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LEADING THE WAY IN MOZAMBIQUE'S NEW ERA OF BIODIVERSITY FINANCE: the Gorongosa National Park (GNP) conservation model.

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List of Abbreviations

BZ	Buffer Zone
FANTA	Food and Nutrition Technical Assistance
FGD	focus group discussions
GNP	Gorongosa National Park
GRP	Gorongosa Restoration Project
HFIAS	Household Food Insecurity Access Scale
USAID	USA International Development Agency

Contents

1.	Introduction	1
2.	Support to GRP	2
3.	Methodology	3
4.	Results	5
4.1.	General	5
4.2.	Agriculture, income and wealth	6
4.3.	Food security.....	7
4.4.	Health.....	8
4.5.	Perspective on the conservation.....	9
5.	Conclusion	10
6.	References.....	11

1. Introduction

Biodiversity is threatened. Poaching, pollution, destruction of habitats and climate change are the main drivers of an unprecedented loss of biodiversity. At the same time, there have been efforts from government and private entities to try and preserve threatened species and their habitats through the creation of reserves and parks. However, it has become increasingly clear that conservation without the involvement of people is extremely difficult. One reason is the recognition that humans being the main threat to biodiversity should also be part of the solution. Another is that habitats in which wildlife thrives are often concreated by humans, so that removing them paradoxically will cause their extinction (Hulme & Murphree., 1999) .

Gorongosa National Park (GNP) supported by the Gorongosa Restoration Project (GRP) in Central Mozambique is trying to navigate the narrow passage between the Scylla and Charybdis of exclusion and inclusion of people. Established in the 1960s under Portuguese rule, it was a key attraction of tourists in the late colonial period. After Independence in 1975, it became the basis of a guerilla movement and the 16-years ware between that movement and the government (Diallo, 2015) . The result was all but complete extinction of iconic mammal species such as lions and elephants and other herbivores. The removal of herbivores, in its turn, led to a rapid growth of vegetation turning the park into a lush landscape (Daskin, Stalmans, & Pringle, 2016).

After the 1992 peace agreement, the government made efforts to reestablish the conservation areas it had inherited from the colonial period. Without sufficient funds of its own, it built strategic partnerships with international organizations, many of which with a background in conservation management. At the same time, it reformed the legal framework recognizing the needs and entitlement of rural communities including those living in and around the parks and reserves, creating a the conditions for a management system integrating public, private and community partners (República de Moçambique, 1997) (Reepública de Moçambique, 1999) (República de Moçambique, 2014) (República de Moçambique, 2017). The GRP has done this by combining four approaches: support community natural resources management structures, introduce technique to reduce the loss of crops and harvests to marauding animals, in particular elephant and buffalo, improve access to public services such as health, education, water and sanitation, and support livelihoods through innovative value chains in coffee and honey, the provision of seed and technical advice to farmers (Gorongosa Project, 2020). The GRP is mainly financed by the Carr Foundation but has also mobilized support from various governments, including the Government of the United States (GUS) (USAID, 2021).

This successful restoration has delivered international recognition to GNP, not at least because it combines the conservation of biodiversity with sustainable development in the buffer zone. GRP believes that conservation of biodiversity can only succeed through “the active involvement of the local community, achieved through the recruitment of young people into its network of rangers and through an ambitious development program that guarantees their access to basic needs, such as water drinking , along with housing rehabilitation and the introduction of sustainable crops such as coffee” (Gorongosa, 2024). More than half of GRP’s budget supports health, agriculture and education projects, benefiting more than 200,000 people in the buffer zone (Gorongosa, 2024). To highlight their vision that conservation and development need to go hand in hand, GRP doesn’t use the expression “buffer zone”. Instead, it speaks of the “Sustainable Development Zone”.

2. Support to GRP

GUS has provided imported support to the GRP through the Resilient Gorongosa Project (RGP). The RGP's goal is to ensure biodiversity conservation in the area. It recognizes that the threats to conservation are driven by a combination of bad governance, economic interests, rural poverty and vulnerability to nature and human-induced shocks, and lack of data.

