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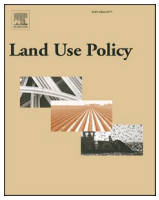

Unlocking opportunities for meaningful participation of land reform beneficiaries in the wildlife economy

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ABSTRACT

Land reform is a key social justice movement across the world, typically focused on agricultural land uses. However, in many parts of the world, land reform properties exist in regions that have high biodiversity value, where options exist for integrating land reform with wildlife-based land uses to promote both conservation and socio-economic development. To effectively design and implement policies aimed at unlocking this under-explored pathway towards inclusive wildlife economies, we need information on the opportunities and barriers confronting the establishment and operation of viable wildlife enterprises on redistributed land. We conducted a survey of 19 landholders awarded land through reform in the Eastern Cape Province of South Africa. We aimed to understand the state of wildlife economy development and assess investment needs for these market entrants. Their characteristics were contrasted with data on 74 established wildlife ranches and 21 conventional livestock farms. Despite all land reform properties listing wildlife-based economic activities in their business plans and most (84 %) having wildlife, only 42 % were generating (very limited) income from their wildlife. Common barriers to upscaling revenues from wildlife were a lack of infrastructure (particularly fencing, water, accommodation) and wildlife stocks. Engagement in the wildlife economy is further hindered by lack of decision-support on viable wildlife business models and subsequent lack of access to skills development and market information. Our results show mismatches between activities that are supported by government and property business plans, and those that are context-appropriate and viable. We suggest that South Africa's land reform programmes need to develop targeted infrastructure and skills development that consider the most appropriate business model for a given site. The barriers and opportunities outlined here could inform strategies that leverage state and private investment to more effectively create viable wildlife-based business models and achieve the dual goals of social justice and biodiversity conservation in South Africa.

1. Introduction

Land reform is a key tool for decolonization in many countries (Akinola, 2019; Boyce et al., 2007), and can have far-reaching outcomes for biodiversity conservation and livelihoods alike. These outcomes can be positive, such as increased farm productivity and improved ecological function (Bryan et al., 2018), empowerment of marginalized groups (Barkat and Suhrawardy, 2019) and rural revitalization (Han, 2020). However, land reform policy can also have unintended consequences that undermine its original intentions, such as food insecurity (Valente, 2009), violence, and the destruction of natural habitats (Alston et al., 2000).

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As land reform programmes often focus on rural landscapes that tend to be relatively undeveloped, they often overlap with untransformed ecosystems that are also prioritized for biodiversity conservation and are in some cases already protected (Kepe et al., 2005). In this context, land reform policies commonly seek win-win outcomes for people and conservation through, for example, co-management and benefit-sharing agreements that ensure restituted land remains within protected areas (Kepe et al., 2005). These solutions can however undermine equity or biodiversity goals. For example, in many cases protected areas do not generate sufficient revenues for recipient communities, and alternative means of generating revenues from the land, such as agriculture, are prevented (Cundill et al., 2013; Kepe et al., 2005; Wolmer et al., 2004). By contrast, where the focus is more strongly on supporting land beneficiaries to engage in agriculture, they may choose to cultivate land that was ecologically intact, with a host of trade-offs for ecosystem service benefits and beneficiaries (Clements et al., 2021). Alternative land use options are needed for the beneficiaries of ecologically important land.

In southern Africa, wildlife-based land uses present an option that could reduce trade-offs between biodiversity conservation and the equity, economic development and empowerment objectives of land reform programmes. In recent decades, wildlife ranching - the management of wildlife for commercial purposes - has emerged as a financially viable alternative to farming, particularly in more arid areas that are agriculturally marginal (Barnes and de Jager, 1996; Carruthers, 2008; Child et al., 2012; Taylor et al., 2020). Wildlife ranches (and other wildlife-based private and communal tenure arrangements, like conservancies) adopt a variety of business models with diverse economic activities that differ in both their investment requirements and financial returns (Clements et al., 2022, 2016; Denner et al., 2024). Common revenue-generating activities include ecotourism, trophy hunting, meat ('biltong') hunting, breeding, selling live animals and selling wildlife meat ('venison') (Naidoo et al., 2016; Taylor et al., 2020). It is also common for ranches to practise wildlife activities alongside more conventional agriculture (typically livestock and to a lesser extent cultivation) (Taylor et al., 2020; Clements et al., 2022). These wildlife ranches represent a significant land use in southern Africa (e.g., an estimated 17–20 % of South Africa's total land area; Taylor et al., 2020), providing jobs and economic opportunities across the region (Denner et al., 2024; Lindsey et al., 2013; Snyman, 2012; Taylor et al., 2020). Importantly from a biodiversity conservation perspective, these land uses do not require transformation of natural areas and can thus be compatible with restoration and biodiversity goals (Shumba et al., 2020). Wildlife-based land uses present a potential opportunity to align development and conservation goals, providing a pathway to improve ecosystem service provision, enable ecosystem-based adaptation to climate change and enhance livelihood options (Chaminuka, 2013; Chaminuka et al., 2014; Cromsigt et al., 2018; Taylor et al., 2020).

Whilst many southern African countries have recognized opportunities to integrate wildlife ranching into land reform programmes (Child, 2019), the efficacy of these policies is yet to be fully realized (Kamuti, 2014; Mokotjomela and Nombewu, 2019; Pasmans and Hebinck, 2017; Spierenburg and Brooks, 2014). For example, the thriving South African wildlife economy occurs almost entirely on private land owned by minority White individuals. This is despite government policy aimed at growing and transforming the sector to benefit racial groups that were disenfranchised under the exclusionary Apartheid regime that ended in 1994 (Department of Environmental Affairs, 2016). As is also common in land reform programmes in other regions and sectors (e.g., Borras, 2003), wildlife economy beneficiation schemes tend to become dominated by wealthy beneficiaries looking to diversify their business (Mtero et al., 2019). Additionally, wildlife economy development can benefit external stakeholders more than intended individuals and communities (Ngubane and Brooks, 2013), which can perpetuate existing inequalities through racialised divisions of labour and displacement of communities from rangelands (Thakholi, 2021).

How then, can wildlife economies be developed to be more inclusive, providing access to these economies and their benefits for previously disadvantaged people without compromising biodiversity and ecosystem services? Thus far, there has been little work on the nature of wildlife-based activities practised by land reform beneficiaries, the challenges that they experience, nor their desired business strategies and trajectories. Without this basic understanding of the current state of the wildlife economy within the land reform sector, it is impossible for policymakers, government programmes and non-profit organizations to design fit-for-purpose interventions and solutions.

In this paper, we aim to address the dearth of knowledge on key barriers and opportunities for realizing the economic and ecological potential of wildlife ranching in land reform programmes, through the lens of South Africa. We conducted surveys of land reform beneficiaries that either were participating or wanted to participate in the wildlife economy, to characterize their current and desired land uses, compare their characteristics with those of established wildlife ranches, identify the main barriers to the establishment of wildlife enterprises, and consider potential solutions to these challenges.

2. Methods

2.1. Policy context and study region

Since the proclamation of the Natives Land Act (1913) under colonial rule, and during the Apartheid era that followed, land ownership by Black people was prevented across much of the country (Hall, 2004). After democracy in 1994, the Restitution of Land Rights Act (1994) and the Land Reform White Paper (1997) were developed to enact (1) land restitution, where land was restored to individuals or groups (or their descendants) that were forcefully removed from their land by racially discriminatory policies since 1913; (2) land tenure reform, which secures the rights of people living in land parcels with insecure arrangements on land owned by others; and (3) land redistribution, which broadens access to land among the country's black majority correcting historic racial inequalities.

