Exploring alternative non-traditional food security strategies to leverage conservation: Insights from case study analysis in southern Zambia

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1. Introduction

As part of contributing to the Africa Biodiversity Collaborative Group (ABCG) learning task on linkages between Food Security and Conservation, the African Wildlife Foundation carried out in-depth assessments of the operations of two relatively novel community-based livelihood strategies – goat production in Siavonga District, and fish farming in Chiawa Game Management Area of Lower Zambezi (Figure 1).

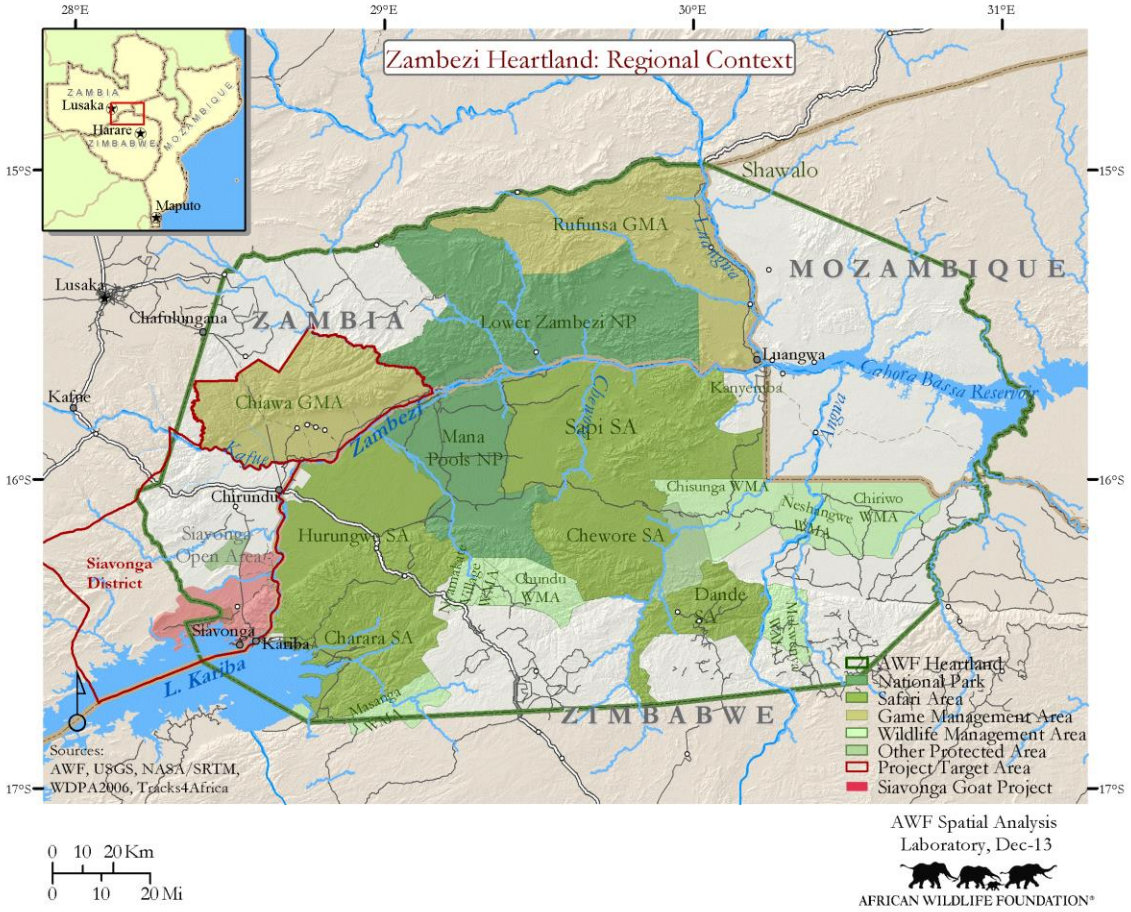

Figure 1: Map of Zambezi landscape showing Siavonga and Chiawa GMA case study sites

This is part of continuing work by the African Wildlife Foundation (AWF) with communities in the broader Lower Zambezi ecosystem to promote improved quality of life and increased food security in concert with ecosystem and wildlife conservation. In Zambia, the Siavonga District, downstream of Lake Kariba and upstream of the Lower Zambezi National Park and the Chiawa Game Management Area complex, is endowed with rich wildlife resources

dominated by elephants with both the Kafue and Zambezi Rivers serving as lifelines for water and food resources. The characteristically semi-arid conditions, generally poor soil agro-ecological conditions, and the historical tsetse fly infestation render it difficult for local communities to sustain livelihoods on crop production and large livestock production. As a result of these challenging conditions, communities turn to poaching, charcoal production, natural fisheries and other non-sustainable practices as sources of income and food security.

