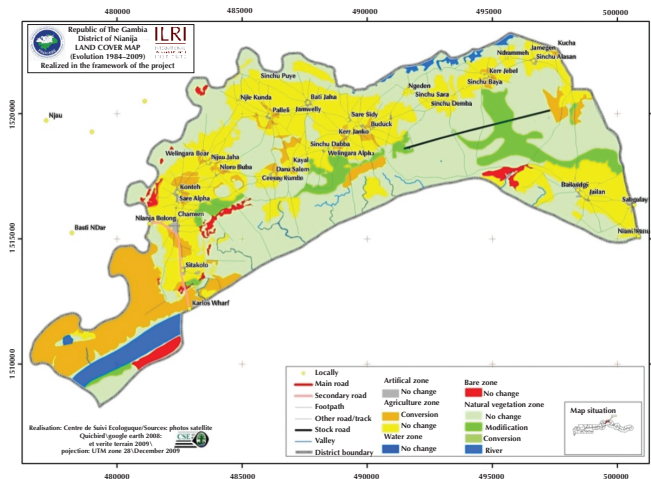


Figure 6. Land cover changes and dynamics in Nianija between 1984 and 2009.

Key message 14: Cropland and rangeland are in abundance and fallowing is common in Kiang West. In Niamina East degraded land is on the rise as indicated by the presence of invasive species and disappearance of certain plant species. In Nianija the land area cropped has increased significantly at the expense of natural vegetation, and rice field has expanded to almost all the available wetlands.

Key message 15: Uncontrolled bush fire is increasing and constitutes a threat to sustainable management of natural resources and the habitat of endemic ruminants.

On land use and trends, it is found that cropland and rangeland are in abundance in Kiang West compared to the other two sites (Niamina East and Nianija). The practice of land fallowing is quite low in Niamina East and Nianija compared to Kiang West. In Kiang West, fallow period was reported to be about 10 years. Demographic pressure and the associated continuous cultivation of land were cited as the major cause of shortening of fallow period in Niamina East and Nianija. It is then not surprising that significant fraction of the land in Niamina East and Nianija was reported to be degraded.

The land cover maps for 1984 and 2009 show that in 1984 the dominant land cover was natural vegetation, covering about 63% of the land surface. In 2009 this had reduced to 52%. Agriculture in 2009 covered 41.3% of the land surface from 30.3% as mapped in 1984. The main land cover in

2009 is rainfed agriculture (29%) and there has been a major increase in rice fields. In Nianija the comparison of land use patterns showed cropped area increased by 11% from 30.3% between 1984 and 2009 while natural vegetation declined by 11% from 63%. There has been a general decline in tsetse population though there has not been any significant clearing of forest. However, there has been expansion of crop field into rangelands.

A major challenge is the management of bush fires. The frequency of bush fire was reported to have increased in Kiang West and Niamina East with the incidence of fires in 2008 observed to have reached 186 and 80, respectively. The incidence of uncontrolled bush fire in 2008 was eight bush fires according to MODIS (remote-sensed data). Such uncontrolled bush fire has been increasing according to remote sensing data (MODIS) and constitutes a threat to sustainable management of natural resources in the community and the habitat of endemic ruminants.

Local conventions and norms governing natural resource use exist but the degree of enforcement varies with different issues. Local conventions/norms governing access to land bush fire control, livestock mobility, grazing/use of crop residues by livestock, farmer–herder conflict and protected forest reportedly exist in all sites. Enforcement of these local norms was reportedly strong except for bush fire control. Long-term investment on acquired land like tree planting is not allowed. Village head and development committees were mentioned as the institutions responsible for the enforcement of the local norms in Nianija. In Nianija absence of well demarcated corridors for livestock passage was reported.

An increasing trend of farmer–herder conflict was reported in the site due to poor herd management, management of village herds by hired pastoralists, increasing ownership of livestock by farmers who have no experience of livestock management, increasing proximity of crop and livestock, and absence of well demarcated corridors.

Key message 16: Local conventions and norms governing natural resource use exist but the degree of enforcement varies with different issues.

Key message 17: The lack of enforcement of local conventions and norms may lead to conflicts over resources.

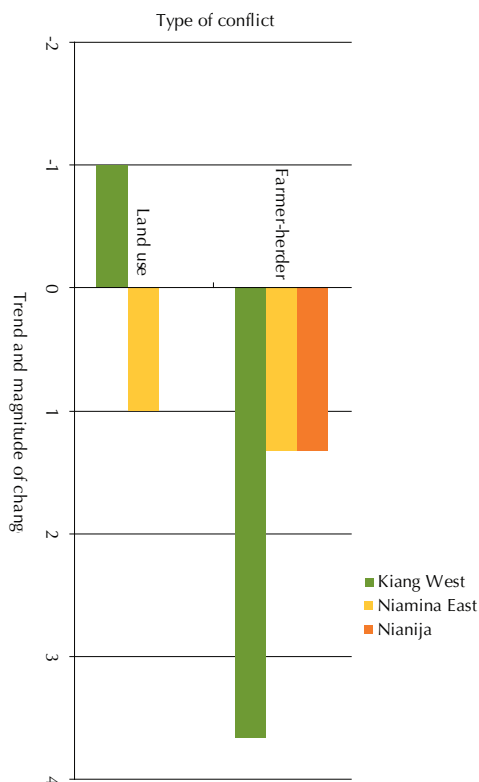


Figure 7. Conflicts over resources use.