The RGP is designed to:

- Enhance resilience in an area that is affected severely by recurrent shocks, both natural and human-induced, by reducing chronic vulnerability and promoting more inclusive growth and development amongst the population.
- Protect biodiversity, ecosystems and wildlife with a dedicated, well-trained conservation team equipped with cutting edge technology.
- Promote sound land and water-use planning and management based on world-class science; Unlock economic benefits arising from sustainable tourism and sustainable natural resource use that focuses on forestry and a wide range of agricultural products and the importance of economic value chain investments, particularly in coffee, cashew nuts and honey.
- Improve human development services in health and education that have a primary focus on women and girls. These include a wide range of education initiatives from Girls' Clubs, conservation, to a master's degree program for Mozambican scientists.
- Develop and communicate an integrated approach to a biodiversity conservation and human development model that can be applied elsewhere in the world; and
- Strive towards empowered and responsible self-governance of BZ communities (Gorongosa Project, 2020, p. 9).

RGP consists of two components: the RGP itself and an added-on fund in response to cyclone Idai (USAID, 2021). The total budget allocated through the GRP amounts USD 30 million covering conservation, science, agriculture, community development with an emphasis on the improvement of access to health, education, water and sanitation services, nutrition support and reconstruction of schools and health centers and their upgrading to climate resilience standards. The project has a well-structured implementation plan with yearly targets by activity. As it covers basically all fields of intervention of GRP in this text we will focus only on some of the main areas:

- **Conservation:** reintroduction of key species, recruitment of additional rangers and their training.
- **Science:** the elaboration of an "atlas of life" highlighting the GNPs biodiversity and support to research infrastructure (laboratory) and research projects as a means to provide evidence in support of the GRP's conservation through development approach.
- **Agriculture:** support to the coffee and honey value chains and other actions to raise productivity and income from farming.
- **Community development:** enhance local governance capacity through community natural management and water and sanitation committees, support to district field clinics, so-called girls', environmental and teachers' clubs at primary schools and youth clubs at secondary school, wildlife-human conflict management measures, and nutrition education.
- **Resilient infrastructures:** rehabilitation of schools and health centers according to building back better norms and using innovative construction material.

The RGP started in 2020 and ended in 2025. This document reports on the evaluation exercise carried out by the CCS team at the end of the project's life span in mid-2025.

3. Methodology

The assessment combines three main methods: a desktop study of project documents and other relevant written sources, primary data collection through semi-structured interviews with GRP staff, partners in provincial and district governments, teachers and learners at schools, focus group discussions (FGD) with grassroots level health workers and community committees and a survey among beneficiaries and non-beneficiaries. The interviews with GRP staff are mainly aimed at understanding their work with achievements, challenges and factors behind their results. The interviews with provincial and district government officials provide information about the level of coordination and integration of GRP and GOM, while interviews with RGP counterparts and beneficiaries at community level help understanding the operations in the field, their impacts and the perception of communities of the GNP.

Key Informant Interviews are a qualitative tool used to gather in-depth information about the knowledge, awareness, understanding and practices in an organization, community or society. The method is ubiquitously used but it is still important to be aware of some important aspects: why are certain persons “key”, and no point of view is “neutral” because no one exists unembedded in the world” (Lokot, 2021).

FGD is a “qualitative research method and data collection technique in which a selected group of people discusses a given topic or issue in-depth” (Eeuwijk & Angehrn, 2017). FGD are helpful for adding meaning and understanding to existing knowledge or getting at the “why” and “how” of a topic (Prasad & Garcia, 2017). An FGD brings together “people from similar backgrounds or experiences to discuss a specific topic of interest.” They provide insight into “how a group thinks about an issue, about the range of opinion and ideas, and the inconsistencies and variation that exists in a particular community in terms of beliefs” (ODI, 1990?). It is therefore important that with an FGD there is room to agree or disagree with each other. The typical size of a focus group discussion is 6 to 12 participants who participate in a guided discussion about 6 to 12 items (Eeuwijk & Angehrn, 2017).

It is important to remember that the selection of the individuals taking part in FGDs potentially suffers from the same biases as that of the selection of key informants. The composition of the groups may reinforce existing power hierarchies and dissent views may find it difficult to find a voice (Lokot, 2021). This requires specific awareness and skills of the FGD facilitators.

For the household interview a structured questionnaire was designed. The questionnaire was aligned with the results of baseline study with the following modifications:

- Use of basic indicators for wealth, notably roofing material, a shortlist of assets and an income estimate. The list was copied from an evaluation of girls' and environmental clubs by Givá (2023).
- Use of the FANTA¹ (Coates , Swindale, & Bilinsky, 2007) validated tool for measuring household food insecurity through the calculation of the Household Food Insecurity Access Score (HFIAS).

