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RESEARCH ARTICLE

Achieving Sustainable and Equitable Consumption of Wild Meat

More than proteins for empty stomachs: *Wild meat in the BaTonga food system*

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Abstract

1. Our paper highlights the limitations of the framework used by many conservation-focused programmes that incorporate food security objectives. This framework encourages the substitution of wild proteins with domestic proteins by promoting animal farming in communities located near conservation areas.
2. We argue that this 'protein substitution' objective disregards key assumptions from the field of socio-anthropology and food studies: Meat is more than just a source of protein; food security is more than a nutritional issue; food consumption is not straightforwardly linked to food production; and consumers need to be involved in governing their food system.
3. To address these gaps, we analysed the food system of the BaTonga people living near a conservation area in Zimbabwe, with a particular focus on the role of wild meat.
4. Our findings demonstrate that BaTonga food insecurity is intricately linked to a local historical context which is characterized by environmental injustice and limited access to essential resources from the local ecosystem, including wildlife. Therefore, reducing BaTonga food insecurity to a protein gap is a form of social violence.
5. Despite its low consumption, the motivations behind the BaTonga's consumption of wild meat are diverse, including nutritional, but also health, hedonic, social, cultural and economic reasons.
6. Furthermore, wild meat served as a safety net during the COVID-19 pandemic. This demonstrates the multiple functions of wild meat in the local food system as well as its role in nutrition.

7. Although domestic animals are present in most households, their contribution to the local meat supply is limited; they serve as productive assets, are bartered for basic foodstuffs, or are sold outside the area to better-off consumers.
8. To integrate food security objectives, conservation-focused programmes must adapt their approach. More space must be given to food studies within their own right. Wild meat consumption must be treated as a component of complex and dynamic food systems rather than a mere source of protein. Food sovereignty and consumer agency must be recognized as legitimate objectives. This requires recognizing that wild meat is more than just protein, and that wild meat consumers are not just empty stomachs.

KEYWORDS
Africa, bush meat, conservation, protein, sociology of food and eating, sustainable food system, wild meat, Zimbabwe

1 | INTRODUCTION

Conservation programmes are increasingly striving to align their activities with sustainable development goals. To alleviate pressure on wildlife and enhance food security, many of these programmes promote 'protein substitution' by encouraging populations living near conservation areas to raise farm animals and reduce their consumption of wild meat (Willis et al., 2022). However, reducing wild meat to a source of substitutable protein may be an overly simplistic way of addressing the multiple drivers of wild meat consumption and food security.

Wild meat can be defined as all food issuing from wild species and used for human consumption, including meat by-products, fish and non-flesh food issuing from captured wild insects, crustaceans, worms, molluscs and eggs from all wild species (Grimaud et al., 2022). Research studies conducted in different geographic settings have shown that hunting and consuming wild meat have many drivers other than protein search. These drivers are related to human/animal relationships, the sociocultural role of hunting, the economics of domestic and wild meat market chains, etc. (e.g. see Duda et al., 2018; Ingram et al., 2021; van Vliet et al., 2016). These studies converge with a common premise in the sociology of food supported by seminal works (Corbeau, 2021; Fischler, 1990; Poulain, 2017; Warde, 2016) that eating is more than feeding oneself, and it has many functions beyond nutritional ones. These functions vary through time and space depending on the cultural and material settings. They connect the eater to its natural and social environment [note that food sociologists prefer the word 'eater' to the market-oriented word 'consumers' (Lepiller et al., 2023)].

Like meat is more than protein, food security is more than a nutritional issue. According to the 1996 World Food Summit, food security is achieved 'when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life'. This definition emphasizes the multidimensional nature of food security, particularly the often overlooked issues of access, beyond a production and availability focus. Furthermore, as Denyer Willis et al. (2023) stated in another context, there is a form of social violence in reducing food insecurity to a nutritional deficit and neglecting the structural drivers of food poverty and inequality: 'While malnutrition is a serious issue, local diets suffer not because of "protein deficiency" but because of inequitable food pathways'.

In recent decades, civil society organizations have contributed to introducing the issue of sovereignty into food security debates. This approach recognizes the importance of individual choices and cultural preferences as well as consumers' rights, knowledge and experience, thus legitimizing their participation in designing and governing their own food systems (Forum for Food Sovereignty, 2007). It confirms the need to consider eaters as more than just hungry bodies in need of protein. Furthermore, in 2020, the High-Level Panel of Experts on Food Security and Nutrition (HLPE, 2020) adopted the concept of agency: 'Agency refers to the capacity of individuals or groups to make their own decisions about what foods they eat, what foods they produce, how that food is produced, processed and distributed within food systems, and their ability to engage in processes that shape food system policies and governance'. This concept invites us to consider local perspectives when analysing food and nutrition and when devising interventions to achieve food security and nutrition goals (Nurhasan et al., 2022).

This paradigm shift in the governance of the food system converges with another paradigm shift in biodiversity conservation. Various organizations have called for a better integration of conservation objectives with sustainable development goals and more participative modes of governance (FAO, Alliance of Biodiversity International, & CIAT, 2021; IUCN, 2019). This trend also converges with a growing attention to the environmental injustices affecting marginalized groups (Ingram, 2020). These injustices are characterized by the deprivation of accessing natural resources and participation in their governance, as well as by overexposure to environmental risks.

In line with the two aforementioned paradigm shifts, our paper contributes to food studies, based on the concepts of food systems, agency and environmental justice. We analyse wild meat as part of a food system and wild meat eaters as agents within their own food system. Our specific objective was to answer the question 'What are the functions of wild meat in the BaTonga food system?', based on the assumption derived from previous socioanthropological food studies that food consumption is about more than just providing nutrients. More broadly, our objective is to challenge the limitations of conservation-focus approaches that frame wild meat as merely a source of protein and food security as merely a matter of filling empty stomachs.

The definitions of the 'food system' are numerous and depend on an action-oriented agenda (von Braun et al., 2021). Exposing the debates on this concept, including the attempt to adapt it to better recognize the knowledge of Indigenous peoples (Milbank et al., 2021), will be beyond the scope of this paper. We define it here in a normative way, as a way to address the various and interdependent drivers of wild meat consumption in a systemic way: that is, recognizing that this consumption is intricately based on a network of stakeholders (hunters, eaters, consumers, institutions, etc.), activities (hunting, farming trading, cooking, etc.), rules (regulations and social norms) and values (economic, cultural, social, etc.). Food systems are articulated and dependent on other systems (hunting system, farm system, ecosystem, etc.) and evolve through time and space. Addressing wild meat as part of a food system allows us to gain a better understanding of the context in which it is consumed, offering a more comprehensive perspective by capturing the 'bigger picture' (Milner-Gulland & Bennett, 2003). This is particularly important when considering the role of wild meat in ensuring food security.

Our study takes place in a rarely documented context, one of the BaTonga people in Zimbabwe. This community lives remotely, in the vicinity of conservation areas, and suffers like many other communities living in such areas from many pressures to maintain their livelihoods and food systems, and from chronic food insecurity (FAO et al., 2021; WFP & FNC, 2016). Food consumption in such a community is often studied from two perspectives: a nutritional one, focusing on food as a biological requirement and consumers as empty stomachs; and a cultural one, focusing on food patterns as the product of routines whose function would be to reproduce local traditions. Adopting a 'food system' perspective when studying the BaTonga's consumption of wild meat offers us a fresh perspective. Combined with a socio-anthropological approach, we analysed the decision-making processes of wild meat consumers within their own food system, based on their perspectives and the assumption of rationality. Rather than identifying correlations based on statistical analysis (i.e. an etic approach), we aim to understand the reasons consumers give themselves for their actions (i.e. an emic approach) (Lepiller et al., 2023).

