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Integrating Sustainability and Tradition: Challenges and Opportunities in Uruguayan Hunting Practices

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ABSTRACT

Recreational or sport hunting elicits a wide range of opinions within society. Its management can lead to varied environmental, economic, and social impacts. This activity is thoroughly regulated and researched in the Global North and parts of Africa and Asia, yet it remains relatively unexplored in Latin America. Through an ethnographic approach that incorporates open-ended interviews and participant observation of wild boar hunting, this study offers several recommendations for improving hunting management in Uruguay, South America. It considers aspects of hunting governance, local traditions, and this practice's ecological and economic sustainability.

INTRODUCTION

Recreational or sport hunting is widespread globally (Damm, 2008). It can contribute to biodiversity conservation, generating incentives for landowners to conserve or restore wildlife on their land, creating revenue for wildlife management and conservation (including anti-poaching activities), increasing tolerance for living with wildlife, reducing the effects of human-wildlife conflicts, and promoting the social visibility of wildlife (Hutton & Leader-Williams, 2003; IUCN, 2019; Lindsey *et al.*, 2006; Lindsey *et al.*, 2007; Loveridge *et al.*, 2006). Hunting lands can increase biodiversity because it is a border to the expansion of urbanization, rangelands for livestock production or agriculture (Sheikh & Bermejo, 2019). Hunting also has the potential to act as a form of combat for invasive alien species, which sometimes are valuable hunting targets (Jean Desbiez *et al.*, 2011; Quirós-Fernández *et al.*, 2017). However, recreational hunting is highly criticized socially (Bellon, 2008; Fischer, Kereži, *et al.*, 2013; IUCN, 2019), and inadequate legal frameworks or inappropriate management systems can have adverse effects (increasing social inequality and corruption, generating genetic erosion, and even the extinction of species) (IUCN, 2012, 2019).

In Latin America, studies related to hunting have focused on bushmeat in local contexts, primarily in indigenous societies (van Vliet *et al.*, 2019). This lack of information on the management of recreational hunting in Latin America is related to restrictive regulatory positions and the absence of organic hunting management systems (Cirelli, 2002; Ojasti, 1996; Rosser, 2009). More recently, some countries are reviewing their positions around sport hunting, and some proposals to improve hunting management are arising (Bragagnolo *et al.*, 2019). In this framework, hunting management is being re-discussed in Uruguay (Dabezies, 2019; Dinama, 2017).

Uruguay's Wildlife Law, No. 9,481 of 1935, regulates hunting, prohibiting native species' hunting. Decree 164/996 categorizes hunting species into sport, scientific, control, and commercial hunting, with free-hunting and protected species. Beyond this categorisation, no explicit management policy exists for any game species. Sport hunting permits are primarily issued to foreign tourists for hunting birds. However, Uruguayan big game is centred on wild boar (Sus scrofa), as it is a free-hunting species and does not require any administrative mediation. This situation has led to a lack of management information. Even though poaching in Uruguay has been considered one of the main threats to wildlife conservation (Dietrich, 1992; González *et al.*, 2016; González & Martínez-Lanfranco, 2010; Hatchondo, 1980; Vaz Ferreira, 1969), hunting studies is a field that is just beginning to develop. Due to this lack of studies, we focused on the case of wild boar, the most widespread and visible hunting modality, to discuss more general aspects of the hunting activity. Wild boars are considered an invasive alien species, a national pest (officially declared in 1982), and a free-hunting species. This legal categorization has caused a significant increase in boar hunting (Borad, 2015; Herrero & Fernández de Luco, 2003; Lombardi *et al.*, 2015).

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The main goal of this work is to provide inputs to discuss hunting management in Uruguay. Based on the three dimensions of sustainable hunting management (Figure 1) and the analysis of the Uruguayan hunting situation, we propose a series of challenges for improving hunting management in Uruguay (Table 4). This work enables a dialogue between these results and those of other Latin American countries where big game hunting regulations are being re-evaluated (Ballari *et al.*, 2009; Bragagnolo *et al.*, 2019), primarily due to the increase in invasive exotic species like the wild boar (Montero-Cruzada & Dabezies, 2024) or due to the existence of social pressures surrounding this activity (Sordi, 2024).