Since 1994, the Department of Agriculture, Rural Development and Land Reform (DALRRD) carries the legislative mandate to return land to persons (or their descendants) who were displaced from their ancestral homes (land restitution), and to assist those excluded from South Africa's formal agricultural economy based on their skin colour (land redistribution). The Land Redistribution Programme seeks to provide its beneficiaries with land for residential and productive purposes to improve their livelihoods. Since 1994 the Department has been executing the mandate of utilizing land to develop the economic potential of rural communities while at the same time addressing contemporary inequalities in access to commercial agriculture by black farmers. Additionally, the Recapitalisation and Development Programme (RECAP) exists to support land reform beneficiaries establish viable agricultural enterprises through infrastructural and mentor support (DRDLR, 2020; Maka and Aliber, 2019).

The Department of Forestry, Fisheries and the Environment (DFFE) also engages with land reform beneficiaries through their mandate to conserve biodiversity, which includes regulating the reintroduction, translocation and management of wildlife – including on private and community land. For example, South African National Parks (SANParks), which is a parastatal under the jurisdiction of DFFE, implements a game donation strategy where wildlife from national parks is provided as start-up assets to community property associations (CPAs) and land reform beneficiaries. They have provided thousands of heads of game to new market entrants since 2015 (for example, SANParks, 2023, pp. 103–104).

Several high-level policies in the country are of relevance to wildlife ranching in a land reform context. The revised National Biodiversity Economy Strategy (out for public comment at the time of writing), which is aligned to the country's National Development Plan, aims to (amongst other goals) increase GDP contribution from consumptive use

of game from extensive wildlife systems from R4.6 billion (2020) to R27.6 billion by 2036; and expand the conservation estate from 20 million to 34 million ha by 2040 (DFFE, 2016; DFFE, 2024a). Similarly, the National Game Meat Strategy aims to increase the production of game meat, especially from enterprises owned by previously disadvantaged individuals and communities, to 100,000 tons per annum by 2030 and to bring 1 million ha of community-owned land into extensive game meat production (DFFE, 2023). To facilitate these goals, DFFE has established spatially-defined biodiversity economy nodes across the country to channel infrastructure and asset investment and provide extension support to unlock the wildlife economy for participating communities (Department of Environmental Affairs, 2016).

Our study was conducted in the Eastern Cape Province, South Africa. We focused on DALRRD's land redistribution sites in the Amathole Biodiversity Economy Node (DFFE, 2020a) (Fig. 1). Some land parcels may occur within important biodiversity areas, which underscores the importance of conservation-compatible enterprise development and the opportunity for beneficiaries to make use of the underlying natural capital. The Eastern Cape is a mega-diverse province, including five biomes and three biodiversity hotspots. It is also South Africa's poorest province (Ngumbela, 2023), with high unemployment and low education levels.

2.2. Data collection

The land reform sites included in this study (19) were purposively selected according to whether the beneficiaries currently have wildlife assets on the property and/or the stated aim of the business plan was to develop wildlife-based enterprises. There are only 29 such redistribution farms in the Eastern Cape that possess wildlife economy assets or ambitions (as listed on the business plans), thus our sample represents 66 % of the total relevant farms. All study sites were part of the land redistribution programme and were identified from the transfer documents registered with DALRRD. Drawing on DALRRD's insights from working with these farms, we selected those that had attempted to implement wildlife economy activities and that were available to participate in our study. A questionnaire on the ecological and socio-economic characteristics of wildlife ranches, developed for the established ranching sector during a 'Sustainable Wildlife Economies Project (SWEP)' project (2020–2023; https://www.wildeconomy.org) (Clements et al., 2022), was adapted for this study based on input from DALRRD and DFFE officials implementing land reform and/or biodiversity economy programmes (Supporting Information). It asked respondents about property size in hectares (ha), when the beneficiary received the property and under what tenure arrangement, as well as the number and type of livestock and wildlife species and their abundances (if known). It requested details regarding any game records (records of large herbivore

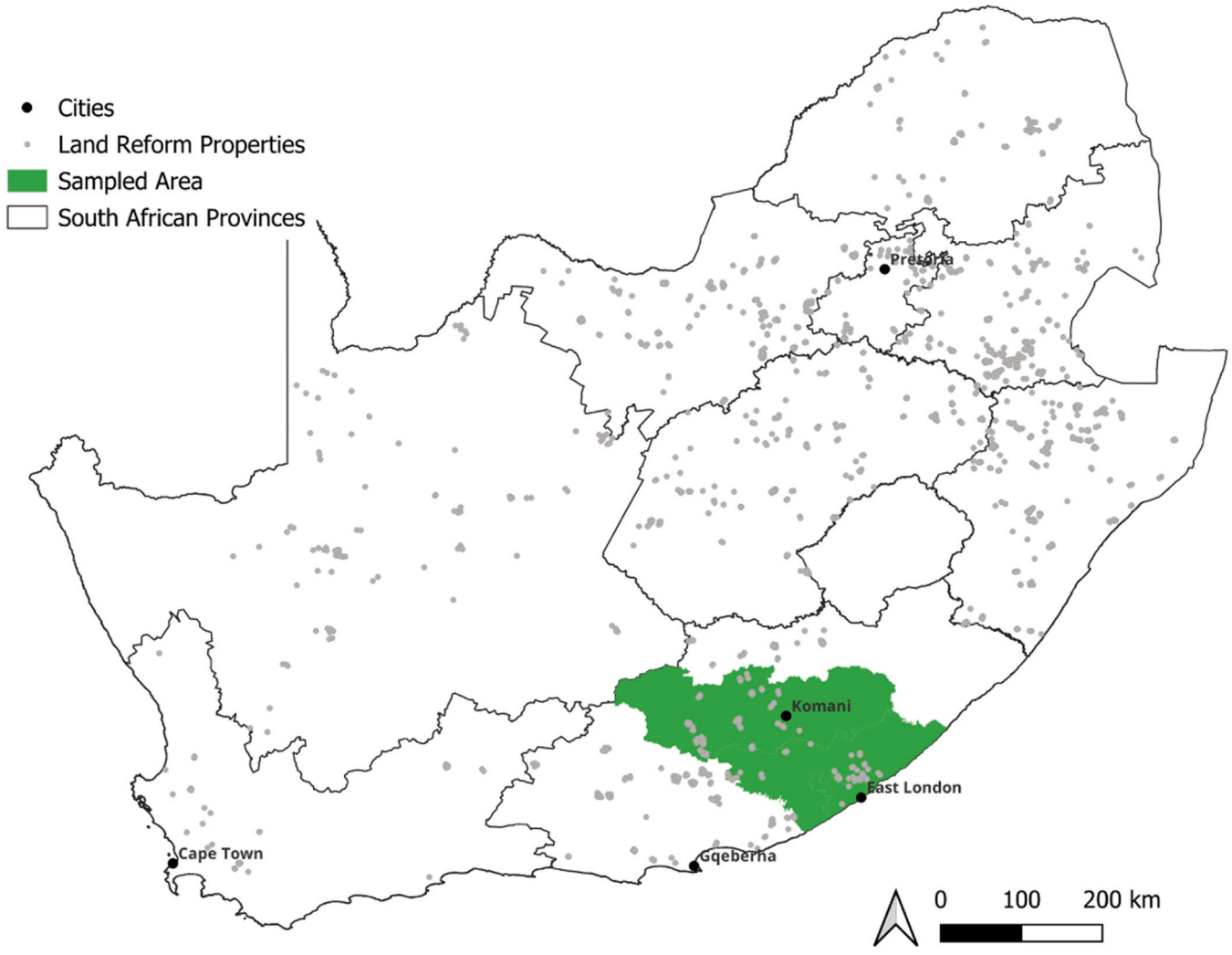

Fig. 1. Distribution of land reform properties across the country. The area sampled in this study is shown in green – it coincided with the Amathole Biodiversity Economy Node earmarked by the Department of Environment, Forestry and Fisheries (DFFE) and the Eastern Cape Parks and Tourism Agency (ECPTA).

numbers on the property) and infrastructure existing upon property acquisition, subsequently developed by the beneficiary (and if any external investment had contributed to this), and future plans for infrastructure development. It asked who developed the business plan and what revenue-generating activities were included in this plan, as well as the current revenue-generating activities and their proportional contributions to total annual revenue, whether the enterprise was financially self-sustaining, and the number of seasonal and permanent employees. Finally, the questionnaire asked about challenges that impeded land reform beneficiaries from participating in the wildlife economy and pressing needs for land reform beneficiaries to succeed in the wildlife economy.

