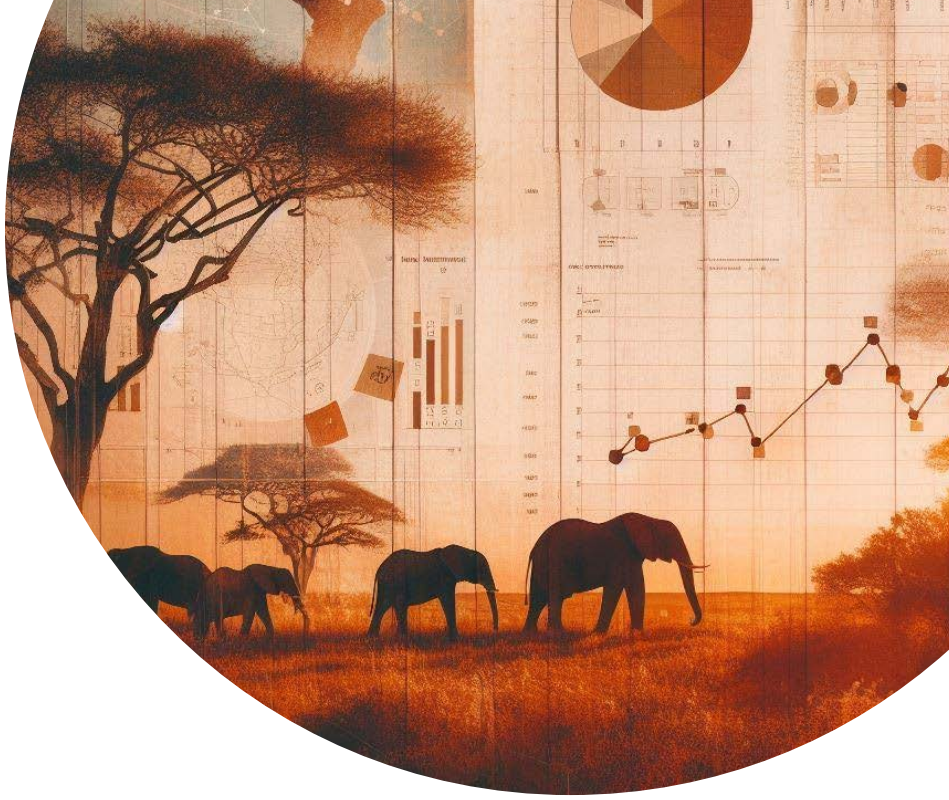


ASSESSMENT OF THE DATA REPORTING SYSTEM OF THE ZAMBIA NATIONAL COMMUNITY RESOURCE BOARD ASSOCIATION

Zambia's wild resources, including forests and wild animals, play a critical role in maintaining ecosystem integrity, supporting rural livelihoods, and in diversifying the national economy. Yet this resource base faces growing local threats such as poaching, uncontrolled fire, and habitat conversion. Proposed extra-national regulations against certain forms of hunting also present a looming threat to local livelihoods. In a context where 94 percent of the nation's land is technically under customary tenureship (i.e., administered by traditional authorities), including more than 25 percent designated for conservation, the responsibility for managing wild resources and averting these threats falls largely on rural communities, whether by mandate or by default.

Yet even where communities hold specific rights to manage and derive benefits from local resources, a combination of factors including weak institutions and structures of governance, as well as weak support from national government, undermines the effectiveness of these practices (Davis et al., 2020). These constraints have long been recognized. The constraints have also been partially attenuated by an active civil society and private sector, consisting of both local and global non-governmental organizations (NGOs) and businesses, that have worked in partnership with rural communities and government ministries. In particular, the vertical link between individual communities and the Zambian National Community Resource Board Association (ZCRBA), formed in 2016, positions the Association as a critical player in the governance of natural resources across government, private sector and non-governmental partners in Zambia.

Effective adaptive cross-scalar governance demands a robust monitoring and communication system to navigate the complexities of natural resource management and promote accountability These complexities encompass more than the state and dynamics of the resource base itself and include coordination of activities between multiple stakeholders, the shaping of values, and other processes. Since May of 2020, ZCRBA has been managing a national database and monitoring system, developed with support from the USAID-funded Integrated Land and Resource Governance (ILRG) program. With the end of the ILRG program in 2023, technical support and the continued development of the data system will depend on ZCRBA and its partners, but ultimately on the value and potential value of the system to help these organizations and institutions in meeting their goals. Thus, there is a need to understand the value of the data system in its current and potential forms.

ASSESSMENT DETAILS

This report forms the capstone of an assessment of ZCRBA's national database and its current and potential utility as a monitoring and communication system for effective natural resource management and governance in Zambia. Since May of 2020, Community Resource Boards (CRBs) and (to a lesser extent) community forest management groups (CFMGs) have been asked to submit to ZCRBA monthly reports on their activities and finances, among other variables, through an app-based and cloud-hosted data collection system. The system has also been used to collect annual reports as a once-off exercise in 2022. As of October 2023, 77 CRBs and 157 standalone CFMGs are registered on the system, though only a subset have used it.

This assessment is based on an analysis of 872 monthly reports submitted through the Open Data Kit (ODK) on a Google Sheets platform between May 2020 and July 2023, 23 annual reports submitted at the end of 2022, and 240 monthly reports submitted through an ODK system on the SurveyCTO platform between January and December 2023. It is also based on a series of on-site meetings with representatives of 8 CRBs and/or CFMGs in Eastern Province in September 2023, meetings, in person and online, with representatives of four partner organizations in the private, NGO, and government sectors (see Annex 1), and background documents.

This assessment was guided by a framework which considered the role of data not only in advocacy and adaptive management, but also in forming the foundation of a multidirectional governance and accountability mechanism. In line with this framework, the potential value of data to various stakeholders, including those to which the data is not currently accessible, was also considered.

EVALUATING DATA UTILITY AND INTEGRITY

STAKEHOLDER-CENTRIC DATA UTILITY

The following examples illustrate the ways in which different actors and coalitions within Zambia can effectively use data to support the governance and management of natural resources and advocate for communities. The examples are far from exhaustive. They also represent an idealized information system that lies beyond the current capacity of Zambia's natural resource governance institutions but are intended to inspire thought around opportunities for investment in improved information management.

ROLE 1: GOVERNANCE AND ACCOUNTABILITY

In the context of community-based natural resource management (CBNRM) in Zambia, meso-scale governance is weak, as district government bears little responsibility over these affairs. Instead, the meso-scale is shared by regional Department of National Parks and Wildlife (DNPW) and Forestry

Department offices, as well as community-based organizations (CBOs) including, especially CRBs. Occupying chiefdom-wide jurisdictions, CRBs have also adopted many micro-scale governance functions from the village-level, albeit according to policy. At the macro-scale, the national DNPW office asserts strong control over wildlife resources while the Forestry Department has devolved many rights and responsibilities to communities following recent legislation (Davis et al., 2020). The macro-scale is also occupied by ZCRBA, which reports to and advocates to government and other institutions the interests of its member communities. The constraints on information flows between actor groups are partly defined by this governance ecosystem, as is the specific utility of information to each group. Because of the interconnections in the domain of governance, it is critical that data systems be developed at, and integrated across each level.

- **ZCRBA**: Through its greater capacity and negotiating power (relative to communities), ZCRBA can draw from resource use/sales data and performance indicators to hold government and joint venture partners (JVPs) to account or to advise communities in contract negotiations. For example, data on activities of the JVPs, their payments and other measures of performance, evaluated against the terms of contracts, can serve as the basis for evaluating tenders. Data on hunting offtakes can also be used to calculate fees owed by DNPW, which can be cross-checked with payments to communities. The effectiveness of ZCRBA in fulfilling a role in accountability would likely be in proportion to its ability to communicate meaningful, credible, and periodic national summaries from the data, as outlined further below.

- **COMMUNITY- BASED ORGANIZATIONS:** At the community level, major responsibilities for leadership revolve around the governance of the benefits from resource use and protection. Where decision-making and project management is devolved from CRBs or CFMGs to lower community levels, such as Village Action Groups (VAGs), the monitoring of spending against budget targets and the monitoring of project implementation against workplans is necessary to hold VAG leadership and contractors to account, as well as to make informed budget and workplan revisions. Similarly, if one of the ultimate goals of community resource governance is in achieving improved livelihood impacts then household-level (HH) data (e.g., on income, food security, access to education and health services, etc.) and analysis of trends is critical for understanding whether benefits are being distributed effectively and equitably. The monitoring of governance quality itself, such as through the governance dashboard (Child et al., 2014), also entails the collection of household data, such as levels of trust in community leadership and awareness levels of CBO decisions.

- **COMMUNITY MEMBERS:** Downward accountability by CBO leaders depends on the extent, timeliness, and credibility of the performance-related information communicated to their constituents, and community members are perhaps the constituent group with the greatest need for information. Ordinary members of communities may possess the right to access information from CBOs, but not necessarily the awareness of this right or even the means to obtain information on a regular basis. Low levels of awareness may lead to apathy or disinterest, allowing poorly performing systems to persist. By leveraging the ubiquity of phones, key performance indicators of CBO and village governance can automatically be transmitted *en masse* to community members, either on a periodic basis, or automatically, when certain thresholds are crossed (e.g., an excessive budget deviation). This mode of information transmission can have value not only in strengthening accountability, but also in fostering micro-level governance by sparking and fueling discussions among community members.

- **PRIVATE SECTOR:** The rise of impact investing (i.e., investments that marry the goals of profit and positive social, environmental, or governance outcomes) offers the possibility of supplementary funds for CBNRM enterprises and initiatives. A reliable and consistent national CBNRM database, by providing baseline indicators and a platform for monitoring outcomes over

time could be used to evaluate investment performance against project targets, or at the very least to help identify potential investment sites.

ROLE 2: MANAGEMENT OF RESOURCES AND BENEFITS

Management is related to governance, but involves technical decisions made from an understanding of system processes and, in adaptive management, the ability to learn from past decisions and outcomes in an iterative process.