¹ FANTA has closely worked with Mozambique's Ministry of Health (MISAU) to develop useful tools for nutrition education in the Mozambican context <https://www.fantaproject.org/countries/mozambique>

- Specific questions aimed at understanding coverage and impact of specific activities such as girls' clubs and environmental clubs, investment in schools and health facilities, access to agriculture, health and nutrition services, the human-wildlife conflict, and of the GNP as a whole on communities and households.

The structured interviews were conducted using tablets and the ODK platform. Excel was used to check for inconsistencies between answers, find errors and clean data. Data were then analysed in STATA and SPSS.

For the interviews, the lead consultant trained a team of six interviewers (two female) during a five-days training session. The training covered the interview guides and the survey tool. The training included a pilot in Nhambita, one of the buffer zone communities in the Púnguè area in Gorongosa district. The community was selected because of its easy access from the main road and the presence of all main activities (natural resource management committee, WASH committee, APEs, model mothers and fathers, beneficiaries and non-beneficiaries). During the pilot, the team could practice and test the group interviews and survey tools allowing for improvement of the original tools. The assessment is supported by evidence collected through key informant interviews, group interviews and a household survey. These semi-structured and structured interviews covered RGP staff, government counterparts at provincial and district levels, implementing partners such as primary and secondary school teachers, promoters, community health agents (APS), mentors (model mothers, and model fathers), *madrinhas*, *matronas*, members of community natural resource management committees, and members of WASH (Water, Sanitation and Hygiene) committees as well as 399 individual household representatives in the districts of Gorongosa and Nhamatanda. Field data collection took about three weeks and involved 766 persons (Table 1). Figure 1 shows the location of the households that are covered by the survey in the buffer zone around the park.

Table 1: Overview of number of interviewees by category.

Category	Female	Male	Total
APE	0	7	7
District governments of Gorongosa e Nhamatanda	18	13	31
GRP staff	9	19	28
Households (by gender of head)	208	191	399
Learners	33	34	67
<i>Madrinhas</i>	39	0	39
Model fathers	0	1	1
Model mothers	6	0	6
Natural Resource Management Committees	37	67	104
Promoters	2	0	2
Provincial government	4	6	10
Teachers	4	12	16
WASH Committees	21	21	42
TOTAL	381	371	766

Impact is measured against baseline data, comparing respondents benefiting from interventions in agriculture and retrospectively, i.e., based on the respondents' recollection of their pasts.

These comparisons suffer from important flaws. The baseline covered a large part of all five districts in the GNP buffer zone: Gorongosa, Maringue, Cheringoma, Muanza, Dondo and Nhamatanda. Due to budget constraints the survey carried out as part of this study covers only communities in two districts: Gorongosa and Nhamatanda (Figure 1). It is unclear to what extent the results represent the districts that were not covered (Maringue, Cheringoma, Muanza, Dondo) by the survey. The comparison between beneficiaries and non-beneficiaries as part of this study cannot be seen as a comparison between intervention and control groups. Households who did not benefit from RGP agricultural support may have benefited from other interventions, e.g., in sanitation, access to health services, etc. Finally, retrospective comparisons suffer from the fact that people may be betrayed by their own memories (Müggenburg, 2021) (Gardner, 2001).

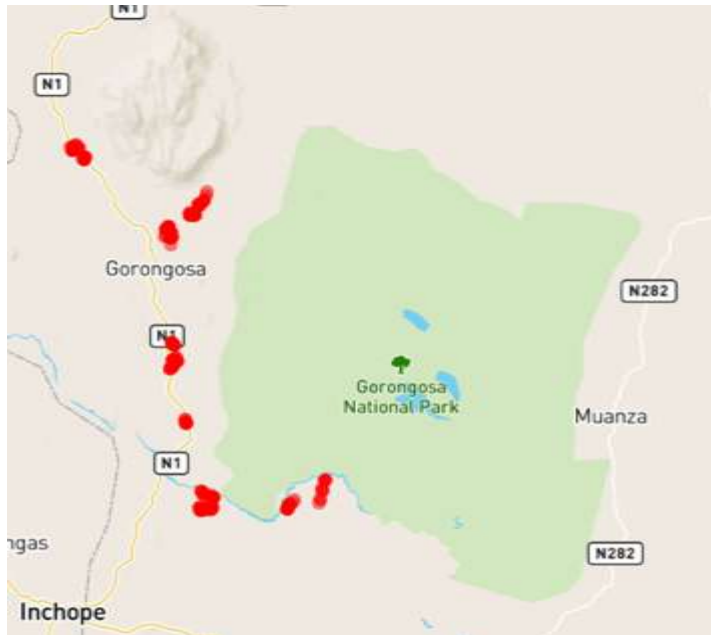


Figure 1: Location of interviewed households in the buffer zone around Gorongosa National Park.

