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FROM BUSH TO BUTCHERY

AN ANALYSIS OF THE GAME MEAT VALUE
CHAIN IN NORTHERN TANZANIA

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TRAFFIC



TRAFFIC REPORT

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A hunter examines his catch.

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RECOMMENDATIONS

TO ENSURE THAT THE LEGAL FOUNDATIONS OF THE GAME MEAT SELLING INDUSTRY ENABLE THE WELL-MANAGED, SAFE AND SUSTAINABLE HARVEST AND SALE OF MEAT FROM WILD ANIMALS TRAFFIC RECOMMENDS:

STAKEHOLDER COLLABORATION

Collaboration of all stakeholders involved in the hunting and meat industries in the revision of hunting regulations (both local and tourist hunting, separate from the Game Meat Selling Regulations) to include stipulations that specify the actions and documentation required during the sourcing of game animals.

Key agencies: DVS, MLF, PO-RALG, TAWA, TMB

HUNTING REGULATION REVISION

Incorporation of meat safety and hygiene standards into the relevant hunting regulations to enable observance of meat inspection during the sourcing stage.

Key agencies: DVS, MLF, PO-RALG, TAWA, TMB

RESOURCE ALLOCATION

Allocation of the necessary manpower and resources (e.g., training, budget, transport, etc.) to enhance management of game meat selling activities at relevant points in the value chain.

Key agencies: DVS, MLF, PO-RALG, TAWA, TMB

[**DGO**: District Game Office; **DVS**: Department of Veterinary Services; **PHO**: Public Health Office; **PO-RALG**: President Office Regional Administration and Local Government; **MLF**: Ministry of Fisheries and Livestock; **MNRT**: Ministry of Natural Resources and Tourism; **TAWA**: Tanzania Wildlife Management Authority; **TAWIRI**: Tanzania Wildlife Research Institute; **TMB**: Tanzania Meat Board; **TRA**: Tanzania Revenue Authority]

DATABASE DEVELOPMENT

Development of a database that tracks the compliance and validity of the requirements to operate GMSFs (e.g., ownership certificates, permits from the Micro, Small, Medium Industrial Development Agency to process game meat into other meat products); and carry out regular and random inspections of the GMSFs.

Key agencies: TAWA, TBS, TRA, TMB, MIT

GMSF INSPECTION

Regular and random inspection of the GMSFs to ascertain compliance against required standards, issuance of valid receipts and regular and random inspections of transport vehicles to ensure that GMSF operators/hunters use vehicles that align with the requirements of the Meat Industry Act.

Key agencies: DVS, MLF, TAWA, TMB

GUIDELINE DEVELOPMENT

The development of guidelines that reflect additional standards, expertise, etc. needed specifically for game meat handling.

Key agencies: DVS, MLF, TAWA, TMB

RECOMMENDATIONS

ADDITIONALLY, TO ENSURE THAT THE HARVEST OF MEAT FROM WILD ANIMALS FOR CONSUMPTION IS SUSTAINABLE, TRAFFIC RECOMMENDS THAT THE MNRT THROUGH TAWA AND TAWIRI COLLABORATIVELY:

RESEARCH UPDATE

Update research findings on wild animal populations and mortality and birth rates to establish well-informed hunting quotas.

TRACEABILITY SYSTEMS

Organise a workshop to determine which key data elements are needed to establish a traceability system to monitor sustainability, safety and legality of offtake and onward supply through the value chain to end-user.

SUPPLY OVERSIGHT

Closely monitor game supplies (including hunting permits, number and species of game animals on sale, frequency of supplies).

SUSTAINABILITY ASSESSMENT

Adapt the 5-Dimensional Sustainability Assessment Framework (5DSAF) tool to the Tanzania context to aid in monitoring the game meat industry's performance against key sustainability standards, building on the pilot testing of the 5DSAF by TRAFFIC with GMSAC members in March 2024.

FINALLY, TO ACHIEVE SAFETY ASSURANCE FOR ALL STAKEHOLDERS ALONG THE VALUE CHAIN, TRAFFIC RECOMMENDS THE FOLLOWING ACTIONS:

HUNTER TRAINING

Train hunters on the specific hygiene and field dressing practices and storage practices they need to observe to ensure game meat quality and safety.

Key agencies: PO-RALG (DGO, DVS, PHO), TAWA, MLF, MoH

TRANSPORTATION OVERSIGHT

Before allowing GMSF operations to commence, ensure that GMSF operators have access to specialized vans with a cooling system during meat transportation and that relevant authorities have a system in place to carry out regular monitoring and inspection of the transport van cooling system to ensure that it functions appropriately.

Key agencies: TAWA, TMB, MLF

HYGIENE INSPECTIONS

Carry out both regular and random inspections of GMSF selling activities to ensure that hygienic practices (e.g., handwashing, sanitising equipment, storage facilities) are being observed to prevent game meat contamination and spoilage.

Key agencies: DVS, TAWA, TBS, TMB

EXECUTIVE SUMMARY

On 10 October 2019, John Pombe Magufuli, the late President of the United Republic of Tanzania, suggested developing a legal mechanism that would enable Tanzanians to gain access to wild meat from wild animals thus benefiting from their natural resources. The directive was framed as a way to reduce the incidence of poaching, provide alternative sources of protein, and provide Tanzanians an option to increase their household incomes by selling wild meat. This set things in motion for the legislation of the legal procurement, selling, and consumption of wild meat (known as game meat) in the country—with the Game Meat Selling Regulations of Tanzania coming into force in February 2020 and game meat selling business operations officially starting in December 2020.



As the game meat selling industry was evolving, the challenges associated with and consequences of the swift development and enactment of the Game Meat Selling Regulations were further revealed. Researchers learned that there was limited law enforcement capacity to manage and efficiently monitor the game meat value chain, and, among supply chain actors, there were gaps in the understanding of the overall regulatory environment underpinning game meat selling. The regulatory links between game meat selling, consumption, and food safety were also not cohesive due to missed opportunities for consultation and collaboration during the development of the game meat industry specific regulations and mandates. Additionally, over the course of compiling this report, the research team learned that the insufficient and irregular supply of game meat for registered Game Meat Selling Facilities (GMSFs) may stimulate opportunities for the illicit acquisition of wild meat outside regulatory provisions.

These challenges and consequences prompted the initiation of a collaborative research effort, early in 2021, to increase understanding of the relative impacts of the Game Meat Selling Regulations on biodiversity conservation, animal health, and public health. The Tanzania Wildlife Management Authority (TAWA) was TRAFFIC's primary partner in examining the potential risks to the legality, sustainability, and safety of the game meat selling industry under the management system framed by the Game Meat Selling Regulations. The research team employed a mixed methods approach for this research. This included gathering data from grey and published scientific literature, government documents, and conference proceedings. Interviews were conducted with value chain actors, including government officials, hunters, tourist hunting companies, GMSF operators, and consumers. Field ob-

servations were also conducted during visits to locations in northern Tanzania. Research findings were validated through a workshop consisting of 41 experts, attended by the District Game Officers (DGOs), District Veterinary Officers (DVOs), Public Health Officers (PHOs), representatives from TAWA, the Tanzania Wildlife Research Institute (TAWIRI), and academics from Sokoine University of Agriculture (SUA).

The findings revealed that, while attempts to ensure the effective governance of the game meat selling industry have been made, **a mismatch in government mandates, capacity and resourcing, combined with a lack of clarity around the roles and responsibilities of relevant actors (i.e. game meat selling operators, law enforcement authorities, and other agencies involved in managing the game meat value chain) have made it challenging to ensure compliance along the game meat value chain.** During the period of this assessment (between June 2021 and December 2023), it was observed that, while there was a clear definition of the roles of GMSF operators, the Game Meat Selling Regulations lacked accompanying implementing guidelines specifically defining the responsibilities of all other government agencies and other actors (retailers, processors, transporters, and consumers) at each stage of the value chain. This not only impacted the ability of value chain managers such as DGOs, DVOs and PHOs to effectively enforce laws related to game meat selling and meat safety but also impacted compliance levels from private sector GMSF operators.

The research also found that the game meat selling industry is challenged by the lack of an effective traceability system for monitoring offtake of wild animal populations, lack of up-to-date and research-informed hunting quotas,

For the purposes of this report, TRAFFIC distinguishes bushmeat from game meat, within the overall context of the trade in wild animal meat. Bushmeat refers to meat that has been harvested illegally for subsistence or trade, while game meat is defined as meat legally harvested for subsistence or trade in Tanzania as per the national Game Meat Selling Regulations.

and a limited understanding of the factors impacting game meat supply and demand such as consumer appetite for game meat and the need for GMSF operators to recoup investment costs into the industry. Without consistent monitoring guided by a traceability system, the risk for unsustainable offtake (through overexploitation) is high, as is the potential for illegally sourced and/or unregulated wild meat to enter the value chain and be sold by GMSFs. It was also ascertained that meat safety and hygiene were not maintained across the entire value chain, largely due to the lack of purview under existing livestock meat inspection regulations to guide the inspection of game animals and game meat. Thus, there was limited compliance with established meat safety standards and protocols used across Tanzania for livestock production. Similarly, compliance with food safety standards and requirements (for example, the Meat Industry Act, 2006) among value chain actors, including value chain managers and consumers, was largely non-existent due to the uncertainty around whether the existing standards that applied to livestock meat would also apply to meat sourced from wild animals.

Although required by the Game Meat Selling Regulations, challenges in maintaining a cold chain¹ during meat transportation were observed, mainly due to economic barriers (GMSF operators being unable to afford meat transport vans) and the relative complexity of the sourcing process (especially hunting, where time spent in the bush, combined with often long distances to the registered game meat selling facility impact the cost, and therefore the likelihood of establishing a continuous cold chain). Disease surveillance and monitoring were also not considered comprehensively during the development of the regulatory framework for the game meat selling industry.

While the challenges surrounding the game meat industry are complex, they are not insurmountable. Government agencies from the environment, wildlife, and health sectors all have a stake in the future evolution of the game meat selling industry, and the relevant

government agencies that form part of the Game Meat Selling Advisory Committee (GMSAC) have begun to develop cross-jurisdictional efforts to effectively regulate and monitor the game meat value chain from source to end use. Research and observations since the implementation began of the Game Meat Selling Regulations in 2020 show that regulatory revision would help to align implementation more coherently with other relevant regulations (e.g. Wildlife Conservation Act, 2009 and corresponding regulations) on the consumptive utilization of wildlife such as the Meat Industry Act which covers all matters relating to the control of quality and safety of meat along meat supply chains. It is also equally important to clarify the roles and responsibilities of all the relevant government authorities in the management of the game meat selling industry. This clarity of purpose across multiple jurisdictions would help ensure compliance during acquisition of wild animals for the game meat industry, based on regular monitoring of offtake levels to ensure that unsustainable and illegal wild meat trade does not occur. It would also prevent products from any illicit acquisition from entering the game meat value chain. In parallel, a system of checks to ensure food safety and hygiene of game meat would increase traceability as wild animal products move through nodes in the value chain.

With government agencies from the environment, wildlife, and health sectors all having a stake in the game meat selling industry to ensure its legality, sustainability, and safety, TRAFFIC recommends adopting the One Health approach to managing the game meat selling industry. Tanzania's National One Health Strategic Plan (2022-2027) provides a conceptual framework which could inform the management of the game meat selling industry by the relevant Tanzanian government agencies and demonstrate the multi-sectoral One Health collaboration needed to conserve and protect its biodiversity in tandem with the health of the people who have the most to gain from sustainable, safe and legal utilisation of the country's wildlife resources.

¹A 'cold chain' is employed to lower the temperature of meat at various stages of handling, inhibiting the growth of micro-organisms, reducing enzyme activity, and slowing the rate of meat deterioration. The best temperature to store meat in a refrigerator is between 32°F (0°C) and 40°F (4.4°C) (Source, Tanzania Meat Board)



Hunted game animals from a hunting block in Kilwa Wildlife Open Area in transit for further dressing.



Launch of the first GMSF (Game Meat Selling Facility) in Dodoma, Tanzania

INTRODUCTION

Between 1960 and 2022, the human population of the United Republic of Tanzania grew from 10 million to 65 million people (World Bank, 2022). The World Bank estimates that about 26 million Tanzanians live below the international poverty line (USD1.90 per day), with about 13 million living in extreme poverty on earnings of less than USD0.60 per day (World Bank, 2021).

While 36% of Tanzanians live in the country's larger cities like Dar Es Salaam, Arusha, and Mbeya, poverty is observed in all areas of the country, with its incidence being more prevalent in rural areas (World Bank, 2021). Increased poverty levels in rural areas have had significant impacts on wild meat offtake which helps to meet the food and livelihood requirements of communities living in wildlife-rich areas (Coad L. *et al.*, 2019; Rao and McGowan, 2002). Studies have shown that households in rural areas typically consume more wild meat than wealthier households in urban areas, because it provides a cheap and accessible source of food and income during times of economic hardship (Brashares *et al.*, 2011; Kideghesho, 2008).

A study undertaken by TRAFFIC between 2017 and 2019 showed how Tanzania's larger cities like Dar es Salaam and Arusha facilitate the increased trade for wildlife products because of the larger number of customers and their willingness to purchase wild meat at higher costs (Andimile and Floros, 2021). Considering the larger populations of these cities, it is necessary to consider how increasing human population numbers affect demand for food, whether wild harvested or cultivated (often involving conversion of wild habitats), which can include impacts on the rate of harvest of wild terrestrial animals to supply the demand for wild meat. A report in 2020 by the Ministry of Natural Resources and Tourism (MNRT) also highlighted the increase in human activities (especially in areas bordering wildlife reserves, wildlife corridors and dispersal areas) livestock herding in protected areas, and climate change causing long-term drought as major threats facing wildlife in protected areas.

Against a backdrop of rising human population numbers and persistent demand for wildlife products, Tanzania's biodiversity is under increasing pressure. The country is among the world's most biodiverse countries with



Wild meat is sold at higher prices in bigger cities like Dar es Salaam and Arusha

over 55,000 confirmed species and ranking 15th globally for the highest number of endemic species (RTI International, 2022). About 33% of the country is protected through various conservation instruments. Tanzania has 22 National Parks, 29 Forest Reserves, 23 Protected Forests, 22 Wildlife Management Areas (also known as Areas of Wildlife Conservation Associations), the Ngorongoro Conservation Area, and other protected reserves (MNRT, 2023). However, despite the government's efforts in protecting and conserving Tanzania's natural resources, poaching and the illegal wildlife trade remain a big problem. A recent government report revealed that law enforcement authorities successfully arrested 2,786 suspects and confiscated 108 guns, 1,334 bullets, and 3,080 wildlife traps as a result of 284,460 patrol days that were conducted between 2021 and 2022 (MNRT, 2023).

The protection and conservation of Tanzania's wildlife resources is governed by the country's Wildlife Conservation Act, 2009. As the country's principal wildlife law, its objectives are to protect and manage wildlife and their habitats, promote the contribution of Tanzania's wildlife sector to sustainable development, and encourage community participation in wildlife conservation (Wildlife Conservation Act, 2009). Provisions for the consumptive use of wildlife are also stated in the Wildlife Conservation Act and are elaborated in linked regulations which include the Resident Hunting Regulations, Tourist Hunting Regulations, and the Game Meat Selling Regulations, among others.

On 10 October 2019, John Pombe Magufuli, the late President of the United Republic of Tanzania, issued a statement during a working

visit to the Katavi region that suggested the establishment of a scheme in the country that would enable Tanzanians to have legal access to wild animal meat, the legal trade of which was defined as game meat. This represented the first time that wild meat would be allowed to be sold in Tanzania for public consumption. This set things in motion for the legislation that would legalise and regulate game meat selling and consumption. Just four months later, the Wildlife Conservation (Game Meat Selling) Regulations were announced in Government Gazette no. 84 on 7 February 2020. By the end of December 2023, at least 94 Game Meat Selling Facilities (GMSFs) had been licensed across the country.

The passing of the Game Meat Selling Regulations by the Tanzanian government catalysed the growth of the legal game meat selling industry. Insights into how these regulations impacted the management of wild meat trade from the perspectives of conservation and health were collected by TRAFFIC and its partners between June 2021 and December 2023 using a mixed methods approach consisting of field surveys, focus group discussions, and participatory observation. In this report, we present the findings and provide insights into the evolution of the game meat selling industry in Tanzania from a policy perspective, as well as the organisation of the industry and the persistent gaps, challenges, and opportunities as the industry evolves rapidly. The report also explores the relative utility of taking a One Health approach to wild meat value chain management.

2020
was the year when
wild meat selling
was legalised in
Tanzania

One Health High Level Expert Panel Definition (OHHLEP, 2022)

One Health is an integrated, unifying approach that aims to sustainably balance and optimise the health of people, animals and ecosystems.

It recognizes the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and interdependent. The approach mobilises multiple sectors, disciplines and communities at varying levels of society to work together to foster well-being and tackle threats to health and ecosystems, while addressing the collective need for healthy food, water, energy, and air, taking action on climate change, and contributing to sustainable development.



A traditional method of preserving meat during a hunt is by slicing the meat into thinner strips, salting it, and hanging it out to dry in the shade.

METHODS

This research into the Tanzanian game meat selling industry aimed to: 1) illuminate any gaps in the current legislative and regulatory frameworks governing the game meat trade and its potential links to the illegal bushmeat trade; 2) understand the socio-economic conditions in which the game meat selling industry is operating and the how the industry is managing wild animal harvesting so that it is within sustainable limits; and 3) identify the potential risks of zoonotic disease transmission at different points in the game meat value chain.

Between June 2021 and December 2023, TRAFFIC studied the operations of GMSFs to understand implications for the sustainability, safety and legality, of the game meat trade in Tanzania, as well as any implications for potential zoonotic pathogen spillover. This focus deliberately reflects [Target 5](#) of the Kunming-Montreal Global Biodiversity Framework, i.e. to

Ensure that the use, harvesting and trade of wild species is sustainable, safe and legal, preventing overexploitation, minimising impacts on non-target species and ecosystems, and reducing the risk of pathogen spill-over, applying the ecosystem approach, while respecting and protecting customary sustainable use by indigenous peoples and local communities.

The research was conducted in three phases: a scoping phase, follow-up research phase, and a validation phase. At each phase, TRAFFIC aimed to answer the following research questions:

Legality:

- What policies and regulatory frameworks govern and underpin the game meat trade?
- How have these policies and regulatory frameworks shaped or impacted the game meat trade?
- How is the game meat supply and value chain organised?
- Who are the actors involved and what are their roles in managing the game meat selling industry at different points in the value chain?
- What are the species/animal commodities that can, and are, being sourced for the game meat selling industry?

Sustainability:

- How have the Game Meat Selling Regulations affected the demand and supply of game meat?
- How is game meat sourced and where from?
- What are the factors influencing the

- game meat trade and consumption?
- What mechanisms are in place to measure the volumes of game meat being sold in relation to the number of animals in the wild (e.g., monitoring levels of offtake, monitoring mortality rates, hunting quotas)?
- Is the rate of wild animal harvesting sufficient to meet the demand for game meat?
- Is wild animal harvesting occurring within sustainable limits?

Safety:

- What regulatory frameworks and oversight or monitoring mechanisms are in place to ensure the safety of game meat for human consumption?
- What control mechanisms are in place to prevent or control the direct and indirect spread of zoonotic diseases between wild animals, livestock and peri-domestic animals and humans, including from wild-sourced meat?

- Who are the actors responsible for implementing health and safety control measures in the game meat trade?
- How effective are the regulations and actors in ensuring food safety for human consumption of wild meat?

For the purposes of this report, TRAFFIC distinguishes bushmeat from game meat within the overall context of wild animal meat in Tanzania. Bushmeat refers to meat that has been harvested illegally for subsistence or trade, while game meat is defined as meat harvested for subsistence or trade through sourcing pathways stipulated in the Game Meat Selling Regulations, which is the predominant focus of this report. Game meat is also the terminology used in the wording of these regulations.

Additionally, all amounts corresponding to prices were recorded in Tanzanian shillings (TZS) but are also reported in USD using 2023 rates from <https://www.oanda.com/currency-converter/en/>.

2.1 SCOPING PHASE

Four months after the Game Meat Selling Regulations were passed (between June 2021 and September 2021), TRAFFIC collaborated with TAWA to conduct a nationwide scoping study to understand how the country's game meat value chain was organised, identify the main value chain actors and the other actors interacting with the value chain, and understand stakeholder responsibilities. The purpose of this scoping research was to inform TRAFFIC's future engagement with partners to support government agencies responsible for the game meat trade at a time of rapid development for the game meat industry.