- **NATIONAL GOVERNMENT:** For national planning purposes there is a need to understand barriers to growth in the wildlife economy and the processes, requirements, and timescales necessary to overcome these barriers. The relative performance of different partnership and governance models in community areas can inform natural resource policy to that end.
- **ZCRBA:** Given a constituency of over 200 CBOs and a limited number of staff available to support them, the ability of ZCRBA to prioritize its capacity building and other extension services is critical for maximizing the impact of these activities at the community level. Of particular importance are measures of governance performance, including the degree of adherence to budget targets, workplans, meeting frequency and attendance, resource protection efforts, and HH data (see above).
- **CBOS:** To the extent that CBOs are responsible for the management of natural resources and human-wildlife conflict, standardized and spatial information relating incidents of resource loss (e.g., from poaching, fire, conversion of land, etc.) and incidents of conflict to enforcement effort (e.g., number of patrol days, kilometers patrolled, investigations, etc.) or mitigation measures (e.g., chili fences, chili blasters, solar fences, etc.) could enable more adaptive responses to these problems, provided both the additional capacity to interpret this information and approved general management and land use plans against which to evaluate performance.
- **CBOS AND DISTRICT-LEVEL ENTITIES:** Community representation in natural resource management is in some cases divided between the wildlife sector and forestry sector and spread across multiple CBOs, including CRBs, CFMGs, and cooperatives. Shared access to data, budgets, and work plans, especially if it is spatialized, would facilitate coordination and planning between groups.
- **NGOS:** Through access to the ZCRBA database, the internal data systems of NGOs can be expanded at virtually no additional cost, providing a more metric-diverse and broader, national context to NGO programs that are often limited to local regions. Built-in, downstream analytical and data-visualization tools can also streamline the process of interpreting complex data sets. This enhancement can lower the analytical burden on NGOs, allowing them to derive meaningful insights more efficiently from information, even when such information may already be accessible through partnerships with CBOs. Additionally, NGOs' analytical expertise and insights can contribute to refining these tools, leading to more effective and collaborative resource management and conservation efforts.
- **PRIVATE SECTOR:** Hunting outfitters and their clients are responsible for a major share of the revenue to CRBs. They are also responsible for obtaining the import approvals for hunting trophies from client-source countries. The long-term viability of safari hunting in Zambia depends on these approvals and the ability to meet the evolving criteria of non-detriment or enhancement findings as established by regulatory authorities primarily in the US and EU. These criteria include evidence that fees paid to, and activities undertaken by communities contribute towards conservation. Other, voluntary standards, such as IUCN's guiding principles on trophy

hunting, include socio-economic benefit criteria as well. A data system that enhances the accessibility of information on how funds from hunting are used by communities thus has clear implications for hunting businesses.

ROLE 3: ADVOCACY AND AWARENESS RAISING

Advocacy and awareness raising entails communication, both domestically and abroad, of the values at stake in CBNRM and the impacts and likely impacts of policy and management decisions.

- **NATIONAL GOVERNMENT:** A national monitoring system linked to community-generated data, especially if spatialized, would allow the Government of Zambia (GRZ) to effectively communicate its commitments and contributions to multilateral environmental agreements, including the Global Biodiversity Framework and the related "30 by 30" agenda of setting aside 30 percent of land for biodiversity conservation. Importantly, and provided that indicators are positive, such data could be used to demonstrate the contributions towards these goals specifically from "other effective area-based conservation measures," including customary land, as an alternative model to strict protection. Data on economic benefits, including income, jobs, projects, meat, etc., from wild resources can also demonstrate the role of the environmental sector in contributing to goals set out in the national development agenda, and also help to align the activities and policies of other ministries (e.g. mining, transportation, etc.) with the sector. Additionally, outcomes around the global debate on the merits of "trophy hunting" as a conservation and development tool and public perceptions and misperceptions of the practice threaten to foreclose, through extra-national regulations, a critical source of conservation funding and income for local communities, particularly if broad-scale bans are instituted. This debate is dominated by activists, industry, and academia from the global North and is missing authoritative information and voices from African range states. Though GRZ already produces non-detrimental findings for certain hunted species, these are based largely on law enforcement and wildlife population data and are rarely made public. Published summaries of annual community benefits, on the other hand, could help to elevate the voices of those who would be most impacted by proposed trade bans.
- **ZCRBA**: National and global advocacy undertaken by ZCRBA on behalf of its constituent communities can be strengthened by published annual summaries focusing on livelihood impacts from natural resources, including both economic benefits and the costs of human-wildlife conflict. Data on resource use and protection can strengthen this advocacy. Responsibilities for resource management at the community level are often handled collaboratively with partners (e.g., DNPW or NGOs), thus reducing the need for CBOs to independently monitor this data. However, data on resource use and protection is central to the argument linking both hunting and devolved ownership and governance to effective conservation.
- **NGOS**: The established communication channels and expertise in public relations possessed by NGOs can significantly amplify ZCRBA's messages, both domestically and internationally (see the discussion of Namibia in the Comparative Analysis section, below). The involvement of NGOs can also bring diverse perspectives and added legitimacy to the advocacy campaigns, crucial for influencing policy and public opinion. By working in tandem with ZCRBA, NGOs not only elevate the association's communication capabilities but also advance their own public relations goals, showcasing their commitment to supporting community-led conservation efforts.

GAPS AND STRENGTHS OF THE CURRENT DATA SYSTEM

OVERALL STRENGTHS AND WEAKNESSES

Perhaps the greatest strength of the monthly reporting system is the level of **commitment by both CBO and ZCRBA personnel**, as demonstrated through their continued participation and follow-ups on reports, respectively. Though reports and data are often missing or late, these issues seem to reflect challenges of acquiring certain information (see below) and learning curves in the adoption of new technology. More tangibly, one of the qualities of the app-based reporting system most liked by CBO members was its ease of use in entering information. Time spent on data entry was estimated at around an hour per report (though does not include time spent creating the original records) and does not appear to be overly burdensome. At the level of ZCRBA, another advantage is that through the use of open access tools and hosting services, resource allocation away from other responsibilities is minimized.

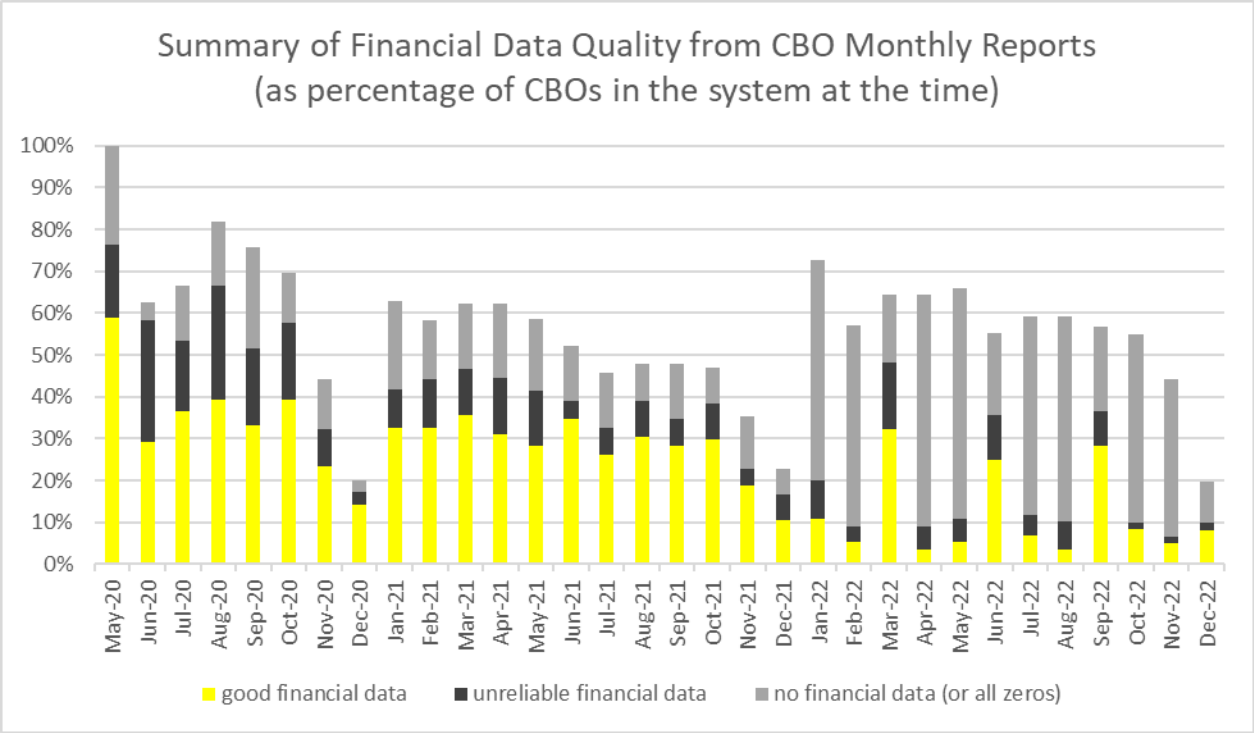
However, the **lack of a dashboard** providing automated data summaries or analyses makes impractical much of the data processing that would be required for the Association to efficiently fulfill the functions outlined in the first part of this section. Data is only displayed in tabular form, organized either as an individual CBO monthly report, or as a consolidation of data from CBO reports for a particular category (e.g., human-wildlife conflict, projects, etc.)—since migrating to the SurveyCTO platform in 2023, ZCRBA staff have lost the ability or understanding to access even the latter mode of data organization. Partly in consequence of this limitation, the two staff members assigned to review reports have focused more on evaluating the completeness and quality of individual reports rather than data analysis and interpretation. A summary of the data at the national level was completed for the first time at the end of 2022 with the support of ILRG staff and is planned as an annual exercise, though without built-in functionality for summaries and analyses, it is unclear whether ZCRBA has the technical capacity to ensure the accuracy of summaries and to produce insights from them. Capacity is required not just at the technical level (e.g., in following consistent procedures for data extraction, cleaning, consolidation, etc.), but also in terms of the ability to use data to inform decisions and actions related to governance and accountability, management, and advocacy.