LITERATURE REVIEW

Sustainable hunting management must consider three key dimensions: ecological, economic, and sociocultural sustainability (Figure 1). Regarding ecological sustainability it is essential to consider the ecological impact of this activity because hunting malpractice and poaching can have critical consequences (IUCN, 2019). Introducing and managing exotic species for hunting purposes can generate leaks that harm the ecosystems. It is essential to manage extraction rates based on accurate data (Sheikh & Bermejo, 2019). The selective pressure on adult males affects populations' social and genetic structure under hunting pressure. In a similar line, crossing species bred in captivity to look for specific characteristics of hunting interest can negatively impact the genetic pool of wild species, such is the case of the red partridge in Spain (Casas *et al.*, 2016). It is key to assess vulnerability, invasive potential, and biosecurity risks of wildlife to preserve native ecosystems and prevent invasive species and zoonotic threats (Armenteros *et al.*, 2013; Quirós-Fernández *et al.*, 2017). When hunting in a territory becomes very intensive, another critical aspect is lead contamination generated by ammunition disposal (Kanstrup *et al.*, 2018).

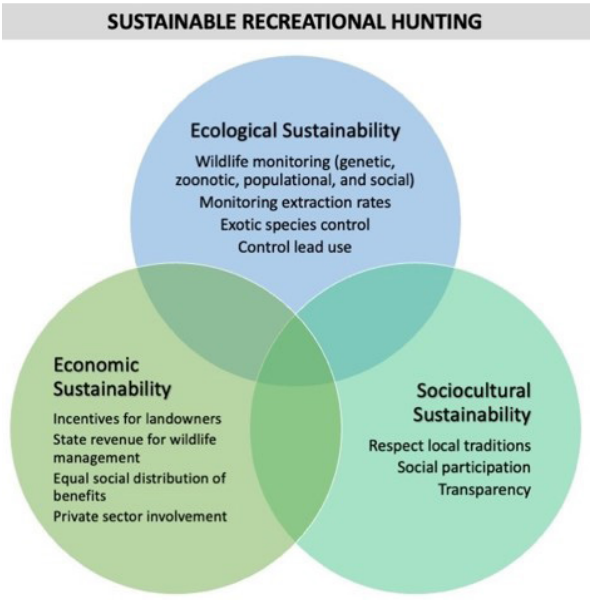

Figure 1: Three dimensions of sustainable hunting management
Source: The authors

Economic sustainability is another important dimension in sustainable hunting systems. It depends on the possibility of generating, financial income and a good distribution among different actors involved in hunting: the State, private sector, NGOs and local communities. Rosser (2009) called this strategy the development of a Net Conservation Benefit, which implies clearly defining a network benefit that generates well-distributed resources, granting rights and defining responsibilities for all the actors involved. Hunting tourism is one of the most extended hunting activities that create economic revenue. It can be understood as a specific type of nature tourism characterised by fewer tourists than traditional nature tourism but with higher per capita expenditure (Loveridge *et al.*, 2006). It can be implemented with basic infrastructure, generating a positive relationship in terms of investment and revenue. In developing countries, hunting tourism can transform social and ecological marginal areas in wildlife conservation units that generate high economic income. It is also less affected by economic or political instability than nature-based tourism (Damm, 2008). Tourism's income is based on trophy fees, specialised guides, equipment (weapons, ammunition, clothing and other hunting technology), and special transport, among others (Martín-Delgado *et al.*, 2020). Despite direct economic income from hunting tourism, local hunting is also essential. There are several ways of generating indirect economic benefits, such as cost savings (control of exotic species, control of poaching and possession of illegal trafficking of wildlife) and the valorisation of marginal lands and game species. Another more direct way of obtaining economic income is fees related to hunting activity (Ullah & Kim, 2020).