As part of this scoping, TRAFFIC and TAWA conducted key informant interviews with 23 GMSF operators from 34 GMSFs in 10 regions of Tanzania where GMSFs were operational. These regions were in the northern, coastal, and western areas of Tanzania. These interviews sought to gain an understanding of the socio-economic profiles of those participating in the game meat selling industry, understand

the challenges and potential solutions in the game meat selling industry business model, and gauge the levels of understanding and compliance by GMSFs with the regulations relevant to the industry.

In addition, 16 DGOs, 16 DVOs, and four TAWA officials from the Northern, Central, and Western Zone regions were interviewed. These interviews were intended to better understand the roles of these officials in governing the value chain and the relevant policy and regulatory context. The research team also visited and observed the different activities and processes occurring at each point in the value chain. All observations were recorded through notetaking and photography to gather evidence to demonstrate compliance with regulations but also to be used later in engagement and communication of the assessment results. At the sourcing stage, the research team took notes and pictures of the hunting area, the slaughter and partial dressing (skinning, evisceration) area, and the equipment used to process and trans-

port the meat. At the selling point, TRAFFIC and TAWA took notes and pictures of products displayed at the sale and storage facilities.

The research team also requested to see relevant permits and certificates including trophy hunting permits for all species sold, trophy dealers licenses, GMSF licenses, and

certificates from the Tanzania Meat Board and Tanzania Bureau of Standards, meat inspection certificates, registry, and other requirements as stipulated in the Game Meat Selling Regulations. Visits were also made to other meat selling outlets nearby such as restaurants, hotels, and festivals where game meat was also being consumed.

2.2 FOLLOW-UP RESEARCH PHASE

Results from the scoping research allowed the research team to devise questions for later surveys and identify the value chain actors to be targeted for follow-up research. Between June 2022 and November 2022, the research team surveyed known game meat consumers and conducted further key informant interviews with game meat selling facility operators, officials from wildlife management and research, public health, veterinary and food quality control to corroborate findings in the scoping phase. The survey sought to understand consumers' game meat purchasing and preparation practices. Respondents were also asked about their perceptions around meat safety and quality, approaches they took to try and ensure safety and quality (Appendix 3).

A team of enumerators visited a total of 27 GMSFs in eight districts across the northern, central, and western areas. Enumerators worked through GMSF operators to reach consumers registered with individual GMSFs. This allowed the research team to interview as many consumers for the survey as possible, especially considering that consumers may not reside in the same area where the GMSF is located. In cases where the GMSF did not have a registry, the GMSF operator provided the contacts of their consumers directly. Altogether, the enumerators collected a total of 1000 contacts. Of these, 967 contacts were active i.e. the call went through. In instances where phone numbers were invalid, the enumerators returned to the GMSF operators to confirm the contact details. In some cases, the enumerators received additional contact details of consumers from GMSF operators. A total of 655 respondents answered the calls made by enumerators, with 472 consumers participat-

ing in the survey.

In-depth interviews were also conducted with GMSF operators and with value chain managers³ at the district and ministry level to get their insights on key criteria: how the value chain works; how value chain players interact with regulators; the main challenges surrounding game meat supply and demand, and relevant governance gaps and recommended solutions. A total of 17 in-depth interviews were conducted either face-to-face or by phone with one member of TAWA, three DGOs, three Public Health Officials (PHOs), two DVOs, and eight GMSF owners. Observations of all the activities undertaken in the legal and illegal game meat outlets were also recorded.

Prior informed consent was obtained from each participant after reading a statement about the purpose of the research, the content of the survey, any risks or benefits, and the time commitment. Participants were assured that their participation was voluntary and could be withdrawn at any point.

Additionally, TRAFFIC conducted a literature review of journal articles, conference proceedings, legislations and regulations, and grey literature to gather further relevant information on wildlife value chains, zoonotic disease risks, and animal disease surveillance, and to offer necessary Tanzanian policy and economic context. Keywords used to search the Google Scholar database included priority zoonotic disease risk*, animal disease surveillance*, zoonotic disease prevalence*, game meat*, regulations*, and wild meat/game meat value chains*. A total of 55 documents were reviewed.

³Value chain managers include all relevant government law enforcement personnel at different points of the value chain.

2.3 EXPERT ELICITATION WORKSHOPS

On 28 November 2022, TRAFFIC brought together experts it identified as playing different roles in the game meat value chain to a three-day workshop as part of a qualitative disease risk analysis (DRA) of the game meat value chain in northern Tanzania. The workshop was organized to learn about their views, experiences and opinions on the game meat value chain. A total of 41 experts attended consisting of DGOs, DVOs, PHOs, representatives from TAWA and TAWIRI, One Health focal points (one each from the Ministry of Natural Resources and Tourism, Ministry of Livestock and Fisheries, and the Ministry of Health), and academics from Sokoine University of Agriculture (SUA). TRAFFIC staff presented the preliminary results of the study followed by a group discussion which divided the attendees into seven working groups, each with experts from the wildlife, veterinary, and public health fields.

Group discussions were semi-structured, with participants being encouraged to share their views on the initial findings. Their views were subsequently analysed for this research.

TRAFFIC also presented the results of the assessment to members of the Game Meat Selling Advisory Committee (GMSAC) with the objective of enhancing their understanding of the situation on the ground. The national committee is comprised of six representatives with expertise in wildlife veterinary services, wildlife management, food and drug control, public health and meat inspection. In March 2022 and then June 2023, the results were discussed among committee members from the Directorate of Veterinary Services (DVS), Tanzania Meat Board (TMB), Tanzania Bureau of Standards (TBS), Wildlife Department (WD), TAWA, and the MoH.



Game meat restaurant in Dodoma.

RESULTS

3.1 MAPPING THE GAME MEAT INDUSTRY

The Tanzania game meat selling industry can be grouped into four distinct stages, namely **sourcing**, **processing**, **selling**, and **end-use**, which in this context is entirely for human consumption as food. Transport is

associated with all four stages (Figure 1). Sourcing includes all the ways through which game meat can be acquired. Processing covers, firstly, game animal slaughter and dressing and, secondly, further processing of

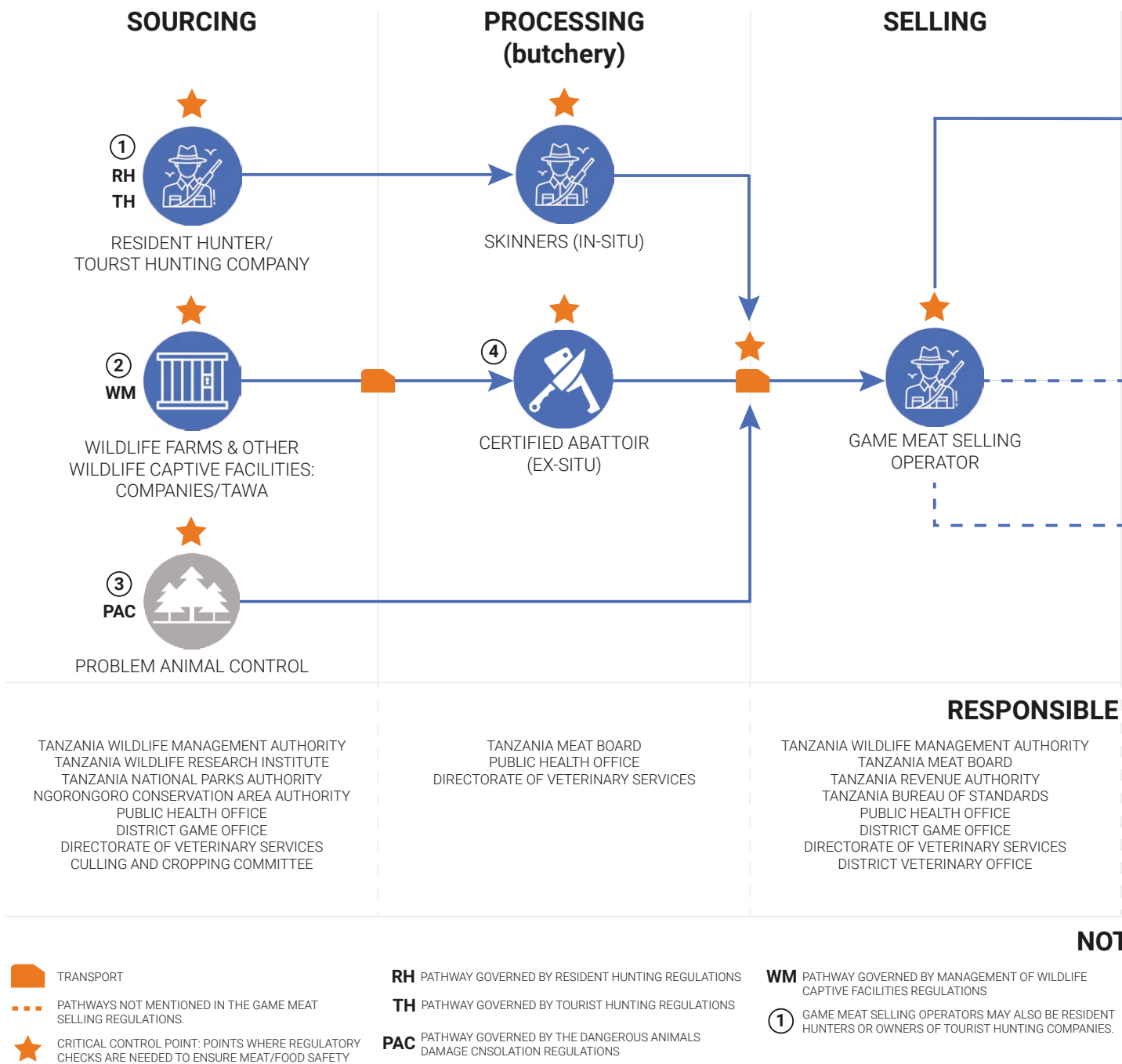
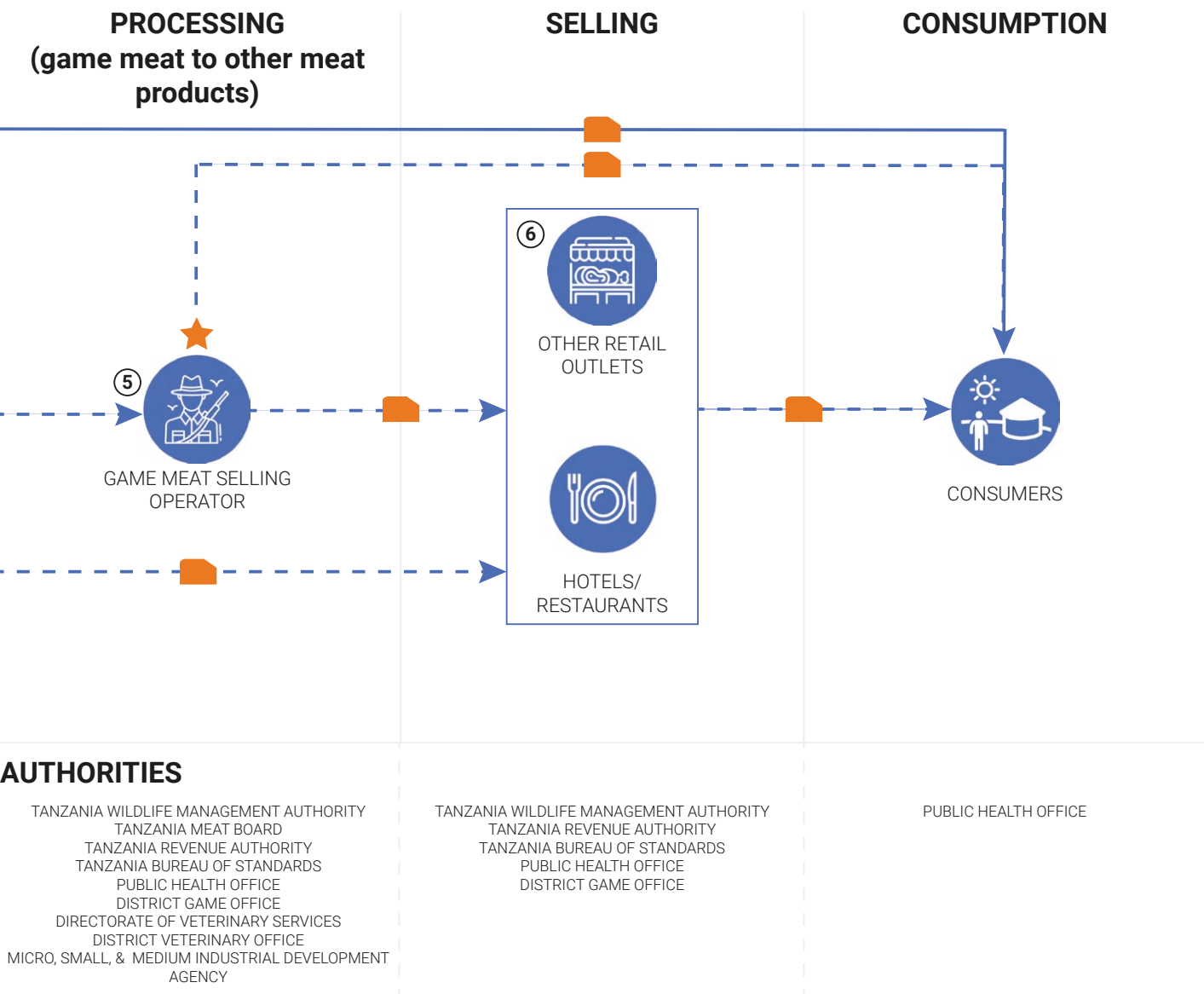


FIGURE 1. The game meat selling industry of Tanzania showing primary actors and responsible authorities involved at each value chain stage⁴.

game meat into other meat products. Selling encompasses the sale of game meat through the GMSFs and other selling outlets to end-use consumers.

This section provides an overview of the game meat industry, using the current regulatory framework as the entry point, to better understand the activities at each node in the value chain, the policies and regulations that underpin these activities, the relationship

between the value chain actors, the drivers of the trade, and the factors that affect sustainability, legality or safety at each value chain node. This information was primarily gathered from interviews with wildlife officers and game meat selling operators who reported the sources of their game meat, with some further research and validation by TRAFFIC through interviews and participant observation of other actors depicted in the value chain map.



ES

- ② GAME MEAT SELLING OPERATORS MAY ALSO OWNERS OF WILDLIFE FARMS OR OTHER WILDLIFE CAPTIVE FACILITIES.
- ③ IF ANIMALS THAT WERE KILLED IN THE PROCESS OF DESTABILIZATION ARE LISTED AS EDIBLE SPECIES OR LISTED IN THE RESIDENT HUNTING REGULATIONS, THEY MAY BE SUPPLIED TO GMSFS.
- ④ GAME MEAT SOURCED THROUGH RESIDENT/TOURIST HUNTING IS PROCESSED IN-SITU. GAME MEAT SOURCED THROUGH WILDLIFE FARMS AND OTHER CAPTIVE FACILITIES MUST BE PROCESSED AT AN ABATTOIR.
- ⑤ GMSFS MAY FURTHER PROCESS GAME MEAT INTO OTHER MEAT PRODUCTS PROVIDED THEY ARE IN POSSESSION OF A SMALL-SCALE PROCESSING INDUSTRY LICENCE.
- ⑥ GAME MEAT SELLING OPERATORS MAY ALSO BE OWNERS OF OTHER SELLING/SERVING ESTABLISHMENTS.

⁴The diagram depicts the legal game meat industry only, rather than any illegal bushmeat, as this is the primary point of discussion in the report.

3.2 SOURCING

The **sourcing stage** in the game meat value chain refers to the ways through which game meat is acquired by game meat selling operators. The Game Meat Selling Regulations stipulate that game meat may be sourced through the following wildlife utilisation schemes: 1) resident hunting, 2) tourist hunting, 3) wildlife captive facilities, which include wildlife farms, wildlife ranches, zoos, and wildlife breeding sites, 4) culling and cropping, and 5) problem animal control (PAC).

Based on the above sourcing pathways, at the time of this research GMSF operators could obtain game meat in the following ways:

- by hunting for game animals themselves,
- by purchasing game meat from tourist hunting companies,
- by buying animals obtained through problem animal control, and
- by buying or obtaining game animals from a wildlife captive facility⁵.

The first two ways are governed by the Resident Hunting Regulations and the Tourist Hunting Regulations, while the last two methods are governed by the Dangerous Animals Damage Consolation Regulations (herein referred to as Problem Animal Control) and the Wildlife Conservation (Management of Wildlife in Captivity) Regulations, respectively.

For the three years between 2020 and 2023, GMSF operators did not source game meat from captive wildlife facilities (see Section 3.2.4) as these were not yet operational to supply the game meat selling industry. All five sourcing methods are governed by regulations that pre-date the Game Meat Selling Regulations. Section 3.2.1 to 3.2.2 delves further into the contribution of each sourcing pathway in the game meat selling industry.

The management of these wildlife utilisation schemes in the country promotes the consideration of animals' welfare, which means that any wrong or cruel treatment of animals during

5 wildlife utilisation schemes

are used to source game meat for the game meat selling industry

⁵Means a wildlife ranch, farm, breeding facility, orphanage facility, sanctuary, zoo and any other ex-situ facility; as per the Wildlife Conservation (Management of Wildlife Captive Facilities) Regulations, 2020.



A resident hunter prepares a wildebeest carcass for further dressing.

and after being harvested for meat production is not allowed. Therefore, hunters and operators of game meat selling facilities are required to humanely treat game animals and carcasses from the source to the point of sale.

3.2.1 RESIDENT HUNTING

The Wildlife Conservation (Resident Hunting) Regulations govern resident hunting in Tanzania. These regulations were reinstated in 2020 to provide the game meat selling industry with a legal source of game meat. Previously

resident hunting was introduced to provide “indigenous Tanzanians legal access to wildlife use” (MNRT, 2007) and to supplement the protein and subsistence needs of local communities that lived in and around protected areas (Wilfred, 2019). The scheme was also put in place to reduce the incidence of overharvesting and poaching by local communities especially those in proximity to wildlife protected areas. The revised resident hunting regulations not only allow hunting for subsistence but also allow resident hunters to sell the hunted game – but only through licensed GMSFs.

TABLE 1.

Timeline of the revisions to the resident hunting regulations in Tanzania.

2007-2010	Resident hunting was provided in the wildlife policy of 2007, as one of the priorities to realising value of wildlife to the rural communities in the country. The government established a local hunting system to enable local and foreign residents of Tanzania to get game meat easily and cheaply while taking into account sustainable utilisation. The government then set aside open wildlife areas to be used for local hunting activities through formal arrangements provided in the Resident Hunting Regulations of 2010.
2016	Resident hunting was banned due to reports of illegal practices which included illegally venturing into hunting blocks, widespread corrupt practices that implicated the District Game Officers, hunting practices of large groups without consideration for animal welfare issues and unethical hunting practices e.g., using machine guns to hunt wildlife.
2020	Regulations were reinstated following the enactment of the Game Meat Selling Regulations in order to provide a key source of meat for the game meat industry.
2021	The Resident Hunting regulations were revised to change the ownership of resident hunting blocks to allowing private ownership of these designated areas, which had previously been owned by the national government. The government held an online auction for these resident hunting blocks, and four successful candidates won bids. However, these regulations did not go into force due to irregularities observed during the auctioning process. Only the two out of the four companies that won the bid were later provided with the license to operate two hunting blocks, both in the Lindi region in southeastern Tanzania.
2022	The Resident Hunting regulations were revised to rescind the privatisation of resident hunting blocks. These regulations reinstated the former method of hunting as presented in the regulations of 2020. The revised regulations were also presented in Kiswahili language to allow easy interpretation among locals.

The scheme is regulated by MNRT and takes place in designated resident hunting blocks which are located outside core protected areas (PAs) but still occur within wildlife open areas⁶ under the jurisdiction of the relevant local government (Resident Hunting Regulations, 2022). It may also take place in partially protected Game Controlled Areas (GCAs), provided that these areas are not already designated for trophy hunting, a type of hunting whereby a part of the hunted animal is kept (see Section 3.2.2). At the district level, the scheme is managed by TAWA and the district council and is overseen by DGOs who issue hunting licences. Licences are issued per hunt, upon payment of the prescribed fees and if hunters meet the conditions of having a suitable firearm, a valid firearms license, and resident hunting identity card which ensures that hunters are aware of hunting regulations. During hunting expeditions, a hunter must be accompanied by an authorised officer and may not take more than four casual labourers who must be Tanzanian citizens.