The study covers all RGP activities, showing that GRP achieved or surpassed most targets set as part of the RGP support to GNP. GNP, GRP and RGP refer to different entities: the park as a government entity and a geographical space dedicated to the conservation of biodiversity, the partner organization that supports that the government and the park entity with the restoration of its conservation value, and a project finances these efforts through funds allocated by the US government through its International Development Agency (USAID). From the outsider's perspective, the distinction between these entities is rather academic. In their eyes, there is only one: the park. For that reason, in the next sections we will not try to separate these entities but take them together and refer to the activities as the GNP's.

4. Results

4.1. General

The assessment uses an array of tools. In this working paper we focus on one: the household survey. The survey is a key instrument to measure changes at community level. We highlight three very specific but important outcomes of the study: changes in agriculture, income, and wealth, food security, impact on health, and the perspective of the interviewed households on the GNP.

The survey covers 399 respondents in the Gorongosa and Nhamatanda sections of the buffer zone representing 225 beneficiary and 174 non-beneficiary households. Most of the interviewees is female (208 or 52.1%). Out of 399 interviewed households 56 (14%) are female. Headed. Many household heads (40.4%) were born outside their current area of residence, The Nhamatanda communities are typically immigrant, with 45.1% of the household heads being born outside their current *regulado* compared to 21.4% in Gorongosa.

4.2. Agriculture, income and wealth

Almost all respondents are agriculturalists. Most common farmed crops are maize, sesame and sorghum. The most sold crops are sesame, maize and pigeon pea. Generally, crops are for domestic consumption and for sale. Only sesame is grown almost exclusively for the market with 93.3% of the producers mentioning that they sell. There are other, smaller crops that are exclusively for the market such as eggplant and beetroot, but only a few people growing these crops is small. Note that while there are clear dominant crops, diversity is large: respondents mention in total 58 different crops. In addition to growing crops, rearing of small animals such as chicken and goats is an important activity practices by 51.1% of the respondents

The results match with baseline data, stating that the most frequently mentioned farmed crops were maize, sorghum and pigeon pea. An important change is the rise of sesame production, which has replaced maize as the most often mentioned cash crop. This may be at least in part explained by the fact that farmers face challenges from marauding herbivores such as elephants and buffaloes. It appears that sesame is normally not eaten by elephant and known to be relevant resistant to trampling (Brockington, 2018).

The survey questionnaire contains several questions addressing income, assets and poverty. The first was an observational question: do any of the houses in the compound have a tin roof? The second was a list of assets people had today and five years ago. The third was a question to estimate their monthly revenue.

The enumerators marked 166 out of 399 cases (41.6%) where they observed that on the compound at least one of the buildings had a tin roof. There is a clear and significant correlation between being a beneficiary or not: among the 225 beneficiaries, 110 or 48.9% had a tin roof compared to 32.2% of the non-beneficiaries (Fisher Exact Text, $p=0.001$).

Table 2: Access to selected assets today and five years ago (n=399).

Item	Today		Five years ago	
	N	%	N	%
Mobile	353	88.5%	251	62.9%
Computer	2	0.5%	1	0.3%
Television	27	6.8%	14	3.5%
Radio	153	38.3%	152	38.1%
Car	4	1.0%	4	1.0%
Motorcycle	76	19.0%	34	8.5%
Bicycle	199	49.9%	172	43.1%
Plough	3	0.8%	3	0.8%
None	36	9.0%	74	18.5%

Table 2 gives a list of nine selected assets and compares the number of times a respondent mentioned having a specific asset today with having them five years ago. The table shows an increase in the percentage of households owning a particular asset for almost all items. Only the numbers of cars (4) and ploughs (3) didn't change. Changes are most pronounced for mobile phones (from 62.9% to 88.5% of the 399 respondents) and motorcycles (from 8.5% five years ago to 19.0% today). In the meantime, the percentage of respondents owning none of the assets in the list declined from 18.5% to 9.0%.

