

18 • *Futures of the African Buffalo*

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Introduction

While the health of the African buffalo (*Syncerus caffer*) population in Africa is generally good, it is threatened in some regions of the continent, as described in Chapter 4. A few African buffalo are kept outside Africa, for example, in parts of the United States (e.g. Texas) where they can be hunted, and in zoo collections across the world (e.g. in European collections there are estimated over 100 *Syncerus caffer caffer* and 150 *S. c. nanus*). Yet it is utterly unlikely that modern governments will allow the population of an exotic mammal, one that can become an exotic invasive species, to be built up. It is consequently unlikely that relatively safe havens for the African buffalo will develop outside Africa; if the species is going to survive, it must be in Africa. On the other hand, the build-up of large populations of nilgai (a.k.a. blue bull, *Boselaphus tragocamelus*) in the USA provide food for thought (Presnall, 1958; Butts, 1979; Foley et al., 2017), as does that of the Canada goose (*Branta canadensis*) and raccoon (*Procyon lotor*) in Europe and banteng (*Bos javanicus*) in northern Australia. Nonetheless, it seems reasonable to anticipate that the futures of the African buffalo will take place in the context of the African continent only. As a result, these futures will depend on how the many and multidimensional factors that impact them develop or unfold.

It is not easy to forecast the fates of biodiversity and biodiversity conservation in Africa. On the one hand, African biodiversity is unique. In some parts of Africa, biodiversity is well conserved compared to other continents, and some African economies (e.g. Namibia) have managed to rely on its sustainable use, mainly through international tourism. Other countries are losing their biological heritage hand over fist, mainly in West and Central Africa (e.g. Scholte et al., 2022). On the other hand, Africa is currently undergoing significant transformations generated by, among other factors, a booming human population, growing

urbanization, shifting geopolitical relationships, increasing pressures on natural resources and political variability and sometimes volatility. These transformations are likely to induce conflicts over land between agricultural production and biodiversity conservation if the land-sparing versus land-sharing debate does not deliver a sustainable framework to conciliate both dynamics (e.g Fischer et al., 2014; Kremen, 2015; Baudron et al., 2021). The fate of the African buffalo residing in and outside protected areas will be impacted by both the politics of conservation (currently mainly centred on protected areas and less so on sustainable use) and the relationship between the people of Africa and Nature in the decades to come. Both the COVID-19 crisis and several bans on hunting also have profoundly incapacitated the international tourism industry, cutting a significant material incentive for protecting wildlife in Africa. The consequences of these crises could say a lot about the resilience of natural resource management on the continent.

Is there any chance that the African forest buffalo (*Syncerus caffer nanus*) will survive in the ransacked forests of West Africa? Or that the northern savanna buffalo will survive in the swath of land stretching between Senegal and Ethiopia? And if so, what has to be realistically and concretely done to safeguard a future for this magnificent animal?

Methodology

The more than 60 contributors to this book, many members of the African Buffalo Interest Group (AfBIG) belonging to the IUCN Antelope Specialist Group, hold a large body of knowledge and experience on the focal species. Drawing from their collective and diverse expertise on the species, and from the updated information contained in the chapters of this book, we created a list of *factors of change* based on the question: what are the factors of change that could impact (positively or negatively) African buffalo populations in the future? We chose a time horizon of 30 years because it is approximately equivalent of one human generation. From this perspective, looking backwards is then what is termed ‘within living memory’ (e.g. Fanta et al., 2019), while looking forward is what most people feel capable of imagining within their lifetime (see e.g. Ebel, 2009; Vecchi and Gatti, 2020). We drafted a preliminary list of factors and submitted it to all co-authors of this book for comments and additions. For each ‘factor of change’ added to the list, a definition was agreed upon and its relevance was discussed and assessed.

Table 18.1 *Influence/dependence matrix used to categorize the factors of change that are thought to shape the African buffalo's futures over the next three decades.*

Factor of change	Weakly dependent	Strongly dependent
Strongly influential	Driver	Leverage
Weakly influential	Outlier/singular	Outputs

Adapted from Godet (1986).

From the list of factors of change, we also implemented a *structural analysis* (Godet, 1986). Structural analysis is performed on a set of factors that are considered as interconnected, thus forming a 'system'. Its final purpose is to uncover *driving forces* that are transforming the system (Godet, 2000). Through structural analysis based on expert knowledge (in this case the authors of this chapter), a systematic pairwise discussion of the direct influences of each factor on all other factors makes it possible to discover how we perceive the structure of the system, that is, the set of dominant factors and their interactions that may shape futures for African buffalo populations. This analytical process leads to the creation of an influence/dependence matrix associated with graphs displaying the position of each factor of change in different categories according to their level of influence on the other factors, and dependence to other factors, as per Table 18.1.

Subsequently, we discussed the list of the important factors of change based on the authors' selections, and the most influential factors of change (based on the structural analysis). Hence, we identified the driving forces that we think drive the futures of African buffalo populations (i.e. the most influential factors of change), and then reflected about the potential *future states* of these driving forces. Given that the most influential factors of change were 'external', that is beyond the control or influence of the core actors involved in the management of the buffalo population, we applied the *critical uncertainty matrix* approach (Curry and Schultz, 2009) to explore alternative futures for buffalo. This approach, also called the 2×2 matrix or the 2×2 scenario method, has been developed and widely used in strategic foresight for exploring contextual futures (Ramirez and Wilkinson, 2014) to the point of being called a 'golden tool' (Bradfield et al., 2005). It consists of (i) selecting one pair of driving forces with a strong impact on the system and a very uncertain development, (ii) imagining for each of the driving forces two contrasting future states by the time horizon selected and (iii) combining these future states to