We use the concept of 'multifunctionality of food' to analyse the place (material and cultural) that the BaTonga people attribute to wild meats in their food system. Food sociologists have identified various functions that different societies attribute to food (Poulain, 2017): nutrition and health, sociocultural, self-identity, economic and pleasure. Meat consumption is generally associated with many of these functions. This reflects the complexity of the connections between humans and animals (Vialles, 1988) and the difficulty of 'thinking and eating flesh' (Poulain, 2007): This difficulty translates into numerous rules, disgusts and taboos affecting meat consumption in all societies, no matter whether these societies are called modern or traditional. We expect this case study to highlight the broader role of wild meat in food systems from the perspective of its consumers and to contribute to the advancement of sustainable food systems beyond the narrow objective of protein substitution.

2 | BACKGROUND

The Binga Rural District is located in the northwest of Zimbabwe, in the Matabeleland North Province, on the border with Zambia (Figure 1). The district (whose main city is also named Binga) is one of the most exposed areas in the country to food insecurity (WFP, 2017). The area is occupied by the BaTonga People, also known as the 'People of the Great River' due to their ancestral links, material and cultural, with the Zambezi River. During the colonial period (1890–1975), the area was isolated and deliberately neglected (no school, no clinic, no vaccination campaigns, etc.) in order to preserve it, including its human population, as a sample of wilderness. In the late 1950s, the BaTonga People were displaced to give way to the Kariba Dam on the Zambezi River, whose main objective was to supply Salisbury (the future capital of Zimbabwe, later named Harare) with electricity (Colson, 1969). Communities were relocated to 'high and dry' areas, losing their access to the fertile and humid banks of the Zambezi River (The New Humanitarian, 2007). In addition, safari and conservation areas were established in the area and the BaTonga people were stripped of their right to hunt for the benefit of the white minority and ruling elites (Dzingirai, 1995; Weinrich, 1977). These events have intensified the breakdown in human–wildlife relations: 'Wildlife thus lost its community utility and instead began to be viewed as a symbol of colonial domination and mastery' (Ndlovu et al., 2022).

Currently, a large part of the district is covered by dry forests and woodlands, with a wide range of animals, but whose population is said to be declining due to numerous factors, including poaching. These include large to small-size animals, such as elephants, buffaloes, lions, leopards, wild dogs, spotted hyenas, hippos, birds and various antelopes. Wildlife is regulated by the Parks and Wildlife Act. The Act does not grant local communities custodial rights over wildlife. A permit is officially required for hunting, including hunting for subsistence in communal areas. Human–wildlife conflicts (HWC) are numerous. Their management is the responsibility of the Rural District Council (RDC), whose resources are too limited to react promptly and efficiently (Ndlovu et al., 2022). The CAMPFIRE Program (Communal Areas Management Program for Indigenous Resources) was established in the 1990s to support

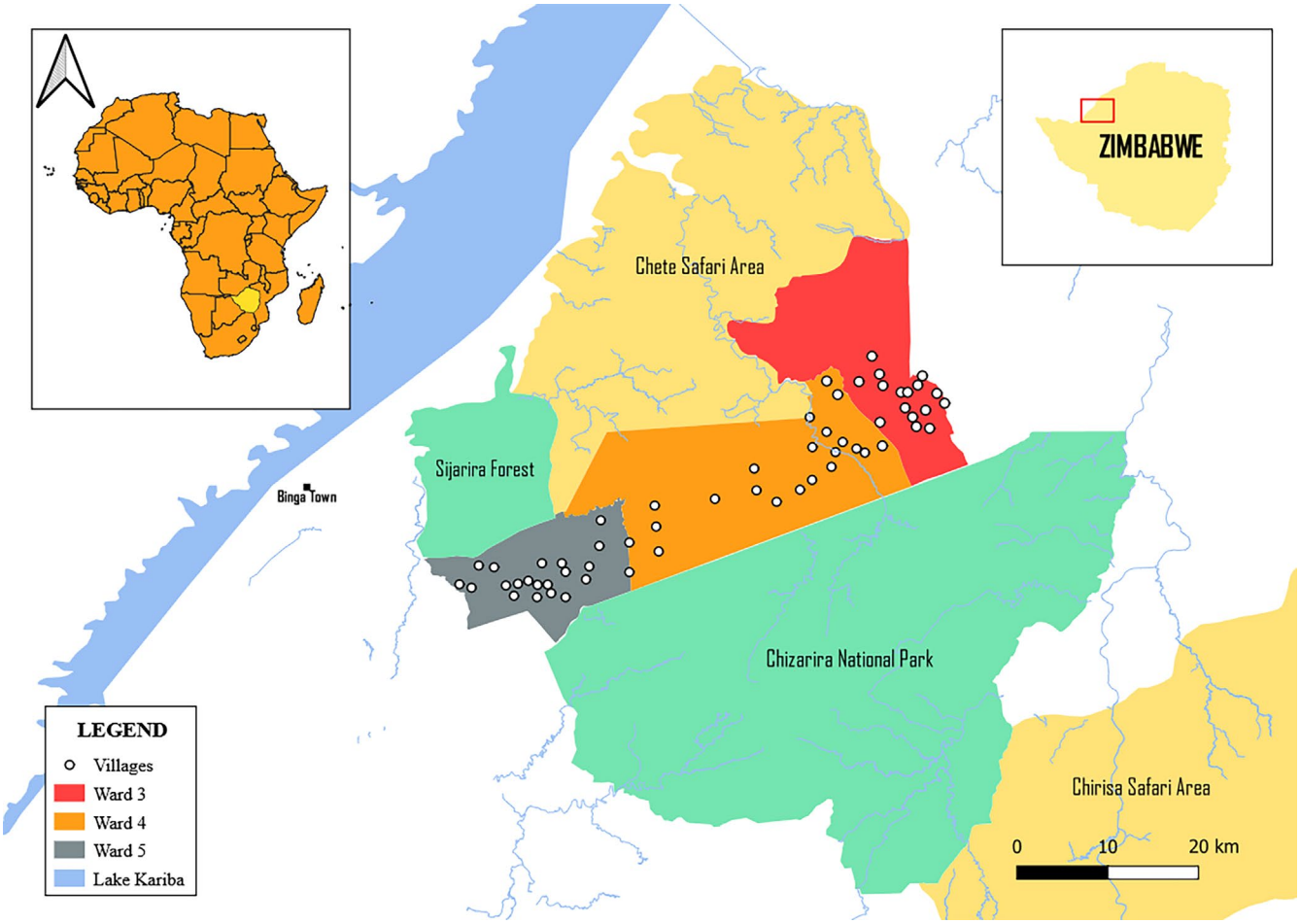

FIGURE 1 Map of the study area showing the location of Wards 3, 4 and 5, Binga district, Matabeleland North Province, Zimbabwe (source: M. F. Usman, Sustainable Wildlife Management Program, SWM).

community participation, decision-making and benefit sharing from wildlife conservation. However, the concrete implementation of this programme has suffered many weaknesses; thus, the benefits to communities remain lower than the costs of HWC (Dzingirai, 1995; Grimaud et al., 2022).