It is also essential to consider sociocultural sustainability, taking into account the sociocultural aspects of hunting, such as local traditions, and not to promote neo-colonial forms of hunting based on the imposition of exotic techniques, Western ethical codes and exotic animals (Hussain, 2010). In this sense, key issues such as the conservationist values promoted by global institutions linked to sport and recreational hunting or the growing demand for animal welfare may conflict (Adams, 2009). These tensions need to be considered when thinking about sustainable recreational hunting systems. Finally, hunting management must be based on solid governance. The involvement of the different actors must be clear, considering their power imbalance and developing realistic ways of participation (Ullah & Kim, 2020). It is also essential to carefully consider the representativeness of participation (IUCN, 2019). The governance must be based on transparent information channels accessible to the actors involved (Cirelli, 2002; Di Minin *et al.*, 2016; IUCN, 2012). The issue of transparency is also crucial in preventing corruption within hunting management systems, which is often critical in developing countries (Leader-Williams *et al.*, 2009).

METHODOLOGY

This work was based on an ethnographic approach to identify and collect data form the main actors related to hunting in Uruguay. The ethnographic approach is a qualitative approach based on interaction and participation in activities with stakeholders related to the study field. It is very suitable for accessing controversial issues, such as recreational hunting since it is based in the generation of bonds of trust with local actors. Beyond the formal-ethical aspects of these data collection methods (such as informed consent permissions), the trust that is generated opens doors to topics or layers of information that are difficult to access with other methodologies (Hammersley & Atkinson, 2001).

This method is characterized by a prolonged fieldwork stage in which these social interactions of information gathering take place. The fieldwork was carried out for two years (between 2017 and 2019) in the eastern region of Uruguay, but it also considered events and actors at a national scale. We worked with hunters, nature managers (rangers and actors with more administrative functions), members of animal rights and conservation organisations, and rural producers. The initial selection of actors was linked to those who had greater public exposure around what has been called "the peccary incident" in 2017. This event consisted of the hunting of peccaries that were reintroduced, generating a national debate around hunting in Uruguay (Dabezies & Di Candia, 2023). The final selection of actors was based on the snowball sampling method until the actors, themes, and tensions began to be constantly repeated. Although it is a compelling and popular method in qualitative studies, it is essential to point out that it has limitations for making statistical generalizations; in addition, since it is a chain sampling method based on social or knowledge ties, it may have a particular bias in the sample. However, since sport or recreational hunting in Uruguay is a topic with almost no antecedents and a relatively narrow field, it was valuable and significant for us. In addition, it allowed us to access the circle of existing contacts quickly and safely, something fundamental in the case of controversial social topics (Biernacki & Waldorf, 2016).

Open-ended interviews and participant observation were the most used techniques to collect qualitative data. We interviewed male and female people related to hunting from different positions. The open-ended interviews were not structured with fixed questions. They were open talks with a thematic pathway but with a non-structured order (Table 1).

Table 1: Number of interviews carried out by type of actor and gender, and topics approached by actor

Actor	Male	Female	Topics approached
Hunters	52	1	Personal biography about hunting; preferred game species; hunting modalities practiced; hunting ethics; role of death in hunting; conceptualization of sportsmanship; relationship with dogs; preferences in the use of dogs; relationships with other actors linked to hunting; invasive alien species; native species; conservation and ecology
Animal right groups	2	4	History of their organization; activism focus; relationship with hunting; opinion about hunting; hunting with dogs; animal death; animal abuse and care; invasive alien species; native species; conservation and ecology
Conservation groups	3	1	History of their organization; activism focus; relationship with hunting; opinion about hunting; opinion of hunting with dogs; animal death; invasive alien species; native species; conservation and ecology; role of hunting in conservation
Nature managers	6	0	General opinion on recreational hunting; hunting and conservation; synergies between hunting and management of protected areas; poaching modalities and species; hunting in protected areas; control of poaching; interaction with other actors linked to hunting
Rural producers	5	3	Relationship with hunting; opinion about hunting; hunting with dogs; animal death; invasive alien species; native species; conservation and ecology; role of hunting in conservation; productive impact generated by invasive alien species; impact of poaching and hunting malpractice; dog´s abandonment
Total	**68**	**9**	

Participant observation aims to generate information from practice together with the local actors. It involves not only orality (i.e., questions and answers) but also participation in the activities of interest. In addition to generating this experiential information, it opens dialogues in comfortable spaces for local actors, improving personal proximity between researchers and local actors (Spradley, 1980). Once trust was established after the interviews and the first contacts, we were invited to join hunters on hunting trips, immersing ourselves in the experience to gain an insider's perspective and taking advantage of these situations to approach some deep topics, such as conflicts with other actors or some layers of the illegality of hunting. This opportunity to participate in hunting trips held significant value for our research, as it demonstrated the depth of mutual trust

between the hunters and the researchers.