The questionnaire was piloted on three land reform sites selected by the Chief Environment Scientist of the land reform programme in the Eastern Cape province (S. Shwababa) between 17 and 21 May 2021, and minor adjustments were made. Four field assistants were hired to conduct interviews with an additional 16 land reform beneficiaries between 1 and 30 June 2021. These assistants were trained by the authors to conduct the questionnaire by developing a script to accompany the survey and conducting a series of training sessions prior to conducting the interviews. This training included the scientific background of the project, social process learning techniques as well as conflict resolution. Three out of four of the field assistants spoke isiXhosa (the predominant first language of the interviewees) to facilitate communication during the survey. In addition, two programme officers from DALRRD accompanied the team during the interviews to facilitate contact with the interviewees and mediate potential administrative issues. Respondents were made aware of the goal of the project and no financial or in-kind compensation was provided. Ethical clearance was obtained from Rhodes University Ethics Committee [no. 2021–2810–5892].

2.3. Data analysis

Summary statistics were used to describe the characteristics of land reform properties. To summarize data on wildlife stocks, we characterised wildlife species as game (ungulates < 900 kg), mega game (elephants and ungulates > 900 kg, including buffalo, elephant, giraffe, hippopotamus, black rhinoceros, white rhinoceros), and large predators (cheetah, leopard, lion, spotted hyaena, wild dog). Following Taylor et al. (2021) we excluded game species that are not generally counted due to characteristics like small body size or preferential selection of thick vegetation: bushbuck, bushpig, duiker spp., grysbok spp., klipspringer, oribi, steenbok, suni, and warthog. Livestock included cows, sheep, and goats.

To assess conservation value, we overlaid land reform sites with the Critical Biodiversity Area (CBA) layer produced by the South African National Biodiversity Institute (SANBI, 2017). The CBA layer is a systematic conservation plan that integrates important biodiversity features (ecosystem types, ecological corridors, species populations) into planning units not contained within formally protected areas but which are necessary to meet conservation targets either because the features are irreplaceable (CBAs) or because they contribute to important ecological processes (Ecological Support Areas). We also calculated the median overlap of the properties with remnant vegetation, and with under-protected vegetation types in the country's national conservation estate (SANBI, 2018). This analysis was performed across 14 properties where accurate geo-referencing was possible.

We compared key property characteristics relevant to engaging in the wildlife economy (property size and species richness and abundance) between land reform properties (emerging ranches) and established ranches. Characteristics of established ranches were collected through interviews with 74 commercial wildlife ranches and 21 livestock ranches as part of the broader SWEP project during 2021. These 74 established wildlife ranches are categorised into four distinct business models based on the relative contributions of different activities to their total annual revenue. Details of these business models and how they were categorised are described in Clements et al. (2022), with the business models summarised in Table 1. These four business models have different land and wildlife requirements, and we thus compared emerging ranches with each established model, to assess which model(s) they appear best suited. We also compared them to the conventional livestock business model, which is the common alternative to wildlife ranching. Finally, we compared the number of permanent and seasonal jobs on emerging and established wildlife and livestock ranches, to understand what the implications of transitioning into different wildlife models would be for employment on land reform sites. Given the non-normality of the data, Kruskal Wallis tests were undertaken to compare emerging ranch characteristics to those of the different established business models. Analyses were conducted using R (R Core Team, 2023).

3. Results

3.1. Characteristics of land reform properties

The 19 surveyed land reform properties within the Amathole Biodiversity Economy Node represented a total area of 47,371 ha. There was a range of property sizes (mean: 2632 ± SE 645 ha). Only one property reported an increase in size since establishment (expanding by 1027 ha). Most (95 %) of the properties were leased land from the state under long term (30–50 year) leases. One property was communally owned. Beneficiaries had been managing the land for an average of nine years (2012–2021) (± SE 1.5 years).

Properties had an average of three game species (± SE 1 species), with an average abundance of 169 game animals (± SE 113 animals). They did not support large predators or mega game species. Properties had an average of two livestock species (with cattle being most common), with an average abundance of 560 livestock animals (± SE 139 animals).

Land reform properties had high biodiversity value. On average, a median of 75 % [interquartile range IQR 43–97] of properties overlapped with CBAs, and an additional 8 % [IQR - 1–20] with EBAs. Properties comprised a median of 89 % [IQR- 87–90] remnant natural vegetation, and a median of 71 % [51−89] of their areas overlapped with vegetation types that are under-protected in the country's national conservation estate (Table 2).

Regarding infrastructure present at the time of acquisition, most properties (>80 %) had drinking water for people and animals upon transfer (Fig. 2). Many also inherited sheds, grazing camps and wildlife. Only a fifth of properties had an existing perimeter fence and a sixth inherited vehicles and machinery when they started. As such, vehicles and machinery were the most commonly invested in infrastructure post-

Table 1
Characteristics of established ranches in the Eastern Cape, including conventional livestock ranches and four distinct wildlife ranch business models.

Business model	Description	Number
Livestock	Generate > 90 % of their revenues from livestock	21
Wildlife-agriculture mixed	Half of revenue from livestock Remainder of revenues from a mix of activities including ecotourism, trophy and biltong hunting, live game sales Mostly South African visitors	17
Wildlife mixed	Revenues from a mix of activities including trophy hunting, biltong hunting, venison, live game sales Mostly South African visitors	12
Trophy hunting focussed	> 66 % of revenue from trophy hunting Remainder of revenues from live game sales, venison Mostly foreign visitors	33
Ecotourism focussed	> 80 % of revenue from ecotourism Mostly foreign visitors	12

Table 2
The biodiversity importance of the new market entrant farms. Critical Biodiversity Areas and Ecological Support areas are mutually exclusive, i.e. the median coverage of valuable biodiversity land should be considered a sum of these areas.

Biodiversity feature	Description	Median [interquartile range] overlap (%)
Critical Biodiversity Area	Irreplaceable or near-irreplaceable biodiversity features	75 % [43,97]
Ecological Support Area	An area that must be maintained in at least fair ecological condition in order to support the ecological functioning of a CBA or protected area, or to generate ecosystem services	8 % [1,20]
Remnant natural vegetation	Untransformed natural land (as of 2021)	89 % [87,90]
Under-protected ecosystem	An ecosystem type that has less than 5 % of its biodiversity target included in one or more protected areas	71 % [51,89]

transfer, followed by drinking water and roads. Only two properties (11 %) had invested in perimeter fences post transfer. Future plans for infrastructure development focused overwhelmingly on perimeter fences, along with abattoirs, wildlife stocks, and guest accommodation (Fig. 2), which is directly linked to their planned activities (trophy hunting, biltong hunting and ecotourism; Fig. 3a). While just over a third of properties were focused in their future infrastructure investment needs (3 infrastructure types or fewer), the majority (63 %) had a future wish-list of seven to 16 infrastructure assets.