To get a better impression of the impact of project interventions in agriculture, a paired sample test of means was conducted for the entire sample, the non-beneficiaries and the beneficiaries comparing the number of assets today with that five years ago. It appears that overall, there has been an increase in the mean number of assets of 0.47 from 1.58 to 2.04. The increase is more pronounced among beneficiaries (0.51) than non-beneficiaries (0.41) who also had fewer assets (1.83) than beneficiaries.

Table 3: Estimated mean monthly income by beneficiary status.

Income class	Non-beneficiaries		Beneficiaries		All	
	N	%	N	%	N	%
0-3000	136	78.6%	152	67.6%	288	72.4%
3001-6000	25	14.5%	39	17.3%	64	16.1%
6001-9000	8	4.6%	7	3.1%	15	3.8%
>9000	4	2.3%	27	12.0%	31	7.8%
Total	173	100.0%	225		398	

Table 3 summarizes the answers to the third question addressing the respondents' economic status. Respondents were asked to declare their estimated monthly income as a bracket value from 0, 1 to 3000, 3001 to 6000 MZN, etcetera. For statistical reasons, income brackets 0 and 1 to 3000 MZN and from 9000 MZN onward were taken together. The figures show that beneficiaries have a slightly higher income than non-beneficiaries. The differences are statistically significant ($\chi^2(3, 398) = 14.53674814, p=0.002$).

There is also an intervention impact on changes in income. Most of the respondents (76.4%) report an overall decrease in their income over the last five years, but some say that their income had still been stable or even increased. The percentage of respondents mentioning an increase (18.2%) is significantly higher among beneficiaries than that among non-beneficiaries (5.7%; $\chi^2(2, 399) = 20.154, p=0.000$), suggesting a positive impact of GNP agricultural support.

4.3. Food security

GNP supports agriculture, value chains and provides nutrition education at community level. These actions should contribute to an improvement of the nutrition status of local residence. However, the Gorongosa district health statistics do not show any reduction in the prevalence of malnutrition.

The survey uses the FANTA HFIAS tool to assess food insecurity among the respondents. The results indicate that people are moderately food insecure (HFIAS between 9-16).

Table 4: Mean HFIAS food insecurity scores for beneficiaries and non-beneficiaries

Category	N	Mean	Std. Deviation	Std. Error Mean
Non- beneficiary	174	12.4138	6.07192	0.46031
Beneficiary	225	10.5200	6.32391	0.42159
All	399	11.3459	6.27836	0.31431

Food insecurity affects both beneficiaries and non-beneficiaries. However, non-beneficiaries are slightly more food insecure (12.4) than their counterparts (10.5; *Table 4*). The difference is statistically significant at 1% (t-student (397) = 3.018, $p=0.003$).

When asked to compare their current food security with the past (five years ago), more than three quarters (76.9%) say that their situation has worsened, 13.0% that it still is the same, and 11.0% that it has improved. There are clear and significant differences between the beneficiaries and the non-beneficiaries, with only 3.6% of the latter reporting an improvement compared to 14.2% of the former. The difference is significant at 1% ($\text{Chi}^2(2, 399) = 13.320, p=0.001$), suggesting that access to GNP agricultural support makes households more resilient (*Table 5*).

Table 5: Changes in food security over the last five years.

Food security status	Non beneficiaries		Beneficiaries		Total	
	N	%	N	%	N	%
Worsened	136	78.2%	171	76.0%	307	76.9%
Stayed the same	30	17.2%	22	9.8%	52	13.0%
Improved	8	4.6%	32	14.2%	40	10.0%
	174	100.0%	225	100.0%	399	100.0%

Food insecurity may vary seasonally. During the survey period (20/06/2025 through 09/07/2025), many people still had food stocks in their homes. Food insecurity is likely to be more severe later in the year, between planting and harvesting. The results show that the GNP intervention contributes to a reduction in food insecurity but not enough to change their status from moderately insecure to secure.

Why does food insecurity persist? During the survey respondents were asked to select the three most important causes of the change in their food security. Those with a worsened insecurity situation – the majority – attribute loss of food security to drought, wildlife attacks and post-harvest losses. Those reporting Improvement of food security highlight an increase in the cultivated area, an increase in yield per hectare, and an increase and/or diversification of livestock.