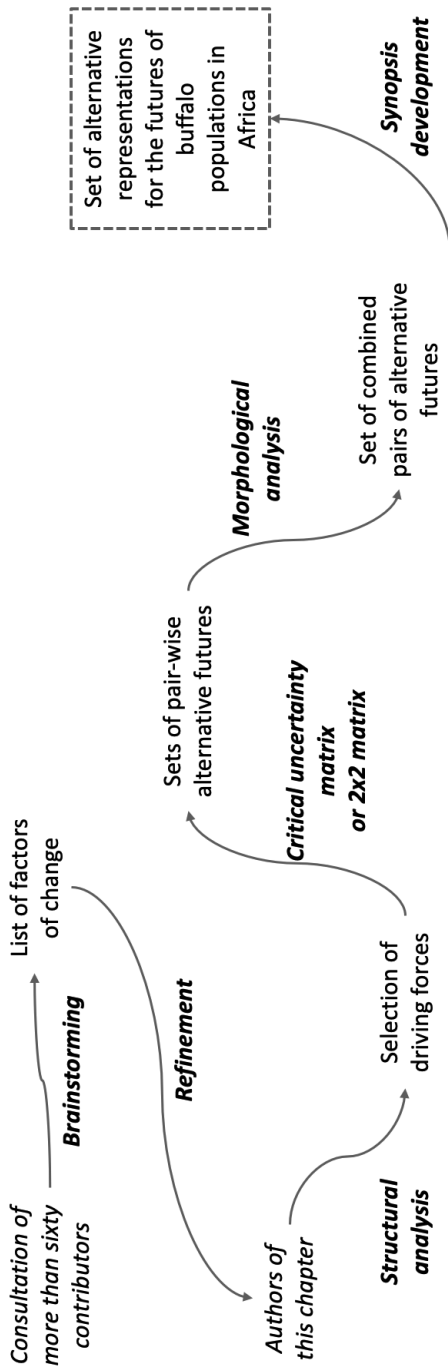


Figure 18.1 The methodological steps used for the development of alternative futures of the buffalo population in Africa. Source: Authors.

portray four alternative futures. Thus, each future represents a possible systems context for the question, here the potential futures of buffalo populations. This approach has well-known advantages and drawbacks (Ramirez and Wilkinson, 2014) and the most important ones for our study will be discussed later. Due to these shortcomings, we modified the approach, applying it to several pairs using all of the driving forces selected. For this, the pairwise combination respected the rule of non-related forces and privileged a combination of different dimensions such as societal, technical, economic, environmental, political and values ('STEELPV' dimensions). We then used an adapted *morphological analysis* (Álvarez and Ritchey, 2015; Duczynski, 2017) to combine these different sets of four alternative futures, thus producing a final set of mutually exclusive and contrasting *synopses* incorporating the different states of these driving forces.

Each synopsis was then further developed with plausible states of the factors of change that the authors considered as being directly related to the description of the state of the buffalo population and its management in Africa. Figure 18.1 displays the entire sequence of the methodology.

Results

Factors of Change and Structural Analysis

The first outputs of this methodological approach included a list of 29 factors of change with their definition and some examples (Table 18.2).

Each of the five authors then conducted a structural analysis of these 29 factors and the results were combined into a merged influence/dependence matrix where each cell was filled with the value that was attributed to it by at least three of five authors. Figure 18.2 displays the position of the factors of change in accordance with their respective relative direct influence on the other factors, and their respective relative dependency on the other factors.

To select the key variables for the 2×2 matrix approach, we decided to temporarily discard climate change because the selection of inputs for the matrix was based on a criterion of high uncertainty. For the selected time horizon of 2050, there is a relatively low level of uncertainty about the future state of this factor for much of sub-Saharan Africa. We also decided to put aside 'Colonial legacy', as this factor of change was closely linked to, and therefore represented in, the 'External influence' and 'Western worldviews' factors of change. Although thought to be highly

Table 18.2 List of factors of change (in alphabetical order) potentially impacting positively or negatively African buffalo populations at the continent level. The most influential factors of change are displayed in grey. The fourth column indicates the domain(s) in which a factor of change falls using the STEEPV dimensions: S, societal; T, technical; Ec, economic; En, environmental, P, political; V, values.

Factor of change	Acronym	Definition	STEPPV	Notes
African buffalo production systems	Prod_Sys	The use of African buffalo for production purposes as a domestic species	Ec	e.g. trophy/meat production, selective breeding
African worldviews	Afr_WorldV	African cultural values regarding wildlife and nature	V	e.g. relation with wild meat consumption, wildlife as cultural heritage
Buffalo uses in natural systems	Buff_Use	The types of use of African buffalo under extensive and natural systems	Ec	e.g. trophy hunting, sustainable harvesting, subsistence hunting
Climate change	Clim_Chg	The change of local climate in terms of frequency and intensity of events	En	
Climate mitigation measures	Clim_Mit	The measures adopted to mitigate the effects of climate change	T	e.g. forest conservation, carbon sequestration in savannas
Colonial legacy	Col_Leg	The influence of colonial era on current international political processes	P	e.g. current conservation models were designed in the context of colonial era
Conservation funding	Conserv_Fund	The status and modalities of conservation funding	Ec	
Conservation models	Conserv_Mod	The diversity and specificities of conservation models	En, Ec	e.g. co-management, role of state, non-governmental organizations, local communities

Conservation priorities	Cons_Prio	The orientation of conservation towards particular species or habitats	V	e.g. focus on large carnivores and pachyderms
Food production	Food_Prod	The quantity and quality of food production, including the balance of animal-based to crop-based agriculture	Ec	Land sparing versus land sharing
Genetic adaptability of African buffalo	Buf_Gen	On an evolutionary timescale, the capacity of the African buffalo to adapt to its changing environment	En	e.g. gene flow and inbreeding depression, deleterious alleles
Habitat fragmentation	Hab_Frag	The emergence of discontinuities (fragmentation) in a given environment	En	
Human/livestock diseases	H/L_Dis	Political and economic importance of animal and zoonotic diseases involving the African buffalo	Ec	e.g. foot and mouth disease, brucellosis
Human population growth	Hum_Pop	The growth of the human population	S	e.g. ratio urban/rural population
Influence of environmental movements	Env_Mouv	Nature and influence of environmental movements of societal values, perceptions and actions	P	e.g. shift towards plant-based diet (versus meat-based diet)
Influence of non-African states	Ext_Infl	The level of political and economic influence of external state in African politics and economy	P, Ec	e.g. land grabbing, infrastructure development
Intersectoral collaboration	Inter_Coll	State of intersectoral collaboration between ministries/governmental services	P	
Land tenure	Land_Cons	The quantity of land converted for agriculture	P, Ec	e.g. green revolution/State versus private ownership
Livestock production	Liv_Prod	The quantity of land use for extensive livestock production	Ec	

(cont.)