3 | MATERIALS AND METHODS

The study was carried out between April 2019 and April 2021, and focused on three of the 21 wards of the Binga district (Wards 3, 4 and 5). These wards are adjacent to conservation and safari areas (Figure 1) and are covered by an ongoing international wildlife management programme (see the acknowledgment section). According to the latest available statistics (from 2017, Zimstat, 2019), 87% of households in the three wards have a consumption expenditure per capita that falls below the total consumption poverty line (TCPL) and are therefore considered poor (the TCPL has been established at 70.36 USD per capita per month, while the food poverty line [FPL]—the minimum expenditure required for a diet of 2.100 calories/day—has been established at 31.92 USD per capita per month; Zimstat, 2019). This percentage is higher than the average for the respective district (84.5%), province (74.3%) and country (60.6%).

Our study is mainly qualitative. We used a mixed-methods approach consisting of focus group discussions and semi-structured interviews; the latter of which included a structured section for collecting some quantitative data (the material used to collect the data is provided in Appendix S1). The advantage of qualitative tools is that they allow research participants to express themselves freely, in line with the emic approach adopted. As many participants were reluctant to be recorded, extensive notes were taken instead.

A first set of interviews ($n = 21$) was conducted with members of local public authorities (members of the District Council, Chiefs and Village heads) and institutions responsible for agriculture and wildlife conservation (Table 1, survey S1). The objective was to document the structure, functioning and dynamics of the food system, as well as the role of these organizations in supporting directly or indirectly household access to food. Each interview was adapted to the type of respondent. Additionally, we interviewed four nationally recognized experts in BaTonga culture (two academics, one journalist and one expert in BaTonga Familial Affairs). Reflecting the functioning of Zimbabwean society, most of these informants were men (23 of 25).

TABLE 1 Data collection tools used in the Binga district (Wards 3, 4 and 5), Zimbabwe, to assess the place of wild meat in the BaTonga food system.

Data collection tool	Sample size	Category of respondents	Collected information
Survey S1 Interviews April 2019	21 informants (all men) working in local public institutions	One extension officer from the agricultural sector, three officers from the Zimbabwe Parks and Wildlife Management office, seven officers from the Binga Rural District Council[a], three ward councillors, seven traditional leaders (Chiefs and Village Heads)	Features of the food environment, role played by these organizations in the local food system (e.g. extension in agriculture, food assistance and hunting rights)
	Four nationally recognized experts in BaTonga culture (two men, two women)	Two academics (man and woman), one journalist (man), one professional in Tonga's Family Affairs (woman)	Features of the BaTonga culture, with a focus on eating habits, food culture and history
Survey S2 Focus groups (FGs) Feb–Dec 2020	Five FGs with 30 participants (15 men, 15 women)	Three FGs with Five men in each Two FGs with women (7 + 8 women) Participants with experience (past or present) in harvesting, hunting or preparing wild meat	Food inventory, wild meat-eating habits, preferences and hunting practices
Survey S3 'Household survey' Interviews Feb–March 2020	Sixty women from 60 different households (20 per ward)	Women from 18 to 60 years old, responsible for preparing meals in their household	Socioeconomic data, assets and eating habits, with a focus on meat and wild meat
Survey S4 'COVID-19 survey' Interviews April 2021	Twenty-four women (sub-sample of S3: 10 in Wards 3; 7 in Wards 4 and 7 in Ward 5)	Women who prepare meals for their households	Household food consumption and copying strategies during the COVID-19 period; impacts on the consumption of wild food

[a]Including two informants from the Social Services Department, two from the Agriculture Department and three from the Natural Resources Department.

Focus group discussions ($n = 5$) were also held (Table 1, survey S2). There is a strong gendered division of activities related to wild meat among BaTonga, from hunting to cooking (Grimaud et al., 2022). We then organized distinct groups: three FGs gathered 15 men, and two FGs gathered 15 women. Participants were selected on a voluntary basis with the support of local ward officers.

Two other sets of interviews were conducted, including a structured section and a semi-structured one. This allowed for collecting quantitative data and the expression of opinions. The first set (S3) targeted women in charge of preparing food for their households (Table 1, survey S3). The BaTonga women are responsible for the preparation of food and are therefore key stakeholders in decision-making. These women came from 60 different households. The households were purposely selected to ensure equal representation of the different wards (20 households per ward) and different wealth groups (WFP & FNC, 2016). Forty-seven per cent ($n = 28$ of 60) of our sample households were extremely poor (with income below the FPL, as defined above), and 22% ($n = 13$ of 60) were poor (with income between the FPL and TCPL lines; see Table 2). The proportion of poor and extremely poor households in our sample (69%) reflects the high prevalence of poverty in the wards. However, this figure is lower than the last figure provided for the area in 2017 (87% according to Zimstat, 2019).

Respondents were asked about the socioeconomic status of their household (composition of the household, income, main farm and nonfarm activities), assets (farm animals, access to water and gardening plots) and food consumption habits (practices of purchasing, cooking, processing, storing and sharing food) with a focus on meats, wild meats and other wild food (frequency, share, species and details on the last wild meat meal). The role of children in hunting and harvesting wild food was also documented (survey S3). Fifteen women who were interviewed as part of this household survey (S3) also participated in the aforementioned focus groups (S2). There was no risk of duplication of information, as the interviews with women (S3) focused on the role of wild meat within the household, while the focus group (S2) considered it at a community level.

The first local impact of the COVID-19 epidemic was the implementation of public health measures imposed by the authorities in April 2020. Two focus groups (of five) were conducted during this COVID-19 period, but with no obvious significant impact on the group discussion. Some respondents of the first survey (S1, representatives of the Agriculture and Conservation sectors) were interviewed for a second time in September 2020. An additional structured and semi-structured survey (Table 1, survey S4) was conducted in April 2021 in 24 households (a subsample of Survey 3) to assess the impact of the COVID-19 context on food consumption. Interviews and focus groups were always held in person, outside, maintaining distance between participants; all participants received a mask and had their hands sanitized.

The food system was the frame of our analysis. Our objective was to obtain a fine-tuned understanding of the decision-making process based on the different functions locally attributed to the

TABLE 2 Characteristics of the households surveyed in Binga, in Wards 3, 4 and 5 (S3, $N = 60$).

Variable	Value	Min-max
Household size (average number of members/household)	5.5	2–9
Livestock ownership (average TLU[a]/household)	4.8	0–50.5
Share of households with at least three meals per day throughout the year (%)	31.7 ($n = 19$ off 60)	
Share of extremely poor households, that is under the FPL[b] (%)	46.7 ($n = 28$ off 60)	
Share of poor households, that is over the FPL[b] and under the TCPL[b] (%)	21.7 ($n = 13$ of 60)	
Share of households over the TCPL[b] (%)	31.7 ($n = 19$ off 60)	
Frequency of domestic meat consumption (days/month)	7.5	0–29
Frequency of fish consumption (days/month)	3.4	0–12
Frequency of wild meat consumption (days/year)	7.9	0–24
Share of households with hunters (%)	65% ($n = 39$ of 60)	
Share of wild meat in total meat consumption (%)	18%	5–50
Share of wild fruits in total fruit consumption (%)	63%	20–90
Share of wild vegetables in total vegetable consumption (%)	57%	20–90

Note: Data based on self-declarations of people responsible for the preparation of meals for their households. Data on food consumption refer to a self-estimated average of the past 12 months.