In light of the foregoing, AWF's analysis sought to assess whether communities can improve and value local conservation and ecosystem protection, while improving their lives at the same time. Thus, under the auspices of ABCG, AWF assessed two small programs implemented in this region as case studies that serve as examples of communities simultaneously improving food security and local ecosystem conservation. This is part of USAID's Biodiversity Analysis and Technical Support (BATS) Program.

2. Learning Context

Understanding trade-offs and synergies between food security and conservation in Africa is essential for sound planning and management decisions that affect the future of both poor rural people and wildlife. AWF believes that introducing alternative economic incentives and new sources of food production, in exchange for conservation, would help provide incentives for local communities to participate in conservation. To facilitate this linkage, the AWF designed two relatively small initiatives aimed at supporting livelihoods while protecting strategic natural areas: goat production and aquaculture. This paper is a synopsis of the resultant outcomes of these two small initiatives in terms of community engagement, food security, and the protection of wildlife and wild lands.

3. Synopsis of case studies

3.1 Improved goat husbandry through breed enhancement in Siavonga District

The climatic and edaphic character with low and erratic rains, shallow and infertile soils, unpredictable weather patterns, etcetera mean that cultivation of rain-fed crops by local communities is almost impossible. Because of the limitations of crop agriculture, communities have resorted to unsustainable land-use activities. Expectedly, the introduction and production of short lifecycle livestock such as goats, chickens, pigs or guinea fowl is key in these rural communities. Of the livestock options, goats are the most resilient and adaptable to the harsh climatic conditions of the Zambezi Valley. However, local farmers to date do not considered them as an alternative source of livelihood, but rather consider cattle to be a status symbol for wealth. AWF was thus faced with the question of how to introduce commercialization of goat production to the Simamba Chiefdom to serve as alternative source of livelihood and mitigate some of the unsustainable land use practices.

To achieve this, AWF assisted members of the local communities that own large populations of indigenous goats through the piloting of a breed improvement exercise. The program focused on integrated 'whole-value-chain' interventions that looked at improved husbandry to raise the quality and size of meat goats, improving revenues from the goat production, and ultimately reducing tendencies to engage in unsustainable livelihood practices (e.g. charcoal production) (Figure 2). As part of the initiative, AWF has also started to assist in finding markets through which the community can sell the goats at competitive prices.

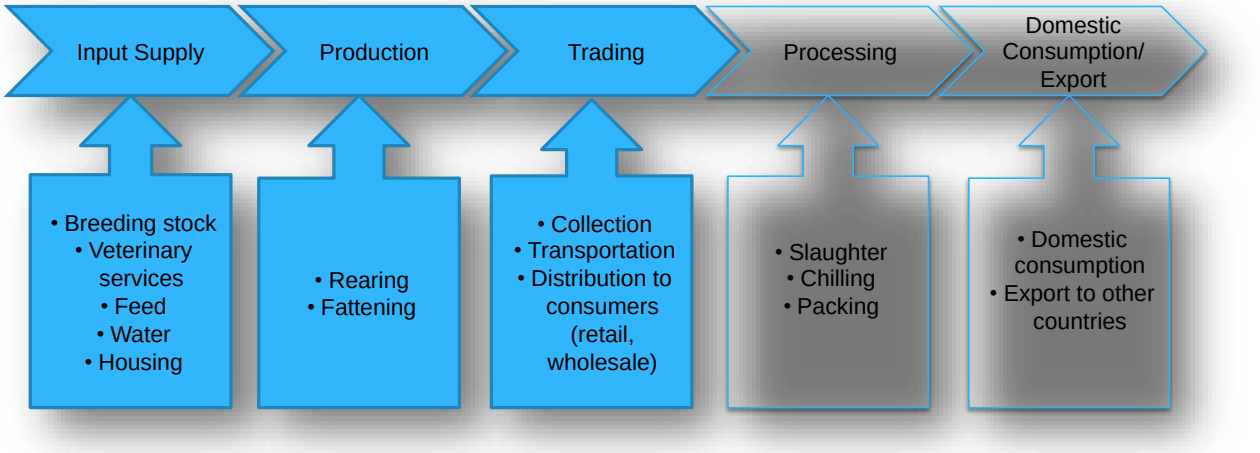

Figure 2: Goat Production Value Chain

3.2 Community-based fish farming by the Chiawa Kupfuma Ishungu Cooperative Bream Farm

Fishing is a way of life for communities living along the Zambezi and Kafue rivers and fish are key to the diet and nutrition of local communities. The dependency on fish is further exacerbated by the limit in alternative land based livelihood options. Findings from earlier fish stock assessments, catch analyses and experimental fishing clearly point to overfishing resulting from the fishing pressure which threatens the sustenance and viability of native fish species assemblages in the river systems; the level of local river-based fishing is simply unsustainable.