Table 18.2 (cont.)

Factor of change	Acronym	Definition	STEEP	Notes
Political governance	Pol_Gov	The quality of state and local political governance	P	e.g. threat of state capture
Political stability	Pol_Stab	The political stability of states and regions	P	e.g. war, terrorism
state of african tourism	Afr_Tour	The state of African nature tourism	Ec	e.g. dependency to international tourism
State of global tourism	Glo_Tour	State of global tourism	Ec	e.g. restriction of global tourism due to COVID-19 pandemic
State of poverty	Stat_Pov	The extent of poverty in African populations	S	
Surface water availability	Surf_Wat	The state of natural and human-induced availability of water	En	e.g. changes in rainfall, water abstraction, leading to loss of wetland habitats
Technological innovation	Tech_Inov	Capacity for researchers and practitioners to access and use new technologies and knowledge to study the African buffalo	T	e.g. democratization and improvement of drones and/or telemetry tools
Transfrontier activities	Trans_Front	Activities implemented from one state into another, formally or informally	Ec	e.g. poaching, transfrontier tourism
Western worldviews	West_WorldV	The state of Western public opinion on African wildlife, nature and it uses	V	e.g. ban on hunting by European and African states

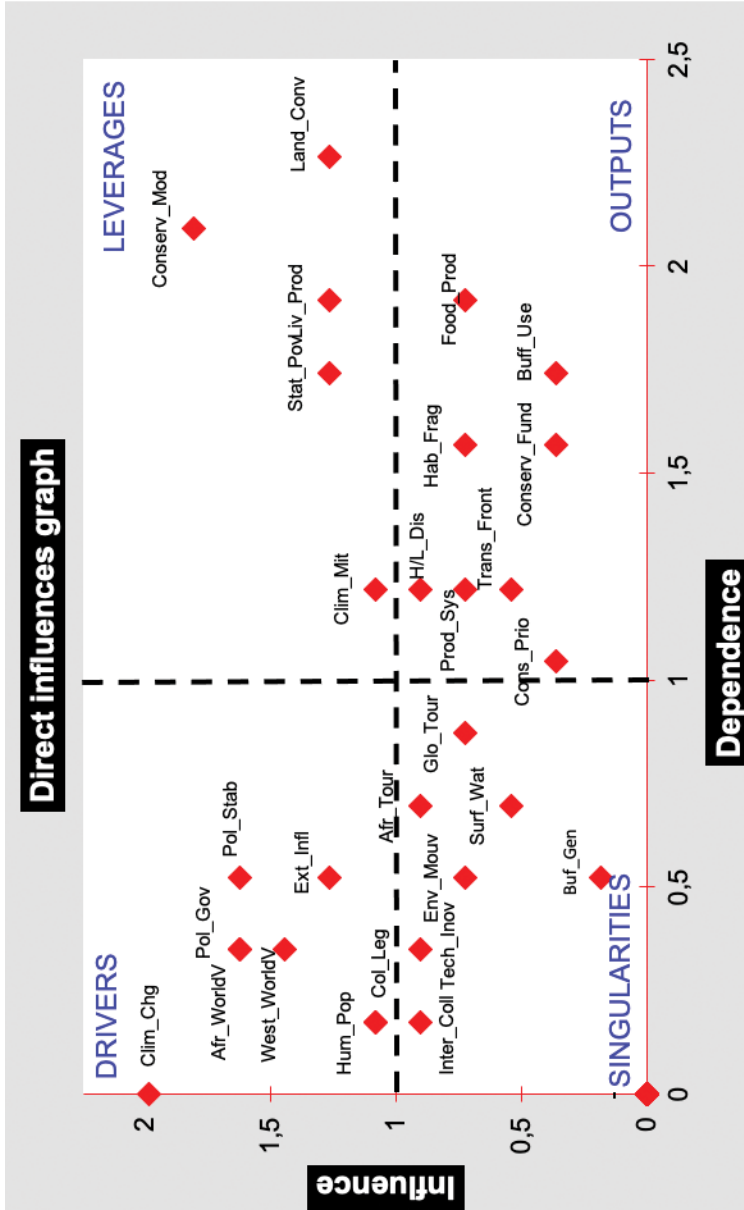


Figure 18.2 Structural analysis direct influence matrix (some squares overlap). The dotted lines represent the 'average' influence and dependence of the factors in this system centred on the value 1. They define for quadrants or categories of factors as indicated in Table 18.1. Each factor of change is visualized on this graph with its influence and dependence coordinates. As a result, eight factors of change appeared to be located in the 'drivers' (top-left) quadrant plus one very influential leverage (i.e. conservation models) as summarized in Table 18.2.

significant, we set aside ‘Conservation model’ due to its extremely high dependency, which implies that it is not really a driving force. ‘Human population’ as a global variable is also quite predictable for the next 30 years, but it is much less predictable when its meaning in terms of rural/urban ratios is considered. We therefore kept it with this specific meaning after checking that this would not change the results of the structural analysis. The key variables selected are thus ‘Political governance’, ‘Political stability’, ‘External influences’, ‘Western worldviews’, ‘African worldviews’ and ‘Human population’.

Creating Pairwise Alternative Futures with the 2×2 Matrix

We combined these six variables into three pairs, avoiding closely linked dimensions in these pairs and ensuring that diverse STEEPV dimensions were mixed. The resulting set of three pairs comprised ‘Political stability and African worldviews’, ‘Political governance and Western worldviews’ and ‘External influence and Human population’. For each driving force, the authors together selected two contrasting alternative states by 2050. These are included in the three sets of matrices presented below. The resulting 12 alternative futures were each given a metaphoric name or descriptive phrase as a way to refer to them, but also to help others to imagine such an alternative future.