Previous assessments of the resident hunting scheme have suggested that it has been ineffective in providing local people access to game meat and that it has also been ineffective in reducing poaching activities and overharvesting (Leader-Williams *et al.*, 1996; Wilfred, 2019). Rural poor, for whom the scheme was established, are unable to afford the fees and meet the conditions that are required to become a licenced hunter and are left with no choice but to hunt illegally for subsistence (Hurt and Ravn, 2000; Leader-Williams *et al.*, 1996; Wilfred, 2019).

In 2016, the resident hunting scheme was suspended following a review by MNRT which highlighted misconduct such as the killing of unauthorised game animals, hunting outside specified areas and areas not specified in hunting licenses, false reporting of the number of animals killed, and overharvesting—subsequently raising issues around the sustainability of the scheme. In 2018, resident hunting was reinstated (see more details **Table 1**) and, in 2020, the regulations were amended to establish its link as a sourcing pathway for the newly established game meat selling industry.

However, doubt still existed around whether the challenges which led to the suspension of the scheme in 2015 had been addressed prior to its reinstatement and if these challenges could once again arise later. As such, five months into the game meat selling industry's emergence in April 2021, when resident hunting was proving to be a major source of game meat supply, TAWA observed once again the potential risks for misconduct that led to the suspension of resident hunting in 2016, thus resident hunting was suspended indefinitely (GMSAC meeting, March 2022). However, results from this assessment showed that this sourcing pathway was the most relied on by GMSF operators. Despite only being active for five months before resident hunting was suspended, it accounted for 58% of the total volume of game meat sold into GMSFs between December 2020 and June 2023 (unpublished data, TRAFFIC, 2023).

Sourcing of meat through resident hunting is managed by TAWA, including the setting of hunting quotas, providing hunting permits, and supervising hunting expeditions. Resident hunters have the option of selling the meat through a GMSF if they have a licence or to utilise it for subsistence. In the event where meat is supplied to a GMSF, the hunting permit is used as a trophy⁷ ownership permit that can be presented to the law enforcement personnel whenever needed. Game animals hunted through resident hunting are priced according to the resident hunting regulations. However, game meat sold at a GMSF is priced at the discretion of the operator.

The costs for hunting game animals for both subsistence and trade are in accordance with the resident hunting regulations, where each species has its own set price (see Appendix 2). So far, 18 species of mammals have been permitted the African Buffalo (*Syncerus caffer*) and Common Eland (*Taurotragus oryx*) fetch the highest prices of up to TZS300,000 (USD120) each, while wild hare (Leporidae spp.) has the lowest price of TZS10,000 (USD4) per animal. Meanwhile, the price per kg of game meat to be sold to the final consumer is at the discretion of the GMSF operator. The price of game meat has also been observed to be dependent on the original sourcing price

⁶Wildlife open areas are partially protected areas which adjoin protected areas like game reserves and national parks (Wilfred & MacColl, 2014).

⁷This definition covers any wild animal alive or dead, and any horn, ivory, tooth, tusk, bone, claw, hoof, skin, meal, hair, feather, egg or other portion of any wild animal (whether obtained from a hunting expedition or otherwise acquired) and includes a manufactured trophy as per the Wildlife Conservation Act.

of the whole animal. Other factors that dictate the price of game meat include the hunting effort (time spent in the wild) and the distance between the source and the selling point.

3.2.2 TOURIST HUNTING

Tourist Hunting is governed by the Wildlife Conservation (Tourist Hunting) Regulations. It is considered a sport and involves the selective hunting of animals within a hunting block for leisure or obtaining trophies (Tourist Hunting Regulations, 2015). The activity is part of the country's wildlife conservation strategy which aims to contribute to the national economy, thus generating income for conservation initiatives while maintaining the tourism density within manageable limits. In Tanzania, tourist hunting is widely acknowledged as a sustainable and economically viable form of wildlife use (Leader-Williams *et al.*, 1996). The scheme is based on a quota system informed by research conducted by TAWIRI and coordinated by TAWA. The industry has evolved for over 100 years, through which government has enhanced its administrative and management systems to control the hunting industry and run it sustainably for over 40 years.

The tourism sector makes a significant contribution to the country's economy. According to the World Travel and Tourism Council (WTTC, 2020), it is second after the manufacturing sector in contributing to the national income. The sector's contribution to the GDP in 2019 was USD6,577.3 million, equivalent to 10.7% of the country's GDP. According to an MNRT report (2022), between 2022 and 2023, 1034 hunting tourists (i.e., hunters and observers) visited Tanzania, contributing TZS170 billion (USD67 million). The number of hunters has been steadily increasing over the past five years.

Tanzania is considered to have one of the largest populations of big game in Africa as well as among the greatest variety of wild species in the world (Anon., 2023). The tourism hunting industry in Tanzania has been developing since 1960. It was the first country in Africa to implement block and quota systems. The industry has sustainably developed through the off-take of mature males from populations managed through issuing low quotas and high-quality trophy hunting, which is seen as a sustainable

form of wildlife use (Leader-Williams *et al.*, 1996).

TAWA is responsible for regulating and managing all activities related to tourist hunting. Hunting takes place in designated hunting blocks located in game reserves, game-controlled areas, open wildlife areas, and wildlife management areas. Unlike resident hunting, tourist hunting is organised by licensed hunting companies. One hundred and forty-six hunting blocks were allocated to 59 hunting companies between 2013 and 2018 (the latest period for which data is available). Also, unlike resident hunting, tourist hunting companies are issued with a five-year licence. The 2015 Tourist Hunting Regulations list 84 species of mammals that can be hunted on a tourist hunting license. Hunting can only take place during the hunting season (July to December) each year. The cost of hunting animals through tourist hunting is much higher than that of resident hunting (see Appendix 2). For example, the price of hunting one Cape Buffalo (*Synceus caffer caffer*) through tourist hunting (USD1,900) is over 20 times the price allocated for resident hunting (USD80). Other species that can be hunted by tourists are not included in the resident hunting regulations and can attract high fees. The African Elephant (*Loxodonta africana*) is priced the highest at USD20,000, and the Marsh Mongoose (*Herpestes paludinosus*) is among the lowest (USD60).

Tourist hunting has been mentioned as one of the sources of game meat in the Game Meat Selling Regulations. Tourist hunters typically retain high-value trophies such as horns, teeth, skin and claws, and often the meat is left behind. Upon agreement between the hunting companies and game meat-selling facility operators, this surplus meat can then be supplied for sale to the GMSFs. However, survey results showed that tourist hunting is not yet considered a reliable or significant source of game meat because tourist hunting is only practiced during the hunting season from July to December, limiting the supply that can be acquired and then sold to GMSFs. Research for this report also showed that in 2020, tourist hunting did not contribute to the total volume of game meat sold via GMSFs and only accounted for 3% of the game meat supply in 2021, rising to 22% in 2022.

22%
of the total volume of game meat sold in GMSFs in 2022 was sourced through tourist hunting



A resident hunter with their hunted impala.

Another reason that limits supply of game meat sourced through tourist hunting is the reluctance of hunting companies to work with game meat selling operators. In the same way that game meat selling operators can be resident hunters themselves, GMSF operators can also be owners of a tourist hunting company. However, in cases where GMSF operators are not the hunters themselves, they can buy the game meat from tourist hunting companies. The prices at which game meat is sold by hunting companies to GMSFs are at the sole discretion of the hunting companies. In interviews with staff from five hunting companies, they shared that they are often reluctant to work with operators to transfer the ownership of the meat as it is an added process that offers no significant financial incentive, especially when the meat can instead be used to feed the hunting camp, as bait for the next hunt, or on some occasions providing it to communities as part of a strategy to promote community-based conservation. However, during the research for this report, TRAFFIC learned that some owners of tourist hunting companies had opened their own GMSFs, likely to take advantage of additional income opportunities from on-selling their tourist-hunted game meat and purchasing game meat from other sources to sell via one or more GMSFs.

3.2.3 PROBLEM ANIMAL CONTROL

Problem animal control refers to strategies for managing human-wildlife conflict. It is informed by the Dangerous Animals Consolation Regulations, 2011. These regulations define damage to be a “permanent, temporary or partial destruction of crops or death of livestock or injury to or death of a human being”. The regulations also stipulate the conditions for how a person may claim compensation for damage to his or her property.

The government agency tasked with responding to a community report of a problem animal is dependent on the location of the incident. If an animal is located in or near a national park, the relevant authority is Tanzania National Parks Authority (TANAPA); if an animal is located in the Ngorongoro Conservation Area, then the relevant authority is the conservation area authority; if an animal is located outside these protected areas, TAWA and the District Council are responsible.

If the animals that are killed as part of problem animal control are listed in the Dangerous Animals Consolation Regulations, the carcasses may be sold to GMSF operators after an agreement (including payment for each carcass) between GMSF operators and relevant authorities (M. Andrew, TAWA, pers.

comm. to Q. Kagembe, November 2023). For animals listed in the Resident Hunting Regulations, payments are made with reference to the prices stipulated in the regulation. For animals that are not listed and whose prices are not specified in the regulations, the price is negotiated between the GMSF operator and the DGO or the responsible wildlife authority. Unlike the other sourcing pathways, payments for game meat through the problem animal control sourcing pathway are made to the Office of the President of the Regional Administration and Local Government (PO-RALG) instead of TAWA. Upon completion of payment, the responsible wildlife officer provides the GMSF operator with a trophy ownership permit.

The sale of game meat via GMSFs, obtained through problem animal control, only came about as a result of the new game meat selling industry. Previously, whenever there was a problem animal in the community, community members would contact the relevant officer (oftentimes the DGO) who would then try to guide or push the problem animal back into the protected area. If the animal proved difficult to be guided back to the protected area, the DGO would ask for TAWA's endorsement to kill the animal. If an animal or group of animals is killed during a problem animal control incident, historically, the Director of Wildlife, could authorise the distribution and utilisation of the game meat to the community. This was one of the ways that community members could be compensated for the costs and damages incurred to their life or property. However, with the new game meat selling industry, the DGOs are still responsible for responding to reports of problem animals but, if classified as such by the DGOs, the animal could then be sold to GMSF operators, who will be deemed responsible for the slaughter, dressing, and transport of game meat obtained from these problem animals. The meat is then sold at the GMSFs, where consumers from rural or urban areas purchase the meat (Mteza Media, 2023). However, GMSF operators who acquire the problem animal are not restricted from distributing some of it voluntarily to the community members where the incident happened as a gesture of goodwill. In Section 4.1, the report further examines ways through which legality in the game meat value chain may be compromised as a result of the current arrangements in the problem animal control sourcing pathway.

3.2.4 WILDLIFE FARMING, RANCHING, ZOOS, AND BREEDING

The establishment of captive wildlife facilities, such as zoos and game ranches are primarily governed by the Wildlife Conservation (Management of Wildlife Captive Facilities) Regulations. Wildlife captive facilities, as defined in Tanzania, may be established in areas outside any reserved land or conservation area, on village land as per the land use plans with written approval from the relevant local government authority, and in any other controlled environment. TAWA manages all activities that take place within an established Wildlife Captive Facility, including trophy hunting, game meat production, photographic tourism, and selling of manufactured trophies. As of 2023, Tanzania had a total of 90 wildlife captive facilities (six wildlife ranches, 41 breeding sites, seven wildlife farms, 35 zoos, and one wildlife sanctuary/orphanage centre). These facilities were established prior to the enactment of the Game Meat Selling Regulations, and therefore, they were not designed with the intent to supply game meat. However, such facilities were highlighted as one of the potential sources of game meat as defined in the regulatory framework enacted in 2020.

TAWA has been encouraging more Tanzanians to establish wildlife farms as the agency sees wildlife farming as a way of diverting dependency to sourcing directly from wilderness areas, such as through resident hunting (see Section 3.2.5 Problem Animal Control). The regulations for establishing these farms were announced in 2020, and the number of applications to open a wildlife farm has been growing since then. At the end of 2023, there were seven wildlife farms, one of which has recently been provided with a permit to harvest animals. However, it is unknown whether these animals have been supplied to the GMSFs as none of the GMSFs that were surveyed reported to obtaining game meat from wildlife farms. Despite the active promotion of wildlife farming by the government to expand the scope of access to game meat while ensuring sustainable supply the uptake of wildlife farming has been slow because of high establishment and running costs as well as strict conditions that need to be met to set up these facilities. For example, in order to set up a wildlife farm, a business owner should own an area of not less than 500



High establishment and running costs

hinder Tanzanians from opening wildlife farms

ha for establishing a wildlife farm and 1500 ha for a wildlife ranch. In the case of joint ventures with non-citizens, the regulations provide that the Tanzanian citizens should own 51% of the shares. Such conditions have discouraged GMSF operators from investing in this industry.

When the research team enquired into why there has been no game meat sourced through farming, ranching, or breeding despite these being mentioned in the Game Meat Selling Regulations, the main reason given was because there were no provisions in the regulations that could specifically cover the sourcing of animals from Wildlife Captive Facilities to GMSFs (from rearing, slaughter, to sale) (Mwaikambo, 2022). Another reason given was the reluctance of farm and ranch owners to be involved with the game meat selling industry. Current farming operations were established prior to the Game Meat Selling Regulations coming into force in 2020, involving large financial investment and natural capital – although they were not set up for the purpose of supplying game animals.

3.2.5 CULLING AND CROPPING

The Wildlife Conservation (Management of Wildlife Captive Facilities) Regulations, 2020, defines cropping as a regular offtake of surplus specimens for both conservation and economic purposes. In contrast, culling is defined as an operation aimed at killing a specific number of specimens of species within the area to

manage it in accordance with the management plan of the area or within a specified area.

While there is no specific piece of legislation that underpins culling and cropping, these two methods are mentioned in the Game Meat Selling Regulations as sources of game meat.

According to the Wildlife Conservation Act and the Management of Wildlife Captive Facilities Regulations, culling and cropping can be carried out in captive wildlife facilities and in core wildlife protected areas such as national parks, game reserves, wildlife management areas, game-controlled areas, forest reserves, and other areas such as wildlife open areas. This means that culling and cropping can also be undertaken in resident hunting blocks and tourist hunting blocks based on the management plans of the designated areas. Whenever needed, culling and cropping is carried out by either of the agencies, TAWA, TANAPA, and NCA, depending on where the culling or cropping is taking place, with the supervision of TAWIRI. The process is informed by the national Culling and Cropping Committee.

Game animals or carcasses obtained from either culling or cropping can be sold directly to GMSFs. However, if cropping is done in a wildlife-protected area, arrangements for supplying the GMSFs are facilitated by TAWA in collaboration with the relevant management authorities. In that case, the price of the meat is based on the prices set in the local resident hunting regulations (Game Meat Selling Regu-



Wildlife farm in Mbalizi – Mbeya, Tanzania

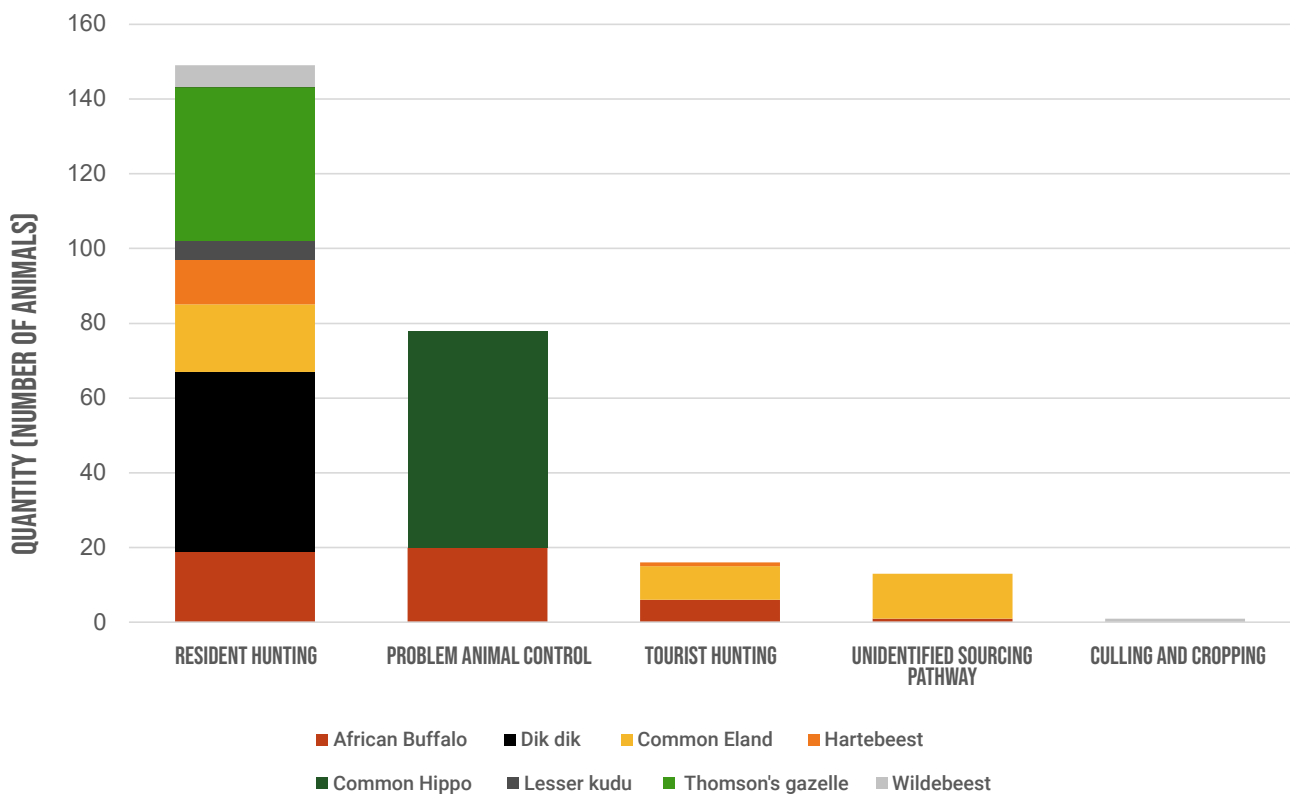
lations, 2020). Meanwhile, if culling or cropping is conducted on privately owned captive wildlife facilities, facility owners arrange for the supply of the game animal carcasses with the GMSF operators under the supervision of TAWA. The price is set by the owner, but 10% of the cost price for each sourced animal is given to TAWA (K. Gregory., pers. comm. to Q Kagembe, November 2022). In situations of live animal capture, the Game Meat Selling Regulations stipulate that animals must first be taken to a certified abattoir before being supplied to the GMSF (Game Meat Selling Regulations, 2020). During the survey, TRAFFIC encountered only one GMSF operator who reported obtaining game meat through culling and cropping, hence only an isolated example – however, it should be noted that culling and cropping usually happens either in conjunction with wildlife captive facilities (which are not yet fully operational for the game meat selling industry) or by government intervention.

3.2.6 CONTRIBUTION OF SOURCING PATHWAYS TO GAME MEAT SUPPLY

Between 2020 and 2022, the majority of GMSF operators that were surveyed reported acquiring game meat from either resident hunting (58% of instances) or problem animal control (30.4%). Hippopotamus (*Hippopotamus amphibius*) obtained through problem animal control accounted for the largest volume of meat that was reportedly supplied to the GMSFs, followed by buffalo, obtained through resident hunting (Figure 2). Continuous monitoring of GMSFs revealed that at least 58 hippos were sold as game meat across six regions (Man-yara, Kilimanjaro, Arusha, Dodoma, Mbeya) between December 2020 and June 2023.

FIGURE 2.

Number of times that a sourcing pathway was mentioned by a game meat seller to be the method through which game meat was sourced and the species that were mentioned between December 2020 and May 2023.



3.3 TRANSPORT

The second stage after acquiring game meat is transporting it to GMSFs. However, the transport of game meat can also happen at different points of the supply chain. The Resident Hunting Regulations and Tourist Hunting Regulations both stipulate that resident hunters and tourist hunting companies must respectively own a pick-up or fleet of pick-up vehicles and refrigerator/s and freezer/s before they can be issued hunting permits. Resident hunters and tourist hunting companies use these vehicles and freezers/refrigerators to store carcasses and meat while on a hunt and then to subsequently transport it to the GMSFs.

Currently, no specific companies/individuals facilitate the transporting of meat to GMSFs; instead, GMSF operators are responsible for transporting meat to their facilities. This means that each GMSF should have registered meat transportation vehicles (i.e. a registered meat van). The Game Meat Selling Regulations highlights that vehicles used to transport game carcasses from the point of harvest to meat abattoir or GMSF must be fitted appropriately in relation to the category of the game animal being handled. Harvested game animal meat or carcasses must be transported and reach the meat abattoir or GMSF within 24 hours of being harvested. Hunters are also advised to preserve the neck slit area (i.e. the throat) to avoid contamination (dirt, dust) when transporting the carcass. For traceability purposes, necessary documents must accompany the transport of game carcasses to a GMSF or meat abattoir. The documents must be verified by the wildlife officer and game meat examiner (veterinary officer) before the meat is supplied to the GMSFs.