GOVERNANCE AND ACCOUNTABILITY

The **governance management effectiveness tracking tool (GMETT)**, deployed in 2021 with the support of Frankfurt Zoological Society (FZS), is a significant step towards an understanding of the strengths and weaknesses of CBO governance. This tool was adapted to the Zambia context with ILRG support and the leadership of FZS and partnership of DNPW and conservation NGOs. Summaries of the data at the national and provincial levels clearly convey a large set of proximate indicators of governance quality. Yet beyond these summaries, the data has been minimally analyzed and causal attribution of strengths and weaknesses at a deeper level remains unclear. For example, is the proportion of the population reached with socio-economic benefits low because income is low, or is it due to elite capture? Are threats to natural resources high because of a lack of an approved land use plan, or is it due to lack of resources for law enforcement? These cross-tab analyses are relatively simple and could be performed with the help of FZS. One of the shortcomings of the GMETT is that by its nature as a self-assessment tool directed to CBO leadership, respondents can be expected to be inherently biased towards positive responses and thus interpretations of the data may tend to conflate procedures and mechanisms of governance with the quality of their functioning. For this reason, governance and accountability assessments could be strengthened by combining GMETT evaluations with data from CBO reports, such as financial flows, budgets, meeting attendance, and project administration.

Financial information on income and expenditure, as reported by CBOs tends, however, to be of low consistency and quality. Reporting frequency in general is low, with an average rate of only 55 percent, though presumably the CBOs with low reporting frequency have less information (financial or otherwise) to report. Even when financial information is reported, an average of 29 percent of reports have contained discrepancies of greater than 10,000 kwacha between expected and reported closing bank balances (Fig. 1). Though some automatic data validation is incorporated to flag and rectify such mistakes, it tends to be circumvented with perfunctory responses. Challenges of financial reporting cited at the community level include limited access to bank statements, as access may require a trip to town, and difficulties with setting up online banking. Misunderstandings of terms such as "bank balance" have also led to the entry of erroneous values.

FIGURE 1. SUMMARY OF FINANCIAL DATA QUALITY, CBO MONTHLY REPORTS



Volume of monthly reports, as a percentage of the total number of CBOs registered in the system that month. Reports with "good" and "unreliable" financial data are distinguished by the presence of large discrepancies (see text).

However, financial data without context has limited meaning. Without targets or expectations against which income and spending can be evaluated, financial flows do not necessarily translate into performance indicators, nor are they necessarily useful as checks on the fulfillment of responsibilities. With respect to income streams, it is not possible through the system to determine whether payments to CBOs by DNPW or JVPs meet their respective obligations in terms of amount and timing. This problem stems partly from the lack of transparency over hunting offtakes and is also complicated by fluctuating exchange rates (hunting is transacted in US dollars) and the consolidation of fees, which are disbursed to communities without a statement of sales linking the payment to specific animals. However, obligations of JVPs are outlined in their contracts with CBOs and without having captured this information in the ZCRBA database, there is little ability to monitor the performance of JVPs in this regard.

Likewise, on the side of expenditure and projects, without the translation of CBO-level or VAG-level budgets and workplans into quantitative targets captured by the database, there is little ability for

ZCRBA to use the system to monitor the performance of CBOs, and at least uncertain ability of CBOs to monitor the performance of VAGs. The frequency of, and attendance at meetings at both CBO and VAG level are captured by the database, but do not necessarily reflect the consistent claims of "3-quarters village attendance" made by CBO representatives during site visits. Meeting attendance values in the database are also without context, in terms of the overall population of the particular catchment area. The above information, together with context, could support efforts to target and strengthen lines of upward accountability.

The **cloud-hosting of CBO reports** presents a novel opportunity to expand access to information to which community members have a right, as constituents, and an inherent interest, as informal shareholders in collective enterprise. In practice, however, only a few individuals within ZCRBA, ILRG, DNPW, and COMACO have accessed the system.

MANAGEMENT OF RESOURCES AND BENEFITS

Responsibility for guidance on many of the everyday functions of resource management is assumed by DNPW or NGO partners, mainly leaving to communities the role of implementation. A greater role in resource management would require a significant investment in technology and technical training of CRBs on data collection and interpretation (some of which, though, has occurred through the adoption of an app-based monitoring tool for hunting through FZS support in the North Luangwa ecosystem). In addition, training on ecological systems and commercial operations would be necessary to link information to management actions in an adaptive process. Given the costs entailed, and the fact that even private landowners in the region often delegate many of these functions, a permanent role for service providers in the technical aspects of management seems the reality. However, without ownership or access to a robust set of data on the status and trends of resources, linked to management inputs and commercial performance, communities are in practice denied the opportunity to seek third party consultation on matters of management. This lack of agency helps to entrench the monopolies of incumbent partners, including DNPW, JVPs, and NGOs.

In the **hunting sector**, specifically, what little information eventually does reach the CRB is often informally communicated by hunting operators and limited to trophy hunting quotas and offtakes (excluding citizen and local resident hunting) and typically arrives only at the end of the season. Though post-hunt return forms are originally recorded by community wildlife scouts and may temporarily be stored in CRB offices, they are then transferred to DNPW, leaving communities without copies. Frequent discrepancies between trophy hunting offtakes reported by CRBs through the monthly reporting system and actual offtakes recorded by DNPW reflect this poor and inconsistent quality of communication (see Annex 2, Fig. A6). Also excluded from communities is data on trophy quality (a useful indicator of selective hunting pressure in the absence of reliable population estimates), license and trophy fees paid, daily rates and hunting days (useful for understanding the total value of the service hosted on community land), and client origin (useful for hedging risks given uncertain extra-national regulation of the industry). Daily rate and trophy fees are not even recorded by DNPW, though together these values constitute at least two-thirds of spending by hunting clients on community land and are thus important indicators of commercial performance.

Similar issues were noted by CRB and CFMG representatives with respect to the **forestry sector**. At site visits, these community leaders expressed a lack of understanding of how payments for carbon credits are calculated from period to period. However, it was not clear whether this lack of understanding arose from limited access to data or from difficulty in interpreting what data they possessed.

While the sensitivity of **data on law enforcement** necessitates careful controls on access, simple indicators of threat level and threat abatement, such as catch-per-unit-effort, can easily be shared

without compromising these activities. While law enforcement was initially proposed to be included in the reporting structure, the DNPW objected and as a result, there is no mention of enforcement in the tool. Law enforcement summaries contained in CBO records appeared to be non-standardized and inconsistent across communities.

Data contained in monthly reports on **human-wildlife conflict (HWC)** is deficient for reasons noted in the following subsection, though for the purposes of management, the records maintained at CBO offices are more relevant. These records are also non-standardized and inconsistent across communities. Importantly, incidents of HWC are rarely mapped and are not accompanied by information on what, if any, mitigation measures had been implemented prior to the incident. Because problem animals are known to learn from, and can become habituated to deterrence efforts, mitigation is necessarily an adaptive process that requires learning what efforts work or do not work, alone or in combination, what continues to work, and what has stopped working.

Community-based organizations tend to have much greater competency and experience **in managing the benefits** of resources—although this is less true of standalone CFMGs. Here, the use of information in decision-making is more informal and based largely on the nested structure of CRBs, in which VAG committee members have representation at CRB level and work closely with the CRB development committee chair. Though CRB representatives are quick to emphasize that project proposals come from the VAG level with large involvement by ordinary members of the community, it is unclear how and with what information budget allocation decisions prioritize between different VAGs, especially if project management activities begin to deviate from budgets and workplans.

Where CRBs and CFMGs operate in overlapping areas, **coordination between the CBOs** is inconsistent and ineffective. Information exchange is limited either to incidental meetings at which each CBO might happen to learn about the activities of the other, or to incidental overlap in representation on both the CFMG and VAGs (e.g., indunas sitting in both groups). Despite encouragement from COMACO for CRBs to attend the meetings of CFMGs, this has not happened.

At the level of ZCRBA, data from the monthly reporting system is not consistent, reliable, nor extensive enough to support prioritization of capacity building efforts, apart from those related to reporting itself. That is not to say that prioritization of its resources is not currently effective, but rather to say that the kind of information and information systems that would better support the management of benefits at the CBO level could also be used to improve the allocation of ZCRBA's own resources if the same information allowed for more systematic identification of communities experiencing governance and management challenges.

ADVOCACY AND AWARENESS RAISING

To date, the monthly reporting system has had the most utility as a reference resource for ZCRBA's efforts in **advocacy and awareness raising**. The system allows specific CBNRM information to be retrieved with relative ease and achieves this at a scale unmatched by but a few regional peers. Yet, outward communication which draws on information from the system is ad hoc in nature and advocacy tends to be more reactive than proactive. An absence of clear goals articulating what target stakeholder groups and members of the public should understand or value about CBNRM, and how far the needle should be moved in these directions, precludes the development of a communication strategy that would, at the very least, maximize the utility of the current data system and, ideally, inform the development of the system so that it captures the indicators most relevant to the goals.

Indicators of general importance in CBNRM advocacy and which are not currently captured by the system include the amount of habitat effectively conserved (in terms of hectares), and amount and trends in resource quantity, including wildlife and forestry resources. These indicators are a critical and

often missing component of the argument linking sustainable use and devolution of rights and governance on the one hand to conservation inputs and outcomes on the other. In light of the management challenges and limited management data held by CBOs, as discussed above, this deficiency speaks to the inadequate horizontal integration of data systems across the sector.

A set of **other potentially relevant indicators** are routinely recorded by at least some CBOs though are not currently captured by the monthly reporting system. For example, Sandwe CRB records the number of beneficiaries served by individual community projects in its annual report, but this information is not captured in the ZCRBA database (instead, the system captures the number of those "involved" in a project). Human-wildlife conflict incidents recorded at CBO level may capture information such as the extent and type of damage caused, but open-ended as opposed to categorical fields in the database permit non-standardized data entry, making aggregation, disaggregation, and monetary cost estimates difficult. And while CBO records obviously refer to community projects by specific names, the ZCRBA database categorizes projects generically. Without unique IDs (e.g., number tags), quantification of the number of projects implemented over time and continued tracking of the status of already completed projects would become error prone.