The ethnographic work not only included interaction with hunters. We also shared several informal talks, field trips, and the teaching of courses and workshops with veterinarians from the Ministry of Livestock, Agriculture and Fisheries, with managers from the Ministry of Environment and with academics linked to the fields of conservation and biosecurity. During all these moments of interaction, we always focused our attention on understanding hunting management in Uruguay. We were always taking mental notes or scribbles on paper, fundamental research tools for anthropology (Sanjek, 1990).

The recorded interviews underwent meticulous content analysis, wherein our approach involved discerning underlying themes and establishing interconnections between the testimonies and the primary topics derived from the literature review. Furthermore, we subjected the participant observation data to both individual and group analyses. All qualitative interviews were conducted under the participants' authorization. In addition, pseudonyms were used in the informants´ names cited in this work to respect anonymity

RESULTS AND DISCUSSION

Hunting in Uruguay

We identified a lack of structure in Uruguayan territory. Uruguay has no national hunting reserves or public or community hunting lands. Hunting is carried out on private properties whose main economic goal is agricultural and livestock production. Access to hunting on these properties requires the verbal permission of the owners of the land, who do not obtain direct economic revenue from this activity. They usually let hunters in because they are friends or neighbours interested in controlling invasive species.

The central institution that regulates hunting is the National Directorate of Biodiversity and Ecosystem Services (DINABISE), Ministry of Environment. In addition, other actors are "in fact" relevant to hunting activity. Hunters established in 2017 the first organisation of national scope, the National Hunters Association, which gathers around 2.000 hunters in a country of about 3.700.000 inhabitants. However, there are other organizations of smaller size and scale, and another big part of hunters are separate from any organisation. Other relevant actors are the Ministry of Livestock, Agriculture and Fisheries, hunting tourism operators, rural producers (hunting landowners), conservation organisations and organisations that defend animal rights (Table 2).

Within this map of actors, there is no structured relationship as part of a hunting management system. It is a de facto system with no structural considerations of ecological, economic, or cultural sustainability. There is no hunting governance or an institutionalised flow of information and decision-making process. The responsibility falls entirely on DINABISE, which has very scarce resources for monitoring hunting activity.

Considering that most hunters are dedicated to hunting wild boars (a free-hunting game species), hunters are not required to pay any tax or fee to the State or other social institution, nor to the owners of the fields where hunting activity is developed. In this sense, hunting is not considered a direct economic income to the landowners (rural producers in Table 2) and does not have any administrative monitoring. There are some exceptions regarding hunting tourism because it is an activity mediated by a permit (categorised as sport hunting).

Table 2: Main actors linked to hunting in Uruguay

Actor	Description	Relation with hunitng
Defenders of animal rights	They focus on animal welfare and abusive use of animals. They are grouped into different types of civil organizations of national scope	They are morally opposed to hunting as an activity that involves animal death to generate pleasure. They also oppose the suffering of hunting dogs during hunting and criticizes the unregulated possession of hunting dogs
Conservation organizations	They are focused on the protection of native wild species and Uruguayan ecosystems. They are grouped into different types of civil organizations of national scope	They are in favour of hunting exotic species but are opposed to the inappropriate use of hunting dogs since they maintain that they harm native fauna
Hunters	At the national level they are grouped into the Hunters National Association of Uruguay, although there are also some organizations with a smaller territorial scope. But most hunters are not part of a hunter organization.	They claim hunting as a cultural and sports activity that also helps in the conservation of native species and the control of invasive alien species
Hunting tourism companies	Companies dedicated to hunting tourism in Uruguay	Hunting represents an important economic activity. It is focused on bird hunting (mostly ducks). They work more than anything with foreign tourists (more than anything North American)