The main challenge observed at this stage of the supply chain is the maintenance of a cold chain. The Game Meat Selling Regulations do not fully highlight how a cold chain and other food safety measures are to be achieved and maintained throughout the supply chain. The regulations only highlight a few requirements that vehicles used must comply with to transport game meat, including the following:

1. A corrosion-resistant hanging frame to bleed carcasses in a hanging position;
2. Designed to provide sufficient space between carcasses to allow effective airflow for cooling;
3. A corrosion-resistant floor, free from holes, durable, non-toxic, smooth-surfaced, impervious and cracks;
4. Designed in such a manner that the animal's feet do not touch the ground while in transit.

These requirements alone cannot guarantee the safety and quality of meat in addition to the fact that these do not necessarily prescribe the use of a specialised meat van. Requirements to maintain the safety and quality of meat in transport are, however, covered by the Meat Industry Act, which prescribes that meat must be transported in a meat van fully equipped to maintain a cold chain from source to selling point. The Act highlights that, while in transport, meat should be stored in temperatures between 0°C / 32°F and 4.4°C / 39.2°F and maintained through to the point of sale using a registered meat van. It must be noted, though, at the time of research that the Meat Industry Act only encompassed meat obtained from domestically reared livestock animals. However, the Game Meat Selling Regulations require all relevant legislation to be incorporated into the regulation of game meat-selling practices. This means that all actions related to the sale of meat for public consumption should be informed by the Meat Industry Act and its accompanying regulations.

Prior to the enactment of the Game Meat Selling Regulations, meat obtained from animals hunted through resident hunting was meant for subsistence use, while meat obtained through tourist hunting was either used in the hunting camp or used as bait for the next hunt. With the regulatory change in 2020, it is unclear whether resident hunters and tourist hunting companies—regardless of whether they are also GMSF operators or not—must also own meat vans if they intend to transport meat from

Within 24 hours, game carcasses must be transported from the point of harvest to the GMSF



Appropriately fitted meat transportation vehicles are required for the transport of game meat.

the point of hunting to the GMSF or if they may just use their existing vehicles and freezers and refrigerators. It is additionally unclear if using these refrigerators/freezers instead of a meat van satisfies the conditions of meat transport and safety of the Meat Industry Act.⁸

In surveying GMSF operators, TRAFFIC found that only 10% of them had a special meat van. GMSF operators stated that it was too expensive to purchase a meat van considering they had reported financial losses due to a limited supply of game meat in the 2021-2023 survey period. Because TRAFFIC only surveyed GMSF operators and not hunters, it remains unknown whether hunters who are not GMSF operators have registered meat vans as required or if they just use their refrigerators/freezers to store the meat during transport to a GMSF where they can sell it. However further analysis of the game meat selling regulations revealed no

provisions that specify the type of meat van to be used for transporting meat.

During visits to GMSFs, TRAFFIC also observed some GMSF operators using public transport to deliver meat to customers living in distant areas. While this is in contravention of the procedures for transporting meat as specified in the Meat Industry Act, the Game Meat Selling Regulations do not specify transport requirements of meat to clients outside the district where the facility is located. As a result, private cars and public transport are being used, affecting the quality and safety of the meat. For example, without the ability to maintain consistent temperatures and without proper handling facilities, the use of rudimentary transportation may facilitate the growth of bacterial pathogens, thus stimulating the transmission of food-borne diseases.

⁸ The Game Meat Selling Regulations provide that every game meat selling facility operator should comply with any other relevant laws. This includes wildlife regulations and meat-related legislation such as the Meat Industry Act and corresponding regulations

3.4 PROCESSING

For the purposes of this report, processing includes the actions involved in preparing a wild animal carcass before it is sold for human consumption, involving slaughter, skinning and butchering. In the game meat value chain, game meat processing occurs at both the sourcing and selling nodes.

PRIMARY PROCESSING

Primary processing occurs at the sourcing stage, where carcasses are partially or fully dressed after the hunt and/or slaughter. The main actions involve slaughtering, skinning, slicing, and packaging. However, these actions depend on the source types, as explained below.

Game animals killed through both resident and tourist hunting or killed during a problem animal control situation are processed in-situ. Both the resident hunting and tourist hunting regulations have provisions that require hunting crews to be accompanied by skinners who ensure that a hunted animal is properly skinned. The skin, together with any other trophies, is salted, appropriately dried, and stored. However, because there are no formal guidelines governing processing game animals hunted for supplying GMSFs, researchers found that some hunters might only do some preliminary processing in situ - such as cutting and packaging the carcass in small portions - and then transport the partially processed carcass to the GMSF for further processing.

For animals obtained from captive wildlife facilities, the Game Meat Selling Regulations provide that game animals so sourced for the purposes of supplying to GMSFs should go through a registered abattoir. This means that all the slaughtering, skinning, and viscera removal should occur in a controlled setting. However, the current abattoirs in the country only deal with domesticated (livestock) animals and it is unclear whether these abattoirs may also be used for wild animals. However, as explained earlier, wildlife farming is not yet a source of game meat, so the relevant processing requirements remain unknown.

SECONDARY PROCESSING

Secondary processing occurs at the GMSFs and involves the additional butchery of a partially dressed carcass. During visits to the GMSFs, TRAFFIC observed that licensed GMSF operators carried out further processing of game meat aside from selling fresh meat. This involved converting meat into various byproducts such as sausages, dried meat, etc. When asked about further processing of game meat, GMSF operators reported that this adds value to the retail price for the meat which is another way for them to earn more and recoup investment costs. Currently, any further processing of game meat (including converting it to other meat products) and the controls around it are not provided for in the Game Meat Selling Regulations.



An increase in retail value

is achieved by transforming game meat into processed meats



The designated skinner of the hunting team skinning a hunted warthog

3.5 SELLING

In the game meat selling industry, game meat must be sold at GMSFs (colloquially referred to as butcheries) as per the Game Meat Selling Regulations. A “Game Meat Selling Facility” is defined as a licensed and registered place or amenity for cutting up and selling of game meat” where game meat is taken to mean “the fat, blood, flesh or an offal of any animal whether fresh, dried, pickled or otherwise preserved.”

3.5.1 PROCESS OF ESTABLISHING GAME MEAT SELLING FACILITIES (GMSFS)

The Game Meat Selling Regulations stipulate that game meat may be sold either at a registered premises or out of a specialised van. The facility must be located within an area designated by the MNRT as a place authorised for the establishment of GMSFs. The certificate to operate a facility is provided by TAWA and is valid for a period of five years. The regulations provide that a person who wants to open a GMSF must be a citizen of the United Republic of Tanzania, and in the event of a company or corporate body, with 51% of the shares being held by a citizen or citizens of Tanzania.

GMSFs are considered to be fully compliant when they possess the following documentation:

1. Certificate of Registration (TAWA);
2. Tax clearance (TRA);
3. Hunting license (TAWA);
4. Trophy dealer’s license (TAWA);
5. Electronic fiscal device (EFD)⁹ that records stocks and issues receipts;
6. GMSF register/registry (customer contacts);
7. Medical certificate (TBS);
8. Certificate from the Tanzania Meat Board;
9. Special meat transportation vehicle; and,
10. Meat inspection certificate (Certified Meat Inspector (DVS)).

The above requirements, when compliance is implemented correctly, are the key data elements that constitute a traceability system that aims to ensure legality in the sourcing and selling of game meat. As such, game meat sellers are required to present authorisation in the form of the EFD, hunting permit (if they take part in hunting activities), certificate of trophy ownership, or any written authorisation to law enforcement to prove that they acquired meat legally. Buyers may also be checked by law enforcement to ensure that purchased meat is from a licensed GMSF through legal receipts and then cross-checking this with the customer records in the GMSF registry. While these key data elements appear to be in place, it is necessary for these elements to be linked through some form of system that would allow for the verification of legality in the value chain at any particular point.

GMSF premises are also required to have all the necessary conditions and equipment as directed by the Meat Industry Act, including: having fridges/freezers for meat storage; stainless steel hooks for hanging meat; buildings painted white both outside and inside; the building should have tiles from the floor to the ceiling not less than six feet in height; and it should have an aluminium glass door, among other requirements stipulated in the Act. The majority of the GMSFs visited by TRAFFIC met these requirements.

After the passing of the Game Meat Selling Regulations, in 2020, GMSF operators were only allowed to open GMSFs in 23 of the 31 regions of Tanzania. However, this number has expanded, and now these selling points can be established in all parts of the country. The first GMSF was opened in Dodoma on 20 December 2022. As of June 2023, TRAFFIC confirmed that 74 GMSFs have been licensed to sell game meat in Tanzania. As of 2023, facilities were established in 21 of the 31 regions in the country with Arusha having the greatest number of facilities (15), followed by Dar es Salaam (13) and Dodoma (6) (Figure 4). Only 23% (16) of them were actively operating, with 30% having never

⁹Electronic Fiscal Device (EFD) means a machine designed for use in business for efficient management controls in areas of sales analysis and stock control system and which conforms to the requirements specified by the laws. Source: Tanzania Revenue Authority - E-Fiscal Devices (EFD) (tra.go.tz)

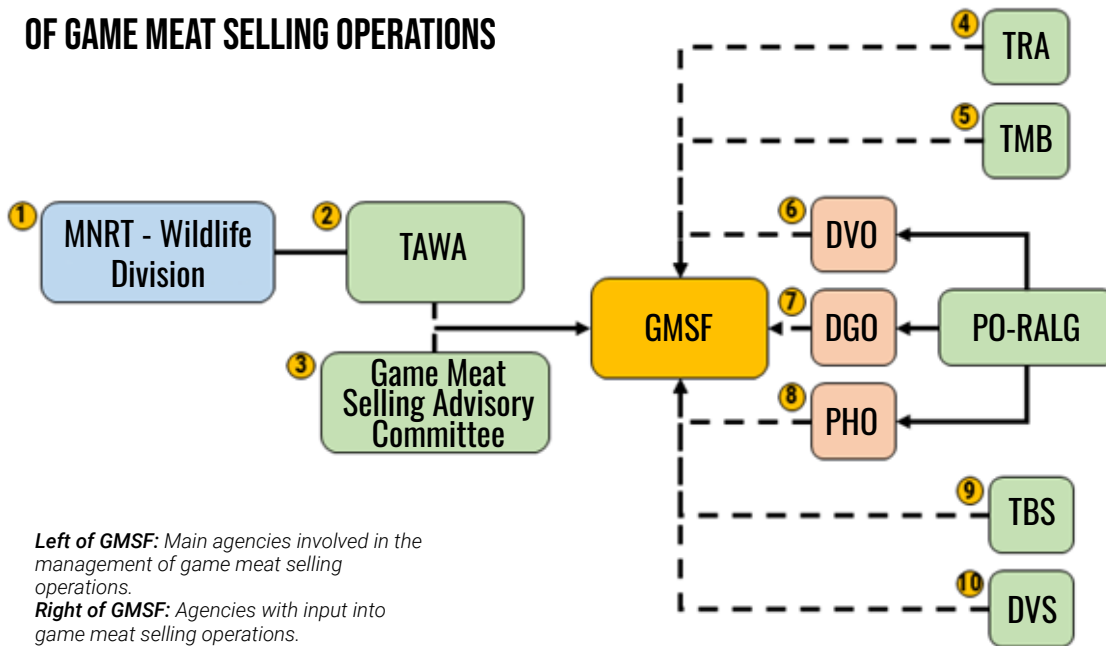
been able to sell game meat, and the remaining 47% having only been able to sell at least once (Tanzania Web, 2022; TRAFFIC, 2023). Section 3.5.3, delves further into the challenges facing

the supply of game meat, including the temporary ban of some main sources of game meat, such as resident hunting.

FIGURE 3.

Distribution of GMSFs by region in Tanzania as of June 2023.

AGENCIES INVOLVED IN THE MANAGEMENT OF GAME MEAT SELLING OPERATIONS



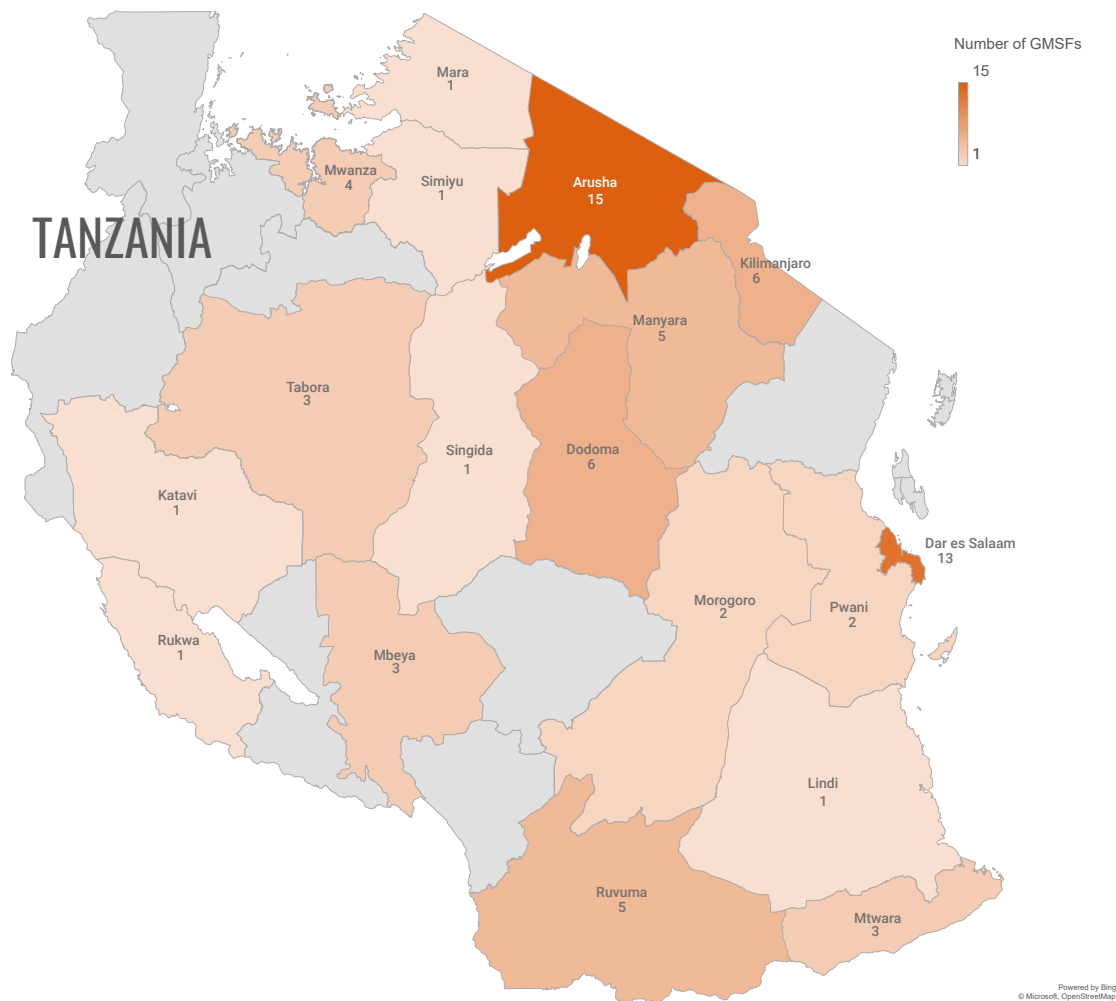
Left of GMSF: Main agencies involved in the management of game meat selling operations.

Right of GMSF: Agencies with input into game meat selling operations.

- 1 **Ministry of Natural Resources (Wildlife Division):** Led the development and enactment of the Game Meat Selling Regulations and associated regulations and authorized the establishment of GMSFs.
- 2 **Tanzania Wildlife Management Authority (TAWA):** Oversees the monitoring and management of the game meat trade from licensing, inspecting, and ensuring GMSF compliance with regulations.
- 3 **Game Meat Selling Advisory Committee (GSAC):** Composed of five members appointed by the Director General of TAWA. Members are experts in veterinary services, wildlife management, food and drugs control, health control management, and meat inspection. Responsible for filtering applications for GMSFs, monitoring and evaluating the performance of GMSFs, and reviewing standard guidelines related to game meat selling. Advises the TAWA Director General on matters relating to the revocation, cancellation, and suspension of the registration of GMSFs.
- 4 **Tanzania Revenue Authority (TRA):** Provides the electronic fiscal devices (EFDs) required by GMSF operators to open a GMSF as stipulated in the Game Meat Selling Regulations. EFDs serve as business management controls for sales and stocks analysis.
- 5 **Tanzania Meat Board (TMB):** Monitors the production and distribution of safe and quality game meat in established facilities and other outlets such as restaurants and small-scale industries.
- 6 **Tanzania Bureau of Standards (TBS):** Certifies and registers game meat products and monitors meat quality and safety through the approval, registration, and control of the use of standard marks for processed game meat products. Grants, renews, suspends, varies, or cancels any licensed issued for the use of any standards mark especially for processed game meat products. Inspects and registers game meat processing premises.
- 7 **District Veterinary Office (DVO):** Accompanies hunting teams at local hunting activities. Directs meat inspectors to perform meat inspection during hunting (ante-mortem and post-mortem). Certifies that game meat has been inspected, especially in GMSFs. Contributes to zoonotic disease surveillance activities.
- 8 **District Game Office (DGO):** Manages hunting activities and monitors the compliance of established GMSFs with regulations related to sourcing game meat. Receives hunting applications and issues the necessary hunting permits.
- 9 **Public Health Office (PHO):** Monitors the health of GMSF operators and hygiene of GMSFs and processing equipment. Conducts awareness campaigns on safe meat targeting game meat consumers.
- 10 **Directorate of Veterinary Services (DVS):** Develops and implements guidelines related to meat inspection, handling, and hygiene in collaboration with local government agencies. Establishes and maintains animal quarantine facilities and coordinates and supervises animal disease surveillance and reporting for game animals.

FIGURE 4.

Government agencies involved in the management of GMSF operations also known as the game meat value chain managers



3.5.2 MANAGING GMSFS AND ASSESSING COMPLIANCE

The management of GMSFs comes under the jurisdiction of TAWA. The TAWA Director General appoints experts in the fields of wildlife management, food safety, public and animal health, and meat inspection to the Game Meat Selling Advisory Committee (GMSAC) to advise TAWA on all matters relating to coordinating, monitoring, and assessing the operations of GMSFs (Figure 3). Interviews with value chain managers and follow-up research into the value chain revealed little to no monitoring of the harvest and sale of game meat in GMSFs since the regulations were passed in 2020 due to a lack of law enforcement capacity and budget challenges. The challenges of managing this business stems from the small

amount of income the country generates from game meat selling activities. For example, the total costs for registering one GMSF is only TZS266,700 (USD104) which is valid for a period of five years, while at the same time GMSF operators are required to renew a trophy dealers licence which costs TZS59000 (USD23) each year. On the other hand, the price of one animal obtained through local hunting is at most TZS600,000 (USD120) but, on average, the number of game animals that are set aside for harvesting in one season and in established hunting blocks do not exceed 1000 individuals per species that are allowed to be sold in GMSF. Therefore, the government is not accruing enough income from local hunting, (which is currently the reliable source of game animals) that can be channelled to enhance the



None of 34 GMSFs

surveyed were fully compliant with the Game Meat Selling Regulations

management of game meat-selling activities and wildlife conservation programmes such as population census in wildlife areas where hunting blocks have been established.

Information collected during the 2021 scoping phase revealed that DGOs had not prioritised the monitoring of GMSF operations in many districts. About 90% of DGOs had not received information about the need to monitor game meat supply in GMSFs, resulting in some meat failing to undergo proper inspection before it was sold for public consumption. The communication gap between TAWA and the DGOs was then found to have resulted from the absence of formal work arrangements between TAWA and the DGOs on managing the operations of the GMSFs.