COMPARATIVE ANALYSIS: INSIGHTS FROM OTHER COUNTRIES

National level community and community-support associations in Namibia (NACSO) and Zimbabwe (the CAMPFIRE Association [CA]) have several decades of combined experience in managing CBNRM data. Their challenges are instructive.

In Zimbabwe, rural district councils (RDCs) and their constituent wards submit separate reports to CA on an annual basis. These reports contain information similar to that which ZCRBA collects but are more detailed and extensive on aspects related to resource management, including wildlife population estimates, poaching incidents and arrests, and information on hunting clientele. As rights over wildlife and its management are devolved to the level of data generation (RDCs), this level of detail is unsurprising. However, frequent and large discrepancies, both internal and with reference to outside sources, gaps in reporting, data anomalies, and procedural errors render much of this data unreliable (author's own analysis). Because reports are filed on spreadsheet tables and transmitted by email, the processing and consolidation of the information by CA is an extremely cumbersome task and therefore in most years is not performed. This system bears similarity to that of ZCRBA in that there is little vertical integration between community level information management, in all its inconsistency, and national level information management. For this reason, the dataset affords CA no reliable window into the quality of CBNRM in its member communities.

In Namibia, communal conservancies likewise are the locus both of the rights to manage wildlife and the source of data which is annually collected by NACSO. Unlike Zambia and Zimbabwe, the national database is highly vertically integrated with information management at conservancy level, which is based on the "management-oriented monitoring system," otherwise known as the "event book system." Through this system, conservancy managers use standard modules and forms to record daily observations, events, and activities, which are subsequently consolidated into monthly, annual, and longer-term summaries (Stuart-Hill et al., 2005). Importantly, the modules facilitate analysis of the summaries at conservancy level, through simple, paper-based data visualizations. The consistent nature of information management across conservancies allows for near-automation of analysis at national level and NACSO has excelled at translating this information into both public relations material and conservancy-specific infographic posters distributed to each conservancy annually. Insidiously, however, the analysis of data performed at national level has contributed to atrophy of analytical and data interpretation skills at conservancy level (R. Diggle, personal communication, Oct. 13, 2023). The larger problem is the lack of staffing capacity within NACSO to provide on-the-ground technical and managerial support to a conservancy system that has rapidly expanded.

Together, these examples suggest that the effectiveness of a national information management system for CBNRM will partly depend on the degree to which it is vertically integrated with record systems at the level of management (and governance). Furthermore, that effective information management systems will not necessarily improve the quality of management unless there is sufficient capacity at the level of management to interpret data and incorporate it into decision-making. However, and as discussed, an effective information management system can help to target capacity building resources to the communities most in need.

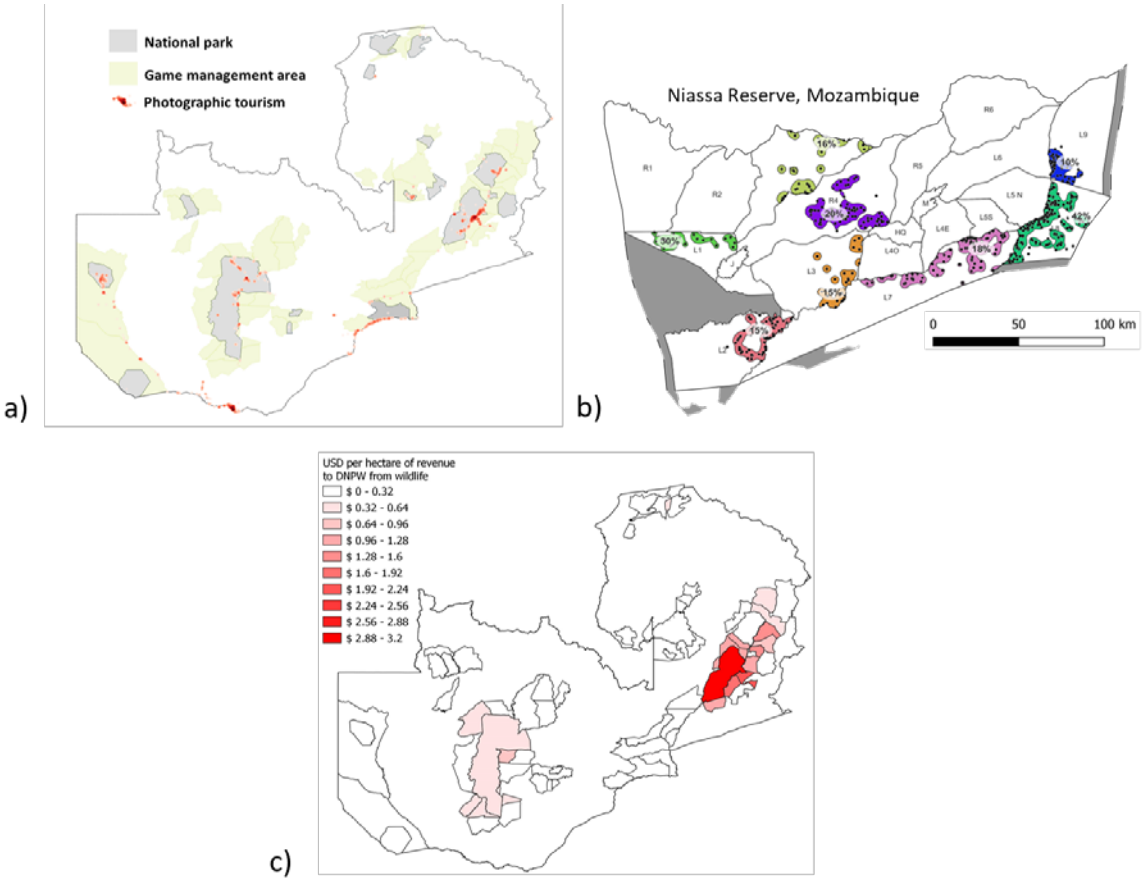
DATA AS A COMMUNICATION AND MANAGEMENT TOOL

The following subsections graphically illustrate examples of how specific information can be communicated to audiences for various purposes.

EXTERNAL COMMUNICATION: VISUALIZATIONS IN SUPPORT OF ADVOCACY AND AWARENESS RAISING

Evidence of conservation and livelihood impacts from CBNRM is strongest when produced through counterfactual analyses. Short of this level of rigor, maps are powerful visual tools that can convey similar information. For example, misperceptions about the potential of tourism to replace hunting's role in generating conservation funds can be addressed by maps of the distribution and volume of each activity (Fig. 2). Likewise, maps of projects, infrastructure, and other benefits can demonstrate the importance of CBNRM to rural livelihoods.

FIGURE 2. DISTRIBUTION & VOLUME OF WILDLIFE USE FROM TOURISM AND HUNTING

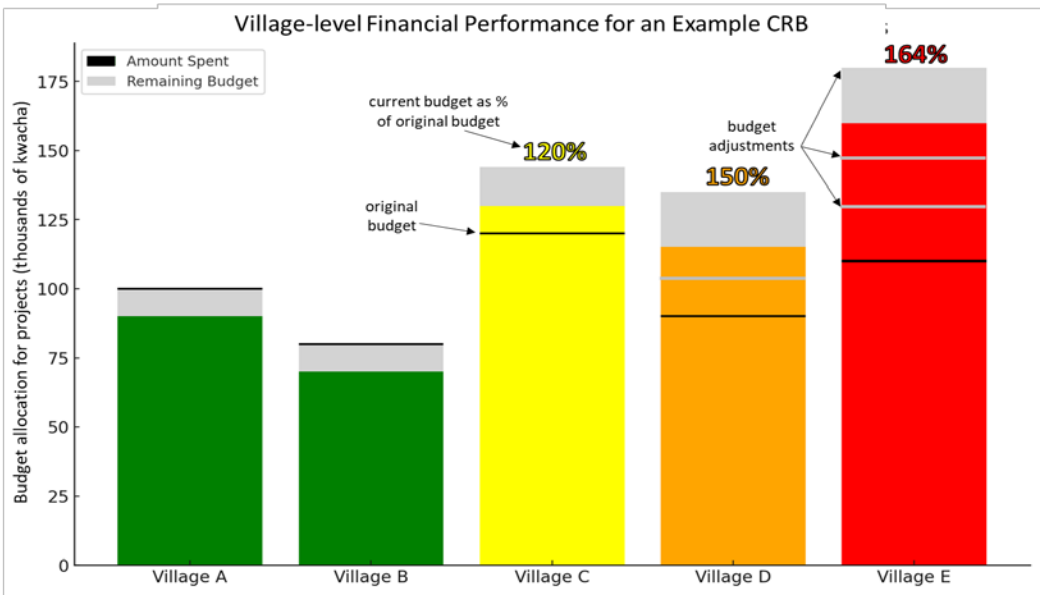


The use of maps in demonstrating the limits and complementarity of different forms of wildlife use. Photographic tourism is virtually absent from the game management areas (a) and in national parks is highly concentrated in a few areas. Similarly fine-grained distribution maps of hunting activity are not currently possible for the whole of Zambia, but see Niassa Reserve as an example (b). Tourism and hunting also have complementary roles in generating conservation funds, but many tourism and hunting areas are underperforming (c). Source: author's own data.

INTERNAL AND UPWARD COMMUNICATION: VISUALIZATIONS IN SUPPORT OF CBO AND ZCRBA OPERATIONS

Within CBOs, visualizations can simplify and enhance the messages from key but often latent information spread across office records or embedded in community perceptions, and thereby inform management decisions. Within ZCRBA, the same visualizations can inform its allocation of support services either to communities or to thematic areas of training. For example, visualizations enhancing financial and project management decisions (Fig. 3) can aid both CBOs and ZCRBA. These visualizations would require standardizing village-specific budget and workplan records.