Of the 13 properties (77 %) that had invested in infrastructure since transfer, eight indicated that they had received help from the government, for dams and irrigation systems (DALRRD), livestock fencing (DALRRD), vehicles and machinery (RECAP, One Household, One Hectare), drinking water (DALRRD), boreholes, or the maintenance of a perimeter fence (DALRRD).

The majority (95 %) of properties were generating revenues and employed an average of five (± SE 1) permanent and three (± SE 1) seasonal staff. Of the commercially active properties, the most important revenue-generating activity was cattle farming (Fig. 3a), which contributed half of the total revenue on these properties, on average (Fig. 3b). Cattle together with goat and sheep farming, as well as cultivation, accounted for 94 % of total property revenue, on average. Only 42 % of properties were currently generating revenues from wildlife, of which biltong (meat) hunting was most common (undertaken on 26 % of properties, where it generated between 5 % and 20 % of revenues; Fig. 3b). Only three properties were currently practicing trophy hunting where it generated just 3–5 % of ranch revenues. No properties currently earned any revenue from ecotourism or game meat sales(Fig. 3b). Overall, wildlife-based activities collectively only accounted for 5 % of total ranch revenue, on average. Overall, 59 % of properties were reported as being financially self-sustaining.

Business plans for the beneficiaries were developed by extension officers from DALRRD (47 %) or through consultants (24 %), whereas the enterprise owners themselves developed 18 % of the business plans and only two of the sites (12 %) were assisted by an industry-specific mentor.

Despite ecotourism currently not contributing to any property's revenue, 90 % of respondents included ecotourism enterprises in their business plans, while 95 % included trophy hunting ventures (Fig. 3a). In 84 % of properties' business plans, ecotourism and trophy hunting were both listed as planned endeavours. Overall, most properties listed multiple wildlife-based enterprises in their business plans leading to homogenously distributed future aspiration of wildlife-based economic activities across properties (each wildlife-based economic activity was listed by at least two-thirds of properties; Fig. 3a).

3.2. *Comparing emerging land reform ranch characteristics to those of the established sector*

Comparing these emerging ranches to the established ranching sector, property sizes differed significantly across business models (Fig. 4; Kruskal-Wallis chi-squared = 16.33, df = 5, p = 0.006). The property sizes of the land reform beneficiaries were similar in size to conventional livestock farms (W = 166, p = 0.5) and mixed wildlife models (wildlife-agriculture: W = 108, p = 0.1; wildlife mixed: W = 97, p = 0.7), and small compared with the more specialised wildlife business models (trophy hunting: W = 165, p = 0.01; ecotourism: W = 48, p = 0.01; Fig. 4).

Emerging ranches had significantly lower numbers of game species (i.e., species richness) than all the established ranch business models (wildlife-agriculture: W = 33.5, p < 0.001; wildlife mixed: W = 27.5,

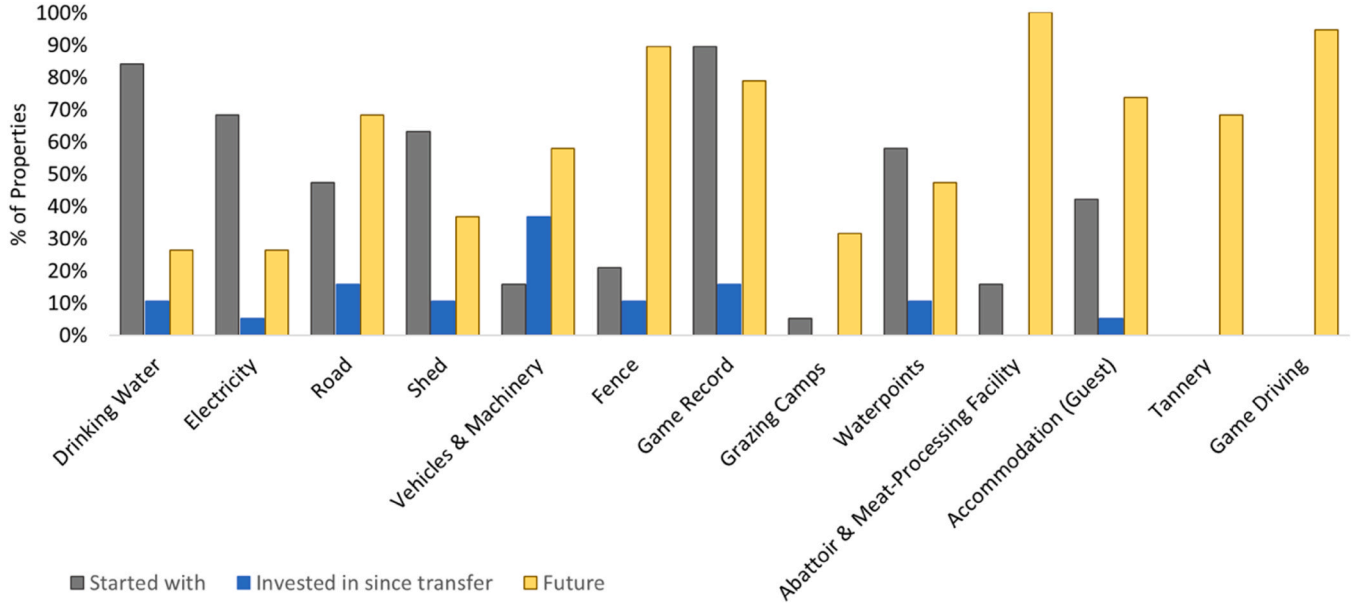

Fig. 2. Infrastructure and assets inherited by the beneficiaries (grey bars) versus invested in post-transfer (blue bars) and planned investments (yellow bars).

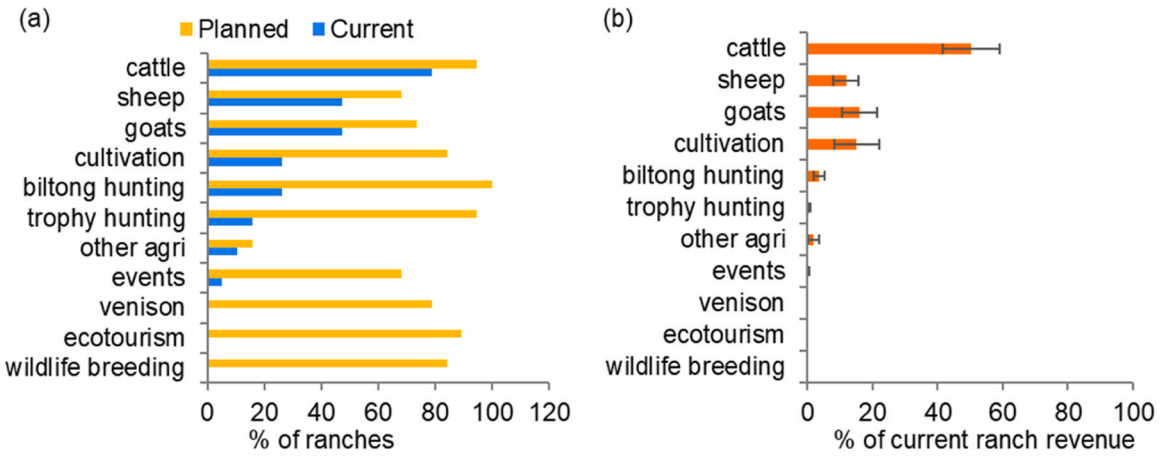

Fig. 3. (a) Percentage of land reform beneficiaries that planned to versus are currently undertaking different revenue-generating activities (n = 19), and (b) the average (± standard error) percentage that each activity currently contributes to total revenue on commercially active ranches (n = 18). "other agri" includes pigs and chickens.