Results from the initial scoping study TRAFFIC conducted in 2021 to assess GMSF compliance against the Game Meat Selling Regulations yielded mixed levels of compliance. TRAFFIC visited 34 GMSFs across 10 regions in Tanzania and found that all GMSFs were legally registered with TAWA, had a trophy dealers' license, and a trophy hunting license. However, just over half of the facilities (56%) had Electronic Fiscal Device (EFD) machines at the time of the survey. Some of the GMSF operators stated that they did not have an

EFD because of there was no business due to shortage of supply of game animals. The EFD receipt, aside from being a tax collection tool, is in principle a traceability tool that is used as proof of the transfer of meat ownership from the GMSF operator to the customer. In cases where a buyer is found without it, they can be subjected to a sentence of not less than two years and not exceeding five years or a fine of not less than TZS100,000 (USD40) and not more than TZS5,000,000 (USD1978) or both, for illegal possession of government trophy¹⁰ as provided in the Wildlife Conservation Act, 2009. TRAFFIC also observed that legal requirements relating to public health were not a priority for most GMSFs with only 9% of the facilities having meat inspection certificates at the time of visit (Figure 5).

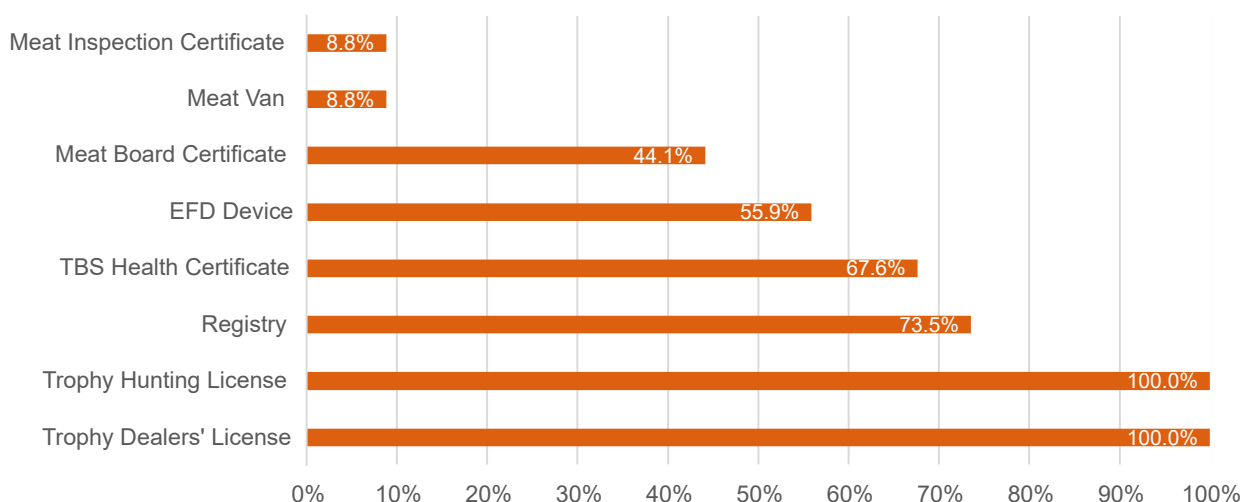
3.5.3 GAME MEAT SELLING: PRICES AND COSTS¹¹

Aside from investment costs, TRAFFIC observed that another factor causing price variations was customer preference. Buffalo was always sold at higher prices compared to other species because it is the most preferred among consumers (Figure 6). Prices were also higher in major cities like Arusha and particularly Dar es Salaam (Figure 6, Figure 7).

Scarcity in game meat supply have led to investment losses for GMSF operators

FIGURE 5.

Percentage of GMSFs having the requirements needed to establish and operate GMSFs as laid out in the Game Meat Selling Regulations, for 34 GMSFs surveyed between July and November 2021.



¹⁰ Legally defined as "Unlawful Possession of Government Trophy Contrary to Section86(1) and (2)(b) of the Wildlife Conservation Act, No. 5 of 2009 read together with Paragraph 14 of the 1st Schedule to and Sections 57(1) and 60(2) of the Economic and Organized Crime Control Act [Cap. 200 R.E. 2019]".

¹¹ Involves price for meat sold at a GMSF, where it is not regulated. This means that each operator can set his/her own price largely based on the location, market and capital invested.

Aside from making it easier for communities with the financial resources to acquire protein from game meat, the game meat selling scheme also provided a new source of potential income, an opportunity that attracted several entrepreneurs¹² looking for income diversification (GMSF Operators, pers. comm. to Q. Kagembe, November 2022). Interviews with these GMSF operators revealed different investment levels into the opening of their GMSF. The maximum investment amount was estimated to range between approximately TZS150,000 (USD59) and TZS150,000,000 (USD58,979). Most of their investments went largely into purchasing vehicles and equipment, such as hunting safari vehicles (50%) and commercial buildings (18%) plus other types of equipment (32%).

The businessmen TRAFFIC interviewed had hoped to significantly profit from selling game animals primarily obtained through resident hunting as they saw resident hunting as the more reliable way to obtain game meat. For example, a buffalo can be bought for TZS200,000 (USD80) but, considering its weight, the meat could be sold for TZS2,000,000 (USD786) to

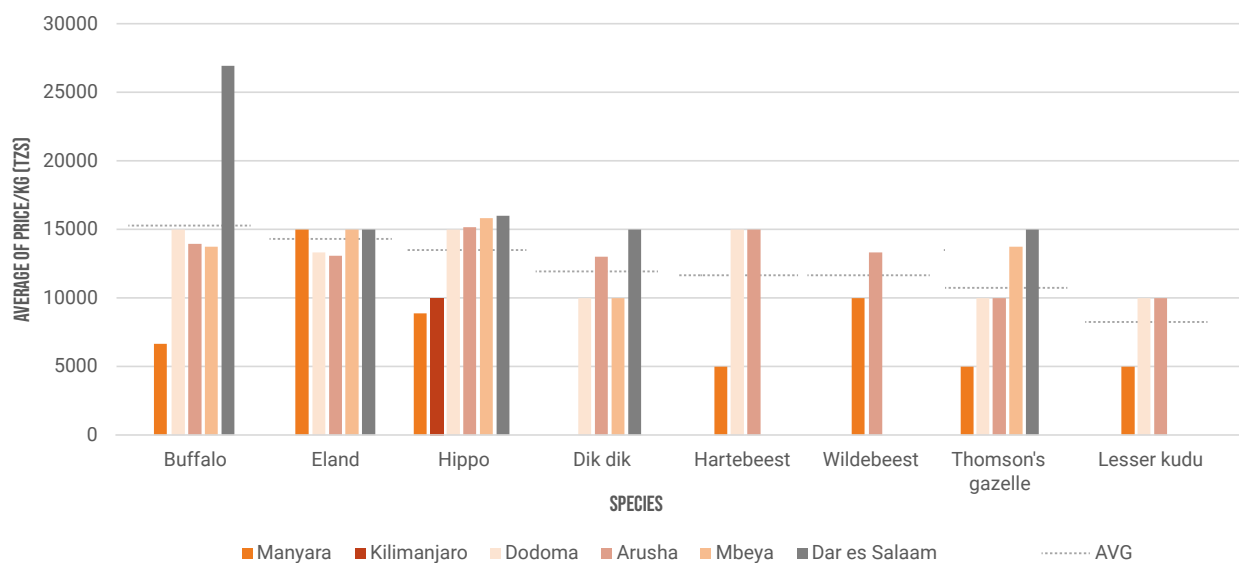
TZS3,000,000 (USD1180) at the GMSF. However, many of these facility operators claimed to have not made any profit from their business since they opened—losing up to 50% of their investments—due to the limited supply of game meat. Nevertheless, the massive returns from selling game meat despite a scarcity in supply kept the businessmen hopeful for their business.

As there was a strong sentiment among GMSF operators to recoup their losses and not close their businesses, the prolonged scarcity of game meat could potentially increase the risk of poached meat entering the legal supply chain. For example, TRAFFIC learned of a few operators who were suspected of being involved in illegal activities, with some of them being arrested for poaching. However, gathering more information on the prevalence of such illegal activities proved difficult for law enforcement authorities due to limited monitoring activities, especially at the point when game meat is first brought into the GMSF.

The high demand for game meat among consumers assured GMSF operators of a large and reliable market for game meat, thus increasing

FIGURE 6.

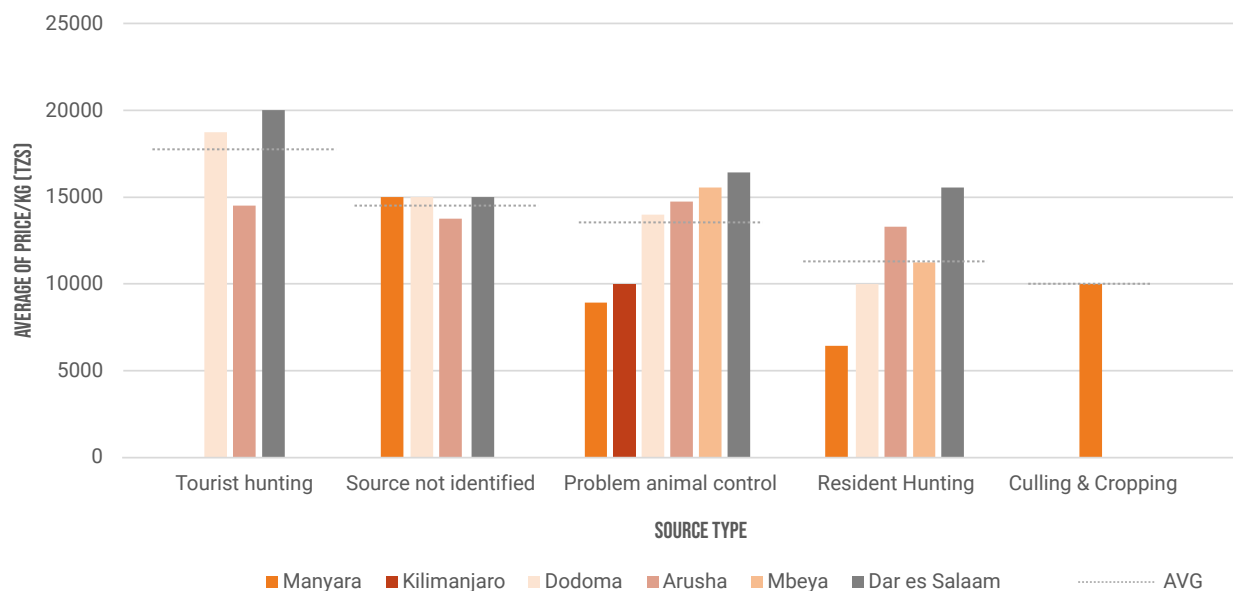
Differences in average price per kg of game meat sold by game meat selling operators based on species sold and region of sale. Source: TRAFFIC survey (2021-2023)



¹²Researchers were unable to ask about the average incomes of survey respondents as this is generally considered a taboo topic of conversation.

FIGURE 7.

Differences in average price per kg of game meat sold by game meat selling operators based on sourcing type and region of sale. Source: TRAFFIC survey (2021-2023)



the demand for game animals among GMSF operators as well – not only to meet consumer demand but also to recoup the costs associated with establishing their GMSF. For example, some businessmen expanded the scope of their business by processing game meat into other game meat products like sausages as a value-added commodity (as mentioned in Section 3.4: Processing)

TRAFFIC also observed other places selling meat outside of the GMSF, like at restaurants and at food stalls during festivals. Some of the major cities with game meat selling restaurants included Dar es Salaam, Arusha (three restaurants were identified), and Mbeya. The Game Meat Selling Regulations do not clearly define the procedures for the sale of meat in these establishments (see Section 3.6).

BUSHMEAT (ILLEGAL WILD MEAT) TRADE

During the research, TRAFFIC learned about the sale of large quantities of bushmeat at cities and towns like Arusha, Babati and Moshi.

In personal communication with the DGOs in these cities, TRAFFIC learned of the clandestine methods that bushmeat vendors would use to sell wild meat. For example, they would discreetly communicate with customers to arrange “meet-ups” where customers can pick-up the meat they had ordered or arrange a time when vendors can visit customers’ houses to deliver the meat.

TRAFFIC also learned that bushmeat was being sold at lower prices than game meat with bushmeat (e.g., Bovidae antelope species) selling for TZS3000 to TZS5000 (USD1.5 to USD2) per kg whereas legal game meat was selling for TZS12,000 to TZS25,000 (USD5 to USD10) per kg. Due to bushmeat being cheaper and more readily available than game meat, some GMSFs could not compete with bushmeat vendors and were forced to shut down (Expert at DRA Workshop, pers. comm. to Q. Kagembe, November 2022).

POTENTIAL EARNINGS FROM WILD MEAT



TABLE 2.

The costs of opening and running a Game Meat Selling Facility and the revenue earned by MNRT from applications to open a GMSF. Note that the revenue earned by the MNRT to oversee the compliance of GMSFs is levied as a one-time cost to GMSF operators, so does not support the recurring costs of regular compliance and enforcement of the game meat industry.

	GAME MEAT SELLING OPERATOR		MINISTRY OF NATURAL RESOURCES AND TOURISM	
	TSH	USD	TSH	USD
FIXED COSTS (ONE TIME PAYMENT)				
Permits and licenses needed to open a GMSF	- 600	-0.22	+ 600	+0.22
Documentation needed to register a GMSF	- 266,700	-101	+ 266,700	+101
Trophy dealers' licence	- 59,000	-22	+ 59,000	+22
Infrastructure and Labour costs				
• GMSF building and equipment	- 5.0M to 10.0M**	- 1,900 to 3,800		
• Registered and appropriate vehicle	- 40.0M	- 15,200		
RECURRING COSTS***				
Labour costs (GMSF personnel x2)	- 400/month	- 0.15		
Payment to TAWA to hunt a buffalo	- 200/buffalo	- 0.07	+200	+ 0.07
Hunting trip costs (inc. transport costs, costs for permits to enter hunting blocks, other charges for staying in the hunting block, vehicle rentals, payments to other hunting personnel)	- 2.5M/hunting trip	-950		
	to open and supply a fully compliant GMSF in a year		to oversee the operations of 1 GMSF in a year	
TOTAL	- 75.3M	-28.614	+ 326,500	+124.07

*The GMSF operator is assumed to also be a licensed resident hunter

**The lower cost of 5.0M TSH is used in the calculation for total costs

***The recurring costs are multiplied by 12. The authors assume that only 1 hunting trip occurs in a month and only 1 buffalo is acquired at each hunting trip. This is a very conservative assumption as GMSF operators may acquire more than one animal from each hunting trip.

3.6 CONSUMPTION

The game meat selling industry was established to enable ordinary Tanzanians to access game meat legally. Aside from the Game Meat Selling Regulations stipulating that game meat must only be sold at GMSFs, it also states that game meat buyers are not allowed to resell the meat bought from the GMSF. This suggests that game meat purchased from a GMSF is solely meant for home consumption. However, TRAFFIC learned from GMSF operators and observed during field visits that game meat was also being sold at hotels, restaurants, and other outlets such as in festivals (Figure 1).

As described earlier, the Game Meat Selling Regulations require game meat buyers to ask for a receipt upon purchase and to keep this receipt for as long as they own game meat. The receipt serves as proof that the meat was obtained legally. Failing to do so, the user faces a crime of unlawful possession of a national trophy as per the Wildlife Conservation Act.

Between June and November 2022, TRAFFIC surveyed consumers through telephone interviews to understand their reasons for buying game meat and their perceptions of meat safety and quality. TRAFFIC interviewed a total of 472 game meat buyers from 27 GMSFs located in eight districts across the northern, central, and western Tanzania of which 58% were men and 40% were women. Fifty-two

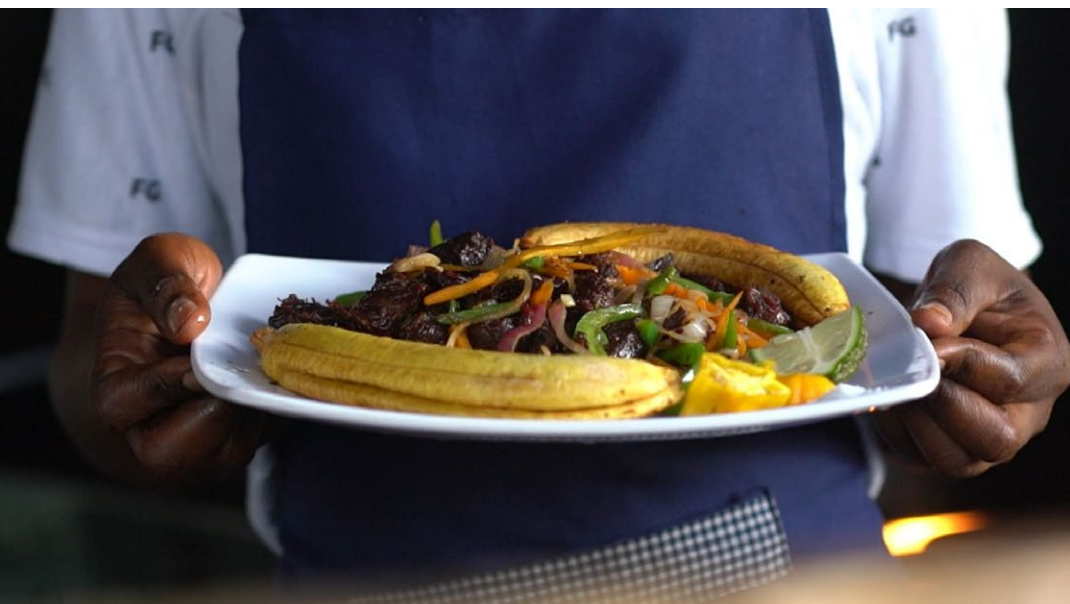
percent of the respondents were aged between 26 and 37 years. Most of the consumers were businessmen (48%) and government officials (32%) (see Figure 8), likely because lower-income consumers are unlikely to afford game meat prices at GMSFs. When consumers were asked (closed question responses) their reasons for buying game meat, nearly half (49.3%) of respondents said that it was because it has no chemical additives or antibiotics (Figure 9).

The survey results showed that most respondents have only been able to purchase game meat one to four times since the game meat selling industry was established (in the period between 2020 and 2022) (Figure 11). This was stated as being due to the lack and infrequent supply of game meat to GMSFs. The survey also showed that a third of respondents preferred buffalo and this was further confirmed during interviews with game meat selling operators (Figure 10).. Preference varied between species, for example, sellers remarked that it would only take an average of two to three days to sell one buffalo, but it might take more than a week to sell one hippo.

When asked how frequently they would buy game meat if there was consistent supply, two-thirds of respondents shared that they would buy game meat one to five times a month, while 30.5% said that they would buy game

**>50% of
game meat
consumers**

surveyed were
higher income
earners



Wild meat being served at a restaurant, Dodoma

meat six to 10 times per month (Figure 11), showing a strong demand and an existing gap between supply and demand as the available sources cannot meet this market demand. Overall, despite the willingness to purchase meat each month if readily available, most respondents successfully purchased meat only one to four times over a period of two years (2020-2022).

In Section 3.5 on selling, it was mentioned that consumers were more likely to purchase from

illegal bushmeat vendors as they were unable to afford game meat sold legally through GMSFs. However, with GMSF operators also struggling to ensure that there was enough meat to keep the GMSFs operational, it was anticipated that GMSF customers would also have to resort to buying game meat from these illegal sources, with bushmeat sellers taking advantage of the opportunity to sell and earn an income.

FIGURE 8.

Respondent profile for 472 known game meat consumers collected through a telephone interview during a consumer survey (closed questions) that covered 27 GMSFs in eight districts across northern, central, and western Tanzania between 2021-2023 by (left) sex, (centre) age group, and (right) occupation

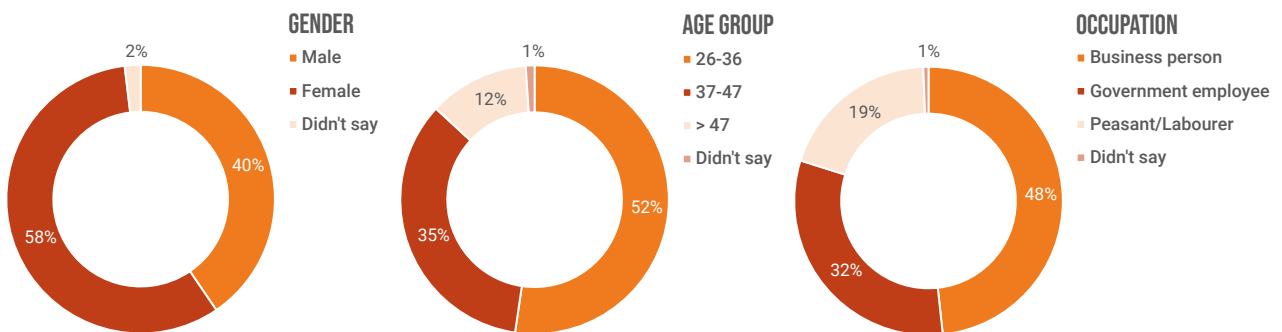


FIGURE 9.