[a]TLU, 'Tropical Livestock Unit' was calculated considering the formula TLU = [@cow] × 0.8 + [@goats] × 0.2 + [@sheep] × 0.2 + ([@[guinea fowl]] + [@chicken] + [@ducks] + [@pigeons]) × 0.02 + [@pigs] × 0.3. The calculation is based on Meyer et al. (2022) and adapted to include non-herbivores, that is pigs and fowls, based on their adult live weight in the local livestock system.

[b]The FPL, Food poverty line, is 31.2 USD/cap/month; the TCPL, Total Consumption Poverty Line, is 70.36 USD/cap/month (Zimstat, 2019). The categorization of the households in our survey in relation to these lines is based on their declared income.

consumption of wild meats. All participants were aware that hunting was prohibited in any area without permission. However, the status of small species, such as birds and rodents, particularly in anthropized areas, was not clear for many of our respondents, including local authorities. The consumption of wild meat by households was probably under-declared. However, when collecting more general information on local norms and practices associated with wild meat, participants in the focus groups were open to sharing their knowledge. One of the researchers in the team (LM) was from the BaTonga community and conducted most of the interviews in the local language (except the interview with informants, S1). An English translation was provided for the other members of the team who were present. We noticed that the interviews conducted by this researcher (LM) facilitated the respondents' expression of their practices related to wild animals. However, we are also aware that her positionality may have encouraged participants to use our survey as a way of addressing complaints to the different authorities.

Our research was carried out under the Memorandum of Understanding signed by the partners of the Sustainable Wildlife Management Program (SWM) and the relevant Zimbabwean institutions (Ministry of Agriculture and Zimparks). The research received approval from CIFOR's Research Ethics Review (RER2021/001). Written consent was obtained from all participants, stating that the information collected would remain confidential and would only be used within the scope of this study. Only the researchers involved in collecting the data (LM, VD and MF) had access to the non-anonymized data (both quantitative and qualitative). The anonymized quantitative data set has been uploaded to a restricted access repository.

A representative of the local authority introduced us in each ward. The interviews and focus group discussions lasted between one and a half and two hours. The collected material was manually analysed and organized according to the topics presented in the Results section above. The quantitative data were stored in Excel files for descriptive analysis. Our mixed approach (several surveys based on semi-structured and structured interviews, as well as focus groups) allowed us to triangulate our information (Olivier de Sardan, 2009): Triangulation involves combining several methodologies and sources of information to verify the accuracy of the data collected and to improve its validity and reliability. In addition, we considered the research process to have reached saturation when no new information was obtained from new focus groups or interviews.

4 | RESULTS

4.1 | The BaTonga food system: From abundance to insecurity

The local chiefs (most of them are elders) and other experts in the BaTonga culture (S1) described to us the past lives of the BaTonga people when the villages settled on the fertile riverbank of the Zambezi River. This time is collectively remembered as a period of abundance (our respondents were born after the displacement of the village for the construction of the Kariba dam in 1957). The BaTonga people had a strong spiritual relationship with the river (associated with the River God Nyaminyami) and with wildlife, particularly through fishing and hunting traditions (S1). Wild meats were the products of two types of hunt: 'royal hunt' and 'common hunt'. The royal hunt performed various cultural and social functions, including initiation rituals, providing trophies that symbolized power and supplying food offerings for ancient ceremonies. 'Common hunt' was more for the daily consumption of wild meat. Domestic animals were mainly used for *Lobola*, a kind of

dowry for bride payment (a prerequisite in order for customary marriage in various southern African cultures).

> Before relocation, we ate wild meat. It was not forbidden. We could have it at any time. Furthermore, the boys used to hunt antelopes, rabbits and bushbucks during the herding season.
>
> (S1)

> We used to eat a large amount of wild meat… We also raised goats, cattle, and donkeys. But these were for 'lobola'. Our daily meat was wild meat.
>
> (S1)

In contrast, the present is described as a time of scarcity. According to the local administration (S1), food aid programmes started in 1980 at the time of country independence and have since been essential to cover the chronic deficits in local food production. The destruction of crops and the loss of farm animals are said to be high due to diseases and attacks by wild animals.

Despite the number of households in our sample living below the food poverty line and unable to afford three meals a day all year round (S3, Table 2), the social dimension of food is important. Food gifts are common among households to support the most vulnerable or to honour those with specific status, for example traditional Chiefs. Sharing meals is the support of many social activities, as one of our respondents mentioned, 'amulomo *mpali kavuna*', which means 'eating together is the solution to all social problem' (S2). Further general features of the local food system and diets can be found in Appendix S2.

4.2 | The 'wild side' of the BaTonga food system

Our respondents described their local food system as the product of a continuous process of deprivation of access to ecosystem resources. However, wild foods are still part of the local food system. There has been significant change in terms of quantity, species and sources of supply, particularly when it comes to wild meats.

A comprehensive inventory of local food items and local recipes (based on S1, S2, S3. Inventory available in Appendix S2) showed that wild food resources contribute significantly to local food culture: They are present as ingredients in more than half of the 55 recorded receipts; this includes wild meats and, to a greater extent, wild vegetables and mushrooms, wild fruits, nuts, tubers and honey.

Wild meat (including rodents, birds and insects), as well as wild fruits and vegetables, make a significant contribution to the diet. The respondents ($n = 60$, S3, Table 2) estimated that these foods accounted for an average of 18%, 63% and 57% of the total quantity of meat (including both domestic and wild), fruit and vegetables (including both cultivated and wild) consumed.

In terms of frequency, wild meats are consumed less than 8 days per year (S3, Table 2) and represent approximately 1 in 10 meat meals. (Note that this relative frequency [1 in 10] is lower than the self-reported quantity [18%, as mentioned above]. These two pieces of information suggest that wild meat accounts for approximately 10–20% of total meat consumption). These results indicate a low consumption of meat (wild and domestic) in contrast to the daily consumption (mainly wild meat) associated with the past time (before the displacement of the BaTonga people) in collective memory.

The source of the wild meat has changed. Local consumption of large animals (buffalos and elephants) is officially carried out as a by-product of trophy hunting activities by private operators. It also occurs from crop culling conducted by the authorities in response to major HWCs. There is no obligation to distribute wild meat from safari hunts or crop culling to neighbouring communities, and the quantities involved are limited and are said to be unequally distributed for the benefit of community leaders.