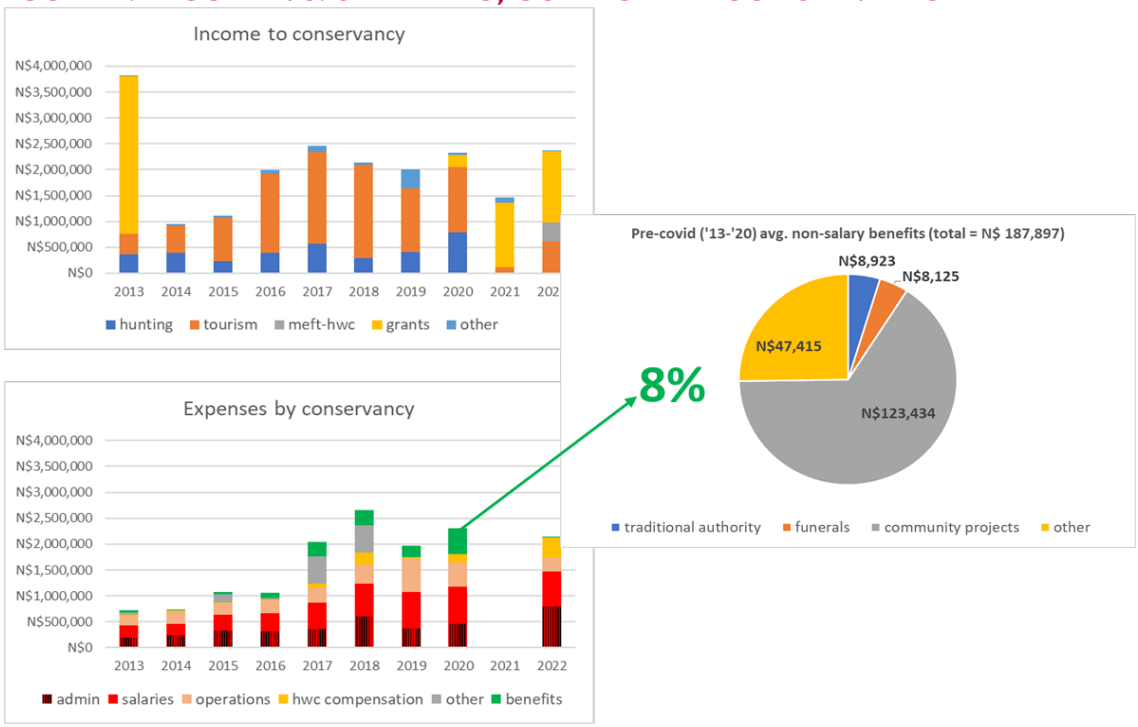
FIGURE 3. VILLAGE LEVEL FINANCIAL PERFORMANCE FOR EXAMPLE CRB



A color-coded graph for an example CRB indicating distribution of benefits between villages and performance in meeting original budget targets for the respective village's projects. Green columns indicate spending below the original budget, yellow indicates a revised budget up to 120 percent of original, orange up to 150 percent, and red exceeding 150 percent of original budget. A similar graph can be constructed to reflect progress in project administration against target timelines.

Aggregate and historic income and expenditure, either at CBO level or nationally, can also signal levels of performance in adhering to budget guidelines, as well as trends or inflection points related to events, policies, or interventions (Fig. 4).

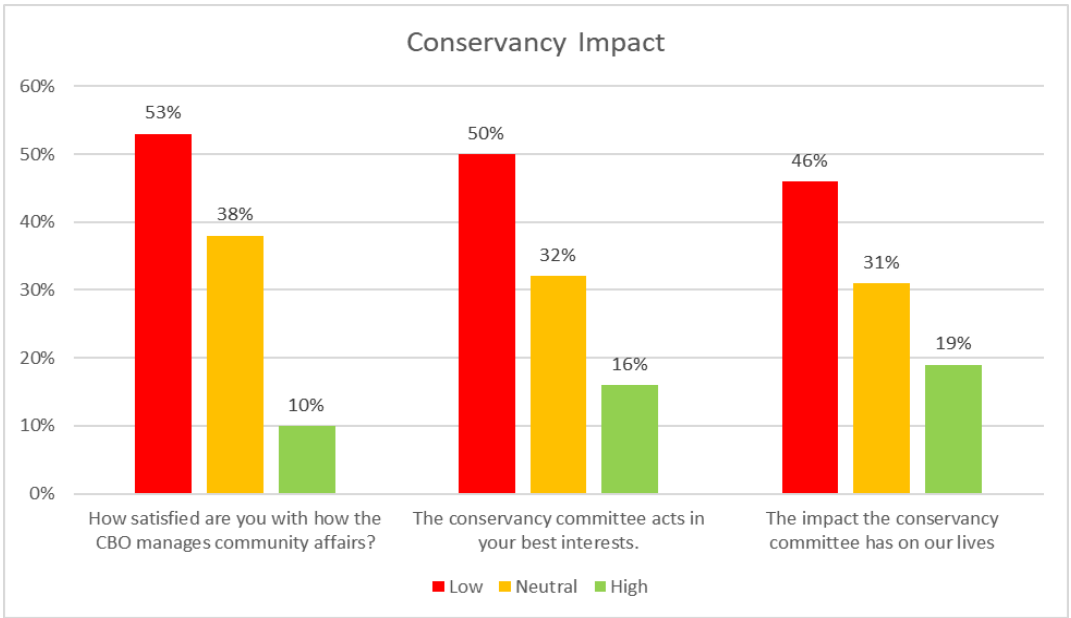
FIGURE 4. INCOME VS. SPENDING, COMMUNITY CONSERVANCY IN NAMIBIA



Breakdowns of income and spending, over time, from a community conservancy in Namibia. Note how most benefits are salary-based (red) and how community benefits (green) tend to be low but increase as a percentage with increased income.

Household-level data, as from the deployment of the "governance dashboard" monitoring protocol, allows for a rare measure of governance quality in terms of perceptions, as opposed to procedures and mechanisms (Fig 5.).

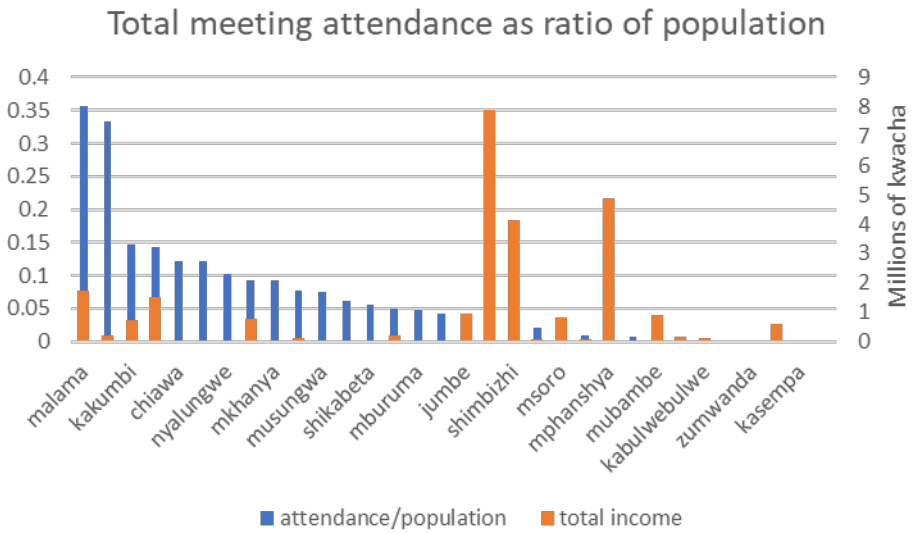
FIGURE 5. HOUSEHOLD PERCEPTIONS OF CBO



Household-level perceptions of a CBO, from a community conservancy in Namibia.

Though the three preceding visualizations are only hypothetical in their application to Zambia, there are opportunities to make better interpretive use of existing ZCRBA data. Meeting attendance, for example, is a rough proxy of community engagement in the process of governance. The database at present does not contain CBO or village-level population attributes but this information is possessed by ZCRBA and can be used to produce a standardized measure of engagement based on attendance figures (Fig 6.), assuming consistent reporting.

FIGURE 6. TOTAL MEETING ATTENDANCE BY CBO

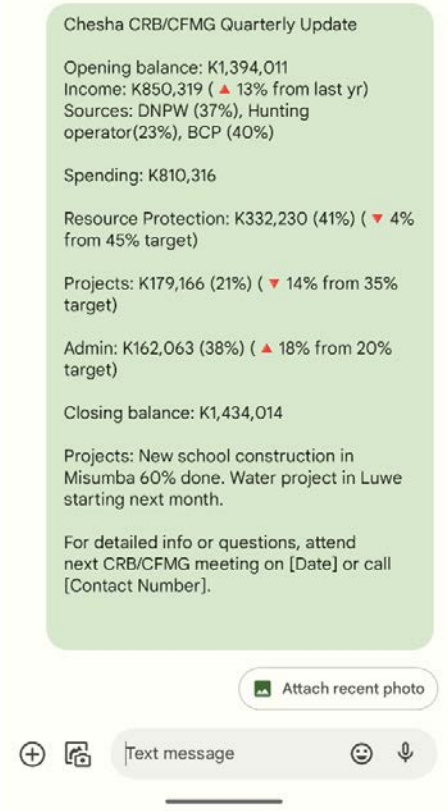


Total meeting attendance, by CBO, as a ratio of CBO catchment-area population, and in comparison to total CBO income.

DOWNWARD COMMUNICATION: INFORMATION TO STIMULATE HOUSEHOLD-LEVEL DISCUSSIONS AND PARTICIPATIVE GOVERNANCE

Mass text messaging to phone numbers registered by community members at CBO meetings can, in certain ways, more effectively communicate the status of finances and management activities than village or community-wide meetings, especially when populations are dispersed and transport is difficult (Fig. 7). The latter fora are not replaced but enhanced when attendees have the prior opportunity to discuss developments. These approaches will, of course, require consideration of inclusion principles to ensure broad access within the communities, including to women and populations who may tend to be excluded from natural resource management.