National Directorate on Biodiversity and Ecosystem Resources	National authority on environment and wildlife management	Regulates hunting as an activity that affects wildlife. Adopts a hunting regulation policy to order the practice, on the grounds that it may be a threat to native fauna
Rural producers	Owners of the land where hunting takes place	They allow hunting on their properties at no cost. They benefit from hunting because they perceive that wild boars or other wild animals negatively impact their productive activity. They denounce the attack of hunting dogs on livestock, the entry of hunters without permission and illegal hunting

In Uruguay, hunters do not have a license or registration that defines them as hunters. If they hunt with weapons, they only must comply with the specific regulations for using weapons. They also need to have the verbal permission of the owner of the place where they will carry out the hunt. When hunting any species for which a permit is required (sport hunting, scientific collection or educational purposes, control hunting or commercial hunting), they must have the corresponding hunting permit. However, if they are going to hunt a free hunting species, they do not need any license. Therefore, there is no guarantee of suitability among hunters or guarantees to landowners, generating a complex mix between highly trained and responsible hunters and hunters who need to learn the regulatory framework. This situation has generated many local conflicts, even between the hunters themselves, since, from the hunters' point of view, a few hunters generate a terrible image that affects them all.

One of the more conflictive topics of hunting is hunting with dogs. There is an essential agreement among actors that hunting with dogs generally negatively impacts native wildlife, such as capybaras (Hydrochoerus hydrochaeris), foxes (Lycalopex gymnocercus or Cerdocyon thous), armadillos (Dasypus novemcinctus or Dasypus septemcinctus) or small deer (Ozotoceros bezoarticus or Mazama gouazoubira).

In the cases of hunting with large packs, the potential impact is much more remarkable since it is complex to control the dogs (Table 3, Supportive quotation 1). Hunters themselves recognize that the greater the number of dogs in a pack, the greater the difficulty of controlling them. However, they also argue that the foundation of good control is good training (Table 3, Supportive quotation 2).

Table 3: Supportive quotations. Representative quotations from different actors and techniques used. The quotations are textual references to qualitative data collection activities

Id	Actor	Supportive quotation	Source
1	Hunter	"My dream is that this field becomes a sanctuary for species. And you are going to tell me ´but you are going to hunt them´. And yes, I know it sounds as a contradiction, but that's my dream. Hunting little, only males. But do not hunt with dogs because it does not discriminate sex or size. In addition, the dogs annoy all the wild animals, even if they don't kill other animals, they drive them away"	Audio recorded open interview
2	Hunter and conservationist	Conservationist: "But what is the way to minimize the impact of dogs on native wildlife?" Hunter: "The orderly dog belongs to the orderly hunter. But there are people who go out with huge packs and let the dogs go ahead killing all kinds of animals. And that is not just dog education, it is hunter education, and the reality is that it is almost impossible to control 20 dogs"	Audio recorded dialogue in a workshop
3	Conservationist	"Just as it is done with fishing, seasons, populations, levels, and modalities must be regulated. And all this must be based on technical and specific information. Good or bad, but there has to be something"	Audio recorded open interview
4	Park ranger	"The police have no idea how to identify the hunted animals. Neither how to act, to whom to inform first; The police have no idea of all this. They call me precisely for that, to find out how they have to proceed (…) I have also had to carry out procedures together with the police, and they themselves tell me ´Hey, we only found one capybara. Couldn't we just hide it and go? Please, if it is only one, please, because if not we will have to spend days going to testify for a simple capybara. It's a pain in the neck´. By this I mean that many times they are already so predisposed that they are going to waste a lot of time, that they no longer even want to go to do an effective control"	Audio recorded open interview

5	Hunter	"This is not about creating more laws. The first thing to do is educate the hunters. Today there is a persecution of all hunters alike: poachers, responsible hunters, hunters with dogs, and without dogs. And that's why we hunters began to organize"	Audio recorded open interview

Dogs' care during breeding and hunting is highly controversial among defenders of animal rights groups and hunters. According to animal advocates, the conditions in which hunting dogs are raised are inappropriate. From the hunters' perspective, dogs are essential to them, and their care is a priority. Regarding breeding dogs, hunters mention that having dogs in horrible health conditions is counterproductive for their performance during hunting (in which they must travel up to 30 km daily). Another aspect linked to dogs' well-being is the wounds they may suffer during hunting, which are sometimes fatal.