The ‘Political Stability and African Worldviews’ Matrix

Positioning on an axis for ‘Political stability’ the two opposite states, ‘political chaos’ versus ‘generalized political stability’, and on another axis for ‘African worldviews’ the two opposite states, ‘Preservation of nature’ versus ‘Exploitation of nature’, and placing them in a Cartesian coordinate plane results in what has been named a ‘scenario cross’ consisting of two axes with extremes and four scenario stories. The resulting four futures with their metaphoric names are displayed in the quadripartite graph in Figure 18.3.

The ‘Political Governance and Western Worldviews’ Matrix

This matrix yields four alternative futures when the two states of ‘Political governance’, that is ‘fulfilling the aspiration of all the people’ versus ‘serving the interest of a few’ and the two states of ‘Western worldviews’, that is ‘preservation with sustainable consumptive use’ versus ‘preservation without

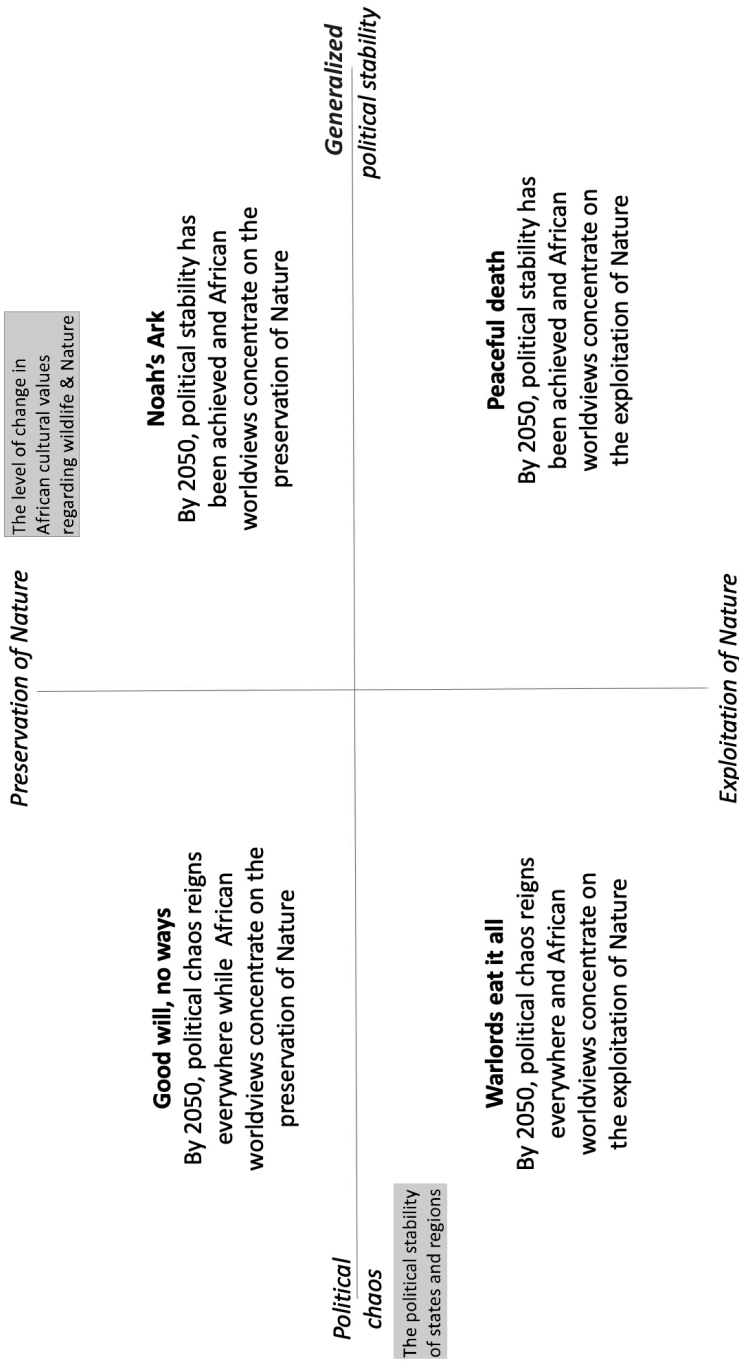


Figure 18.3 Alternative futures from the 'Political stability and African worldviews' matrix.

consumptive use' are placed in an orthogonal Cartesian plane. The resulting four futures are displayed in a quadripartite graph in Figure 18.4.

The 'External Influence and Human Population' Matrix

This matrix yields four alternative futures when the two states of 'External influence', that is 'Africa independent from the world economy and politics' versus 'external influence dictates politics and economy' and the two states of 'Human population', that is 'people live in rural areas' versus 'people live in urban areas' are placed in an orthogonal Cartesian plane. The resulting four futures are displayed in a quadripartite graph in Figure 18.5.

Using Morphological Analysis to Create Integrated Synopses of the Six Driving Forces

We proceeded by developing a morphological table combining the future states of the first two matrices where we discarded incompatible futures, that is futures whose combination would make an inconsistent synopsis (results displayed in the first two columns in Table 18.3). For example, we discarded futures where 'political chaos' was associated with 'political governance fulfilling the aspirations of all the people' under the postulate that political stability figures among the aspirations of at least some people. In a second morphological analysis step, the eight resulting combinations were put in relation with the four alternative futures produced with the third matrix (Table 18.3). The purpose was to identify where each of these four futures best fitted with the preceding eight ones. We ensured that all four futures were used in the results. We noted that the presence of the future state, 'independent from the rest of the world' of the 'External influence' driving force made automatically inessential some of the first eight futures whose differences came from discrepancies between African worldviews and Western worldviews on Nature. Hence, not all eight futures were selected.