The practice of transhumance by the livestock owners in the project sites is not the classic type by the pastoralists in the Sahelian zone who could be away from their homesteads for three or four months with their animals in search of pasture and water. The practice of transhumance by livestock keepers in the subhumid zone where the project sites are located only involves a short distance (often less than 30 km) and few days. Transhumance only involved a short-distance movement and it was reported to have increased in recent years. It is driven more by protection of crops from damage by livestock than search for pasture and water Niamina East.

3.5 Key constraints to ERL in the Gambia:

The production and management of ERL systems in the Gambia are faced with a number of constraints:

High mortality rates: Mortality rates of animals indicate the level of natural death (as opposed to slaughter). Mortality was listed as one of the key constraints to breeding. For cattle the mortality rate was around 20% for animals ≤ 2 months old, and lower at 5–7% for animals > 12 months old. Mortality rates for the small ruminants were significantly greater than that for cattle at 33–45% for animals ≤ 12 months old, and 25–54% for animals > 12 months old. The high mortality rate of cattle ≤ 12 months old, and small ruminants at all ages, requires addressing.

Lack of knowledge: In addition to mortality, key constraints to improvement of animals through breeding were 'lack of capital to purchase good breeding animals', 'lack of knowledge of breeding practices in general', and 'lack of knowledge of how to identify good breeding animals from own herd'.

Technical constraints include water shortage, lack of feed and diseases which were reported in all nine villages surveyed. However, some patterns of dominant biophysical constraints according to specific sites seem to emerge. Disease is the number one problem in Kiang West whereas water shortage is more acute in Nianija. Furthermore, farmers in Niamina East experience more feed shortages than farmers in other sites.

Access to water is limited by lack of or non-operational infrastructures (boreholes and wells), lack of water lifting devices, and salt intrusion in villages' streams. On animal health, most important cattle diseases are trypanosomiasis and tick borne diseases (15%). Other important diseases are lumpy skin disease, heartwater, anthrax and Foot and Mouth disease (6%). Most important diseases in small ruminants are PPR, worm infestation, trypanosomiasis and tick borne diseases and mange/sarcoptes. The access to veterinary services is limited.

Key message 18: Mortality was listed as one of the key constraints to breeding. Livestock mortality rates are very high especially for animals younger than 1 year old.

Key message 19: In addition to technical constraints (water shortage, feeding and diseases), key constraints to ERL are related to breeding (lack of capital to purchase good breeding animals), and lack of knowledge on both breeding practices and how to identify good breeding animals.

Table 5. Percentage of households reporting main constraints to access to water for livestock

Constraint	Dry season (%)	Wet season (%)
No constraint	55	87
Borehole/well not operational	5	1
Water source has dried up	10	2
Well too deep/lack of water lifting devices	11	3
Not enough labour	2	2
Lack of access to water source	14	5
Water too salty	2	1

4 Implications for project interventions

Feedback workshops were held in all three sites in the Gambia to understand the findings of the baseline study. This understanding would increase the utility of the findings in the project design and implementation and improve the consistency of the country report findings with respect to stakeholders' values and views:

On livelihoods, the communities recommended that the project should invest more on small ruminants due to their shorter production cycle and quicker incomes.

The community confirmed the high dependence on forest products particularly in Kiang West site. The community participants recommended making more sustainable by greater emphasis in forestation, bush fire control and investment in community forest systems.

Livestock are predominantly ERL and kept for saving and insurance purposes. Therefore the development of formal savings and insurance services could allow for greater marketed off take of livestock.

Livestock diseases, water shortage and lack of feeds, need to be combated by accelerating the establishment of paravets and veterinary drug depots in the districts, implement herd health care program, provide watering facilities for livestock, protection of rangelands, collection and use of crop residues and agro-industrial by-products.

Uncontrolled bush fires increasing and need to be investigated. Although the quantity and quality of water for human and animal consumption has increased, salt intrusion into the wetlands is growing. There is a need to learn from earlier interventions.

The market cattle are not kept for milk production, therefore, the establishment of the dairy plant should be delayed until information of the functioning of the dairy plant is established.

Implications for partners (1): All species were kept as 'savings and insurance' hence the incorporation of survival and reproductive traits in the current ITC small ruminant breeding program should be accompanied by adequate health care and management.

Implications for partners (2): The Gambia Livestock Marketing Agency should be strengthened and expanded to the project sites while ITC should distribute selected bulls from their ITC herds to overcome the constraint of access to improved bulls.

Implications for partners (3): Suggested measures against transhumance include taxes on transhumance herds and strengthening conventions on transhumance.

Implications for partners (4): Few livestock keepers sell animals, but for those who do, they sell a non-negligible proportion of their herd/flock, therefore, there is a need to sign a memorandum of understanding with GLMA.



ilri.org
better lives through livestock
ILRI is a member of the CGIAR Consortium

Box 30709, Nairobi 00100 Kenya
Phone +254 20 422 3000
Fax +254 20 4223001
Email ilri-kenya@cgiar.org

Box 5689, Addis Ababa, Ethiopia
Phone: +251 11 617 2000
Fax: +251 11 617 2001
Email: ILRI-Ethiopia@cgiar.org