Another critical point was the need for more population studies supporting decisions on hunting management. Although DINABISE must establish these criteria, this institution currently does not destinate resources for this type of study neither significant revenue from hunting permits. According to Law No. 9,481, DINABISE must establish the quotas and hunting seasons by an annual legal decree. However, the last decree was done in 2000 (Decree 104/000). The other actors also do not carry out such studies with the specific objective of generating inputs for game management (Table 3, Supportive quotation 3).

Finally, poaching control is another crucial aspect highlighted as a key aspect to consider in improving hunting management. Poaching control is ultimately the responsibility of the national police. The figure of environmental police does not exist, and the park rangers do not have the legal capacity to apprehend a poacher. In any case, they should call the police for such actions. In general, hunters, conservationists, rural producers, and park rangers point out that there is no genuine concern of the police in combating illegal hunting and that control should be increased on rural roads and national routes to prevent poaching. A key aspect is that the police themselves need to be better informed about the existing regulations and need to know how to proceed with poaching incidences (Table 3, Supportive quotation 4). Hunters state that one type of control is that which the hunters themselves should exercise within the hunters' collective. To do this, they propose to organise themselves better, promote better training and thus generate a change in the bad social image that many of them consider they have (Table 3, Supportive quotation 5).

Challenges for Hunting Management in Uruguay

According to the topics considered as key elements for a sustainable hunting system, the actors, traditions and challenges of big game hunting in Uruguay (previous section), we propose several management potential actions (Table 4, Figure 2).

Table 4: Management potential actions to improve hunting management in Uruguay

Hunting management topics	Specific management impacts	Management potential actions
Hunting governance	Allocate resources to DINABISE	Design a governance system led by DINABISE
	Define the actors that will participate	
	Develop a participation structure and process system	
	Define the rights and obligations of participation.	
Hunters' informality	Need for a clear differentiation between hunters and poachers	Issue a hunting license with a national registry of hunters
	Increase dialogue among hunters regarding sportsmanship	
	Promote the articulation of hunters in wildlife conservation and biosecurity policies	
	Develop mandatory basic training for hunters	
Hunting with dogs	Improve training of hunting dogs	Regulate hunting with dogs
	Regulate pack sizes during the hunt	
	Regulate hunting dogs' living conditions (keep them well fed, healthy, in large spaces, and free to move) and their safety while hunting (with neck protectors and GPS devices)	
Wildlife monitoring	Create alliances with actors linked to outdoor activities to promote social monitoring	Develop collaborative wildlife monitoring
	Evaluate species categorisation and quotas more frequently	
	Improve the control of pests and invasive species	

Poaching control	Develop rigorous controls of poaching on routes and other places	Promote a realistic and effective poaching control system based on enforcement, shared ethics, and social control
	Develop a shared hunting ethics code and promote social control of poaching	
Economic revenue	Improve the State taxes system	Generate multisectoral economic revenue
	Promote hunting tourism	
	Generate economic income for landowners	
	Distribute equitable distribution of benefits	

In countries with scarce resources for wildlife and hunting monitoring, it is advisable to involve different actors. Including other actors related to recreational hunting will allow the delegation of tasks, reducing costs and empowering society (Ullah & Kim, 2020). To promote good hunting governance, it is necessary to define the legal and institutional relationships between State institutions and other actors related to hunting and consider the hierarchy and the type of interactions (Fischer, Sandström, *et al.*, 2013). In the Uruguayan case, DINABISE is the central institution, but it needs to consider other actors for improving hunting management. Promoting this governance must include concrete spaces for citizen participation that function regularly. The actors mentioned in Table 2 should have delegates who can be part of these spaces. In addition to these actors, others linked to wildlife, such as research institutions, can contribute important information. It is also important to allocate resources to DINABISE to actively manage this system.