We gave a metaphoric name to each of the seven resulting differentiated futures and scripted them in the form of synopses combining the related states of the six driving forces. Each synopsis thus represented a contextual future environment for the buffalo population that was detailed enough to logically conjecture what would be the credible state of the buffalo population and its related internal factors, that is the factors that the actors directly involved in the management of the buffalo population could influence/control. Among these, the factor 'Conservation model' plays a crucial role

Western worldview is preservation with sustainable consumptive use

The state of western public opinion on African wildlife, Nature and its uses

Royal hunting estates

The governance system fulfils the aspiration of a few while Western worldviews of preservation with sustainable consumptive use dominate

Good will, good use

The governance system fulfils the aspiration of all the people while Western worldviews of preservation with sustainable consumptive use dominate

Political Governance fulfils the aspiration of a few

Political Governance fulfils the aspiration of all the people

The quality of State and local political governance

Jurassic Park

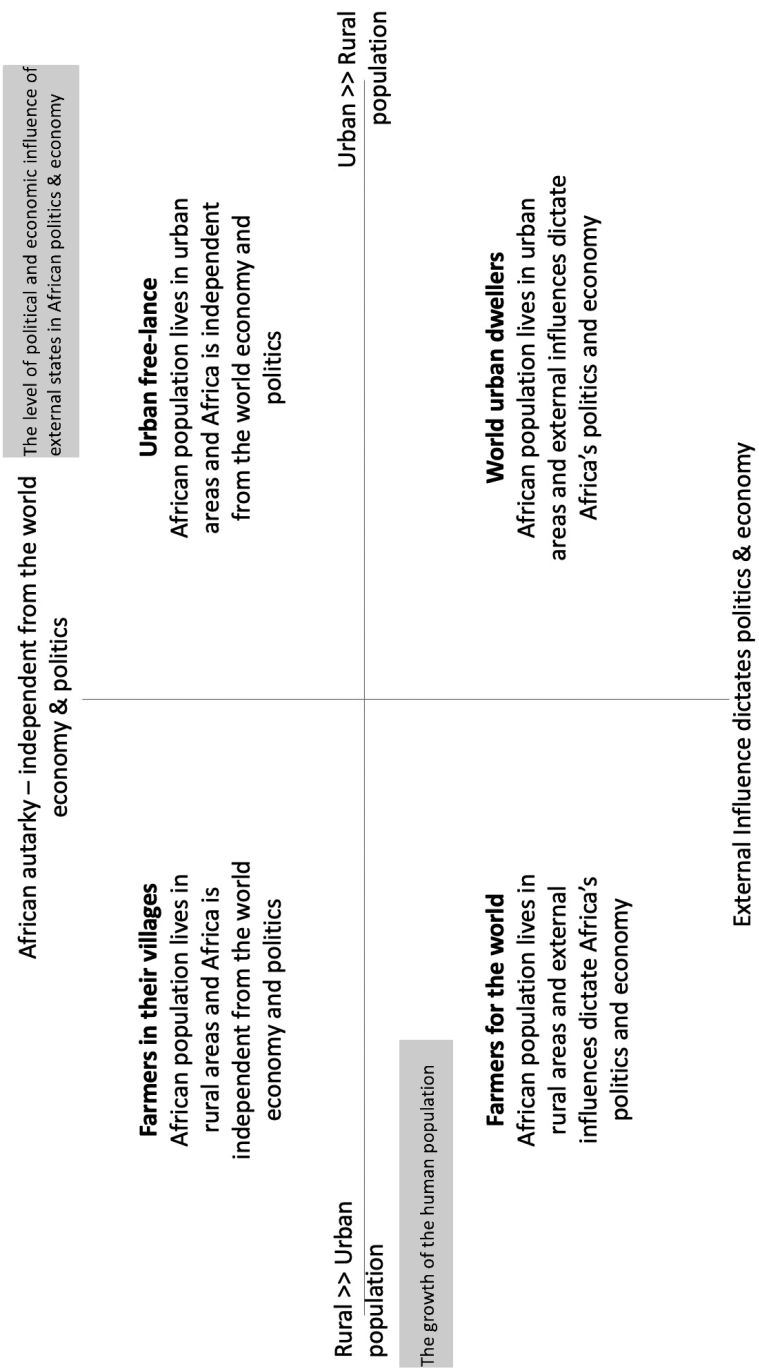
The governance system fulfils the aspiration of a few while Western worldviews of preservation without consumptive use dominate

Conservation conflicts

The governance system fulfils the aspiration of all the people while Western worldviews of preservation without consumptive use dominate

Western worldview is preservation without consumptive use – i.e. Wilderness

Figure 18.4 Alternative futures from the 'Political governance and Western worldviews' matrix.



The level of political and economic influence of external states in African politics & economy

The growth of the human population

Figure 18.5 Alternative futures from the 'External influence and human population' matrix.

Table 18.3 Second morphological analysis step: after putting in relation the first 2x2 matrices and developing metaphorical names and short synopses (first two columns), the eight resulting combinations were put in relation with the four alternative futures produced with the third matrix. White backgrounds indicate the 7 combinations of 6 driving forces' states selected, including the metaphorical names of these synopses, ensuring that all driving forces' states were used in the results. Dark backgrounds indicate combinations that were discarded because of an incompatibility between the driving forces' states. Light grey backgrounds indicate possible combinations that were not selected because of inessential selected combinations.

Synopsis of 2x2 matrix: External Influence x Human population					
Metaphoric names of 2x2 matrix	Combination of the future states of the first two matrices: African worldviews x Political stability and Western worldviews x Political governance	1. Urban freelance African population lives in urban areas and Africa is independent from the world economy and politics	2. World urban dwellers African population lives in urban areas and external influence dictates Africa's politics and economy	3. Farmers in their villages African population lives in rural areas and Africa is independent from the world economy and politics	4. Farmers for the world African population lives in rural areas and external influence dictates Africa's politics and economy
1. Noah's universal Ark	By 2050, political stability has become generalized and the governance system fulfils the aspiration of all people. African worldviews concentrate on the preservation of nature while Western worldviews concentrate on preservation with sustainable consumptive use.				
					African renaissance

(cont.)

Table 18.3 (cont.)