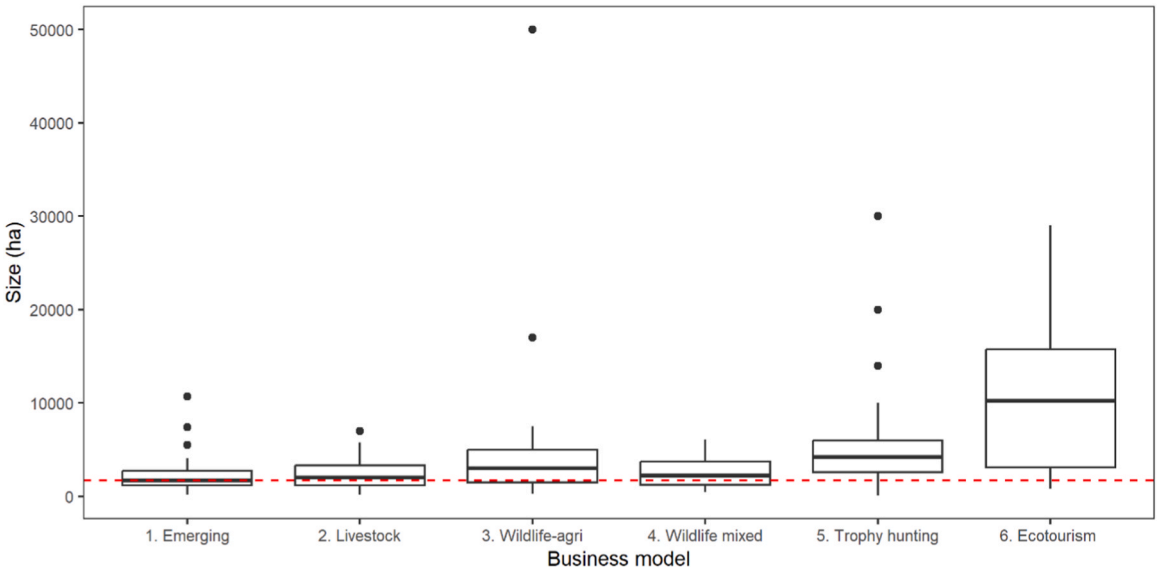

Fig. 4. A comparison of the property sizes between emerging ranches (land reform sites), conventional livestock farms, and the established wildlife ranch business models. The dashed red horizontal line shows the median size of a land reform property.

$p < 0.001$; trophy hunting: $W = 25.5$, $p < 0.001$; ecotourism: $W = 8.5$, $p < 0.001$), and similar game species numbers compared to conventional livestock farms ($W = 118.5$, $p = 0.047$) (Fig. 5). The median mega game species richness was zero for all business models except ecotourism (median = 3) and trophy hunting (median = 1), and the median large predator species richness was zero for all business models except ecotourism (median = 2; Fig. 5).

Emerging ranches had significantly lower abundances of game than all the established ranch business models (wildlife-agriculture: $W = 22$, $p = 0.003$; wildlife mixed: $W = 15$, $p < 0.001$; trophy hunting: $W = 32.5$, $p < 0.001$; ecotourism: $W = 5$, $p < 0.001$), as well as conventional livestock farms ($W = 45.5$, $p = 0.017$; Fig. 6). Livestock abundances on emerging ranches were similar to mixed wildlife-agriculture ranches ($W = 111.5$, $p = 0.56$) and livestock farms ($W = 112$, $p = 0.12$), though there was greater variability among livestock farms, with some having much higher livestock abundances (Fig. 6). Mixed wildlife, trophy hunting and ecotourism ranches typically did not have livestock (Fig. 6).

Ecotourism-focussed ranches employed by far the most people (Fig. 7). Emerging ranches employed significantly fewer people in total than established ranches focussed on ecotourism ($W = 30$, $p < 0.001$) and trophy hunting ($W = 163$, $p = 0.004$), and a similar number of people to livestock, mixed wildlife and wildlife-agriculture ranches ($p > 0.05$; Fig. 7). Similarly, emerging ranches supported significantly fewer permanent jobs than established ranches focussed on trophy hunting ($W = 118.5$, $p < 0.001$), ecotourism ($W = 22$, $p < 0.001$), and wildlife-agriculture ranches ($W = 94$, $p = 0.03$), and a similar number of permanent jobs as livestock and mixed wildlife ranches ($p > 0.05$; Fig. 7). The number of temporary jobs was low relative to the number of permanent jobs, and similar across all business models (Fig. 7).

3.3. *Challenges and pressing needs for emerging ranches to engage in the wildlife economy*

The most commonly mentioned challenges to engaging in wildlife-based activities included a lack of infrastructure (fencing, accommodation, irrigation and water storage; 32 % of properties), theft of property and animals (32 %), electricity and water supply and cost (16 %), lack of rain (16 %) and problem animals (jackal, caracal; 11 %). The most pressing needs were skills development, perimeter fencing, water infrastructure, accommodation and additional game (Fig. 8).

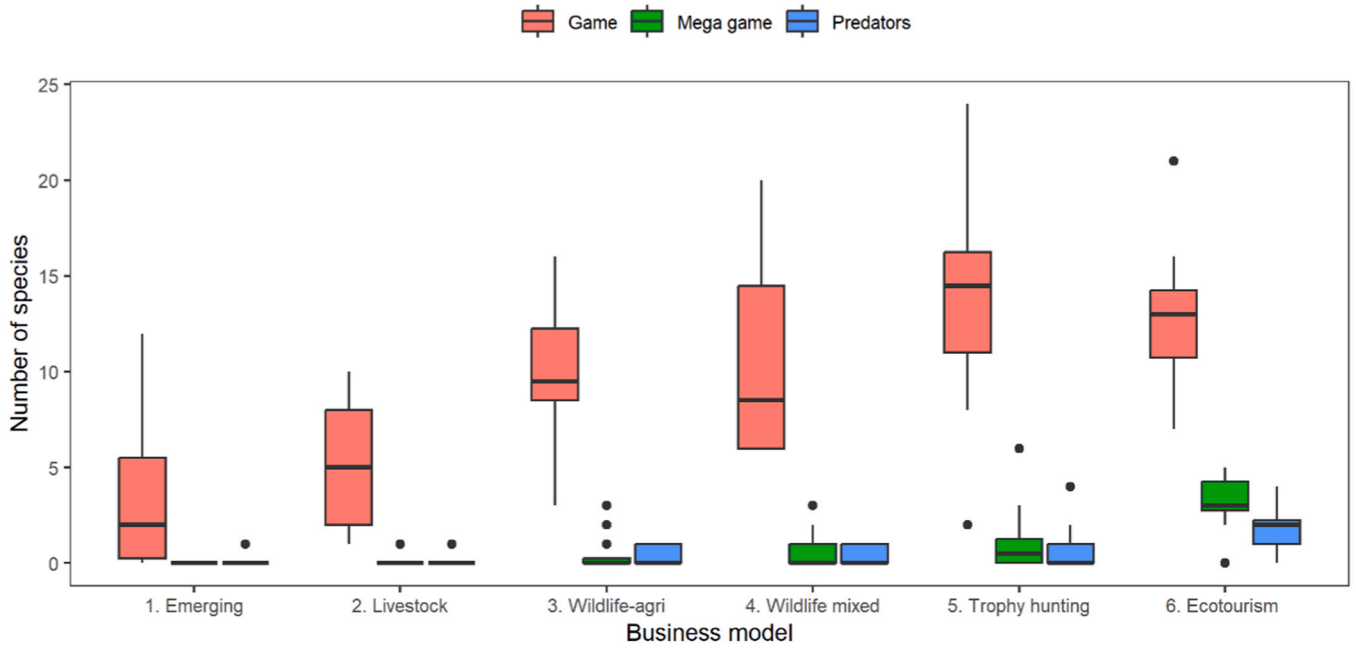

Fig. 5. Comparison of wildlife species richness between emerging ranches (land reform sites), conventional livestock farms, and the established wildlife ranch business models.