FIGURE 7. SUMMARY TEXT MESSAGE OF QUARTERLY CBO PERFORMANCE



An example text message summarizing the quarterly performance of a CBO

SUGGESTED SHORT TERM MODIFICATIONS

Discussions on the eight CBO site visits and with partner organizations, as well as an informal review of CBO office records elicited feedback and insights on current practices in information management and reporting and how these processes could be made more efficient and effective.

REPORTING FREQUENCY

It was generally agreed by CBO representatives that the monthly reporting frequency is not overly burdensome but that there is also validity to the inclusion of an annual report, which would facilitate national summaries and outward communication by ZCRBA. Under the current system, annual summaries require aggregation across months, which leads to inaccurate sums because of inconsistent reporting and because certain information is only available to CBOs at the end of the year (e.g. hunting offtakes). Though the one-off annual reporting exercise in 2022 yielded responses from only 22 CBOs, at least some non-responding CBOs were apparently unaware of the request.

ADDITIONAL INFORMATION AND INFORMATION PROCESSING

- The **reporting of financial information** by CBOs is one of the more tedious reporting tasks. It has also proven to be error-prone despite efforts to assert quality control. Automated integration with CBO financial records, where these records have been standardized, would address these two issues and render this aspect of reporting more efficient and accurate. For example, through DNPW, CRBs have adopted a standard tabular format for recording quarterly finances (Annex 3). If the Excel file with this information was attached to the CBO's quarterly

report to ZCRBA, it could be used to automatically populate a corresponding set of financial fields.

- As mentioned, the **number of beneficiaries served** by individual community projects is information that at least some CBOs are currently recording. Together with geographic coordinates (for placed-based projects) and unique project IDs, this information could enable basic performance monitoring of projects themselves (e.g., if a new school is not being used for lack of a teacher). What constitutes a community project and its beneficiaries may also need clarification, as some CFMGs are engaged in for-profit enterprises (e.g., beekeeping).
- The inclusion of **quantified general mitigation efforts** (e.g., number of chili blasters deployed, hectares of solar-fenced fields, etc.) and prior mitigation efforts associated with individual HWC incidents could improve the adaptability of response measures as the nature of HWC changes over time.
- More generally, the **inclusion of contractual obligations, quantified objectives, guidelines, and other targets** is necessary as a reference against which to evaluate the various indicators from the database. The reference values can serve an accountability purpose, as in comparing income from a JVP against their obligatory commitments, or to benchmark performance, as in comparing a CBO's carbon revenues per hectare against a collective average.

OTHER SUGGESTIONS

- Some of the anomalous data contained in monthly reports was revealed on CBO site visits to be due to **confusion over terms** like "[bank] balance." A reference guide to accompany the reporting form was suggested as a means to avoid such misunderstandings.
- Since the migration of monthly reporting from ODK to SurveyCTO, **CBO's have apparently lost the ability to obtain copies of submitted reports**. Restoring this ability would allow supervisors at CBO level to confirm that submitted information is accurate, as well as allow CBOs to more easily send report copies to interested 3rd parties or partners.

SUGGESTED LONG TERM OBJECTIVES

ENHANCING SUPPORT FROM PARTNERS

The development of a data system as comprehensive and functional as the one outlined in this document will demand significant resources and the commitment of the multiple and varied organizations that operate in Zambia's CBNRM space. Yet at present, resources have not materialized for the maintenance of even the current ZCRBA database beyond simple consulting services that are being provided on a *pro bono* basis. The willingness, therefore, of partner organizations, including government and cooperating partners (donors), to invest in greater data integration remains unclear and merits further and sustained inquiry by ZCRBA.

Discussions with partners should make clear the potential synergies of horizontal integration of data systems and how support for improved vertical integration within the ZCRBA data system could improve CBNRM outcomes. These discussions can be made persuasive with demonstrations not merely of the database itself, but of the ways in which ZCRBA has used or could use data to inform its operations and those of its members. Though several partners (i.e., DNPW and COMACO) already have access to CBO monthly reports, their use of the information appears to be minimal. Whether this speaks to the quality of the data, the need for inspiration, or other issues should be explored through continued dialogue. However, realistic expectations for greater collaboration must factor the interests

and values of partner organizations. Those that operate at regional or global scales often have proprietary data systems into which a country-specific one may not easily fit. Organizations that derive funding from donors or which channel funds to communities from markets may not necessarily share the same priorities in information management as ZCRBA.

Apart from proactively pursuing greater collaboration with partner groups, the development of integrated data systems invokes the potential role of national government, the relevant line ministries, and communities in the governance of information. Memoranda of understanding (MoU) between government and NGOs can place greater emphasis on data integration and capacity building in data management. . In recognizing the potential of technology to reinforce existing institutional inequalities (Toyama, 2015), MoUs should also uphold the ideals of transparency and devolved information governance. For example, where capacity building involves change in the way that data is collected (e.g., adoption of digital platforms), care should be taken to ensure, at minimum, that the ability of CBOs to access and interpret data is not compromised. Finally, contracts between CBOs and NGOs can include clauses stipulating shared ownership and shared access to all data collected in the community.

CONNECTING THE HOUSEHOLD LEVEL

The need to motivate improved reporting and information management by CBOs raises the question of incentives. Arguably, the strongest motivating factor is tied to the inherent incentive of increased management performance from better decision-making capacity and greater legitimacy through improved quality of governance. Micro-governance is perhaps the scale at which there is greatest need for improved governance quality. Full vertical integration of data systems could contribute to this level of governance by ensuring that households have on-demand access to information and that their voices are allowed to resonate upwards. The willingness of CBOs to adopt technology in their communication practices and to adopt HH monitoring of governance may be proportional to the current quality of governance, as vested interests are at stake, but with the relative inexperience of many CBOs that are now flush with carbon revenues, there is still opportunity to target this scale of governance for data system expansion—opportunity that may be harder to find in the future. Undoubtedly this will also require careful facilitation and training with the help of a long-term partner.

ADOPTING A SPATIAL DATABASE ENGINE

A spatial database engine (SDE) is tied to geographic information systems (GIS) as a system designed to store, retrieve, and manage geospatial data. The advantages of a database architecture that allows for spatial queries are numerous, including increased ease of map-making, greater transparency and accountability when reported information can be verified on a map, and greater ability to generate counterfactual evidence by identifying geographically similar areas that differ with respect to attributes of interest.

FINAL REMARKS

The significant efforts made by DNPW and its partners to modernize information systems dedicated to law enforcement, such as through the adoption of SMART, are an encouraging sign of commitment to capacity building. These investments into resource protection and government-managed systems, however, risk alienating communities from their resource base if they are not balanced with appropriate attention given to systems for community governance and local capacity to manage and learn from data. Beyond merely balancing both sets of investments, the relationship between law enforcement and governance aspects of CBNRM (including economic performance and conflict reduction) points to the need for linking both data systems through coordinated planning.

As a starting point, this assessment has underscored the critical need for the evolution and enhancement of ZCRBA's data system given its potential to strengthen governance in the CBNRM sector. The foregoing long-term objectives, each integral to fortifying information management, aim as well to ensure sustainability in information management. Addressing these objectives collectively anchors a future where data underpins decision-making and community engagement in the natural resource sector.

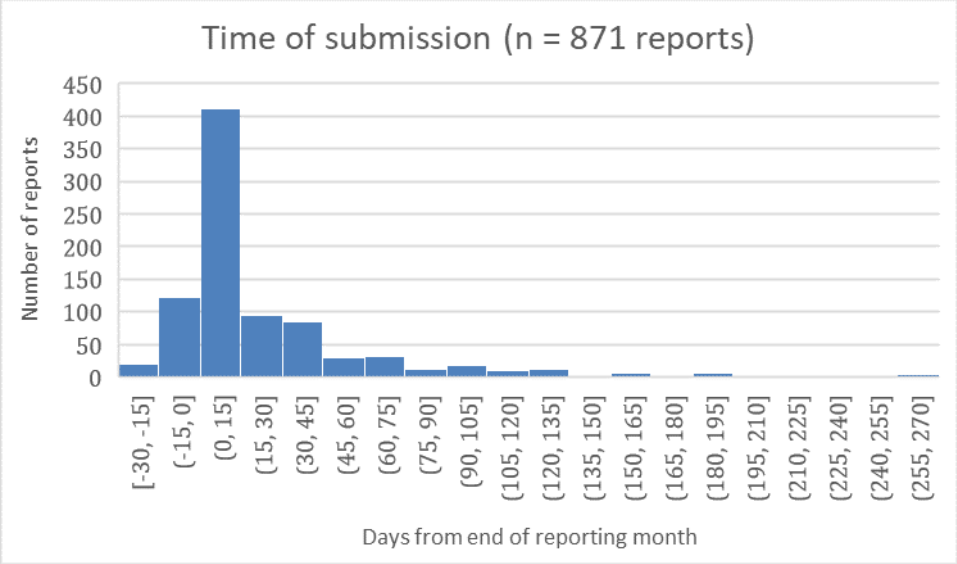
SUGGESTED CITATION:
Chidakel, A., Mwanza, A. and Sommerville, M. (2023). *Assessment of the Data Reporting System of the Zambia National Community Resource Board Association*. USAID Integrated Land and Resource Governance Task Order under the Strengthening Tenure and Resource Rights II (STARR II) IDIQ.