Figure 2: Weakness, challenges and potential actions to improve hunting management in Uruguay. Source: the authors

Regarding the ecological sustainability of hunting, it is key to strengthen the potential of hunting in conservation and minimise its adverse impacts on wildlife. It is also necessary to establish a system to monitor the impact of hunting on wildlife, regardless of whether they are invasive alien species or pests. The existence of free-hunting species, that is, species that can be hunted without any administrative intermediation, implies no type of administrative control and monitoring of this activity. The administrative mediation system would allow continuous feedback in relation to the monitoring of the activity, including data of ecological value. Finally, it is advisable to consider those forms of subsistence hunting that, although marginal and not very widespread, exist in Uruguay (Chouhy & Dabezies, 2021) and are complex practices to regulate. All this administrative intermediation must be carried out agilely and efficiently (Bragagnolo *et al.*, 2019).

The impact of hunting at the population level must be based on good information to define quotas and hunting seasons. Determining extraction rates at the national or regional level is a crucial but complex challenge. Adverse impacts on wildlife, but also on human productive activities (e.g., crops, tree plantations), could occur by certain types of hunting procedures. Trophy or selective hunting could provoke a decrease in genetic variability and an unwanted population increase of the target species or coexisting ones (Gürtler *et al.*, 2017; Knell & Martinez-Ruiz, 2017) particularly worrying when considering invasive species such as the wild boar. In the evaluation of native species and their potential interactions with exotic species, it is imperative to focus on their vulnerability,

invasive potential, and associated biosecurity risks. The goal is to ensure the preservation and sustainability of native ecosystems while safeguarding against the negative impacts of invasive species and zoonoses (Armenteros *et al.*, 2013; Quirós-Fernández *et al.*, 2017).

Nevertheless, habitat status monitoring, population demography, catch per unit of effort and population surveys are complex and expensive (Kunz & Blum, 2009). This budgetary argument has been the central one in the Uruguayan case. This situation has generated a paralysing effect on the definition of extraction rates. However, this could be solved in different ways. One way is by incorporating less exact but straightforward, efficient and relevant methods of wildlife monitoring (Child & Wall, 2009). In this sense, working with people linked to wildlife is cheap and productive (Adams *et al.*, 2009). This integrative data-collecting proposal can solve economic barriers and improve the quota and season planning. For example, wildlife observers such as birdwatchers or mammals' observers are immersed in citizen science networks that provide vast amounts of data globally (Larson *et al.*, 2016; Lawson *et al.*, 2015). Also, hunters can contribute to this monitoring with simple techniques such as measuring trophies, which provide valuable information on the genetics and structure of populations and measure the direct impact of hunting (Child & Wall, 2009). Other simple indicators to incorporate are carcass tagging, using weigh stations, and the ageing and sexing of carcasses (Leader-Williams, 2009). The evaluation of the impact of the ammunition is also a variable to be considered. Sometimes, it may be necessary to opt for lead-free ammunition, which must be done gradually and planned within the community of hunters, shooters and ammunition suppliers (Kanstrup & Thomas, 2020).

Another way is to invigorate the economic dimension of hunting management, attracting financial resources with specific activities such as hunting tourism. In Uruguay, international hunting tourism is not a widespread activity, and it has also the resistance of conservation groups. To promote an increase in hunting tourism, it is necessary to involve the local communities, sharing the economic benefits. This articulation increases the interest of the leading communities in promoting hunting, which increases economic activity (Ullah & Kim, 2020) and conserves wildlife populations. Uruguay also needs to enforce the licencing system. This system can generate large volumes of economic resources based on the issuance of licenses, trophy taxes or even access to hunting places. The actors involved in hunting management will value hunting positively if it represents an economic income, thus increasing the participation of different actors in hunting management and wildlife conservation (Loveridge *et al.*, 2006). Considering that hunting in Uruguay takes place on private properties (primarily for agricultural purposes), the involvement of the rural producers who own these lands is fundamental. One of the ways to involve them actively is to ensure that their lands have hunting productivity, i.e., that they obtain economic benefits from recreational hunting.