The domestic self-supply of wild meat has also changed. Small animals and locally less-valuable species have replaced large game. The household survey (S3) revealed that for 70% of the respondents ($n = 42$ of 60), their last wild meat-based meal consisted of birds, rodents, insects or toads, collected by children or women. Hunting activities are no longer the main source of home self-supply; however, they have not disappeared. More than half of the households (65%, $n = 39$ of 60, S3, Table 2) reported at least one member who occasionally hunted. These hunters do not have permits; they are considered poachers by the authorities. They hunt small to medium-sized herbivores (e.g. duikers), and more rarely wild pigs, monkeys, carnivores and reptiles. As stated sadly by one respondent:

> Now we are seen as poachers on our own land.
>
> (S1)

National Park authorities conduct antipoaching patrols, but these are limited due to lack of resources. In addition, authorities show tolerance for bird and rodent hunters, particularly in communal areas. Poaching wild meat is consumed by hunting families and provides low-cost food because it mobilizes the workforce with low opportunity cost (owing to the limited local employment option) and because it relies on traditional low-cost techniques (snaring, use of catapult, glue, traps and dogs). Wild meat can also be sold or traded between households. Young people may occasionally offer to catch wild animals on demand to buy Internet credit cards or other goods. Some cases of prostitution paid for with wild meat have also been reported. Hunters cannot ask too much for their prey: a poacher was reported to the authorities by neighbours who were unhappy with the poacher's price for meat, which they considered too high. One carcass of an impala can be bartered for 60 kg of cereal, the two hind legs can be bartered for 20 kg (and one goat for 40 kg).

The seasonal determinants of wild meat consumption also changed. One man explained that in the past, people used to hunt during the dry seasons, taking advantage of the reduced vegetation cover that made animals visible. However, today people

prefer to hunt at night and during the rainy season because they now need to hide from authorities in tall grass and vegetation (S3). Wild meat is also a subproduct of crop protection: harvest time in agriculture is a period with low manpower availability, but hunting can be a priority to protect crops from predators such as birds and rodents.

4.3 | The multifunctionality of wild meat consumption

This section explores the different functions locally attributed to wild meat consumption. There are multiple motivations for the persistence of wild meat in the local food system, linked to its various functions: nutritional, hedonic, economic, cultural, identity-based and social.

When asked what the most nutritious meat is, respondents converge in ranking first the meat of large animals, particularly wild ones. For example, a traditional leader declared:

> Wild meat makes you stronger. Wild meat is number one!
>
> (S1)

This leader proposed the following decreasing ranking: large game > beef > goat > sheep > fish > chicken. Interestingly, this leader only considered large game to be wild meat.

Wild meat is also considered more natural and safer than meat from farm animals because the latter can be medicated and vaccinated. Despite local cases of anthrax caused by the consumption of sick hippo meat (S1), people apparently do not fear zoonotic diseases caused by wild meat:

> Wild meat is safer. The cows are vaccinated; this may not be good for people to eat them. Wild animals die quickly when sick. Thus, the chance of hunting them is less. Furthermore, hunters avoid catching sick animals.
>
> (S2)

However, the consumption of wild meat is also driven by factors that extend beyond nutrition and health considerations. Many foods are consumed and valued for their taste and pleasure, confirming the hedonic function of food identified by the food sociology. Although some of these foods are recognized as not nutritious, unsatiating or potentially unsafe, they are consumed (S3). For example, toads, rabbits and impalas are considered delicacies. However, toads are known to be potentially poisonous. Preparation for them requires specific long-term skills to ensure safety.

Other participants said that they liked the impala meat because it is tender and tasty and makes a good stew (S2). Consuming wild meat is also an economic choice because it spares farm animals.

> People watch for the return of hunters and then trade cereals for wild meat. This meat helps save farm animals that are few in number.
>
> (S2)

Access to meat from large wild mammals is an indicator of social status and can explain discrepancies in how wild meat is perceived locally, as shown by the leader ranking of meats mentioned above. Several respondents said that community leaders and their families benefit the most from the distribution of wild meat by authorities and safari companies. One of these leaders mentioned the wild meat gifts he received from the safari operators as a sign of respect for his authority and as a recognition of his ownership of the land (S1).

In contrast to the other respondents, the traditional leaders spoke to us in more detail about their consumption of wild meat, with a proud tone of voice, which we interpreted as a hint of provocation. Other members of the community complained that they only received low-quality cuts of wild meat. Within households, the distribution of meat (wild and domestic) also serves to reinforce the social order: the most prized cuts are reserved for men. Additionally, some species are reserved for specific individuals: frogs for pregnant women, pythons for traditional healers and squirrels for children.

Sharing food is an important form of socialization. This is particularly relevant when it comes to wild meats: Hunting is a way to show bravery, and sharing the hunter's prey at the hunter's introduction is a way to welcome the hunter as a 'man among men' (S1). In remote villages where leisure activities are limited, wild meat harvesting provides seasonal entertainment for boys and girls (S2): They hunt together small animals (rodents and birds) and insects, which are consumed on site. This consumption contributes to the sociality of this age group.

Some species have a high cultural value for the BaTonga people (S1). As an example, the important role of female elephants in herds is said to reflect the matrilinear organization of the BaTonga. Traditionally (but these traditions are said to be declining) consumption of wild meat is also driven by food taboos (e.g. one cannot eat one mother's animal totem) and beliefs (e.g. women eating crocodile meat would be protected from attacks while fishing).

4.4 | Functional substitutions of wild meat

This section explores the substitutions implemented locally to replace wild meat within the food system, as reported by our respondents. These functional substitutions are summarized in Table 3, which compares the past and present. Respondents mainly referred to 'past times' as the period when they were free to hunt and before the displacement of their villages. However, we know that these substitutions depend on many interlinked factors, such as agricultural development and market integration, and these factors have followed different rhythms of change.

Despite their presence in most households, farm animals play a limited role in supplying the local food system with meat. Almost

TABLE 3 Functions and functional substitutions of wild and domestic meat in the BaTonga food system. Time trends.

Functions	Past	Present
Nutrition and health	Wild animals	In the wealthier households: Farm animals (chicken and goat) In the poorest ones: low value wild meats like rodents and insects
Pleasure and taste (i.e. psychological and hedonic benefits)	Wild (and, secondarily, domestic) animals	Small game, farm animals (chicken and goat)
Social	Wild animals Domestic animals (for *lobola*)	Beef meat for family events Chicken and goat for guests
Cultural	Large wild animals	Wild meats, sometimes received from safari operators for chief celebrations
Economic/ commodity	?	Beef as a productive asset (saving, draught power, manure) Chickens and goats: sold or battered (e.g. for cereals) Small and medium-sized wild herbivores (locally battered and trade)

90% of the surveyed households ($n=53$ of 60, S3) owned farm animals. However, the reported frequency of domestic meat consumption is low at an average of 7.5 days per month (S3, Table 2). The ability of farm animals to replace wild meat in the local food system varies according to the species and functions. In wealthier households, farm animals fulfil the nutritional role of wild meat. However, the poorest households still rely on low-value wild species, such as rodents and insects. At most traditional events, domestic meat has replaced wild meat, with beef replacing large wild mammals as a highly ranked source of meat.

Substitution dynamics also depend on the influence of different stakeholders within households. For example, wild meat is not valued in the same way according to sex and age. Practicality is an important food attribute for women who are in charge of cooking. In this regard, cooking wild meat, particularly large mammals, requires more time and resources than cooking chicken (chicken size is said to be adapted to the preparation of one family meal, and chicken meat is tender: no need to dry it for storing, and no need to collect much wood for cooking it during hours).

> We received elephant meat with many tendons and had to cook it for a very long time to make it gentle. (S2)

> Rhino meat is not good when consumed fresh because it is fatty. We need to dry it before we can consume it. (S2)

> I prefer to cook chicken (than elephants), it's easier, quicker, and the meal is more beautiful, more colorful. (S2)

There is also a generational difference in food perception: older men highly value wild meat (S1), but, as a young man stated (S2), young people prefer domestic meat because it is what 'we are used to now'.