Responses to reasons for preferring game meat. Source: TRAFFIC consumer survey, 2022.

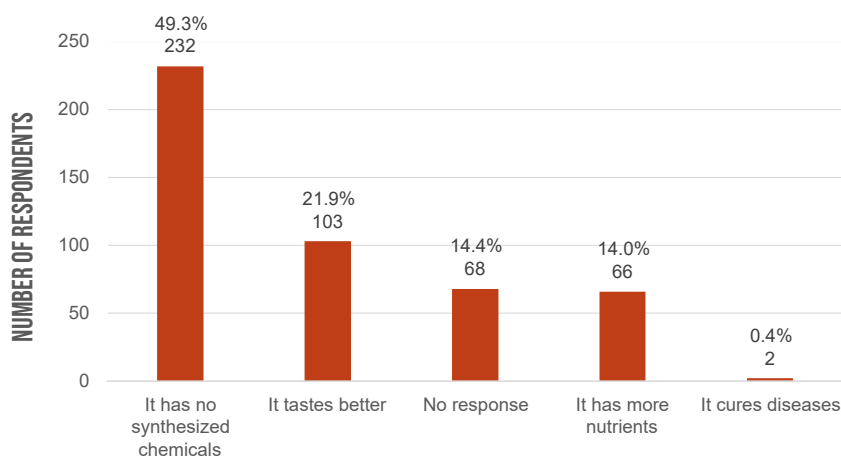


FIGURE 10.

Number of times that consumers reported purchasing type of game meat. Source: TRAFFIC telephone consumer survey, 2022.

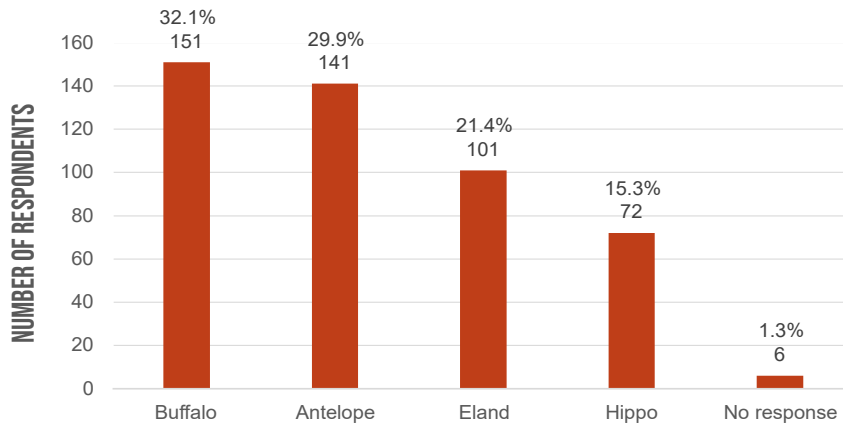
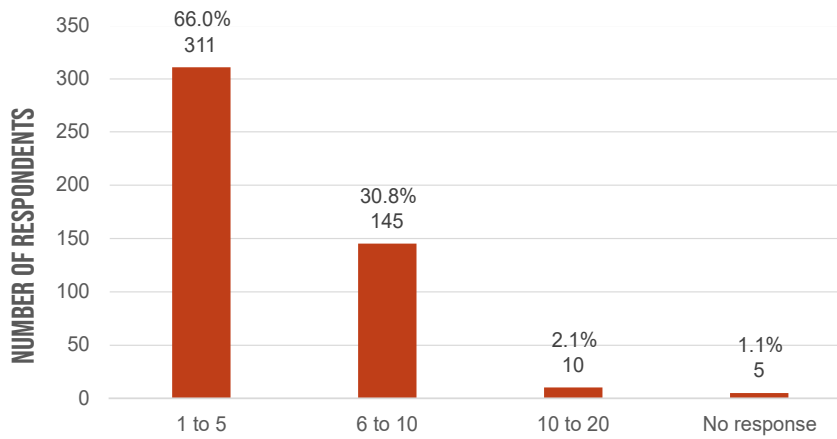


FIGURE 11.

Number of times in a month that residents would purchase game meat if it was available. Source: TRAFFIC telephone consumer survey, 2022.





A hunted wildebeest.

IMPLICATIONS FOR THE LEGALITY, SUSTAINABILITY AND SAFETY OF THE GAME MEAT TRADE

The following section combines the data presented above with additional insights obtained over the three-year period from 2021 to the end of 2023. Information was gathered from surveys and interviews with game meat selling

operators and the game meat selling industry value chain managers (Figure 4) to understand the remaining challenges that exist around legality and governance, sustainability and safety of the game meat trade in Tanzania.

4.1 LEGALITY AND GOVERNANCE

Attempts towards the effective governance of the game meat trade have been made. However, due to the lack of a game meat selling industry-specific traceability system and lack of clarity on the roles and responsibilities of key actors along the game meat value chain, especially, game meat selling operators, compliance management and law enforcement, and game meat selling industry value chain managers, opportunities for illegality have arisen.

At the time of research, the Game Meat Selling Regulations lacked bespoke procedures that regulated sourcing practices for some of the source types (PAC, wildlife farming and tourist hunting), processing, and selling. Where guidelines or procedures were available, they were not specifically adapted for the game meat selling industry. For example, in referencing the Resident Hunting Regulations, Tourist Hunting Regulations, and other regulations (see Section 3.2: Sourcing) as sourcing pathways, the Game Meat Selling Regulations assume no difference between the sourcing of game animals for subsistence, sport or leisure, and the sourcing of game animals for the game meat selling industry. Because game meat is classified as a trophy, its movement between actors at every

node in the game meat value chain needs to be documented by a transfer of ownership certificate. This is not the case for hunting for subsistence and hunting for sport or leisure as the ownership of the trophy does not change.

However, TRAFFIC found that some authorised officials were unclear on the process of transferring game meat ownership (from hunter/company/captive facility to GMSF operator) and legally documenting each step of this process. Because these legal directives were missing, it was difficult to establish lawful ownership of the commodity and ascertain whether all conditions pertaining to legality (such as trophy registration and observance of hunting quotas) were observed during sourcing. This did not only create grey areas around the legality of certain types of supply but could also threaten protected species populations if offtake is not well regulated. For example, if a GMSF operator is not issued with a proper permit when they buy game meat from a hunter, the GMSF operator may be dishonest about what game meat species they are selling based on what they think consumers would like to buy, rather than what the exact animal/meat is.



Wild meat being cut at a GMSF in Dar es Salaam, Tanzania

Findings also showed that there were instances where GMSF operators recorded a false sourcing pathway for their game meat. For example, some facilities indicated that they obtained wildebeest through problem animal control, but this could not have been the case as wildebeest is not covered under the Dangerous Animals Consolation Regulations, which specifies seven species as dangerous animals including, Black Rhinoceros (*Diceros bicornis*), Spotted Hyena (*Crocuta crocuta*), Hippopotamus, Nile Crocodile (*Crocodilus niloticus*), American Buffalo, Lion (*Panthera leo*), and African Elephant. It was unclear then how exactly the wildebeest meat was obtained, but, as per the law, it should not have been through problem animal control – suggesting potential illegal sourcing of products.

Regulatory gaps undermine the legality of game meat supply.

In Section 3.2 on Sourcing, it was mentioned that game meat is priced according to the relevant sourcing regulations. In sourcing animals through problem animal control and if the game animal is not listed in the regulations, the game carcass price is negotiated between the hunter/hunting company/captive facility and the GMSF operator under the supervision of the relevant officials. From interviews, the research team learned that officials supervising the handover of game meat to GMSF operators have had to sometimes randomly allocate price ranges for the supply—especially for game animals that were sourced through problem animal control as these species are not always listed in the regulations. It would not be unreasonable to expect that the random price allocations could create perverse incentives among government officials to contribute to the supply of game meat, regardless of the species. Additionally, GMSF operators may see it as an opportunity to pay a premium to hunters to secure supply for their GMSF, consequently driving hunting activities that, if unregulated and undocumented, could become unsustainable.

From interviews, the research team also learned that some GMSF operators would promise to pay relevant government authorities a certain amount in exchange for getting priority access to game animals obtained after

a problem animal control event. On some occasions, this has been associated with the quick killing of problem animals instead of exploring all the necessary options to guide them back into protected areas or provoking an animal to create a dangerous situation that would require them to kill the animal.

Poor understanding of the factors that influence game meat supply and demand can enable game meat sellers and consumers to seek illegal and unregulated sources of game meat.

Market supply and demand are other factors that influence the sustainability of the game meat selling scheme. While some reports highlight the importance of the game meat selling industry in reducing demand for poached meat (Kadigi *et al*, 2023), legal game meat supply is not sufficient to meet game meat demand, which is being driven by both consumer demand for game meat and the GMSFs' need to recoup investment costs. With established sources not generating enough supply the risk for GMSF operators to consider other ways/violate established procedures to obtain game meat was observed to be high. Similarly, the likelihood of consumers seeking other (illegal) ways to purchase game meat so as to meet their demands for game meat was also high.

Limited hygiene controls at all stages of the supply chain threaten meat safety and quality.

As previously stated, less than 10% of the GMSFs that the research team visited had meat inspection certificates (Figure 5). The limited compliance of GMSFs with the legal requirements aimed at ensuring that the public was consuming safe game meat was largely since the Meat Industry Act was not fully integrated into the game meat selling industry and into its provisions. The Meat Industry Act applies to all meat and all meat products and encompasses the following: the quality controls that need to be met to ensure meat safety, the hygiene conditions where meat was produced and sold, the appropriate technology used in meat production, meat export and import, and meat branding to indicate its safety for consumption. It even considers how the government can ensure reasonable meat prices for consumers while ensuring the competitiveness of the market.

Because the Meat Industry Act was developed for regulating domestic livestock meat, the Act does not consider game meat which has historically only been consumed for subsistence. As such, specific requirements to ensure the quality and safety of meat obtained from domesticated animals do not always apply to wild animal meat. For example, the transport of game meat from source to selling point can take place over much longer distances than the distance covered in the transport of domestic livestock meat (where abattoirs and butchery sites are located near consumers). The Game Meat Selling Regulations are also unclear about which agency should manage and prescribe game meat-specific transport conditions. The Game Meat Selling Regulations are also unclear about further processing game meat into other meat products. While the Tanzania Meat Board (TMB) is mandated to ensure that all meat products are safe for consumer there has been limited involvement of the agency in the monitoring of the sale of game meat products due to a lack of clarity on their role and the standards with which to assess the safety of the production and sale of game meat products.

However, the integration of the game meat selling industry into the Meat Industry Act is largely complicated by the fact that game meat is still treated as trophy when it enters the game meat trade. This runs contrary to the intention of establishing the game meat selling industry which treats game meat as food to enable the wider-scale domestic consumption of game meat. As such, among the relevant government authorities, it was unclear how game meat inspection was to proceed and how this might differ according to the type of sourcing pathway, whether the existing standards against which meat was being inspected also applied to game meat, and the frequency of game meat inspections despite mentioning that game meat should be inspected before use. It is therefore necessary for relevant government agencies to consider how to bridge this regulatory gap.

An additional challenge is, that in its present form, the Game Meat Selling Regulations consider the GMSF as the last point along the value chain. The regulations also only consider fresh meat as the final game meat product

that would make its way to end consumers. However, the research team also found that some GMSFs have processed game meat into other meat products. Researchers also found that game meat was also being offered in other establishments like restaurants, hotels, and other retail outlets such as bazaars. However, because the game meat selling industry hasn't been fully integrated into the Meat Industry Act, game meat and these processed game meat products along these additional chain points remain uninspected and unregulated.

Unclear roles and responsibilities and limited capacities of government officials undermine government efforts to combat illegal wildlife trade.

The monitoring of GMSFs has not been prioritized by many of the districts due to the absence of formal work arrangements between TAWA and the DGOs. It was unclear to the DGOs what specific activities they needed to carry out to monitor GMSF operations, what they were supposed to be monitoring, and against what reference they were going to evaluate the legality of GMSF operations if there was no robust and reliable way to trace the movement of game meat along the value chain. If the DGOs are unable to monitor the movement of game meat along the value chain, then they are unable to fulfil their mandate of monitoring the use of natural resources at the district level. This also undermines their efforts in combatting potential illegal activities in areas where GMSFs have been established, especially as reports of illegally sourced game meat making its way into the legal value chain have already been received.

This lack of law enforcement capacity alongside other systemic issues like a lack of a game meat selling industry-specific traceability system, unfamiliarity of some officials with the regulations, and financial incentives for those participating in the trade have allowed for the formation of value chain not specified in the Game Meat Selling Regulations, where game meat is not only sold in GMSFs but other outlets such as restaurants and in festivals. At present, the only game meat selling outlet recognised by the Game Meat Selling Regulations is the GMSF. These two value chains interact with reports of illegally sourced wild meat (an

Regulatory gaps
allow illegally-sourced game meat to enter the legal supply chain

informal value chain not recognised by the regulations) making its way into the formal game meat value chain which is recognised by the regulations.

Interviews that the research team conducted with the DGOs of Manyara, Arusha and Kilimanjaro regions between January and April 2023 revealed that there was a large volume of bushmeat being consumed in the three regions. This feedback concurs with another TRAFFIC report that shows that wildlife poaching is rampant and continues to grow despite many government efforts (Andimile and Floros, 2021). This is also in line with the information presented by the MNRT to the June 2023 budget parliament that explained that, in one year, 2,786 suspects were arrested, and 108 guns, 1,334 bullets, and 3,080 wildlife wire traps were removed from wildlife-protected areas.

From monitoring some bushmeat vendors in Arusha during the same period, TRAFFIC found that bushmeat was being brought into the city every four days with eland meat being the most frequently available. TRAFFIC estimates that over 40 elands were possibly poached to supply this illegal outlet in a three-month peri-

od, between January and April 2023. This accounts for a supply of approximately 36 tonnes of meat, considering an adult eland could weigh up to 900 kg. When TRAFFIC spoke to the DGOs about this, the DGOs admitted that the amount of bushmeat entering urban areas for sale is enormous, and for every incident intercepted by law enforcement, an additional four attempts at least succeeded in eventually reaching the consumer. This means that law enforcement can only intercept one poaching incident in every five. When asked about the challenges they faced in intercepting poaching and trafficking incidents, DGOs shared that this was mainly due to the lack of law enforcement capacity to monitor large, extensive wilderness areas and the poachers' use of motorcycles, which can easily bypass checkpoints. Due to these limitations faced by law enforcement, the risk of poached meat entering formal game meat supply chains and GMSFs is also high. However, results highlight that, despite limitations in getting a supply of game meat, there is little evidence which concludes that poached meat is being supplied and sold by licenced GMSF operators.

**Only
1 in 5
poaching
incidents**
are intercepted
due to lack of
law enforcement
capacity



Four dik-diks poached around the Serengeti area.

4.2 TOWARDS A SUSTAINABLE GAME MEAT TRADE

The sustainability of the game meat value chain is threatened by the lack of an integrated sustainable management plan, including a traceability system specific to the game meat industry, to enable monitoring of hunting offtakes relative to the wild population status of target species. Hunting quotas need to be set based on regular field monitoring of those populations, including being informed by a robust understanding of the factors impacting game meat supply and demand. Law enforcement efforts should be increased to enhance compliance with prescribed standards and regulations during the sourcing stage.

During the early stages of the development of the Game Meat Selling Regulations, the potential risks of unsustainable wildlife harvesting were debated among government and non-government organisations. TAWA was selected as the primary government agency tasked with managing the scheme—citing the agency’s years of experience in managing the consumptive use of wildlife and success in keeping the tourist hunting industry widely recognised as sustainable. However, with the rapid development of the game meat selling

industry, the government agencies responsible for managing wild animal hunting and the game meat industry could not come together in time to discuss how to keep pace and adapt conditions of safety and sustainability to the newly established game meat selling industry. The conditions that were never resolved included quota setting, monitoring offtake, tracking the movement of game meat supply, and monitoring game meat supply and demand.

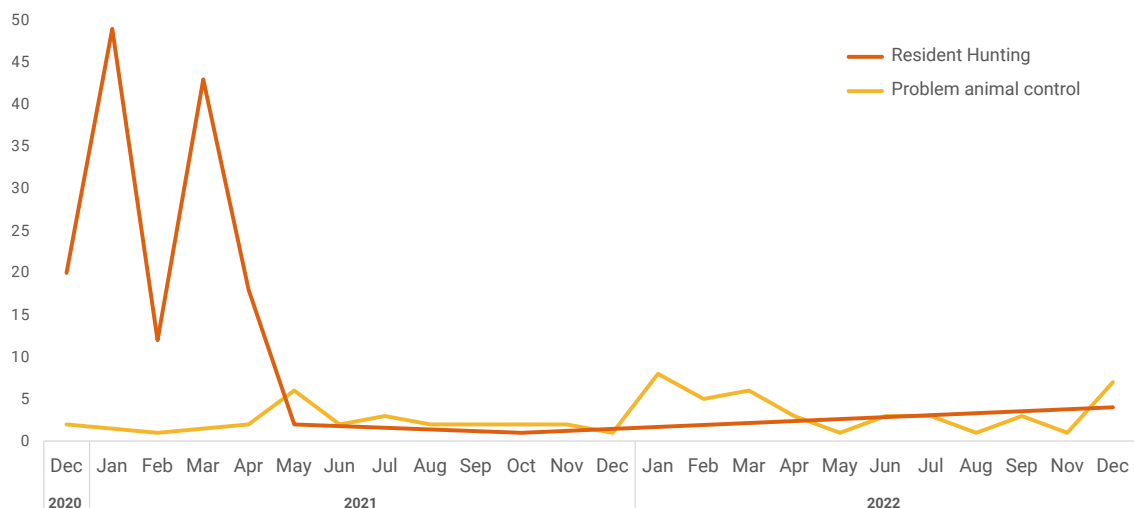
It may be worth pointing out that the commercial trade in game meat was new to the country, as it was a confluence of the hunting and meat industries. As a result, it unreasonable to expect that the government agencies would find it challenging to have all the mandates and legal directives in place to manage the game meat selling industry

Hunting quotas need to be updated and informed by research to guard against overharvesting.

Early into the development of the game meat selling industry, authorities anticipated that resident hunting was going to be a significant contributor to the supply of game meat.

FIGURE 12.

Sourcing Pathways November 2020 – December 2022: From the suspension of resident hunting in April 2021, there was an increase in the number of game animals reportedly obtained through problem animal control than sold through GMSFs.



However, with outdated hunting quota allocations and the fact that there were only six geographic areas allocated for resident hunting across Tanzania, the government thought that it was essential to mitigate against concerns of overharvesting. As a result, resident hunting was suspended in April 2021, only five months into the game meat selling scheme, with the suspension extending through until August 2023. During this 28-month suspension period the Resident Hunting regulation was amended twice.

Moreover, because resident hunting was established primarily for subsistence, it was expected that new quotas would be set to account for the fact that it would now be used to source game meat for industry. However, when TRAFFIC enquired into updating quota allocations, it learned that only limited research into animal population numbers, mortality and birth rates, and offtake was being conducted relative to resident hunting – an approach insufficient to set well-informed and updated quotas. Because resident hunting areas are located outside core protected areas such as national parks and game reserves and will likely have lower population numbers, conducting an animal census in these areas has been a low priority for authorities which are already at overcapacity to monitor other designated hunting areas.

The temporary suspension of local hunting between April 2021 and August 2023, although a precautionary decision, eventually resulted in problem animal control being seen by GMSF operators as the only reliable and consistent source of game meat. This was also influenced by captive wildlife facilities not being fully operational and hunting being seasonal. Unlike resident hunting and tourist hunting, problem animal control is not subject to quota allocations. It is not a form of hunting but rather a response to a dangerous animal that could harm local people.

Strict monitoring and enforcement of hunting activities at the sourcing stage is required to ensure sustainable offtake levels.

With problem animal control being listed as a method to source game meat and with no quota allocations governing it, there arises the risk of encroaching into areas and arbitrarily killing animals to supply the game meat

selling industry under the guise of problem animal control. This would not be a surprising phenomenon considering that the game meat trade also suffers from a lack of a robust and effective traceability system (as mentioned in Section 4.1: Legality). It is important to note here that, despite the suspension of the resident hunting activities from April 2021 to August 2023, which included the initial scoping and follow-up research phases (June 2021 to November 2022), it was still being reported as a game meat source in interviews with GMSF operators. This suggested that hunters were likely issued hunting permits post-suspension of the regulations, either knowingly or unknowingly, or that game meat was likely acquired through potentially illegal channels under the guise of resident hunting. With increased reports (during the study period) of game meat obtained through problem animal control called for strict monitoring of this sourcing pathway, as there were potential risks of overharvesting that could irreversibly impact species population numbers.