		Synopsis of 2×2 matrix: External Influence × Human population	
		Happy nature	Even more difficult if Western dictates wilderness and all people live in rural areas
2. Noah's controversial Ark	<p>By 2050, political stability has become generalized and the governance system fulfils the aspiration of all people. African worldviews concentrate on the preservation of nature while Western worldviews concentrate on preservation without consumptive use.</p> <p>By 2050, political chaos reigns everywhere and governance system fulfils the aspiration of few people. African worldviews concentrate on the preservation of nature as do Western worldviews but without consumptive use.</p>		
3. Into the wild	<p>By 2050, political chaos reigns everywhere and the governance system fulfils the aspiration of few people. Western worldviews concentrate on preservation with sustainable consumptive use while African worldviews concentrate on the preservation of nature.</p>		
4. Private games	<p>By 2050, political chaos reigns everywhere and the governance system fulfils the aspiration of few people. Western worldviews concentrate on preservation with sustainable consumptive use while African worldviews concentrate on the preservation of nature.</p>		
		Pauper's hell	Conservation islands

		Self-service	
5. We profit all	By 2050, political stability has become generalized and the governance system fulfils the aspiration of all people. While Western worldviews concentrate on preservation with sustainable consumptive use, African worldviews concentrate on the exploitation of nature.		Not very consistent: opposition of worldviews while Western dictates
6. All against the West	By 2050, political stability has become generalized and the governance systems fulfil the aspiration of all people. African worldviews concentrate on the exploitation of nature while Western worldviews concentrate on preservation without consumptive use.	Agro-Africa	Not very consistent: opposition of worldviews while Western dictates
7. The lords of nature	By 2050, political chaos reigns everywhere and the governance systems fulfil the aspiration of few people. African worldviews concentrate on the exploitation of nature while Western worldviews concentrate on preservation without consumptive use.	Not very consistent: opposition of worldviews while Western dictates	Not very consistent: opposition of worldviews while Western dictates
8. The hunting lords	By 2050, political chaos reigns everywhere and the governance systems fulfil the aspiration of few people. African worldviews concentrate on the exploitation of nature while Western worldviews concentrate on preservation with sustainable consumptive use.	Battleground 2050	Not very consistent: opposition of worldviews while Western dictates

Table 18.4 Resulting synopsis setting contextual futures for the future of buffalo population in Africa.

African renaissance	<p>By 2050, external influences dictate Africa's politics and economy; political stability has been reached in Africa now for one generation and the governance system fulfils the aspiration of all people. In the context of the doubling of the human population, the urban population remained stable while the rural population tripled. Western worldviews have changed and adopted relevant preservation of nature modes that promote sustainable consumptive use in recognition of local culture and knowledge, echoing re-emerging African worldviews rooted in ancestral beliefs about the interconnectivity between all human beings and nature and the need to respect them. These ancestral beliefs are now ruling once again the relationship of man to nature. New locally relevant conservation models have emerged, promoting land sharing between conservation and local development for the benefit of both. As external influences led to improved agriculture, agricultural intensification took place as the rural population embraced conservation, preventing expansion into the bush. Climate change has pushed most farmers to focus on livestock production systems integrated within rangeland management programmes, sustainable resource use and local livestock markets to maintain a low livestock density. The state of poverty thus drastically reduced in Africa. <i>The African buffalo is a key economic asset of these new conservation models (for tourism, hunting, meat) and free-roaming populations thrive in protected areas and community-based managed areas.</i></p>
Happy nature	<p>By 2050, external influences dictate Africa's politics and economy; political stability has been reached in Africa now for one generation and the governance system fulfils the aspiration of all people. The African human population has almost doubled, the urban population more than tripled while the rural population drastically decreased, leading to extreme agricultural intensification. Africans live in urban areas, allowing for biodiversity to flourish in almost deserted rural areas since Western worldviews pushed for and imposed preservation without consumptive use over African worldviews. African cities are fed by international trade and some local concentrated intensive livestock production units. A luxury local agricultural market exists for citizens on the little land left in African landscape protected at 50%. The state of poverty in rural Africa is now much lower because fewer people live there with a few job opportunities such as those generated by the private sector, which has developed a highly profitable wildlife economy, for example in southern Africa. The dominant conservation model is still largely based on National Parks with no human activities apart from safari tourism. In southern Africa, the private sector has developed a highly profitable wildlife economy that generate many jobs. <i>The African buffalo is free-roaming in protected areas and a large private population, genetically selected, exists in intensively managed farms.</i></p>

Pauper's hell

By 2050, Africa is independent from the world economy and politics. Political chaos reigns everywhere and the governance system fulfils the aspiration of few people. African populations find shelters in cities to make a living. The ones who stayed in rural areas can only produce for subsistence and rely on nature for the rest of their needs. The state of poverty has remained as in the 2020s. Due to shrinking state services, the tsetse fly and sleeping sickness have returned in large parts of the continent and therefore prevent livestock production in large tracks of land. The dominant African worldviews is the preservation of nature, not because the pauperized people would not like to harvest it, but because the elite want to hunt or enjoy these animals for themselves and they enforce strict rules about the (inequitable) access to wildlife. The Western worldviews focusing on sustainable use cannot reach Africa, which is completely disconnected from the rest of the world. ***The African buffalo is free-roaming in protected areas that are classified as 'National Parks' but are, in reality, more like royal domains.***

Self-service

By 2050, political stability has become common and widespread and the governance system fulfils the aspiration of all people. Africa is independent from the world economy and politics. Thus, while Western worldviews try to promote preservation with sustainable consumptive use, the worldviews of the African populations, who live in urban areas, concentrate on the exploitation of nature. As a result, a small rural population exploits unsustainably most of the landscape, which is becoming drier and subject to extreme events. Livestock is produced in vast quantities feeding the local markets but the density on the land is high. Poverty has increased as the land produces less and less. Conservation models advanced by the West do not convince African populations to change their mind on the preservation of nature apart from a few places. ***The African buffalo populations are isolated in protected areas, under the pressure of livestock farming and numbers are decreasing. The highest number of living individual buffalo are private property in intensive farms, profiting a few.***

Conservation islands

By 2050, political chaos reigns everywhere and the governance systems fulfil the aspiration of few people. Africa is independent from the world economy and politics. The worldview of African populations, who live in rural areas, concentrates on the exploitation of nature while Western worldviews still try to promote preservation without consumptive use where it can. Thirty per cent of the land is under strict conservation since 2030, following international agreements, but the need for land for the ever-increasing rural population puts pressure on protected areas. Livestock farming is dominating in the arid landscape and the level of poverty has increased since the 2020s. There are no conservation models beside the willingness of the powerful to keep a few animals for their own pleasure in their private holdings. ***The African buffalo is not a key species for conservation in Africa and its populations have declined and are on the brink of extinction.***

(cont.)