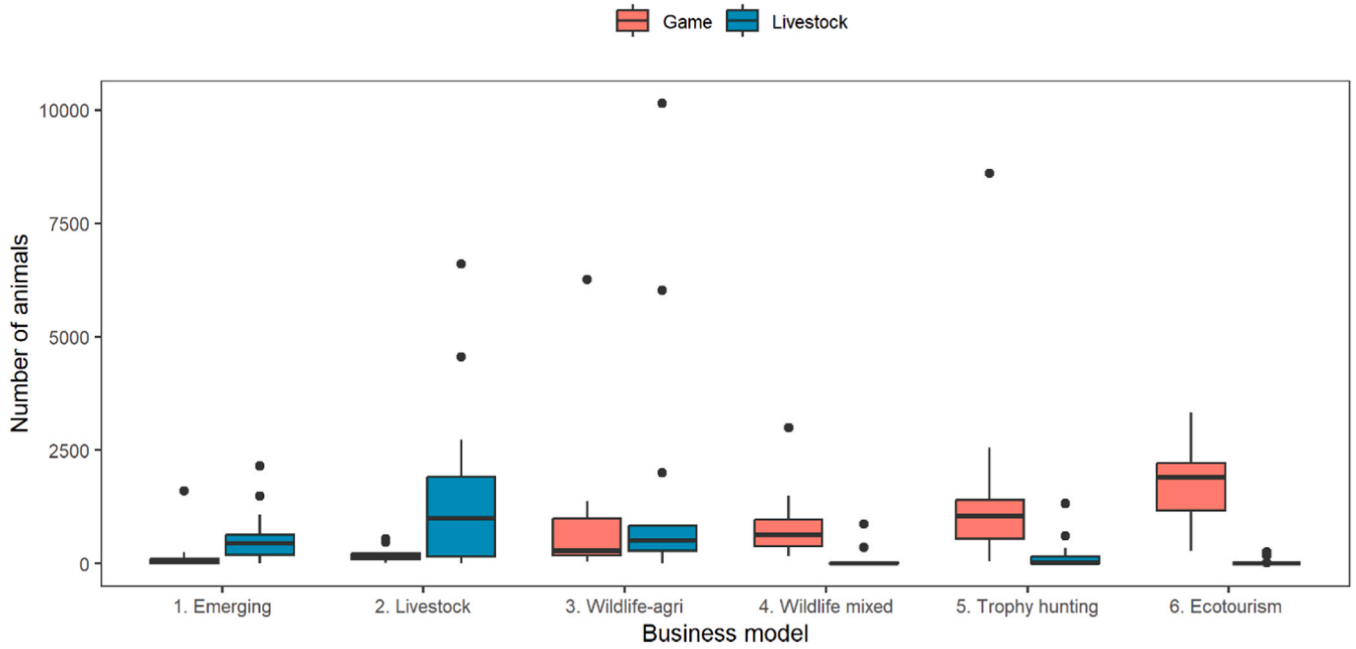

Fig. 6. Comparison of game and livestock abundance between emerging ranches (land reform sites), conventional livestock farms, and the established wildlife ranch business models.

4. Discussion

Despite ambitious South African policy to enable an inclusive wildlife economy, and the desire of some land reform beneficiaries to engage in this economy, we show that these goals are not currently being realised. Wildlife-based activities within existing enterprises in the land reform programmes were very underdeveloped, with only 42 % of surveyed properties generating (very limited) revenue from wildlife. This disparity between ambition and reality appeared to be related to a lack of investment in key assets, primarily wildlife fences, tourist accommodation and wildlife stocks. Considering the typical size of specialised trophy hunting and ecotourism properties, our results suggest that land reform properties tend to be too small for these wildlife economy models, and more appropriate for a business model that integrates wildlife-based activities with livestock farming. Importantly, there is significant underlying biodiversity on the surveyed land reform farms, including high overlap with critical biodiversity features that are needed to meet national conservation goals. These findings have several policy implications for the development of the wildlife economy in land reform programmes to achieve key biodiversity, economic, and equity goals.

Despite boasting significant biodiversity value, our data suggest new market entrants to the wildlife economy are currently unable to survive

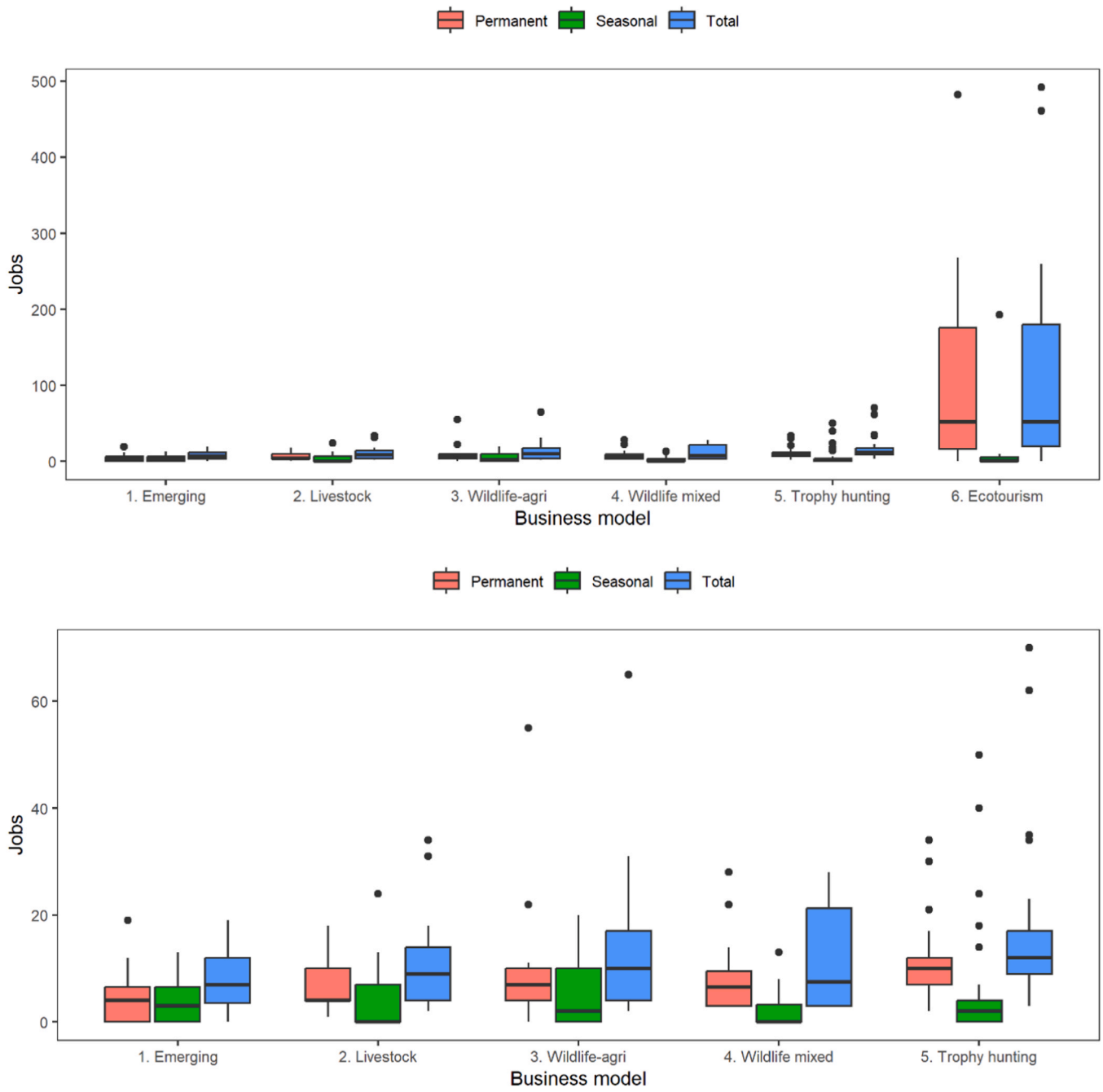

Fig. 7. Comparison of employment characteristics between emerging ranches (land reform sites), conventional livestock farms, and the established wildlife ranch business models. In in the bottom plot, ecotourism-focused ranches have been removed to better depict differences between the other business models.