4.5 | Copying strategies: Role of wild food during the COVID-19 pandemic

When it comes to mitigating the impacts of events related to the COVID-19 epidemic, wild meat and other wild foods have proven to be important resources (S4). The direct sanitary impact of the 2020 epidemic has been limited, with no officially confirmed cases of the virus locally. However, the community faced mounting challenges in marketing (selling or bartering) domestic animals, fish, cash crops and artisanal products, as foreign buyers ceased travelling through the area. Other reported consequences included an increase in domestic animal theft by impoverished people, as well as field invasions and crop destruction by wild animals due to the limited capacity to report these invasions to the authorities as a result of transport limitations.

Almost all the respondents (96%, $n=23$ of 24, S4) declared that their food security had been severely affected during the pandemic period; half (50%, $n=12$ of 24) had to reduce the number of meals they ate each day. Approximately half of the households surveyed (54%, $n=13$ of 24) decreased their cereal consumption, and a third (37.5%, $n=9$ of 24) decreased their consumption of domestic meat. The impact on vegetable consumption was more contrasting, with some households increasing their consumption (33.3%, $n=8$ of 24) due to fewer opportunities to sell vegetables and more family members available for home gardening (e.g., children, as a result of school closures).

In this context, access to wild food has been crucial in limiting food insecurity. During the pandemic period, two thirds of the

households surveyed (66.7%, $n = 16$ of 24) increased the frequency with which they ate wild fruits (such as tamarind and monkey orange) and/or wild vegetables (such as wild okra, amaranth and black jack), as well as nuts and seeds (such as baobab seeds). The same proportion of households (66.7%, $n = 16$ of 24) also increased their hunting and fishing activities, particularly because children had more free time.

> Now we eat more fish. My dinner now includes fish, unlike before COVID.
>
> (S4)

One respondent stated that her family harvested and sold up to 20 kg of birds daily in April.

> The birds make a difference, and so we are grateful for the birds.
>
> (S4)

Local authorities also confirmed an increase in the poaching of impalas, duikers and bushbucks, particularly at night, involving younger hunters than usual.

> They had better access to wild foods and could collect these without the authorities pining down their mobility due to the lockdown.
>
> (S4)

Importantly, it is not only wildlife, as a biological resource, that has been a factor of resilience, but also associated knowledge and culture. Together, these resources enable the temporary expansion of the range of species consumed:

> We have increasingly accessed wild food because unlike others we have no social restrictions that prevented us from eating insects and frogs' meat.
>
> (S4)

Furthermore, as stated by one of the traditional chiefs:

> We, BaTonga, have a past. This past allowed us to survive COVID-19. We have our own food that we use for your modern ones. That is what we are doing now. We have forests, hills, and valleys. These contain different foods.
>
> (S4)

5 | DISCUSSION

Previous conservation research has described the various functions of hunting and consuming wild meat (Nasi et al., 2011; van Vliet et al., 2016). Other works in the area of Indigenous People's Food Systems have highlighted the need for recognition of indigenous knowledge and the right to food sovereignty (FAO et al., 2021; Milbank et al., 2021). However, implications for the widespread objective of 'protein substitution' have not yet been drawn. Our case study of the BaTonga people living in Zimbabwe confirms that the 'protein substitution' framework adopted by many conservation-focused programmes when including food security objectives into their scope is based on oversimplistic assumptions and fuels a form of social violence against 'targeted' communities.

5.1 | Environmental injustice

We documented the process of environmental injustice that has deprived people of access to the resources that make up their food system. Colson (1969) and Tremmel (1994), who studied the history of the BaTonga People and the aftermath of their relocation in 1957, reported that life on the banks of the Zambezi was difficult, with high rates of infectious diseases and child mortality. However, they also confirmed the abundance of food and the rich cultural life associated with hunting, fishing, preparing and sharing food, as recounted by our respondents, based on collective memory.

Since then, the material basis of the lives and culture of the BaTonga people has been turned upside down, forcing them to move to a new food system and affecting their food sovereignty and security. Our study shows that BaTonga now rely on food assistance. Access to wild meat no longer comes from the brave act of hunting; rather, it depends on the good will of foreign trophy hunters or illegal activities. This change has affected the collective and individual identity of the BaTonga people.

Our analysis of the history of the BaTonga food system consolidates previous works (Dzingirai, 1995; Saidi, 2017), which highlighted the process of marginalization suffered by the Zimbabwean BaTonga people (economic, social, political and even cultural). Our study also enriches the set of case studies that depict the pressures faced by other communities, in particular Indigenous people, in maintaining their livelihoods and food systems (FAO et al., 2021).

Our approach stresses the symbolic violence of framing the food insecurity of those living near conservation areas as a protein deficit or as a consequence of biodiversity depletion for which they would be responsible. As stated by Boutinot et al. (2018) in the case of the Baka people in Cameroon, poaching can then be interpreted as a form of resistance to the environmental injustice experienced by those qualified as poachers.

5.2 | Food security, food access and poverty

Two important dimensions of food security are often conflated in the 'protein deficit' and other similar approaches: 'availability' and 'accessibility'. Availability refers to whether food is present or not within a given context; accessibility refers to the determinants of

food acquisition, such as price. In the study area, farm animals have many other functions other than just providing meat, and when they supply meat, part of this supply benefits wealthy consumers living outside the area. Consequently, increasing livestock activities will not necessarily improve the local availability of meat and local consumption. This confirms that the impact of local production on local consumption is not straightforward (Joshi et al., 2017). de Verdal et al. (2022) studied industrial fish production in the neighbouring lake Kariba and provided another example of this gap. This lake is one of the most important fishing centres in the country, with few large-scale commercial fisheries companies supplying 90% of the Zimbabwean national market, mostly with kayenta fish (*Limnothrissa miodon*). However, these fish are too expensive for local consumers whose consumption of fish mainly relies on artisanal home fishing (cat fish and tilapia). Ignoring the gap between 'food availability' and 'food access' perpetuates the structural drivers of food poverty.

5.3 | Wild meat consumers: Stakeholders of the food system

Our study provides a systemic and dynamic approach to investigating the multiple drivers of wild meat consumption, based on tools from the sociology of food and eating (Figuié & Lepiller, 2020). As with most people worldwide, none of our participants specifically referred to the motivation for 'eating proteins' (indicating that this objective, so formulated, could hardly be a shared objective in a participative conservation programme). We used the typology of the functions listed by food sociologists as a grid to analyse the motivation of the respondents to consume wild meat. As stated by Murcott (2007), 'items chosen as food are not given once and for all'. In the same way, functions are not given by the biological nature of the food itself and are not simply defined by individual choices. These functions are dynamic and emerge at the interface between the material and social worlds. We showed that new food norms have been emerging in the BaTonga food system: beef meat has replaced the past social function of large game meat; goats and chicken have replaced the nutritional function of wild meat and its role in the barter economy; and small species like rodents, birds and insects have been replacing higher valued wild species to provide access to low-cost food. Furthermore, the preferences of younger people differ from those of older people. These results confirm that 'wild meat' is much more than protein, and their consumption is framed by social norms. Ignoring wild meat consumers, as stakeholders (or more precisely 'agents', in order to refer to the above-mentioned concept of agency) of their food system, with their own values, strategies, objectives (and probably internal conflicts that we could not address in the scope of this study), would perpetuate the continuous loss of food sovereignty experienced by the BaTonga people.