ANNEX 1: SITES VISITED AND INDIVIDUALS INTERVIEWED

- Xia Stevens, Panthera, Aug 29, Microsoft Teams
- Rich Peel, Luke Miller, Ephraim Lombe, FZS, Sep 7, Microsoft Teams
- Dale Lewis, COMACO, Sep 22, in-person
- Mastano Ng'andu, DNPW, Sep 22, in-person
- Shikabeta CRB/CFMG, Sep 23, in-person
- Luembe CRB/CFMG, Sep 24, in-person
- Sandwe CRB/CFMG, Sep 25, in-person
- Nsefu CRB/CFMG, Sep 26, in-person
- Jumbe CFMG, Sep 26, in-person
- Chikomeni CRB, Sep 27, in-person
- Chikwa CRB, Sep 29, in-person
- Luembe CFMG, Sep 30, in-person
- Benjamin Kayeyi, Martin Kambinga, Kelvin Banda, COMACO, Oct 5, Microsoft Teams

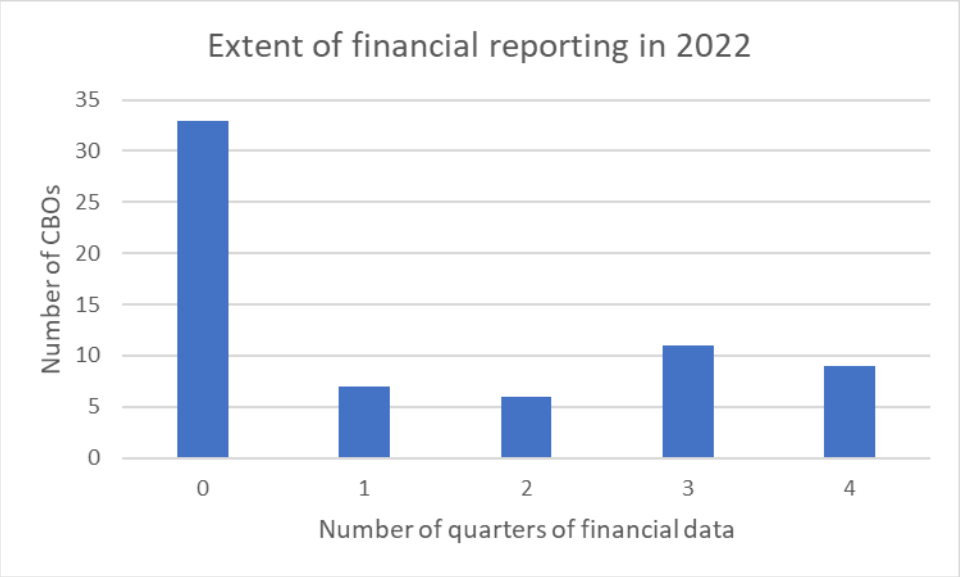
ANNEX 2: SUPPLEMENTARY ANALYSIS OF THE ZCRBA DATABASE

FIGURE A1. TIME OF SUBMISSION FROM END OF REPORTING MONTH



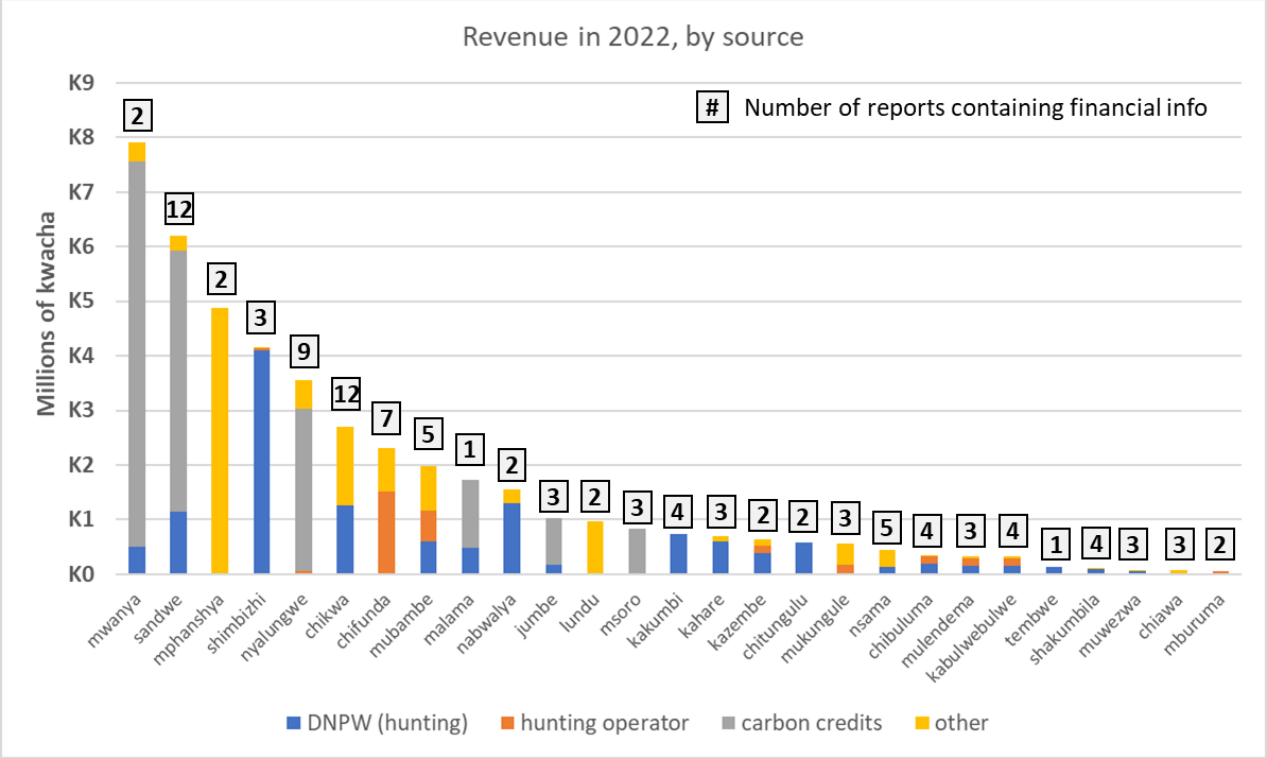
Time of submission, in days counted from the end of the reporting month, for reports submitted between May, 2020 and July, 2023 via ODK. Around 75% of all reports were submitted within 30 days.

FIGURE A2. FINANCIAL REPORTING 2022



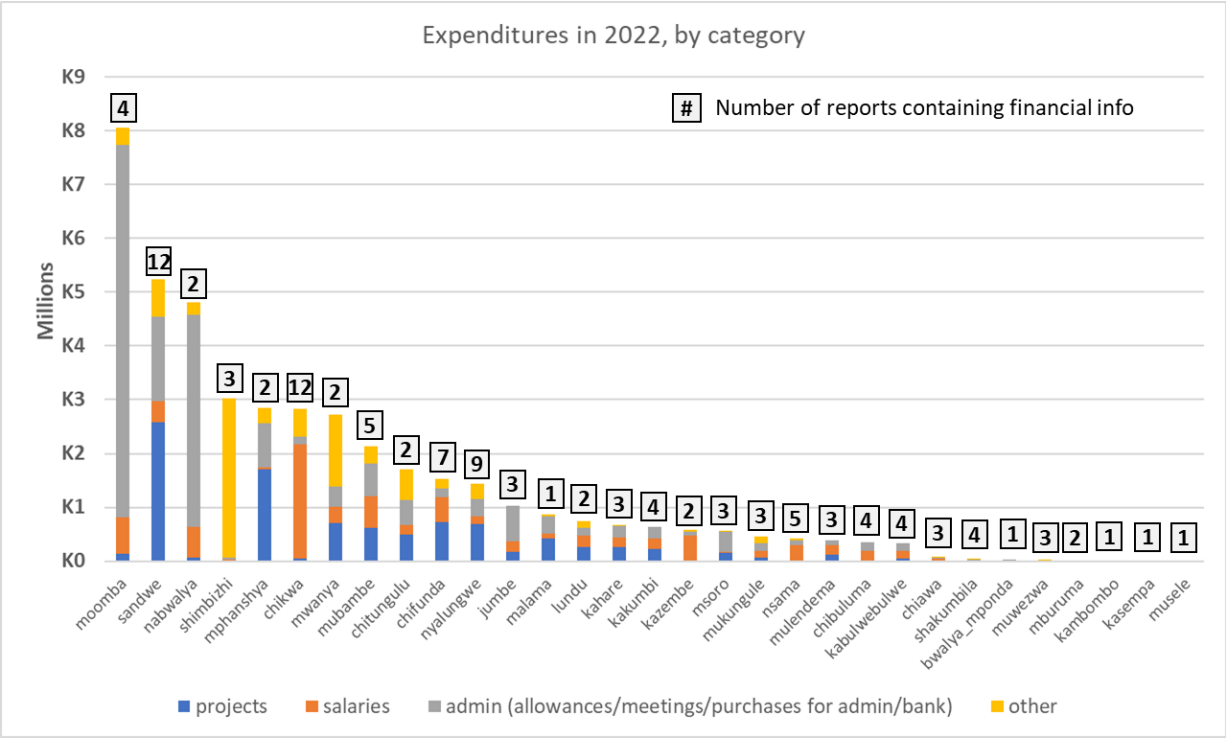
The number of CBOs submitting reports in 2022 by the number of quarters of financial data contained in the reports (2022 is a more representative year in terms of this distribution, as overall reporting fell in 2023, likely due to technical challenges associated with migration to a new reporting app—see Fig 1 in the main text).