and thrive in South Africa's wildlife economy. Similarly, Mokotjomela and Nombewu (2019) found only 21 % of new market entrants in the Eastern Cape had game farming capacity, and that 50 % of enterprises who had entered the wildlife industry subsequently reverted to agriculture. In the Waterberg region of the Limpopo province, redistributed farms also underwent an attrition of wildlife ranching activities (from 5 % of farms to none) (Netshipale et al., 2017). These results corroborate the existence of systemic barriers to wildlife economy transformation, despite increased government policy focus and investment. Considering that functioning wildlife ranches are generally more profitable than livestock farms in semi-arid regions (Barnes and de Jager, 1996, Kreuter and Workman, 1997, Cloete et al., 2015), reverting to livestock agriculture or failing to transition to wildlife is unlikely to reflect economic drivers but rather that wildlife ranching requires high levels of capital investment, skills development and market access to be successful, which emerging farmers lack.

At one level, these systemic barriers appear related to a lack of resources. For example, fencing emerged as critical to managing wildlife populations. A suitable game fence, depending on the species enclosed and the provincial ordinances, is necessary to receive a certificate of adequate enclosure, which enables landholders to legally own and fully utilize the wildlife on their property and invest in additional wildlife. It can also help mitigate the common issue of property and wildlife theft. Only four properties had perimeter fences on transfer, and only two managed to invest in this expensive asset since transfer while most properties (79 %) listed perimeter fences as one of their most pressing needs. Guest accommodation is also important for ecotourism and hunting, and lacking on two-thirds of surveyed land reform sites. The

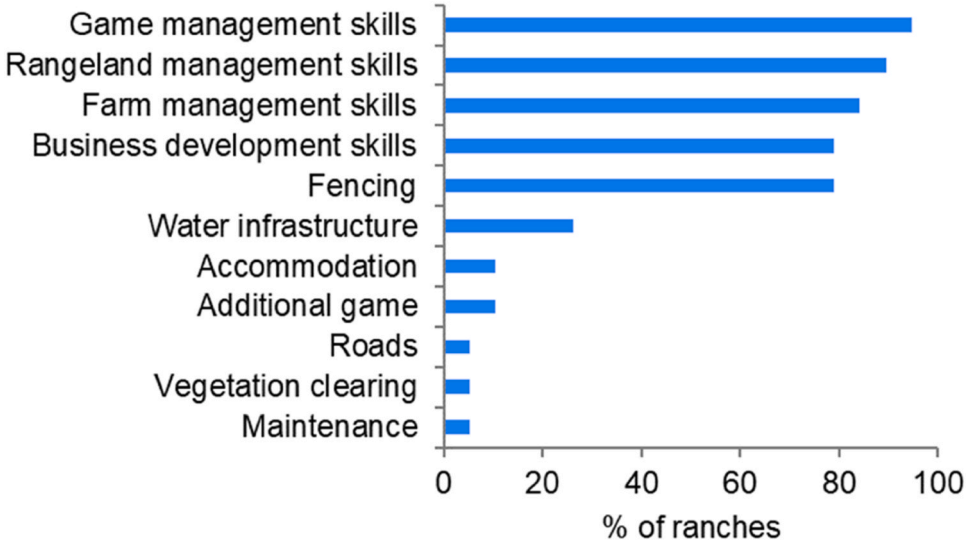

Fig. 8. The most commonly mentioned pressing needs of land reform beneficiaries to engage in the wildlife economy.

richness and abundance of game species was also lower on average on land reform sites compared with established wildlife ranches, suggesting additional game is essential to effectively engage in the wildlife economy. The increasing emphasis on game donation programmes for new market entrants – whereby statutory bodies transfer game from state land to emerging ranches – could be an important mechanism to achieve the species richness and abundances seen in the established wildlife ranching sector.

A key related barrier, supported by a comparison with the established sector and previous studies, concerns the need for knowledge of appropriate wildlife economy business models and their associated asset and skills requirements – not only by new market entrants, but also by government programmes and policies. Most land reform properties had almost all potential wildlife activities listed in their government-approved business plans, yet trends in the established sector suggests there are distinct combinations of activities that work (Table 2). Importantly, trophy hunting and ecotourism as specialised enterprises both require large investments in land, wildlife, infrastructure and personnel. We show that land reform properties are more similar in size to either commercial livestock farms or established ranches that adopt mixed land uses – with several wildlife activities such as local tourism, biltong (meat) hunting and wildlife and meat sales, sometimes together with livestock farming (Table 1). While potential profits and employment of such models are more limited, they also require far less upfront investment in land, wildlife and infrastructure, and have lower running costs (Clements et al., 2016; Denner et al., 2024).

South African government programmes related to growing the biodiversity economy currently emphasize ecotourism, as this is most conceptually similar to the biodiversity stewardship programme that seeks to expand the protected area estate through non-state actors (Barendse et al., 2016; Cockburn et al., 2019; Rawat, 2017; Wilson et al., 2018). Consequently, integration of land reform into the biodiversity economy is dominated by biodiversity stewardship mechanisms that intend to create 'meaningful benefits' for land reform beneficiaries through the development of 'new protected areas' (SANBI, 2020). As such, opinions on what constitutes the ideal wildlife business model could be biased by the pressure of achieving conservation targets under the Global Biodiversity Framework, and international preference towards 'wild' conservation systems supported by non-consumptive revenue-generating models, which can then be reinforced at national and subnational scales by government, non-governmental organisations and private consultants (for example, see recommendations in DFFE, 2020b). Additionally, while wildlife ranches have predominantly converted from livestock ranches (Carruthers, 2008), they are mostly owned by white landowners who have the capital and market access to implement specialised business models (Spierenburg and Brooks, 2014). Since these models can be more profitable (Denner et al., 2024), it may be another reason they are disproportionately pursued through policies and subsequent investment.

As our discussion thus far suggests, such models might undermine community enterprises by restricting access to land and natural resources (Kepe et al., 2005) or pushing communities and individuals into models that are not viable given available land and infrastructure. The high capital outlay of establishing ecotourism and/or trophy hunting enterprises (Clements and Cumming, 2018), combined with the dependence of these models on foreign patrons (Mbaiwa, 2005), also make these specialized enterprises less resilient to market shocks (Lindsey et al., 2020; Clements et al., 2022).

Another consideration for the social implications of promoting wildlife economies on land reform sites relates to that of employment. Market entrants supported fewer permanent employees compared to most established ranch business models, suggesting there is some scope to create employment through engaging in the wildlife economy. Adopting a mixed wildlife or wildlife-agriculture business model would increase permanent jobs from an average of five to nine or ten. Specialised ecotourism creates an order of magnitude more jobs, but as outlined above has considerable barriers to entry (Clements et al., 2016).