For example, as part of Tanzania's commitment to CITES, only a fixed number hippos may be traded in the country per year as per the country's non-detriment findings (NDF), a tool that assesses whether the trade in a particular CITES-listed species will have a detrimental impact on its survival. The NDF also looks at "whether or not a trade would allow populations of the specific species to be maintained, throughout its range and at a level 'consistent with its role in the ecosystems in which it occurs'" (CITES, 2022). However, this number does not consider the number of hippos which can be killed as part of problem animal control (see Section 3.2.3). Between April 2021 and June 2023, an estimated 58 hippos were sold through GMSFs—all of which were sourced through problem animal control. Even though hippo meat can be obtained through problem animal control (Appendix 1), strict monitoring must be carried out to ensure that the reasons for killing the animal are in line with the Dangerous Animals Consolation Regulations. Although hippos utilised from this source (PAC) are not for international trade and therefore not regulated by CITES, the setting of hunting quotas for hippos should consider these other forms of mortality within the national boundaries of Tanzania.



Outdated hunting allocations and animal population surveys

threaten the sustainability of the game meat selling industry

¹³ https://www.iied.org/sites/default/files/uploads/2023/11/5DSAF_background_paper_Nov23.pdf



Impala meat is traditionally preserved by salting and drying.

Assessing the sustainability of wild animal harvest and trade is normally associated with threats posed to the survival of wild species populations, disruption of wildlife ecosystems, and affecting the livelihoods of the people who depend on them. Considering the findings of this research relating to the sustainability of the game meat selling industry, a 5-dimensional sustainability assessment framework (5DSAF) was piloted in Tanzania with feedback being collected from a range of stakeholders including the GMSAC, TAWA, TAWIFAGAMSA, and other stakeholders along the game meat value chain. The 5DSAF¹³ was developed by the IUCN Sustainable Use and Livelihoods (SULi) Specialist Group, IIED, TRAFFIC, Endangered Wildlife Trust, and EPIC Biodiversity, together with a multi-disciplinary expert advisory group. The 5DSAF incorporates criteria for animal

welfare and human health, in addition to social, economic and ecological parameters for gauging sustainability.

Overall feedback showed that the 5DSAF could be a valuable tool for assessing sustainability parameters of the Tanzanian game meat industry. The feedback also showed that, for the game meat industry in its current state, the human health, ecological and economic dimensions can easily be evaluated due to the structure of the value chain and its corresponding legal framework. However, the social and welfare dimensions were more difficult to assess, with stakeholders sharing that it was difficult to assess the welfare principles because they were more related to wildlife farming and ranching—both of which are not yet contributing game meat supply to the value chain.

4.3 MANAGING DISEASE RISKS IN TANZANIA'S GAME MEAT TRADE¹⁴

Several studies have highlighted that the risk of zoonotic disease outbreaks are an increasing threat to humans and wildlife especially in northern Tanzania where almost 40% of all GMSFs in the country are located (Cash-Goldwasser *et al.*, 2018; Mwakapeje, Høgset, Fyumagwa, *et al.*, 2018; Mwakapeje, Høgset, Softic, *et al.*, 2018). This was corroborated by evidence collected from 41 experts from various fields (veterinary, public health, wildlife, epidemiology and microbiology) during a TRAFFIC-organised Expert Elicitation workshop as part of a qualitative disease risk analysis (DRA) of the game meat value chain in northern Tanzania. The experts highlighted that the overall risk of transmission of pathogens of zoonotic origin at vulnerable nodes of the game meat value chain is high—especially those pathogens causing the most prevalent zoonotic diseases in Tanzania (i.e. Anthrax, Rabies, Brucellosis, Bovine tuberculosis, Rift Valley Fever, Taeniasis, and Leptospirosis). On the other hand, the risks for other foodborne diseases were high due to challenges in ensuring food safety measures are practised at all nodes in the game meat value chain, from sourcing and processing to distribution, retail, and end-consumer handling.

With the game meat selling industry further increasing the interactions between humans and wild animals, it would not be unreasonable to expect an increase in the risk of zoonotic disease transmission—especially without proper and thorough inspection of activities at each value chain node and without the observance of food safety procedures.

To get a clear understanding of the safety implications associated with the game meat selling industry, TRAFFIC triangulated various data sources (key informant interviews with experts, focus group discussions, and field observations) to assess potential disease risks and other meat safety issues at critical control points along the game meat value chain.

From a health and safety perspective, mandating the wildlife sector—as opposed to a sector with experience of managing meat trade—to manage the game meat value chain has arguably limited the effective management of meat safety and hygiene overall. This is because wildlife agencies in the country have limited expertise and systems for managing meat value chains, unlike its counterpart Ministry of Livestock and Fisheries through its responsible agencies, including the Tanzania Meat Board and Directorate of Veterinary Services. It has been argued that due to this mismatch between mandate and expertise, many aspects of governance aimed at ensuring game meat safety, for example, monitoring and surveillance, were not prescribed in the relevant laws, thus creating a risk of zoonotic and foodborne disease spread and transmission. We now explore the safety issues in the game meat trade in further detail, with reference to the value chain nodes, as shown in Figure 1.

Challenges in enforcing meat safety regulations negatively impact meat safety and hygiene and could make game meat unsafe for consumption.

What happens at the sourcing stage (which also involves partial dressing of carcass) is an important determinant of the safety of the meat obtained by traders, retailers, and consumers. Despite the evident importance of this node, legal arrangements to maintain meat safety and hygiene were not appropriately developed when the game meat selling industry was established. For example, the meat inspection guidelines for game meat were not developed before the establishment of the industry. The mismatch of mandate and expertise, combined with the fast-tracked development of the game meat selling industry, meant authorities were limited in their ability to conduct proper game meat inspections

Overall zoonotic disease transmission risk

at vulnerable points in the game meat value chain are high according to experts

Aspects of disease monitoring and surveillance

were not prescribed when the Game Meat Selling Regulations were passed

¹⁴With reference to the safety of meat: “the guarantee that meat will not cause harm to handler or consumer”.

and establish monitoring and surveillance systems—bearing in mind that what might work for domestic livestock meat may not be entirely replicable for the game meat trade involving wild animals.

Nevertheless, lack of capacity to monitor compliance and enforce regulations remains a challenge. The research team learned that even if the meat inspection regulations for game meat had been in place, the ability to conduct proper ante¹⁵ and post-mortem inspection, which would have been required by the meat inspection regulations, during sourcing (e.g., during hunting) would still be limited due to the challenging environment in which hunting animals takes place. For example, conducting a proper ante-mortem inspection (i.e., physically examining the animal before shooting) was nearly impossible for meat inspectors in the wild during a hunt because of the considerable distance between the hunter and the animal to be hunted.

The next option would be to conduct a post-mortem inspection to detect any abnormalities that may deem the meat obtained from the animal unfit for consumption. This step can be used to deter the transmission of harmful pathogens. However, conducting post-mortem inspections in the wild is challenging due to the environment; namely limited infrastructure and unhygienic environments for slaughter. Moreover, certified meat inspectors do not accompany the hunting team during a hunting expedition to allow inspection shortly after a successful hunt, likely due to the absence of formal guidelines that enables them to be present and perform their duties during hunting activities, and a lack of capacity.

Maintaining the temperatures prescribed in the Meat Industry Act, which stipulates that meat should be stored in temperatures between 0°C / 32°F and 4.4°C / 40°F including immediately after hunting, was observed by researchers to be a very challenging criterion. For example, during resident hunting, there are limited facilities like freezers to establish a cold chain that could prevent bacterial proliferation. GMSFs equipped with deep freezers are also located far from hunting areas. Instead, most hunting groups would use cool boxes

to store meat. It is important to point out here that the length of a hunting expedition depends on a hunt's success. Hunting teams can spend several days in the wild, increasing the challenge of maintaining the prescribed temperatures and the risk of growth of potentially harmful microorganisms that could make meat unsafe for consumption.

TRAFFIC also observed additional health risks that could arise with improper kill handling. The research team saw additional butchery processes after slaughter such as skinning, chopping, and even packaging occurring in the wild. This further increases the risk for contamination especially when chunks of meat are placed on top of grass or hung on a tree. Some zoonotic pathogens, such as those causing anthrax, can stay alive in the soil for extended periods, increasing the risk of being picked up and consumed (Rahman *et al.*, 2020), especially when meat is left unprotected in the outdoors. The other potential health issue associated with the processing of game meat at the GMSF is the inconsistent use of personal protective equipment to mitigate against meat contamination. GMSF operators acknowledged that this equipment is often not used.

TRAFFIC also observed that hunters would use lead ammunition during hunting. While the hunting regulations specify the type of hunting rifle to be used during hunting, the regulations do not specify the type of ammunition—giving hunters the flexibility to use their ammunition of choice. Several studies have not only shown that the consumption of game animals killed with lead ammunition has increased blood lead levels in humans. It has also increased lead residues in the wild, contaminating ecosystems and poisons wildlife (Ahmadi *et al.* 2018; Arnemo *et al.*, 2022). Despite the risks associated with such kinds of ammunition, control of its use has not featured in any relevant food safety and hunting legislations.

Meat safety and hygiene during transport is difficult to achieve when game meat sellers cannot afford the equipment required to maintain a cold chain during transport.

While practices at the sourcing stage are important determinants of meat safety, good hygiene practices must also be maintained



Risks to human health

from wild meat consumption remain uncertain

¹⁵Any procedure or test conducted by a competent person on live animals for the purpose of judgement of safety and suitability and disposition. (FAO)



Buffalo sausage being prepared for household consumption.

during the transportation and distribution of meat throughout the value chain to prevent deterioration of meat quality and increase risks to meat safety.

In Section 3.5: on selling, it was mentioned that less than 10% of GMSF operators owned special transportation vehicles to transport meat from the point of slaughter to the point of sale, largely due to the high purchase costs of these meat vans. Instead, most GMSF operators would use cool boxes to store the meat. However, these cool boxes cannot maintain the prescribed temperatures between 0°C/32°F and 4.4°C/40°F that need to be met to prevent the risks of growth of harmful bacteria during the transportation stage as per the Meat Industry Act. TRAFFIC also found that some GMSF operators would personally transport meat to clients living far away, instead of selling through the GMSF, using public transport, as this is cheaper than purchasing their own meat van.

Lack of formal arrangements agreed with the officials responsible for game meat inspection at the selling node have resulted in GMSFs not being regularly, or at all, inspected.

TRAFFIC learned that meat safety at the retail node highly depends on how it was handled during the sourcing and transportation stage. However, because the meat supplied to the butchers is in a fresh state (only partly processed), the need to maintain safety and hygiene at the retail/distribution node is equally important.

During the initial scoping phase, over 90% of GMSFs that TRAFFIC visited did not have meat inspection certificates at the time of the survey, meaning that the meat supplied to the GMSFs was not inspected, despite this being a legal requirement under the Meat Industry Act. TRAFFIC learned of many occasions when a meat inspector would not be present at a hunting expedition or problem control scenario to inspect the game meat. However, when TRAFFIC interviewed the GMSF operators at the GMSF, they reported that the meat had been inspected before being brought to the GMSF. This gives false confidence to consumers and other downstream retailers such as restaurants that the meat they are purchasing is safe for human consumption.

Another issue of concern was the frequency of inspection conducted by responsible agencies

>90% of GMSFs did not have meat inspection certificates at the time of the survey

of GMSFs. The prominent roles of these critical offices were meat inspection, routine inspection of premises, routine inspection of personal hygiene, routine inspection of storage facilities, and raising awareness on public health and zoonotic diseases. Key informant interviews revealed that only a limited number of these inspections had been undertaken, while results from the initial scoping mission highlighting that over half of the DVOs and DGOs had never conducted any inspections of the GMSFs despite this being a requirement of the Meat Industry Act.

The primary objective for conducting meat inspections is to identify animals that are not fit for human consumption and to remove them from the food chain. Other objectives, according to the Food and Agriculture Organization of the United Nations (FAO), are to support animal disease control and to identify and prosecute animal welfare issues (Herenda *et al.*, 1994). Meat inspection prevents and detects public health hazards such as foodborne pathogens or chemical contaminants in meat and blocks the transmission of possible hazards to the handlers and consumers. FAO meat inspection guidelines specify that ante mortem examination can be done within 24 hours of slaughter and repeated if slaughter has been delayed over a day. This provides opportunities to carry out inspections in situations with limited settings, such as during hunting. However, the absence of proper meat inspection in the current game meat industry meant that a significant amount of meat consumed since its establishment was unsafe for consumption.

The safety of meat for consumption is critically dependent on the meat safety and hygiene practices observed at upstream nodes in the value chain.

The safety of meat for human consumption is mainly shaped by the procedures and practices applied upstream in the value chain, particularly at the time of sourcing (Bandick and Hensel, 2011; Floris *et al.*, 2024). During this study, the research team learned that there is a perception mainly among wildlife law enforcement bodies and consumers that game meat is safe and cannot cause transmission of zoonotic diseases. This is perpetuated by the fact that it is yet uncertain the extent of the contribution of wild meat consumption (as opposed to other activities like hunting, carcass preparation, meat handling, etc.) to zoonotic pathogen spillover (Milbank and Vira, 2022; Tumelty *et al.*, 2023; van Vliet *et al.*, 2022). As a result, actions that prevent possible transmission of zoonotic pathogens have not been highly considered.

On the other hand, communities in Tanzania have been consuming wild meat for decades for subsistence needs or as part of local tradition. For example, according to the Resident Hunting Regulations, the Hadza in the districts of Mbulu and Iramba and the Ndorobo in Simanjiro and Kiteto districts are considered as indigenous communities and are therefore allowed to hunt in their traditional areas as stipulated in Wildlife Conservation Act, 2009. However, these traditional practices are not guided by any meat safety procedures. Such situations have shaped the public's awareness of the safety of meat from diseases (DRA Expert opinion workshop, November 2022).

Nevertheless, surveys for this report showed that buyers of game meat still take precautionary measures to ensure that the meat they purchase is safe to consume, but these are confined to checking the appearance and odour of meat before purchasing or freezing the meat to increase its shelf life.



Dressed carcasses of various hunted animals.

CONCLUSIONS AND RECOMMENDATIONS

Over three years have passed since the Game Meat Selling Regulations came into force in late 2020, catalysing rapid development of a national game meat industry in Tanzania. Evidentially, as shown in Section 4, there is still more to undertake to address challenges around the legality, sustainability, and safety of the trade to achieve positive impacts, for example on human livelihoods and nutrition. TAWA as the managing body has addressed some of these challenges, including periodic revision of the resident hunting regulations, temporary banning of hunting activities and raising awareness of traders and game meat operators. Regardless of the swift development and enactment of the Game Meat Selling Regulations in response to the President's directive, the responsible agencies (those managing wildlife utilisation and meat supply chains) were meant to come together in

time to develop the conditions to manage for sustainable sourcing of game animals, meat safety and hygiene controls and compliance against established legislation in the game meat selling industry.

In developing the Game Meat Selling Regulations, game meat was largely considered a government trophy and not treated as meat products for public consumption. While government agencies within the wildlife sector may be knowledgeable on how the hunting industry works, there was a knowledge gap for these agencies on how the safety of game meat can be ensured. Meanwhile, other management frameworks aimed at ensuring game meat safety and quality, starting from the sourcing stage to the consumption stage, were not fully integrated into the game meat selling industry.

With most guidelines not being developed in time to bridge this knowledge gap, value chain managers from both the hunting and meat industries had to manage the game meat selling industry reactively – learning as they went and having to address the consequences of these regulatory gaps. As discussed earlier, without a well-defined traceability system specific to the game meat industry, information around sourcing and movement of products and controls were not effectively implemented. Consequently, there was no way to ascertain transfer of trophy ownership procedures and hunting quotas were being observed by hunters where relevant.

Establishing a traceability system will help to clarify how and which species is used and where and by whom it has been sourced. Meanwhile, the setting and observance of hunting quotas is necessary to manage the ongoing viability of wild animal populations, ensuring that overharvesting is not occurring, and thus setting sustainability thresholds for the game meat industry. While understanding these concerns, over the past three years, TAWA has managed to set small hunting quotas.

When it comes to safety, value chain actors must ensure that the quality and hygiene of game meat is maintained as it moves from source to end-use as this will consequently determine its safety for public consumption. At the time of writing, Tanzania is awaiting the approval of the revised Meat Inspection Regulations, which TRAFFIC and the GMSAC co-developed to amend the regulatory gaps governing game meat inspection and safety.

Financial barriers and perverse incentives have also been observed to encourage practices that could threaten protected species populations—as illustrated in Section 3.2.3: Problem Animal Control. Moreover, a lack of law enforcement capacity makes it challenging to ensure that GMSFs are inspected thoroughly and frequently. Despite the best intentions of the Game Meat Selling Regulations (2020), the subsequent development of the game meat selling industry has ironically made it difficult for poorer members of society to access game meat due to higher prices. This has stimulated alternative value chains where wild meat is sold through illegal channels which may make

meat safety even more challenging to ensure.

While the challenges surrounding the game meat selling industry are complex, they are not insurmountable. A good first step would be to revisit and update the Game Meat Selling Regulations to align more coherently with other relevant regulations on consumptive utilisation of wildlife (Section 3.2 Sourcing) and the Meat Industry Act which covers all matters relating to the control of quality and safety of meat along meat supply chains (Recommendations 1-10). It is equally important that the legal instruments clarifying the roles and responsibilities of the value chain managers (Figure 3) along the value chain are in place. This will ensure accountability, enhance enforcement of the Game Meat Selling Regulations, and make clear the human, financial, and physical resources needed to support the implementation of the regulations and management of the game meat selling industry. TRAFFIC also recognizes the importance of including downstream actors in the value chain such as GMSF operators and hunters in decision-making relevant to any changes and additions to the Game Meat Selling Regulations and associated regulations to more accurately reflect the gaps in the legislation that have made it challenging to comply with the regulations. The Tanzanian government may also consider a temporary pause in some of the sourcing pathways such as problem animal control and resident hunting until the issues outlined in Section 3.2 Sourcing are resolved.

As mentioned in Section 4.3 Managing Disease Risks, what happens at the sourcing stage is an important determinant of the safety of the meat obtained by traders, retailers, and consumers. In relation to that, what happens at the sourcing stage to ensure meat safety depends on the regulations that stipulate and enforce meat safety and hygiene practices. As such, the ensured safety of stakeholders along the different points in the value chain (managers, hunters, sellers, consumers) will ultimately follow from the revisions to the Game Meat Selling Regulations and the legal instruments that relate to the control of quality and safety of meat along meat supply chains and the enforcement of said regulations (Recommendations 15-22).

Additionally, a useful step to improve upon the game meat trade and ensure it is legal, sustainable and safe could be to use the Five Dimensions of Sustainability tool (5DSAF) by IUCN SULI, IIED, TRAFFIC, Endangered Wildlife Trust, and EPIC Biodiversity (Recommendations 12-14). The tool builds on the conventional use of ecological, economic and social considerations by adding animal welfare and human health considerations into an integrated consideration of sustainability. The framework can be implemented with a simple spreadsheet-based tool allowing users to score performance against each of the 42 principles and identify areas where improvements are needed.

With government agencies from the environment, wildlife, and health sectors all having a stake in the game meat selling industry to ensure its legality, sustainability, and safety, TRAFFIC recommends adopting the One Health approach to managing the game meat selling industry. One Health “recognises the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and inter-dependent” and consists in “mobilis[ing] multiple sectors, disciplines and communities at varying levels of society to work together” to “sustainably balance and optimise the health of people, animals and ecosystems.” Tanzania’s National One Health Strategic Plan (2022-2027) provides a conceptual framework which could inform the management of the game meat selling industry by the relevant Tanzanian government agencies and demonstrate the multi-sectoral One Health collaboration needed to conserve and protect its biodiversity in tandem with the health of the people who have the most to gain from sustainable, safe and legal utilisation of the country’s wildlife resources.