4.4. Health

Health is a key impact area with RGP investing in three important areas: training of grassroots health agents (APS), support to mobile clinics, and investment in improved water sources and their management. The interviews indicate that these activities increase access to health services and reduce the prevalence of diarrhea. Health statistics from Gorongosa district confirm a sharp decline in the prevalence of waterborne diseases. Compared to baseline data there is a very large increase in access to health services. At baseline 44.8% used healthcare services, this survey shows that more than 90% had access. At baseline the health post was the most

important service provider. (63.7%). While the health post remains important the expansion of health service coverage is largely due to the increase in mobile clinics and APS. The same is true for information about child marriage and Gender Based Violence (GBV). At baseline only 44.4% had information about child marriage, mostly from the local health center. In this survey, the percentage has more than doubled (to 94.5%) thanks mainly to mobile clinics, the model mothers and *madrinhas* and the APS. The increase in the percentage of respondents with access to information about GBV is similar: at baseline it stood at 45.5% whereas in the present survey 93.7% stated to have been informed about this issue.

The survey shows that 240 respondents benefit from some advice about nutrition. Access to this service is not influenced by being a beneficiary of agricultural activities ($\text{Chi}^2(2, 399) = 2.275$, $p=0.321$). There is also no correlation between having access to nutritional education and changes in one's reported food security situation.

4.5. Perspective on the conservation

The last topic to be highlighted in this working paper is the perception of the Gorongosa National Park among the interviewees. Does the approach that tries to integrate conservation of biodiversity with support to the socio-economic development of the human communities around the conservancy indeed contribute to a more positive view of the park? The results show that there is generalized recognition (96.7%) among interviewees that the broad range of interventions by the GNP in the buffer zone makes a difference. There is less consensus about who benefits most: GNP (conservation of wildlife), the community, or both equally (Table 6). However, more than half of the respondents says that the people are the ones who benefit most (57.9%). The appreciation of the GNP was higher among the direct beneficiaries (64.9%) than on those who didn't benefit directly (48.9%). Differences are statistically significant ($\text{Chi}^2(2, 399) = 17.070$, $p=0.001$).

Table 6: Who benefits: GNP, the population or both (n=399)?

Who benefits		Beneficiary		Total
		No	Yes	
GNP (the animals)	Count	49	48	97
	%	28.2%	21.3%	24.3%
Both gain equally	Count	26	28	54
	%	14.9%	12.4%	13.5%
Population	Count	85	146	231
	%	48.9%	64.9%	57.9%
Doesn't know/doesn't want to answer	Count	14	3	17
	%	8.0%	1.3%	4.3%
Total	Count	174	225	399
	%	100.0%	100.0%	100.0%

These results suggest that the GRP approach contributes to a more positive view of conservation.

5. Conclusion

This working paper focuses mainly on the results of the household survey. As a result, many efforts of GNP with significant impacts such as the dissemination of improved seed, the promotion of coffee, honey and other agricultural value chains, the use of beehives and pepper as elephant repellents, the introduction of elephant-proof granaries, support to community management committees, schools and students, are not mentioned. Also not mentioned are activities directly related to conservation and to science: the reintroduction of lost species, recruitment and training of rangers, and an impressive record training of national and international students and scientific output. Together, these activities constitute a coherent action connecting conservation and community development. The results of the survey confirm that they contribute to higher income, improved housing and the acquisition of assets, that they result in an increase in access to health services such as mobile clinics and grassroots health workers (APS). However, they fail to resolve widespread food insecurity, which at least in the eyes of the population is caused at least in part by damage from roaming marauding herbivores. Nevertheless, most interviewees believe that GNP benefits the population more than conservation.

The positive image of the GNP is essential for obtaining a support base among the people surrounding the park for the conservation agenda. However, to maintain that support it will be essential that the GNP and its partners understand the reasons for the tenacity of food insecurity. Why is farming so vulnerable to climate shocks? Which lessons can be learned to the relative ineffectiveness of herbivore management measures until now? How can these lessons be translated into new interventions that effectively raise the resilience of local farming within the context of population growth, coexistence with wildlife and climate change? Are there viable solutions outside the realms of farming and agricultural value chains including diets and alternative sources of income? For GNP and its partner GRP it will be essential to direct some of its immense technical and scientific capacities to find answers to these questions.

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