4.1. *Implications for policy and implementation*

Our results suggest that policies and initiatives that support a more localised and resilient production system where mixed livestock and wildlife ranches can respond to domestic markets might offer the best entry point to developing the wildlife economy within the land reform programme. Focussing on increasing wildlife production on extensive game farms to supply local hunters and game meat markets will require less upfront capital investment and receive more state support in the form of game donation or infrastructure, in line with the priorities of the National Biodiversity Economy Strategy and National Game Meat Strategy being implemented by DFFE. These business models also more easily integrate with existing livestock ranching models. In our sample, over half the enterprises reported being financially self-sustaining, with cattle farming being the most important contributor to revenue generation. Cattle are not just production units for communities, but interwoven into social relationships and cultural constructs that connect people to the land and place (Hornby and Cousins, 2019). Thus,

retaining cattle in the landscape whilst introducing wildlife gradually would enable cultural continuity, allowing time for people to develop relationships with novel ecosystems (Achieng et al., 2020), and the skills and infrastructure to engage in wildlife ranching. Additionally, there is scope to improve livestock grazing management on these lands through construction of grazing camps (currently listed as a low priority for investment) and a shift to rotational grazing practices, which would enable improved soil carbon sequestration and a potential new revenue stream (for example, Abdalla et al., 2022). Gradually rewilding these lands would then unlock revenue streams from the wildlife economy, as well as improve soil carbon content (Sitters et al., 2020).

Our study's findings support government investment focused on developing basic infrastructure and skills, with the additional observation that both DFFE and DALRRD could work more effectively together to synergise investments (DFFE through game donations and skills development and DALRRD through basic agricultural infrastructure such as fencing, water, machinery, abattoirs, etc.). Three particular critical areas to focus this investment on could be fencing, biltong hunting and mentorship. Adequate fencing is the most fundamental infrastructure requirement for wildlife ranching, and a necessary condition for any wildlife trading or management. The value of the local South African biltong hunting and game meat market remains to be realised and a lack of consistent game meat supply is a key barrier to unlocking this industry (DFFE, 2023). New entrants could help overcome this barrier, whilst simultaneously tapping into an under-developed local hunting market and capitalizing on context-appropriate complementary activities within mixed farming systems, like local ecotourism and rural entrepreneurship (e.g., selling hides).

Mentorship partnerships with established ranches could be a cost-effective strategy to help access market knowledge about average hunting prices, as well as basic game management (e.g., keeping of game records) and hospitality skills (Maka and Aliber, 2019). Such mentorship could also aid the current lack of focus in business plans and infrastructure development, as identified through our interviews, and address lack of inclusivity in the industry. A promising mechanism to facilitate engagement with and mentorship from the private sector is through conservancy formation, or land reform beneficiaries joining existing conservancies. Conservancies are formed when multiple landowners, and often multiple land uses and business models, manage the landscape collectively through a constitution (Downsborough et al., 2011). Conservancies can facilitate land consolidation to unlock more specialised business models, such as ecotourism or trophy hunting, while often also supporting livestock production. For example, Amakhala Game Reserve in the Eastern Cape was originated by eight landowners previously practising cattle and sheep farming who converted to wildlife ecotourism collectively, which resulted in increased female employment from local communities, increased wages and skills development (Achieng et al., 2020). Advantages of conservancies include cost efficiency (e.g., anti-poaching and infrastructural investment); enhanced viability of wildlife populations on larger landscapes; and the development of social capital within communities needed to implement shared management plans (Lindsey et al., 2009). Additionally, participating in conservancies with the established sector could help emerging farmers with market access to international clients through the networks established through existing hunting outfitters and tour operators. Our results show strong mismatches between appropriate business models and those aspired to by new entrants' business plans. To redress this, and lower the barrier to entry for new market entrants, mixed land-use conservancies should be promoted through better co-ordination between different government departments and projects that are intended to expand inclusive wildlife economies. For example, 46 % of existing wildlife ranches are mixed cattle and wildlife systems (Taylor et al., 2020), indicating that this is a stable and strategic land-use in South Africa and not simply transitional to wildlife-only areas. This can be used as a foundation to fundamentally reframe the wildlife economy away from ranches as independent, capital-intensive ecotourism and hunting enterprises towards conservancies that integrate multiple land-uses and enterprises. By shifting away from the focus on individual ranches and towards an 'ecosystem of enterprises' at the landscape scale, we believe transformation could be achieved in the sector as both established and emerging actors collaborate to optimise existing wildlife assets and infrastructure and catalyse greater uptake of wildlife economy activities.

The Biodiversity Sector Investment Platform, housed by DFFE (DFFE, 2024b), is one avenue to achieve this where foundational information on business models and conservancies could be made accessible to all stakeholders. Communicating such information on this platform could also be used to channel government and private investment into emerging enterprises, especially if asset and infrastructure needs can be linked to clear boosts in viability and return on investment, including ecosystem services and assets. Engagement with private investors could also unlock the property expansion needed to access the more specialised wildlife economy models over time.

4.2. Conclusions

Wildlife ranching offers a major opportunity to minimize trade-offs between equity in land and enterprise wealth, biodiversity conservation and economic development in rural land reform contexts. However, it has not been adequately integrated into land reform and agricultural programmes and has been under-resourced and under-capacitated. The lack of inclusive wildlife governance in South Africa's land reform programme has limited meaningful participation of the beneficiaries in context-appropriate economic opportunities. We have highlighted key barriers to participation, including lack of resources for basic infrastructure and access to key skills. We have further identified leverage points in the system, particularly related to context-appropriate business models, and opportunities available in existing programmes to redirect finance, donations and investment to new market entrants to enhance the likelihood of becoming viable.

In particular, our findings reveal systemic mismatches between policy design and ground realities, likely rooted in the centralized, consultant-driven approach to business model planning (Kepe et al., 2005). Addressing these challenges could involve rethinking the emphasis on individual enterprises and exploring more collaborative frameworks, such as conservancies. Conservancies, as shared governance and land-management models, both activate the wildlife economy assets of emerging farmers and also enable peer-to-peer learning and improve market access (Lindsey et al., 2009; Downsborough et al., 2011). Lessons from other contexts, such as Zimbabwe's CAMPFIRE program (Murphree, 2009) or East Africa's mixed wildlife-livestock rangeland systems (Ogutu et al., 2017), underscore the importance of governance flexibility, community engagement, and adaptive livelihood strategies. For example, CAMPFIRE's emphasis on community ownership and benefit-sharing demonstrates how empowering local actors can align conservation with development goals. Similarly, East African systems highlight the potential of integrating wildlife and livestock to enhance resilience and productivity (Charles et al., 2017, Keesing et al., 2018). Adapting these principles to South Africa should involve shifting focus towards mixed wildlife-livestock strategies tailored to local conditions and fostering collaborative frameworks (like conservancies) that better align with beneficiaries' aspirations and capacities.

CRediT authorship contribution statement

Child Matthew: Writing – review & editing, Writing – original draft, Methodology, Funding acquisition, Formal analysis, Conceptualization. **Shwababa Siviwe:** Writing – original draft, Methodology, Conceptualization. **Clements Hayley S.:** Writing – review & editing, Methodology, Investigation, Formal analysis, Conceptualization. **Mneno Naledi:** Writing – review & editing, Methodology. **de Vos Alta:** Writing – review

& editing, Investigation, Formal analysis, Conceptualization.

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Declaration of Competing Interest

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.landusepol.2025.107565.

Data availability

Data will be made available on request.

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