Because many hunters are used to hunting without any administrative intermediation, a system like this needs a robust poaching control system, which is considered a national weakness by different actors. Increasing poaching control in rural areas is necessary, especially on secondary roads or main routes. The hunters also must play a key role in promoting social and ethical control of poaching and hunting malpractice, promoting a hunting licence. Hunting licenses must be obtained after completing some requirements, where experienced hunters can actively teach new hunters. This license type considerably reduces hunting malpractice and infractions (Cirelli, 2002). In Latin America, these requirements are generally basic (minimum age of 18 years, personal criminal history, weapons permit, and payment of fees). In Europe, the United States and Africa, the requirements are more demanding, generally requiring a test of skills and knowledge (Rosser, 2009). In the Uruguayan case, where it does not exist, this license can allow a clear separation between suitable and unsuitable hunters, guaranteeing that the former have hunting training and thus facilitating the improvement in the hunters' social image.

This administrative aspect must be linked to an ethical dimension raised in the discussions around sportsmanship. Concepts like "Fair Chase" (Posewitz, 1994), "True Sportsman" (Adams, 2009) or "Free Ranging Hunting" (IUCN, 2012) are promoted by international nature conservation institutions such as IUCN. Beyond those aspects related to sportsmanship, hunters must explore other aspects of hunting ethics, focusing on their shared values with other actors (Peterson, 2004), such as an interest in nature, animals and the rural world (Cooper *et al.*, 2015). This process must be linked to developing hunting organisations at different scales. By promoting international values of sportsmanship and conservationism, an elitization of hunting should be avoided since it is a counterproductive consequence from the point of view of integration and social development (Adams *et al.*, 2009). The necessary maturation in organisational, technical, and ethical terms should be framed in Uruguayan local traditions. On the other hand, considering the organizations that oppose hunting, greater tolerance and openness to dialogue aimed at better cultural coexistence are also crucial.

Hunting with dogs is particularly important for Uruguayan hunters. As in other cases hunting with dogs has a cultural and symbolic dimension that highlights this activity as culturally relevant. The regulation of hunting dogs in matters of breeding, training and hunting must take place following the parameters established in the law of animal welfare and conservation of wildlife (considering the species that are not the target of hunting but that are affected as incidental impact) and civil liability regarding the implications for productive animals. The definition of responsibility derived from the possession and use of dogs is usually associated with the owner of the dogs, which implies that the dogs are identified and associated

with a person or a company (Mesa Gutiérrez, 2017). It is also necessary to regulate aspects related to the welfare of the dogs in the breeding places, transportation, training, and the modalities of hunting. An essential aspect of Uruguayan hunting related explicitly to hunting with dogs is the prey's welfare. This dimension is gaining importance in hunting management at an international level (Rosser, 2009). Within this aspect, hunting techniques that promote the quick and clean death of animals highlighted, minimising animal suffering, are being promoted (Di Minin *et al.*, 2016).

There remains a critical need for the development of diverse perspectives to enhance hunting management in Uruguay. It is crucial to delve into the social, legal, and economic dimensions of sustainable hunting practices. Among these issues, the study of poaching's impact on native wildlife stands out as particularly pressing. Furthermore, incorporating comprehensive analyses from cultural viewpoints —ones that account for local practices of engagement, utilization, and coexistence with wildlife— is indispensable.

CONCLUSION

For sustainable hunting management, it is essential to consider ecological, economic, and sociocultural dimensions related to the specific national context. In this sense, we propose developing solid governance, maintaining the existing central structure, reinforcing it with the participation of more actors, delegating practices, saving costs, empowering stakeholders, and invigorating economic sustainability. It will allow a more active monitoring of wildlife and hunting, a fundamental aspect of regulating extraction rates. It is also essential to promote the development of ethical values linked to the sportsmanship of hunting (such as supported by global institutions related to conservation, hunting and animal welfare), but especially considering the cultural aspects of local practices, such as, in the Uruguay case, hunting big game animals with dogs. It must be associated with certain guarantees regarding the rights and obligations of the actors involved. Recreative or sport hunters must have specific licences that guarantee their knowledge and allow for more effective control of this practice by the State. This system must be accompanied by effective poaching control to ensure compliance with legal regulations.

As more studies like this exist, the study of sport hunting in Latin America will be able to dialogue at the continental level. It will continue to shed reflective lines that feed the international debate on sport hunting, conservation, and environmental and social sustainability.

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