To encourage the uptake of fish farming as a source of additional animal protein and income, AWF facilitated training in fish farming business management and local community-based fish production for the Kupfuma Ishungu Community Cooperative. The training was executed by aquaculture technical staff form Zambia's Department of Fisheries and focused on all aspects of the value chain, emphasizing the production and business management aspects of operating a fish farm (Figure 3). Despite the small size of the fish farm, sales have so far generated income for the local community, and is considerably reducing the number of fishers on the local river systems.

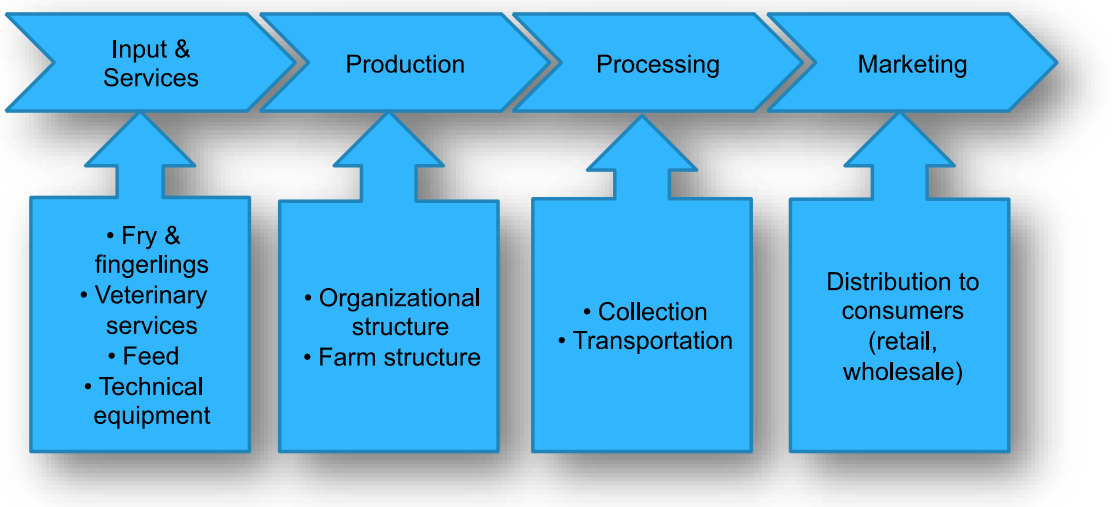

Figure 3: Fish Farming Value Chain

4. Key Outcomes and Recommendations

Overall, both case studies provide evidence that with proper training and assistance, local communities can positively alter their impacts on the natural environment and increase their incomes simultaneously. In both programs, local incomes were increased, additional food protein was generated and sold to markets, and behaviors started adapting to properly focus on sustainable approaches to livelihood development.

The increased awareness and understanding of the marketing component of goat production has helped to shift the focus of goat production from being a 'safety net' for emergencies, to being a viable source of income. There is good scope that with scaling up and expansion, this shift in focus has potential to contribute positively to conservation leverage; farmers have begun shifting away from unsustainable resource use practices (most notably charcoal production) as a means of income generation given that goat production is now viewed as potential income for their livelihoods.

The goat breed improvement intervention has significantly contributed to improve the commercialized goat production in the participating areas. However, further similar interventions may consider the lessons learned from this intervention and ensure the following:

Local resources: The input supply, including supplies of supplemental feeds, should not interfere with people's needs for food. Feeding techniques should also be aimed to use those resources which are not limited in the local area.

Local systems: The system of free-roaming goats within the community is a common practice. To sustain an improved breed of goat, it will be necessary to introduce a system of fenced grasslands or other practices of segregation for particular groups of goats, to ensure the long term viability and productivity of the improved breeds.

Market linkages: Need to develop market linkages, including the creation of an adequate market information system that enables farmers to sell their goats with improved return based on current market information and understanding.

Performance monitoring: A monitoring system should be introduced, giving the farmers a toolkit to track the impact of the changes made to their goat production system. This will also allow precise evaluation of the intervention's impact on food security and conservation gains.