As such, TRAFFIC recommends the following management actions that relevant government agencies can take at each critical control point to ensure the legality, sustainability, and safety of the game meat selling industry: Over three years have passed since the Game Meat Selling Regulations came into force in late 2020, catalysing rapid development of a national game meat industry. Evidentially, as shown in Section 4, there is still more to

undertake to address challenges around the legality, sustainability, and safety of the trade to achieve positive impacts, for example on human livelihoods and nutrition. TAWA as the managing body has addressed some of these challenges, including time to time revision of the resident hunting regulations, temporary banning of hunting activities and rising awareness to traders and game meat operators. Regardless of the swift development and enactment of the Game Meat Selling Regulations in response to the President’s directive, the responsible agencies (those managing wildlife utilisation and meat supply chains) were supposed to come together in time to develop the conditions to manage for the sustainability sourcing of game animals, meat safety and hygiene controls and compliance against established legislation in the game meat selling industry.

In developing the Game Meat Selling Regulations, the fact that game meat has largely been considered a government trophy and not treated as meat products for public consumption as food was lightly considered. While government agencies within the wildlife sector may have an idea of how the hunting industry works, there was a knowledge gap for these agencies on how the safety of game meat can be ensured. Meanwhile, other management frameworks aimed at ensuring game meat safety and quality, starting from the sourcing stage to the consumption stage, were not fully integrated into the game meat selling industry.

With most guidelines not being developed in time to bridge this knowledge gap, value chain managers from both the hunting and meat industries had to manage the game meat selling industry reactively – learning as they went and having to address the consequences of these regulatory gaps. As discussed earlier, without a well-defined traceability system specific to the game meat industry, information around, sourcing, movement of products and controls were not effectively implemented. Consequently, there was no way to ascertain transfer of trophy ownership procedures and hunting quotas were being observed by hunters where relevant.

Establishing a traceability system will help to clarify how, which species and where game meat has been sourced by whom. Meanwhile, the setting and observance of hunting quotas is necessary to manage the ongoing viability of wild animal populations, ensuring that overharvesting is not occurring, and thus setting sustainability thresholds for the game meat industry. While understanding these concerns, over the past three years, TAWA has managed to set small hunting quotas. When it comes to safety, value chain actors must ensure that the quality and hygiene of game meat is maintained as it moves from source to end-use as this will consequently determine its safety for public consumption. At the time of writing, Tanzania is awaiting the approval of the revised Meat Inspection Regulations, which TRAFFIC and the GMSAC co-developed to amend the regulatory gaps governing game meat inspection and safety.

Financial barriers and perverse incentives have also been observed to encourage practices that could threaten protected species populations—as illustrated in Section 3.2.3: Problem Animal Control. Moreover, a lack of law enforcement capacity makes it challenging to ensure that GMSFs are inspected thoroughly and frequently. Despite the best intentions of the Game Meat Selling Regulations (2020), the subsequent development of the game meat selling industry has ironically made it difficult for poorer members of society to access game meat due to higher prices. This has stimulated alternative value chains where wild meat is sold through illegal channels which may make meat safety even more challenging to ensure.

While the challenges surrounding the game meat selling industry are complex, they are not insurmountable. A good first step would be to revisit and update the Game Meat Selling Regulations to align more coherently with other relevant regulations on consumptive utilisation of wildlife (Section 3.2 Sourcing) and the Meat Industry Act which covers all matters relating to the control of quality and safety of meat along meat supply chains (Recommendations 1-10). It is equally important that the legal instruments clarifying the roles and responsibilities of the value chain managers (Figure 4) along the value chain are in place. This will ensure accountability, enhance enforcement of the Game Meat

Selling Regulations, and make clear the human, financial, and physical resources needed to support the implementation of the regulations and management of the game meat selling industry. TRAFFIC also recognizes the importance of including downstream actors in the value chain such as GMSF operators and hunters in decision-making relevant to any changes and additions to the Game Meat Selling Regulations and associated regulations to more accurately reflect the gaps in the legislation that have made it challenging to comply with the regulations. The Tanzanian government may also consider a temporary pause in some of the sourcing pathways such as problem animal control and resident hunting until the issues outlined in Section 3.2 Sourcing are resolved.

As mentioned in Section 4.3 Managing Disease Risks, what happens at the sourcing stage is an important determinant of the safety of the meat obtained by traders, retailers, and consumers. In relation to that, what happens at the sourcing stage to ensure meat safety depends on the regulations that stipulate and enforce meat safety and hygiene practices. As such, the ensured safety of stakeholders along the different points in the value chain (managers, hunters, sellers, consumers) will ultimately follow from the revisions to the Game Meat Selling Regulations and the legal instruments that relate to the control of quality and safety of meat along meat supply chains and the enforcement of said regulations (Recommendations 15-22).

Additionally, a useful step to improve upon the game meat trade and ensure it is legal, sustainable and safe could be to use the Five Dimensions of Sustainability tool (5DSAF) by IUCN SULi, IIED, TRAFFIC, Endangered Wildlife Trust, and EPIC Biodiversity (Recommendations 12-14). The tool builds on the conventional use of ecological, economic and social considerations by adding animal welfare and human health considerations into an integrated consideration of sustainability. The framework can be implemented with a simple spreadsheet-based tool allowing users to score performance against each of the 42 principles and identify areas where improvements are needed. With government agencies from the environment, wildlife, and health sectors

all having a stake in the game meat selling industry to ensure its legality, sustainability, and safety, TRAFFIC recommends adopting the One Health approach to managing the game meat selling industry. One Health “recognises the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and inter-dependent” and consists in “mobilis[ing] multiple sectors, disciplines and communities at varying levels of society to work together” to “sustainably balance and optimise the health of people, animals and ecosystems.” Tanzania’s National One Health Strategic Plan (2022-2027) provides a conceptual framework which could inform the management of the game

meat selling industry by the relevant Tanzanian government agencies and demonstrate the multi-sectoral One Health collaboration needed to conserve and protect its biodiversity in tandem with the health of the people who have the most to gain from sustainable, safe and legal utilisation of the country’s wildlife resources.

As such, TRAFFIC recommends the following management actions that relevant government agencies can take at each critical control point to ensure the legality, sustainability, and safety of the game meat selling industry:



Wild meat traditionally preserved by salting and drying.

TABLE 3.

Recommendations

Risk Category	Value Chain Node	Critical Control Points	Recommended Actions	Stakeholders Involved*
Legality	Sourcing	Hunting locations	1. Collaboration of all stakeholders involved in the hunting and meat industries in the revision of hunting regulations to include stipulations that specify the actions and documentation required during the sourcing of game animals	<ul style="list-style-type: none"> • DVS • MLF • PO-RALG • TAWA • TMB
	Processing	Processing premises (in-situ)	2. Incorporation of meat safety and hygiene standards into the relevant hunting regulations to enable observance of meat inspection during the sourcing stage. 3. Allocation of the necessary manpower and resources (e.g., training, budget, transport, etc.) to enhance management of game meat selling activities at relevant points in the value chain	<ul style="list-style-type: none"> • DVS • MLF • TAWA • TMB • PO-RALG
		Processing premises and dressing (ex-situ)	4. Development of a database that tracks the compliance and validity of the requirements to operate GMSFs (e.g., ownership certificates, permits from the Micro, Small, Medium Industrial Development Agency to process game meat into other meat products); and carry out regular and random inspections of the GMSFs	<ul style="list-style-type: none"> • DVS • MLF • TAWA • TMB
		Secondary processing at the GMSF	5. Check that GMSFs have a permit from the Micro, Small, and Medium Industrial Development Agency to process game meat into other meat products.	<ul style="list-style-type: none"> • TMB • TBS
	Transport	From the field to GMSF	6. 5. Regular and random inspection of the GMSFs to ascertain compliance against required standards, issuance of valid receipts and regular and random inspections of transport vehicles to ensure that GMSF operators/hunters use vehicles that align with the requirements of the Meat Industry Act. 7. Inform and train law enforcement stationed at checkpoints on how to inspect vehicles being used to transport game meat.	<ul style="list-style-type: none"> • TMB • MLF • DVS • TAWA
	Selling	Game meat storage	8. Carry out regular and random inspections of GMSFs to ensure that ownership certificates and other relevant documentation account for all game meat in the facility.	<ul style="list-style-type: none"> • TMB • TAWA
		Game meat sale	9. The development of guidelines that reflect additional standards, expertise, etc. needed specifically for game meat handling.	<ul style="list-style-type: none"> • TAWA • TRA • TMB
	Consumption		10. Carry out Social and Behaviour Change (SBC) initiatives on the benefits of consuming legally, sustainably, and safely sourced game meat.	<ul style="list-style-type: none"> • MLF • DVS • MNRT • TAWA

***DGO**: District Game Office; **DVS**: Department of Veterinary Services; **PHO**: Public Health Office; **PO-RALG**: President Office Regional Administration and Local Government; **MLF**: Ministry of Fisheries and Livestock; **MNRT**: Ministry of Natural Resources and Tourism; **TAWA**: Tanzania Wildlife Management Authority; **TAWIRI**: Tanzania Wildlife Research Institute; **TMB**: Tanzania Meat Board; **TRA**: Tanzania Revenue Authority

Risk Category	Value Chain Node	Critical Control Points	Recommended Actions	Stakeholders Involved*
Sustainability	Sourcing	Preparatory stages before hunting	<ol style="list-style-type: none"> 1. Update research findings on wild animal populations and mortality and birth rates to establish well-informed hunting quotas. 2. Organise a workshop to determine which key data elements are needed to establish a traceability system to monitor sustainability, safety and legality of offtake and onward supply through the value chain to end-user; 	<ul style="list-style-type: none"> • TAWA • TAWIRI
	Selling	Game meat sale	<ol style="list-style-type: none"> 3. Closely monitor game supplies (including hunting permits, number and species of game animals on sale, frequency of supplies); and 	<ul style="list-style-type: none"> • MNRT (WD) • TAWA
			<ol style="list-style-type: none"> 4. Adapt the 5-Dimensional Sustainability Assessment Framework (5DSAF) tool to the Tanzania context to aid in monitoring the game meat industry's performance against key sustainability standards, building on the pilot testing of the 5DSAF by TRAFFIC with GMSAC members in March 2024. 	<ul style="list-style-type: none"> • MNRT • MLF • PO-RALG
Safety	Sourcing	Processing premises (in-situ)	<ol style="list-style-type: none"> 5. Train hunters on the specific hygiene and field dressing practices they need to observe to ensure game meat safety. 	<ul style="list-style-type: none"> • DGO • DVS • PHO • TAWA
		Game meat storage	<ol style="list-style-type: none"> 6. Train hunters on storage practices that best ensure game meat quality and safety. 	<ul style="list-style-type: none"> • DGO • DVS • PHO • TAWA
		From the field to the GMSF	<ol style="list-style-type: none"> 7. Before allowing GMSF operations to commence, ensure that GMSF operators have access to specialised vans with a cooling system during meat transportation and that relevant authorities have a system in place to carry out regular monitoring and inspection of the transport van cooling system to ensure that it functions appropriately 8. Regularly inspect and test the functionality of the transport van cooling system to ensure that it can withstand even transport across long distances. 	<ul style="list-style-type: none"> • TAWA • TMB • MLF
		Secondary processing at the GMSF	<ol style="list-style-type: none"> 9. Train hunters on the specific hygiene and field dressing practices they need to observe to ensure game meat safety. 	<ul style="list-style-type: none"> • DGO • DVS • PHO • TAWA
	Selling	Game meat sale	<ol style="list-style-type: none"> 10. Carry out random inspections of GMSF storage facilities to test functionality and fitness for the purpose of storage equipment 	<ul style="list-style-type: none"> • TMB • MLF
			<ol style="list-style-type: none"> 11. Carry out both regular and random inspections of GMSF selling activities to ensure that hygienic practices (e.g., handwashing, sanitising equipment, storage facilities) are being observed to prevent game meat contamination and spoilage. 	<ul style="list-style-type: none"> • TMB • DVS • TAWA • TBS
	Consumption		<ol style="list-style-type: none"> 12. Carry out SBC initiatives on the practical intervention's consumers can take to ensure the food safety of their game meat products (e.g., handwashing before handling meat, salting, cooking thoroughly, etc.). 	<ul style="list-style-type: none"> • MLF • DVS • MNRT • TAWA

APPENDIX 1

Table 2. Matrix of species that can be sold in GMSFs based on their listing in relevant TZ regulations.

	Common Name	Scientific Name	Resident Hunting	Tourist Hunting	Wildlife Captive Facility (if/when operational)	Dangerous Animals Consolation
1	Buffalo	<i>Syncerus caffer</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2	Bushpig	<i>Potamochoerus larvatus</i>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
3	Dik-dik	<i>Madoqua kirkii</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
4	Eland	<i>Taurotragus oryx</i>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
5	Gerenuk	<i>Litocranius walleri</i>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
6	Giant Forest Hog	<i>Hylochoerus meinertzhageni</i>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
7	Greater kudu	<i>Tragelaphus strepsiceros</i>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
8	Coke's Hartebeest	<i>Alcelaphus buselaphus cokii</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
9	Lichtenstein Hartebeest	<i>Alcelaphus lichtensteinii</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
10	Hippopotamus	<i>Hippopotamus amphibius</i>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
11	Impala	<i>Aepycero;s melamp</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
12	Klipspringer	<i>Oreotragus oreotragus</i>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
13	Lesser kudu	<i>Tragelaphus imberbis</i>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
14	Oribi	<i>Ourebia ourebi</i>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
15	Oryx	<i>Oryx sp</i>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
16	Puku	<i>Kobus vardonii</i>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
17	Pygmy antelope	<i>Nesotragus batesi</i>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
18	Common Duiker	<i>Sylvicapra grimmia</i>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
19	Red Duiker	<i>Cephalophus natalensis</i>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
20	Abbot's Duiker	<i>Cephalophus spadix</i>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
21	Blue Duiker	<i>Philantomba monticola</i>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
22	Bohor-Reedbuck	<i>Redunca redunca</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
23	Mountain Reedbuck	<i>Redunca fulvorufula</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
24	Southern Reedbuck	<i>Redunca arundinum</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
25	Roan antelope	<i>Hippotragus equinus</i>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
26	Sable antelope	<i>Hippotragus niger</i>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
27	Sitatunga	<i>Tragelaphus spekii</i>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
28	Stein buck	<i>Raphicerus campestris</i>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
29	Thomson Gazelle	<i>Eudorcas thomsonii</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
30	Grant's Gazelle	<i>Nanger granti</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
31	Topi	<i>Damaliscus lunatus jimela</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
32	Warthog	<i>Phacochoerus africanus</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
33	Common-Waterbuck	<i>Kobus ellipsiprymnus</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
34	Wildebeest	<i>Connochaetes taurinus</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
35	Zebra	<i>Equus quagga</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

APPENDIX 2

Table 3. Matrix of the prices (USD) of selected locally edible species that can be sold in GMSFs as listed in the relevant regulations (Section 3.2 Sourcing).

	Common Name	Scientific Name	Resident Hunting	Tourist Hunting	Wildlife Captive Facility (Price is for parent stock)	Dangerous Animals Consolation
1	Buffalo	<i>Syncerus caffer</i>	80	1,900	78	No fixed price
2	Bushpig	<i>Potamochoerus larvatus</i>		420	31	
3	Dik-dik	<i>Madoqua kirkii</i>	23	250	8	
4	Eland	<i>Taurotragus oryx</i>		1,700	117	
5	Gerenuk	<i>Litocranius walleri</i>		2,500	390	
6	Giant Forest Hog	<i>Hylochoerus meinertzhageni</i>		445	69	
7	Greater kudu	<i>Tragelaphus strepsiceros</i>		2,200	344	
8	Coke's Hartebeest	<i>Alcelaphus buselaphus cokii</i>	39	650	70	
9	Lichtenstein Hartebeest	<i>Alcelaphus lichtensteinii</i>	39	650	70	
10	Hippopotamus	<i>Hippopotamus amphibius</i>		1,500	234	No fixed price
11	Impala	<i>Aepyceros melamp</i>	31	360	31	
12	Klipspringer	<i>Oreotragus oreotragus</i>		1,200	187	
13	Lesser kudu	<i>Tragelaphus imberbis</i>		2,600	406	
14	Oribi	<i>Ourebia ourebi</i>		250	39	
15	Oryx	<i>Oryx sp</i>		2,800	56	
16	Puku	<i>Kobus vardonii</i>		800	125	
17	Pygmy antelope	<i>Nesotragus batesi</i>		160	25	
18	Common Duiker	<i>Sylvicapra grimmia</i>		250	39	
19	Red Duiker	<i>Cephalophus natalensis</i>		250	39	
20	Abbot's Duiker	<i>Cephalophus spadix</i>		280	39	
21	Blue Duiker	<i>Philantomba monticola</i>		250	39	
22	Bohor-Reedbuck	<i>Redunca redunca</i>	39	450	70	
23	Mountain Reedbuck	<i>Redunca fulvorufula</i>	39	450	156	
24	Southern Reedbuck	<i>Redunca arundinum</i>	39	450	156	
25	Roan antelope	<i>Hippotragus equinus</i>		2,250	398	
26	Sable antelope	<i>Hippotragus niger</i>		2,250	398	
27	Sitatunga	<i>Tragelaphus spekii</i>		2,000	312	
28	Stein buck	<i>Raphicerus campestris</i>		250	39	
29	Thomson Gazelle	<i>Eudorcas thomsonii</i>	20	500	10	
30	Grant's Gazelle	<i>Nanger granti</i>	31	450	31	
31	Topi	<i>Damaliscus lunatus jimela</i>	39	800	39	
32	Warthog	<i>Phacochoerus africanus</i>	20	450	19	
33	Common-Waterbuck	<i>Kobus ellipsiprymnus</i>	31	850	132	
34	Wildebeest	<i>Connochaetes taurinus</i>	39	650	39	
35	Zebra	<i>Equus quagga</i>	117	1,200	390	

APPENDIX 3

W-TRAPS CONSUMER SURVEY

PHONE INTERVIEW QUESTIONS

Name of interviewer _____

Name of GSF _____

Date of interview _____

Start time _____

End time _____

Utangulizi

My name is.....; I am a public health specialist. We have got your contacts from a game meat selling facility namedlocated at _____. We are contacting you to get your opinions to help the government improve the health environments along the game meat selling supply chain. I would like to get your opinions through a few questions, so I ask for your consent.

Questions

1. How many times have you purchased game meat from this facility?
 - a. 1-4
 - b. 5-6
 - c. 7-10
 - d. More than 10 times

2. Are you aware of the species of the meat you purchased last time?
 - a. Yes
 - b. No

If yes, what is the species name? _____

3. What quantity (kg) did you last purchase from this facility? _____

4. What other species have you purchased from this facility? _____

5. Apart from purchasing meat, where else have you consumed meat?
 - a. Hotel
 - b. Restaurant
 - c. Friends house
 - d. Others (mention) _____
 - e. I haven't

6. What quantity of meat can satisfy your household per meal (how much meat would you buy when you go to a GSF)? _____

7. If readily available, what quantity of meat can satisfy your household per month?
- a. 1-5
 - b. 6-10
 - c. 11-20
 - d. More than 20
8. How do you preserve meat purchased from a butcher?
- a. Drying (salting, smoking, sun drying)
 - b. Boiling
 - c. Roasting
 - d. Freezing
 - e. Others (mention)_____
9. Have you ever faced any health problems after consuming game meat?
- a. Yes
 - b. No
10. If yes, what health problems did you suffer?
- a. Fever
 - b. Vomiting
 - c. Skin rash/itching
 - d. Diarrhoea
 - e. Flu
 - f. Others (mention)_____
11. How do you satisfy yourself that the meat is safe for consumption?
- a. Check meat inspection certificate
 - b. Meat odour
 - c. Meat appearance
 - d. Meat stamp
 - e. Meat texture
 - f. Others (mention)
12. Are you aware of zoonotic diseases?
- a. Yes
 - b. No
13. Are you able to identify the species of the meat?
- a. Yes
 - b. No
14. If yes, how do you identify?
- a. Appearance of the skin, head, and other body parts
 - b. Meat appearance
 - c. Considers butcher description
 - d. Others (mention)_____

15. Why do you prefer game meat?
- a. It has nutrients
 - b. It has no synthetic chemical
 - c. It has good taste
 - d. Cure diseases
 - e. Its cheap
 - f. Others (mention)_____
16. How do you satisfy that the meat is coming from legal sources before you purchase?
- a. Check permits and certificates
 - b. I believe its coming from legal sources
 - c. Considers operators description
 - d. Others (mention)_____
17. Which district are you from?_____
18. Which of the following categories do you fall?
- a. Government employee
 - b. Business person
 - c. Peasant
 - d. Unemployed
 - e. Others (mention)_____
19. Which age group category do you fall in?
- a. 15 – 25
 - b. 26 – 36
 - c. 37 – 47
 - d. 48 and above

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