5.4 | Bias of a 'conservation-only focus' on consumption issues

Many programmes on wild meat consumption have addressed it from a conservation-focused perspective. When they embrace an additional aim of food security, these programmes are exposed to two main limitations.

The first limitation relates to the tool used to address wild meat consumption. From a conservation-only perspective, wild meat is framed as part of ecological and hunting systems. Data on wild meat consumption are collected to assess 'wildlife offtake' and its impact on defaunation (Margulies et al., 2019). However, if the objective changes to include the food security issue, the approach to wild meat needs to be adapted. It cannot be reduced to an accounting approach of protein offtake, but needs to be addressed in the context of the food system. It is necessary to understand its contribution to a sustainable food system, defined by the FAO (2018) as '*a food system that provides food security and nutrition for all in such a way that* the economic, social and environmental bases *to generate food security and nutrition for future generations are not compromised*' (our emphasis). Similarly, a food-only focus on wild meat would be irrelevant when it comes to addressing conservation issues related to wild meat consumption.

The second limitation is related to the species of interest. Conservation programmes focus mainly on big mammals as key and/or endangered species and/or for their economic value for tourism and safaris. However, it may not be relevant from a food security perspective since it maintains 'blindness' to other wild species of importance for food security (Margulies et al., 2019). Our study confirms that the large diversity of species (animal and vegetal) plays an important role in the food system, including their contribution to the diversity of the diet and as a security net. However, these species are generally neglected in studies on wild meat consumption conducted within the framework of conservation research programmes, including those aiming to align conservation objectives with food security.

Furthermore, our study highlights the importance of conserving not only biodiversity, but also the knowledge associated with it. During the COVID-19 lockdown, wildlife, together with local knowledge of it, made it possible for BaTonga to expand what food sociologists call the 'food repertoire' (Poulain, 2017); this expansion supported the resilience of the food system. Conserving wildlife is not only a biological task; it is driven by choices that are rarely explicit about what needs to be protected, why and for whom. Answering these questions must include those that are historically, socially, culturally and physically related to this wildlife. In any case, the diversity to be protected must necessarily be biocultural: biological and cultural. This argues in favour of better engagement of local communities in biodiversity management programmes, so that these programmes are built on a broader set of values and knowledge and to avoid the cultural imperialism denounced by researchers, such as van Vliet (2018).

6 | CONCLUSIONS

We examined the consumption of wild meat within the BaTonga people's food system. This system is characterized by food insecurity, which is rooted in structural and historical drivers of environmental injustice. Our findings challenge the common goal of alleviating pressure on wildlife and improving food security through the promotion of animal farming as an alternative source of protein. This objective fails to acknowledge the multiple functions that wild meat plays in food systems, as evidenced in our study. As a consequence, this protein-focused approach reduces food security to only nutritional and production concerns and confines wild meat eaters to their biological entities.

Interestingly, an increasing number of conservation programmes now include food security in their objectives. However, to expand the scope of these programmes, a conceptual and methodological shift is also needed in research, policy and practice. To avoid a narrow focus on protein substitution, we propose adopting a food system approach. As Milner-Gulland and Bennett (2003) suggest, conservation issues can only be addressed by considering the 'bigger picture' in which hunting occurs. Similarly, our study showed that incorporating food security issues into conservation programmes requires giving food studies their own place. This will enable these programmes to consider wildlife as part of complex, dynamic food systems and recognize wild meat consumers as stakeholders in their food systems, rather than merely as people with empty stomachs. This 'bigger picture' approach will help to highlight the structural drivers of food poverty, which extend far beyond the 'protein deficit' approach. It can support interventions that address the interconnected issues of environmental and food injustices that prevail in many areas bordering conservation zones.

AUTHOR CONTRIBUTIONS

Muriel Figuié, Luzibo Ottilia Munsaka, Vupenyu Dzingirai and Olivier Lepiller conceived the ideas and designed the methodology. Patrice Grimaud, project coordinator, supervised the study and fieldwork. Luzibo Ottilia Munsaka collected most of the data, with Vupenyu Dzingirai, Muriel Figuié, Maxwell Phiri and Olivier Lepiller. Data (quantitative and qualitative) were analysed by Luzibo Ottilia Munsaka, Muriel Figuié and Vupenyu Dzingirai. Muriel Figuié led the writing of the manuscript. All authors critically contributed to the drafts (and gave their final approval for publication).

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CONFLICT OF INTEREST STATEMENT

The authors have no conflict of interest to declare.

DATA AVAILABILITY STATEMENT

The quantitative data produced during this study are stored in the CIRAD repository (https://doi.org/10.18167/DVN1/LPACOM) and are available upon request due to ethical reasons. The participants in this study consented to the collected data being used within the framework of the Sustainable Wildlife Management Program (SWM).

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REFERENCES

Boutinot, L., Baticle, C., Dkamela, G.-P., Karpe, P., Le Roy, E., & Mbom, D. (2018). Surveiller sans punir. Un commun de résistance à partir des pratiques braconnières de l'espace forestier camerounais. *Espaces et Sociétés*, *4*(175), 51–68.

Colson, E. (1969). Spirit possession among the Tonga. In J. Beatie & J. Middleton (Eds.), *Spirit mediumship and Society in Africa* (pp. 54–65). Routledge.

Corbeau, J. (2021). Reflections for a sociological representation of the eater. *Social Sciences*, *10*(9), 339. https://doi.org/10.3390/socsci10090339

de Verdal, H., Svosvai, C., Arnaud, E., & Goli, T. (2022). The fishing system. In P. Grimaud, D. Gumbo, & S. Le Bel (Eds.), *Towards sustainable wildlife management: An in-depth study for the promotion of community conservancies in Zambia and Zimbabwe* (pp. 79–92). FAO, CIRAD, CIFOR and WCS.

Denyer Willis, L., Kayendeke, M., & Chandler, C. I. (2023). The politics of irrationality. *Medical Anthropology Quarterly*, *37*(4), 1–395. https://doi.org/10.1111/maq.12809

Duda, R., Gallois, S., & Reyes-García, V. (2018). Ethnozoology of bushmeat. *Revue d'Ethnoécologie* [online], 14|2018, Online since 31 December 2018, connection on 09 January 2019.

Dzingirai, V. (1995). *'Take back your campfire': A study of local level perceptions to electric fencing in the framework of Binga's campfire programme*. University of Zimbabwe Edition.

FAO. (2018). *Sustainable food systems. Concept and framework. FAO technical brief*. FAO.

FAO, Alliance of Biodiversity International, & CIAT. (2021). *Indigenous peoples' food systems: Insights on sustainability and resilience in the front line of climate change*. https://doi.org/10.4060/cb5131en

Figuié, M., & Lepiller, O. (Eds.). (2020). *Methodological guide for a sociological and qualitative study of wild meat consumption*. UE Sustainable Wildlife Management project. FAO, CIRAD, CIFOR, WCS. https://agritrop.cirad.fr/600369/

Fischler, C. (1990). *L'Homnivore*. Odile Jacob.

