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Project Report

Sustainable Intensification of Indigenous Cattle in Sub-Saharan Africa

(Dt. „Auf dem Weg zu einem besseren Verständnis der Genotyp-Resilienz einheimischer Rinder in der sich verändernden klimatischen Umgebung und in den intensivierten Nutztierproduktionssystemen südlich der Sahara“)

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Introduction

Indigenous cattle serve a wide range of functions depending on the socio-cultural, economic and environmental context. Increasing their potential contribution to the 2030 Agenda for Sustainable Development in Sub-Saharan Africa (SSA) as well as the Africa Sustainable Livestock 2050 (ASL2050), requires interventions tailored to the specific needs of the agri-food production environment. The production environment means, geographical location, changing climatic conditions due to climate change, available vegetation resources, changing feeding systems, the changing animal and soil microbiome. The countries involved in this study are Benin, Nigeria, South Africa, Zambia and Germany. This gave us the opportunity to examine not only different agro-ecological zones but also different production systems. The aim of the project was to better understanding of indigenous-cattle genotype resilience in the changing climatic environment and intensified crop-livestock production systems in Sub-Saharan Africa. The specific objectives were:

1. to build an interdisciplinary research framework that addresses the central research question on the better understanding of the degree of interaction between the cattle genotypes at the genome level with the changing environment in the context of intensifying crop-livestock systems in SAA;
2. to undertake project-related country visits to understand local needs and degree of intensification of indigenous dual-purpose cattle in Benin, Nigeria, South Africa and Zambia; and
3. to develop empirical questions for further in-depth research, strategies, methods, designs and collaborations for a research grant proposal.

Methodology

To address the objectives, the following approach was employed:

- Travelling workshops

The Core Team travelled together from one country to the other, i.e. Benin, Nigeria, Zambia, South Africa (Figure 1). During the field visits, the team observed the indigenous breeds of cattle in the area of their predominance, spoke with the farmers/herders, and had sit-down workshops with experts, professionals, academics, farmers and practitioners.



Figure 1. Political map of Africa highlighting the four countries where field visits were conducted: Benin (blue) and Nigeria (pink) in West Africa, Zambia (yellow) and South Africa (green) in Southern Africa. Map adapted from source: Wikimedia <https://commons.wikimedia.org/wiki/File:Africa-political-map.jpg>

In April 2025, a final workshop took place in Lusaka, Zambia to synthesize the project findings and to draft a proposal that would help us address specific objective 3.



Figure 2. Part of the team together with the Cabinet Minister of Fisheries and Livestock in the Republic of Zambia. Photo credit: Mizeck Chagunda

Findings

The travelling workshop gave us insights into the different indigenous cattle breeds of Africa (Figure 3 and 4).



Figure 3. Stakeholder discussion between researchers and Fulani herders in Benin Republic (top left), Red Fulani cattle in Nigeria (top centre), Muturu cattle in Nigeria (top right), White Fulani cattle, Nigeria (bottom left), White Fulani cattle in Benin Republic (bottom centre), and Angoni cattle in Zambia (bottom right). Photo credit: Mizeck Chagunda and Abdulmojeed Yakubu



Figure 4: Barotse x Boran crosses cattle in Zambia (top left), White Fulani in Benin Republic (top centre), Bonsmara cattle in South Africa (top right), Nguni cattle in South Africa (all bottom panels). Photo credit: Mizeck Chagunda

Following is a summary of the findings which will be taken further for an in-depth study that will focus on both conservation and commercialisation of indigenous cattle breeds.

- a. Intensification has been taking place involving different indigenous breeds at different scale, rate and in different manner. One of the prominent ways of intensification has been cross breeding with other breeds. For example, with exotic breeds like Holstein-Friesian in dairy oriented production systems and with Boran in beef-oriented production systems. In addition, in traditional cattle production systems, Boran and Brahman are cross-breed with traditional breeds such as Angoni, Barotse and Tonga breeds in Zambia. During the travelling workshop, we found out that both practitioners and experts believe that both breeding and feeding have potential for livestock intensification regarding indigenous cattle of Africa.

- b. Although there is no systematic selection taking place, farmers and pastoralists have their distinct animal breeding practices that constitute pseudo selective breeding. For sustainability, these practices need to be well investigated, documented and utilise together with the local farmers in order to co-create robust and resilient intensification pathways especially in light of climate change.
- c. By spending some time with the local farmers, herders, and pastoralists, we noticed that there is a special link between cattle breeds and their peoples. This is not only reflected in livelihoods but also in the culture and traditional practices. For example, unlike in Europe, cattle breeds have names of the places where they were established; in Africa, cattle breeds predominantly, have names of the tribes of people. Examples of this are the White Fulani, Red Fulani, Angoni, Barotse, Tonga, Mashona, etc. Cattle, just like most livestock are part of the social fabric in Africa. In this case, sustainable intensification of the cattle has to be through knowledge exchange and capacity development.
- d. Although it goes without saying that there is a general diversity in cattle breeds of Africa, it is when you travel and visit different countries that one witnesses the extent of this diversity. As shown in the pictures above, even by visiting only 4 countries, there was evidence of high phenotypic diversity in size, body colour, conformation, horn shape and size, presence of dewlap and hump.
- e. During the travelling workshops, we witnessed first-hand the effect of climate change. Food and feed reserves are either in short supply or of very poor quality. Water is also becoming scarcer, mostly in communal grazing areas. Another issue discussed by herders and experts is that tick-borne diseases are on the rise.
- f. Visiting the four countries, observing things on the ground, and having discussions with local experts, there was a general “hunger” for data- and knowledge driven interventions in indigenous cattle of Africa.

Future Activity

The third objective of the current project was to develop empirical questions for further in-depth research, strategies, methods, designs and collaborations for a research grant proposal. This was achieved in a final workshop that was carried out in Zambia in April 2025. In that workshop, a concept of a project was developed with the main idea of further investigating the indigenous breeding and feeding practices that would promote the development of a sustainable value chain for indigenous cattle in Sub-Saharan Africa.

Conclusion

The project met all its objectives and created a strong consortium that is ready to move together in preparing a proposal for further research and development activities.

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