It is envisaged that program initiatives that incorporate these recommendations will increase the popularity of commercial goat production in the area. This in return will contribute to food security and continue the shift from unsustainable land use practices in the area —largely the result of the need for income—as farmers will now have an alternative sustainable and reliable source of income.

On the one hand, fish farming is already recognized as socially acceptable and appropriate to the area and the needs of the community, understandably because fish has always been a core part of the diet. The individuals participating in the fish farming cooperative as well as others in the community—through training, information, and experience—now consider its potential adequate to cause them to change from other agricultural activities or fishing in rivers to fish farming (supporting the conservation objective of reducing pressures on fish stocks in the rivers). Furthermore, the fish ponds serve multiple purposes as water reservoirs used by community who use the fish farm effluent for market gardening, etc.

As a result of the additional training offered through this initiative, the cooperative is now able to have at least two production cycles per year; this has resulted in a direct increase in production levels and related income levels. The cooperative members now have the necessary knowledge to appropriately apply correct production techniques and management, including planning and management, application of inputs, efficient operations, and cost containment. In fact, the project has now become a demonstration training facility within the area, and in the long term, the farm intends to recruit a foreman / manager for oversight while the individual cooperative members plan to develop their

own household backyard fish ponds.[1] The community's long-term goal is to have twelve ponds (double current capacity). In addition, the farm has integrated with a 2.5 ha banana plantation within the fish farm area which now uses the nutrient rich effluent from the fish farm to irrigate the banana plantation.

5. Applications for next steps and concluding remarks

While both these programs have shown success in the local communities, challenges do remain. Access to markets and to market information, and ability to produce consistently to meet market commitments — is a persistent challenge for local communities, given the poor transport networks and lack of information dissemination. *Ad hoc* supplies of inputs, and unreliable technical back up for extension advice limit the potential of these operations.

For future positive development, it is essential to have proper planning and management, especially in the design phases of these livelihood strategies to set a firm base for long-term positive impacts. In this respect, for the breed improvement in goat husbandry, the assessment has shown that the initiative of providing improved breeds to local goat-keepers is very positive. Local herders attested that the improved breeds helped to increase their incomes and instill confidence that goat production can indeed be an income-generating endeavor (and not just a safety net for emergencies). However, longer-term planning on breed segregation, proper herd management, and prevention of local-breed pregnancies is imperative to maintain the benefits of the improved genetics. Failure to employ these critical herd management skills and techniques will result in the loss of any improved breed benefits.

Similarly, experiences from the community fish farm in Chiawa highlight the positive contribution that aquaculture can have on a local community's access to animal protein while mitigating the pressures on local ecosystems. The successful fish farm has employed good management skills and maintains a consistently high quality output from its operations. The success thus far has led to an additional, ancillary business — banana cultivation — that benefits from coexistence with a fish farm operation. Working with local communities from the beginning is crucial to ensure smooth operations. It is noteworthy though that fish farming is a very technically sensitive operation where issues of site selection, farm (and pond) design and construction are fundamental aspects of the development phase that can be a recipe for success or failure.

Community fish farm development is poised for success in Zambia as the policy framework provides for scaling up with government backup extension services. The Department of Fisheries recently rolled out a national Aquaculture Development Policy and is strengthening the network of hatcheries and extension back up that will benefit community operations like that in Chiawa GMA.

[1] Conversation with Cooperative Chairperson, Mr Chinoi

An underlying limiting factor for both cases and other comparable smallholder farmer/community farming initiatives relates to market access. Smallholder farmers are inherently disadvantaged when compared to large scale players in the agriculture sector. Community farmers generally lack economies of scale to consistently satisfy demand with assured product quality. Community-based farmers also lack the resources to build efficient networks, research market conditions, and make rational, reasoned decisions about production, pricing and positioning.

Future interventions in these spaces should thus provide innovative mechanisms to allow smallholder farmers to compete equitably with the large-scale market actors. As these cases have shown, farmer-level interventions can have a positive impact on food security, income generation, and ultimately positive stewardship of the local ecosystems and local environments. However, much of this impact will remain limited until smallholder farmers can more effectively participate in the broader markets for agriculture and livestock. Access to markets and market information is one fundamental key to future success.

However, regardless of such challenges, the two small community-based initiatives facilitated by AWF have shown that business development initiatives, when properly aligned within a proper conservation context, can improve both livelihoods and the very ecosystems on which those lives depend. It is thus hoped that lessons learned from these operations can inform how conservation NGOs continue to streamline integrated landscape conservation to cater for diversified rural economies and food security strategies that offer conservation leverage.