FIGURE A3. CBO REVENUE 2022



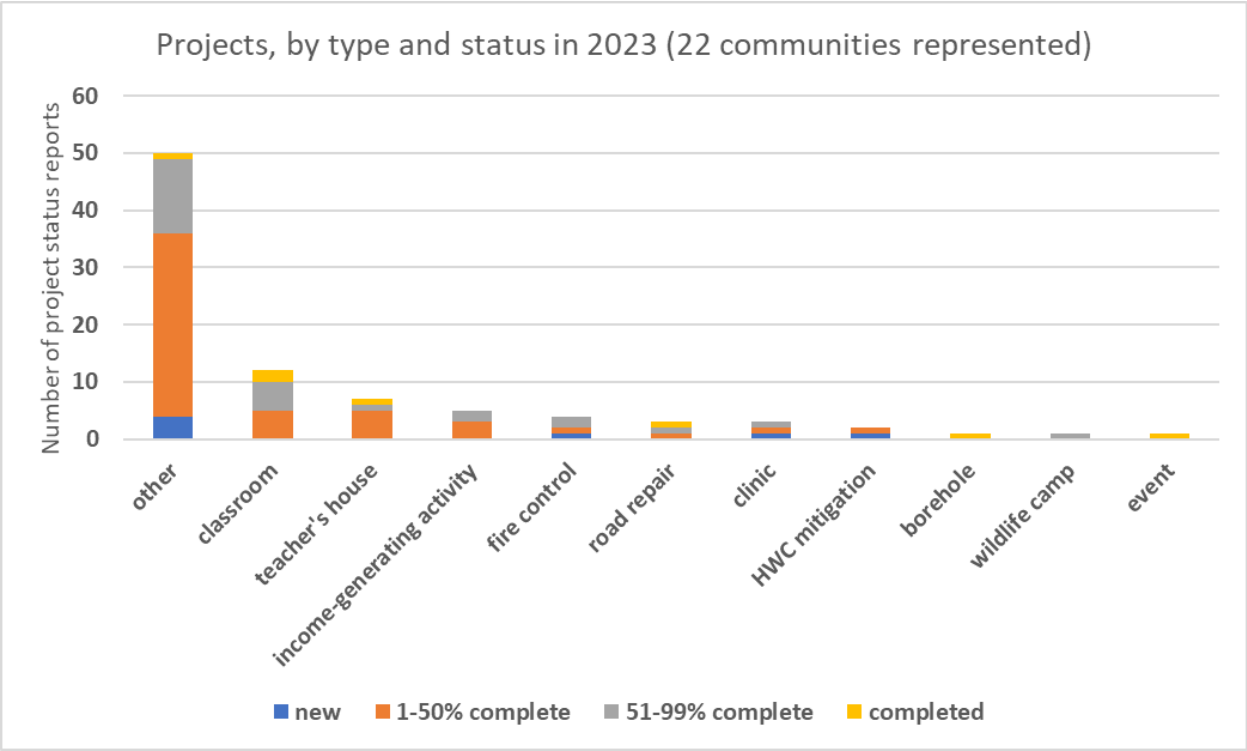
Revenue to CBOs in 2022, by source. Note that although guidance for CBOs is to report financial information on a quarterly basis, many CBOs continue to report this information on a monthly basis. In 2022, CBOs took in approximately K44.9 million. Revenues were led by carbon credit sales (40%), followed by hunting fees (36%). However, the accuracy of these sums is unclear because, as indicated in Fig A3., CBOs vary in their consistency of financial reporting. For full coverage of the year, at least 4 reports containing financial information would be expected.

FIGURE A4. CBO EXPENDITURES 2022



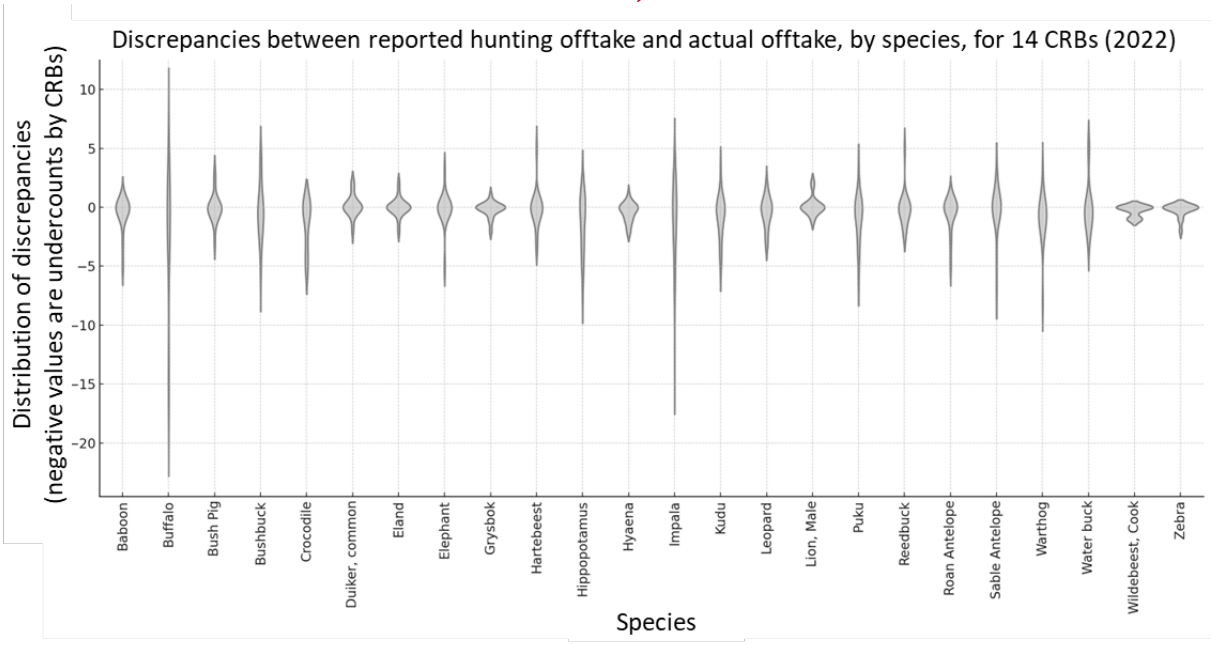
Expenditures by CBOs totaled around K43.5 million. The largest category was administration (including sitting allowances; 41%), followed by projects (22%), "other" expenditures (19%), and salaries (18%). The latter category can be considered a rough proxy for resource protection, as scouts constitute the largest segment of the payroll and salaries are the largest expense in resource protection. Note that this breakdown is not in accordance with DNPW guidelines of 45% for resource protection, 35% for projects, and 20% for administration. However, as with revenues, it is not clear how accurate these sums are because of inconsistency in financial reporting.

FIGURE A5. NUMBER OF PROJECT STATUS REPORTS, 2023



The number of project status reports in 2023, by type of project and project phase. A total of 89 project status reports were made in 2023. Out of this total, seven projects were reported as completed. However, it is not clear how many distinct projects exist out of the remaining 82 status reports because the same project can be reported on multiple times as its status changes, up and until it is completed. Without unique IDs for each project, this potential for multiple-counting will remain. Little other information exists for these projects beyond very brief descriptions and no photos could be found that were obviously linked to the projects in any of the reports containing project info. Additionally, given the predominance of the "other" category, more guidance is needed on project categorization. For example, many projects in this category (e.g., goat or chicken initiatives) would more properly fall under income-generating activities. Other projects, such as toilet construction, may need a separate category or be combined with existing categories (e.g., included with boreholes in a water, sanitation, and hygiene category).

FIGURE A6. DISCREPANCIES BETWEEN REPORTED AND ACTUAL HUNTING OFFTAKE, 2022



A violin plot of the difference between the number of animals hunted in 2022 as officially recorded by DNPW and the number of animals hunted as reported by CRBs, by species. Negative values on the y axis represent undercounting of offtake by CRBs while positive values represent overcounting. The width along each "violin" represents the number of CRBs at that value for that species. Large discrepancies were observed between the reporting of hunting offtake by CRBs and the official DNPW records. The discrepancies are most significant for buffalo, a moderate-value but high-volume species. In 2022, CRBs were officially entitled to $401,382 in overall fees from non-resident hunting licenses but from CRB reports the derived estimate would total only $248,015 (62%).

ANNEX 3: EXAMPLE OF A STANDARDIZED QUARTERLY CRB FINANCIAL REPORT

MINSTRY OF TOURISM AND ARTS DEPARTMENT OF NATIONAL PARKS AND WILDLIFE **REPORT FORM:**					
CRB NAME:	XXXXXXXXX COMMUNITY RESOURCES BOARD				
REPORTING PERIOD:	JANUARY TO MARCH, 2023				
		Resource Protection	Projects	Admin	**Total**
	Apportionment:	**45%**	**35%**	**20%**	
A) INCOME:					
Opening Balance	2,000				2,000.00
Add: Funding Received From GRZ this Period	0	0	0	0	0
Funding Received From Other Corp Partners	100,000.00	45,000.00	35,000.00	20,000.00	100,000.00
Other Funds (i.e Carbon, Minerals, etc)	0	0	0	0	0
TOTAL INCOME		**45,000.00**	**35,000.00**	**20,000.00**	**102,000.00**
LESS EXPENDITURE:					
a) PE's Related expenses (45%/20%)	**Codes:**				
Salaries	1	0	0	0	0
Napsa	2	0	0	0	0
Leave Days	3	0	0	0	0
Bonuses	4	0	0	0	0
Allowances	5	5,280	0	15,260.00	20,540.00
Others (e.g. funerals, accidents, medicals)	6	0	0	0	0
Sub-Total		5,280.00	0	15,260.00	20,540.00
b) Operations Related Expenses (45%):	**Codes:**				
Fuels	201	15,000.00	0	0	15,000.00
Repairs and Maintenances	203	0	0	0	0
Electricity	204	0	0	0	0
Water	205	0	0	0	0
Rations	206	11,101.00	0	0	11,101.00
Ammunitions	207	5,377.00	0	0	5,377.00
Stakeholder Consultative Meetings	208	0	0	0	0
Awareness meetings	209	0	0	0	0

Uniforms	210	0	0	0	0
Camping Equipment	211	0	0	0	0
Other Expenses (e.g HWC expenses)	212	1,764.00	0	0	1,764.00
Sub-Total		33,242.00	0	0	33,242.00
c) Community Project Related Expenses 35%	**Codes:**				
Labour charge	301	0	10,608.00	0	10,608.00
Building materials	302	0	17,392.00	0	17,392.00
Transport expenses	303	0	7,000.00	0	7,000.00
Community Meeting expenses	304	0	0	0	0
Training Expenses	305	0	0	0	0
Community Support expenses (e.g livelihoods)	306	0	0		0
Sub-Total		0	35,000.00	0	35,000.00
B) TOTAL EXPENDITURE '(a+b+c)		**38,522.00**	**35,000.00**	**15,260.00**	**88,782.00**
NET INCOME (A-B)		6,478.00	0	6,740.00	13,281.00

ANNEX 3: REFERENCES

Child, B., Muyengwa, S., Lubilo, R., & Mupeta-Muyamwa, P. (2014). Using the governance dashboard to measure, understand and change micro-governance. In G. Barnes & B. Child (Eds.), Adaptive Cross-scalar Governance of Natural Resources (pp. 205-237). Routledge.

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