Forum for Food Sovereignty. (2007). *The declaration of Nyéléni* [press release]. www.nyeleni.org

Grimaud, P., Gumbo, D., & Le Bel, S. (Eds.). (2022). *Towards sustainable wildlife management: An in-depth study for the promotion of community conservancies in Zambia and Zimbabwe*. FAO, CIRAD, CIFOR and WCS. https://doi.org/10.4060/cb9082en

HLPE. (2020). *Food security and nutrition: Building a global narrative towards 2030*. https://openknowledge.fao.org/bitstreams/8357b6eb-8010-4254-814a-1493faaf4a93/download

Ingram, D. J. (2020). Wild meat in changing times. *Journal of Ethnobiology*, *40*(2), 117–130.

Ingram, D. J., Coad, L., Milner-Gulland, E. J., Parry, L., Wilkie, D., Bakarr, M. I., Benítez-López, A., Bennett, E. L., Bodmer, R., Cowlishaw, G., El Bizri, H. R., Eves, H. E., Fa, J. E., Golden, C. D., Iponga, D. M., Minh, N. V., Morcatty, T. Q., Mwinyihali, R., Nasi, R., … Abernethy,

K. (2021). Wild meat is still on the menu: Progress in wild meat research, policy, and practice from 2002 to 2020. *Annual Review of Environment and Resources*, *46*(46), 221–254. https://doi.org/10.1146/annurev-environ-041020-063132

IUCN. (2019). *Recognising and reporting other effective area-based conservation measures* (978-2-8317-2025-8). https://portals.iucn.org/library/node/48773

Joshi, P. K., Kishore, A., & Roy, D. (2017). Making pulses affordable again: Policy options from the farm to retail in India. *Economic and Political Weekly*, *52*(1), 37–44.

Lepiller, O., Fournier, T., Bricas, N., & Figuié, M. (Eds.). (2023). *Studying food and eaters. A cocktail of perspectives and methods*. Quæ editions. https://doi.org/10.35690/978-2-7592-3664-0

Margulies, J. D., Bullough, L. A., Hinsley, A., Ingram, D. J., Cowell, C., Goettsch, B., Bullough, L.-. A., Klitgård, B. B., Lavorgna, A., Sinovas, P., & Phelps, J. (2019). Illegal wildlife trade and the persistence of 'plant blindness'. *Plants, People, Planet*, *1*(3), 173–182. https://doi.org/10.1002/ppp3.10053

Meyer, C., Arbonnier, M., Lhoste, P., Huguenin, J., Letenneur, L., Roberge, G., Tacher, G., & Vall, E. (2022). *Dictionnaire des sciences animales*. http://dico-sciences-animales.cirad.fr/

Milbank, C., Burlingame, B., Hunter, D., Brunel, A., de Larrinoa, Y. F., Eulalia Martinez-Cruz, T., Katic, P., Wallet Aboubakrine, M., Roy, P., Rosado-May, F., Dounias, E., & The Global-Hub on Indigenous Peoples' Food Systems. (2021). Rethinking hierarchies of evidence for sustainable food systems. *Nature Food*, *2*(11), 843–845. https://doi.org/10.1038/s43016-021-00388-5

Milner-Gulland, E. J., & Bennett, E. L. (2003). Wild meat: The bigger picture. *Trends in Ecology & Evolution*, *18*(7), 351–357. https://doi.org/10.1016/s0169-5347(03)00123-x

Murcott, A. (2007). Social influences on food choice and dietary change: A sociological attitude. *Proceedings of the Nutrition Society*, *54*(3), 729–735. https://doi.org/10.1079/PNS19950072

Nasi, R., Taber, A., & Van Vliet, N. (2011). Empty forests, empty stomachs? Bushmeat and livelihoods in the Congo and Amazon Basins. *International Forestry Review*, *13*(3), 355–368.

Ndlovu, N., Katati, M., & Gumbo, D. (2022). Institutional and normative framework. In P. Grimaud, D. Gumbo, & S. Le Bel (Eds.), *Towards sustainable wildlife management: An in-depth study for the promotion of community conservancies in Zambia and Zimbabwe* (pp. 39–57). FAO, CIRAD, CIFOR and WCS.

Nurhasan, M., Maulana, A. M., Ariesta, D. L., Usfar, A. A., Napitupulu, L., Rouw, A., Hurulean, F., Hapsari, A., Heatubun, C. D., & Ickowitz, A. (2022). Toward a sustainable food system in West Papua, Indonesia: Exploring the links between dietary transition, food security, and forests. *Frontiers in Sustainable Food Systems*, *5*, 789186. https://doi.org/10.3389/fsufs.2021.789186

Olivier de Sardan, J.-P. (2009). *La rigueur du qualitatif: les contraintes empiriques de l'interprétation socio-anthropologique*. Academia-Bruylant.

Poulain, J.-P. (Ed.). (2007). *L'Homme, le mangeur, l'animal. Qui nourrit l'autre?* (Vol. *12*). Observatoire Cidil des Habitudes Alimentaires.

Poulain, J.-P. (2017). *The sociology of food. Eating and the place of food in society* (A. Dörr, Trans.). Bloomsbury Publishing.

Saidi, U. (2017). BaTonga culture: A rich heritage. *DANDE. Journal of Social Sciences and Communication*, *2*(1), 45–60. https://doi.org/10.15641/dande.v2i1.40

The New Humanitarian. (2007). *The Tonga: Left high and dry*. https://www.thenewhumanitarian.org/report/74139/zambia-zimbabwe-tonga-left-high-and-dry

Tremmel, M. (1994). *The people of the great river. The Tonga hoped the water would follow them* (Vol. *9*). Silveira House, Mambo Press.

van Vliet, N. (2018). "Bushmeat crisis" and "cultural imperialism" in wildlife management? Taking value orientations into account for a more sustainable and culturally acceptable wildmeat sector. *Frontiers in Ecology and Evolution*, *6*, 112. https://doi.org/10.3389/fevo.2018.00112

van Vliet, N., Cornelis, D., Beck, H., Lindsey, P., Nasi, R., LeBel, S., & Jori, F. (2016). Meat from the wild: Extractive uses of wildlife and alternatives for sustainability. In *Current trends in wildlife research* (pp. 225–265). Springer.

Vialles, N. (1988). La viande ou la bête. *Terrain*, *10*, 86–96. https://doi.org/10.4000/terrain.2932

von Braun, J., Afsana, K., Fresco, L. O., Hassan, M., & Torero, M. (2021). Food system concepts and definitions for science and political action. *Nature Food*, *2*(10), 748–750. https://doi.org/10.1038/s43016-021-00361-2

Warde, A. (2016). *The practice of eating*. Polity Press.

Weinrich, A. H. K. (1977). *The Tonga people on the southern shore of the Lake Kariba*. Mambo Press.

WFP. (2017). *Zimbabwe country strategic plan (2017–2021)*. WFP.

WFP, & FNC. (2016). *Binga district profile*. WFP & FNC.

Willis, J., Ingram, D. J., Abernethy, K., Kemalasari, D., Muchlish, U., Sampurna, Y., Midoko Iponga, D., & Coad, L. (2022). WILDMEAT interventions database: A new database of interventions addressing unsustainable wild meat hunting, consumption and trade. *African Journal of Ecology*, *60*(2), 205–211. https://doi.org/10.1111/aje.13000

Zimstat. (2019). *Zimbabwe poverty report 2017*. Zimstat.

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

Appendix S1. Data collection tools.

Appendix S2. General features of the food system in the Binga district (wards 3, 4 and 5), Zimbabwe.

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