Table 18.4 (cont.)

AgroAfrica	By 2050, political stability has become common and widespread and the governance systems fulfil the aspiration of all the people. Africa has taken independence from the world economy and politics and now concentrates on its food security with African populations living mostly in rural areas. African worldviews concentrate on the exploitation of nature against the Western worldviews incapable of imposing the preservation of nature without consumptive use anymore. The land use is dominated by agriculture as a booming sector sustained by intensification principles that have been adapted to African contexts. Livestock production is integrated in crop–livestock systems. Poverty is on the verge of being eradicated in Africa. The conservation of nature is an old story of Western dreamers: as Europe, Africa has made its green revolution to the expense of nature. African states have conserved National Parks to follow international treaties but their state is poor. <i>The African buffalo population remains in protected areas, isolated, including fading populations in small parks under human pressure.</i>
Battleground 2050	By 2050, external influence dictates Africa's politics and economy; political chaos reigns everywhere and the governance systems fulfil the aspiration of few people. Western worldviews are preservation with sustainable consumptive use. As most people now live in cities, land tenure has shifted towards dominant conservation landscapes at low human density with integrated management of livestock and rangeland management. The level of poverty is relatively low. However, urban African populations have developed worldviews that concentrate on the unsustainable exploitation of nature, creating a demand for natural resources. This includes bush meat, which makes environmental criminal organizations thrive. Conservation models that have emerged are now locally relevant, promoting land sharing between conservation and agriculture. The unsustainable exploitation of wildlife threatens this fragile equilibrium. <i>The African buffalo is an important asset of the new conservation models, but the constant poaching activities prevent a true success story of the sustainable use for the benefit of all.</i>



Figure 18.6 Herd of Cape African buffalo, central Botswana. © Rudi van Aarde.

as a leverage as its future is determined by the contextual environment set by influential factors and at the same time an influential one for the buffalo system in particular. Three other factors also play roles, to a lesser extent, as leverages as indicated in Table 18.2, namely ‘Land Tenure’, ‘Livestock Production’ and ‘State of Poverty’. We thus incorporated them in the refinement of the synopses along with the other internal factors directly associated with the buffalo population as indicated in Table 18.4.

Discussion

The list of factors of change identified by the co-authors of this book who responded to our calls for input includes two groups of separate factors. The first consists of external factors (e.g. ‘Climate change’, ‘External influence of States’), which put together sets a general context for Africa. The second group consists of more internal factors (e.g. African buffalo production systems, conservation funding). The results of the structural analysis shows that the first group strongly influences the second group, and thus contributes largely to shaping the future of African buffalo populations in Africa (Figure 18.6).

Regarding the full process, we considered Africa as a whole for the sake of the exploratory nature of this reflection. The resulting synopses (Table 18.4) should not be understood as continent-wide alternative futures. A synopsis represents a possible contextual situation, which could

occur only in parts of the continent or of countries, coexisting with others in other parts as discussed later. These alternative futures are not predictions either. They are exploratory imaginaries of possible futures, and as such constitute only one way of anticipating amidst several alternative ways (Amer et al., 2013; Crawfords, 2019). They serve as a basis to enlarge our reflection on the future of the buffalo population beyond and in complement to the conventional use of trends and projections. As such they are intended to shed additional lights on how we ‘...make sense of change (difference) in the emergent present’ (Miller, 2015), that is the current situation of the buffalo population, and what that could mean for the future.

While we discarded ‘Climate change’ from our selection of drivers due to its high level of predictability at the time horizon selected, this factor of change cannot be removed from the discussion. Climate evolves ‘slowly’, will exert continuous pressure across the century and cannot be represented by different and contrasting states in the 30-year horizon that we set for this futures exercise. The climate is already changing and symptoms of these changes already can be felt in the buffalo range, especially in semi-arid areas (e.g. southern Africa; Kupika et al., 2018). Future buffalo in Africa will most probably live under a changed climate including more extreme events but also with a larger human population. Droughts or lack of surface water, their frequency and intensity in particular, will be a direct threat for buffalo that are quite susceptible to them, with substantial declines in some populations as witnessed in the Sahel at the end of the 1960s and during the 1990s in Tsavo, Serengeti/Mara, Gonarezhou and Kruger (East, 1999; Cornélis et al. 2014) and in 2022 in Amboseli, Lewa Downs and Tsavo in Kenya (Prins, personal observation). Without access to drought refuge resources such as extensive wetlands, some populations could suffer high mortality.

Against this general backdrop, the other factors of change that we perceived as setting the context of Africa in 2050 are mainly political and value-based. First, the quality and stability of African States’ political systems, including their governance, seem to be decisive with regard to their capacity to design and implement environmental policies, and to control or enable illegal activities. Consequently, the occurrence of wars and other conflicts can have serious impacts on wildlife populations, especially buffalo herds that can feed troops with good quantities of quality meat, as observed in the past. For bygone centuries, African politics have been largely impacted by the influence of colonial powers, and since independence by the influence of former colonial powers and emerging players on the African continent such as China, Russia, Israel and Turkey. The

status of these future international relationships will impact the global context in terms of development, politics and ultimately the management of natural resources (e.g. extractive industries). Alternative futures with stronger or ruptured ties can be framed with secondary impacts on other factors of change (e.g. differences between 'Pauper's hell' and 'Self-service' synopses). The influence of external States is impacting African conservation. Historically, the pre-eminence of Western countries in African affairs was associated with their capacity to globally impose the now dominant Western worldviews regarding conservation. Today, these Western worldviews have shown some limits (e.g. a land-sparing system too often neglecting local communities triggering negative local perceptions towards conservation and conflicts) and some voices have expressed the need for a decolonization of conservation policies (Domínguez and Luoma, 2020). This process, only started recently, could create a space for the re-emergence of the multiple African worldviews that pre-existed the colonial era and fell silent or went extinct since then, such as in 'African renaissance'. If and how these African worldviews will reinvent themselves in the new contexts and redefine the relationship between African populations and nature is a major uncertainty for the future of conservation in Africa, and therefore for buffalo.

This group of contextual factors of change sets the scene in which future conservation models will succeed or fail to preserve African buffalo and perhaps associated biodiversity. The different synopses in Table 18.4 depict alternative futures considering different states of each of these factors of change articulated together to build a possible future. The aim is once again not to predict the future but to explore the maximum range of the possible futures in which the African buffalo could exist. As for most large wild mammals, the fate of the buffalo in Africa will be mirrored by the fate of conservation. The current status of buffalo in the West and Central savannas, where they only remain as a few isolated (but relatively robust) populations in national parks and well-guarded hunting areas and reserves, can serve as a picture of the future of African buffalo populations in a context of fortress conservation imposed by strong pressure from human activities (e.g. mobile pastoralism, both nomadic and transhumant and sedentary livestock husbandry, the former impacting more buffalo populations) such as in the 'AgroAfrica', 'Self-service' and 'Conservation islands' synopses. However, even if this future is possible, it does not mean that future buffalo populations will be restricted to protected areas only. In many parts of Africa today, the expansion of cotton growing (with unsustainable farming practices), pastoralism and the development of mining are only a few

examples of elements that are already putting growing pressure on land, pushing buffalo into protected areas and sometimes encroaching into protected areas, including rainforests in the central parts of the continent. The demand for land for the growing human population superimposed on climate change could drive the conversion of more land for agriculture and other extractive activities and leave less land for natural habitat and buffalo. This will create a difficult context for achieving the objective of 30 per cent of land under protected areas by 2030 (even if some African countries have already reached this proportion, albeit some areas have been called ‘paper parks’; Blom et al., 2004; Di Minin and Toivonen, 2015; IUCN, 2022; e.g. ‘Conservation islands’). Another key for the future of buffalo in Africa will be its capacity to exist outside protected areas.

Disruptive developments could unfold in the management of land, its uses and the relationship between conservation and local development. These developments could be attractive for all stakeholders, but would require quite systemic changes in conservation. The previous paragraph demonstrates that land conversion for conservation could take place in two cases: either if conservation delivers decent livelihoods for the local human population (e.g. ‘African renaissance’), or if the majority of African populations live in cities as the current trend points at (e.g. ‘Happy nature’). In relation to the former, community-based natural resource management programmes (CBNRM) have been tested in Africa since the mid-1980s with failures and successes (Dressler et al., 2010). Their central tenet is the devolution to local communities of the right to access natural resources such as wildlife, and to encourage the sustainable management of the resources through consumptive (e.g. hunting, meat production) and/or non-consumptive (e.g. ecotourism or photographic safari) uses. Given many cases where this CBNRM failed (for instance, because of resource capture by local elites, weak safeguarding against short-term profiteering versus long-term sustainability, rent-seeking behaviour, weak embedding in existing legislation if at all, non-understanding of cultural differences, etc.), we do not plea for a blanket application of CBNRM at all. We thus call for a critical analysis of success factors as was done for fisheries (e.g. Cunningham and Bostock, 2005; Squires et al., 2017) instead of blind faith in self-regulation of natural resource use not by local peoples. Possible futures could go beyond the initial CBNRM concept to embrace further the framework of environmental justice that not only calls for more equal distribution (i.e. benefits) between stakeholders, but also for more equal involvement in decision-making processes, an aspect partially covered by CBNRM, and more recognition of local identities and

cultural difference, meaning more recognition of local (African) world-views (Martin et al., 2016; e.g. ‘African renaissance’). This would mean a progressive shift from (conservation) projects that are designed outside of local contexts, without the involvement of the final beneficiaries and are imposed on the latter by national or international external experts. The decision for a community to use its land for some form of conservation would be their own decision (they would have the right not to do so as well), under their terms and their governance and management system, and with enough benefits to be sustainable in the long term (after the end of external funding if this is not long term). The result would be mixed conservation–agricultural or conservation land, preferentially adjacent to protected areas to promote connectivity between natural habitats and/or between protected areas (e.g. ‘African renaissance’ and ‘Battleground 2050’). Pockets of this future already exist today, although they remain in a minority, with a progressive paradigm shift in some stakeholders (donors, practitioners, researchers) towards exploring these new forms of land use (Caron et al., in prep.). Any form of Half Earth concept (50 per cent of land protected globally) could only emerge in Africa through these types of new conservation models that would not concentrate solely on the management of protected areas as disconnected land use, but on larger landscapes in which protected areas are integrated with pro-conservation or coexistence land uses, benefiting a larger set of (local) stakeholders and benefiting from them. The concept of ‘Other effective area-based conservation measure’ (or OEACM) means ‘a geographically defined area other than a Protected Area, which is governed and managed in ways that achieve positive and sustained long-term outcomes for the *in situ* conservation of biodiversity, with associated ecosystem functions and services and, where applicable, cultural, spiritual, socioeconomic, and other locally relevant values’ and was adopted in 2018 by the 14th Conference of the Parties of the Convention on Biological Diversity and could provide a framework for such land-sharing options (OECMs, 2019; Figure 18.7).

The African buffalo could be a key species, if not the most important species, for these new conservation models that would be based on the consumptive use of wildlife. The reason for this is that only a small fraction of African landscapes and wildlife communities can offer proper products for clients of wildlife viewing. Alternative uses are trophy hunting and meat production through sustainable management. Today, trophy hunting is a very sensitive topic that divides Western opinion, sometimes violently (Chapter 16). An influential and powerful part of Western opinion opposes consumptive use in Africa and has succeeded in imposing bans



Figure 18.7 Forest buffalo calf, Odzala National Park, Republic of Congo. © Thomas Breuer.

on trophy imports in countries from which important populations of hunters come from, reflecting a combination of three drivers, ‘Western worldviews’, ‘External influence of States’ and ‘Colonial legacy’. There is no such fracture in mainstream African worldviews, where consumptive uses of natural resources are often allowed with access rules (e.g. seasonal, geographical, social, mystical, specific hunting rules). Chapters 13 and 16 present the central role that buffalo already play in the wildlife and trophy-hunting industry (i.e. it would be difficult to run a trophy-hunting business without buffalo except in cases where very iconic species can be hunted), and Chapter 14 focuses on meat production, which is also a valuable use of buffalo if markets for this meat exist. The new land-use options in which the buffalo may play an important role could, in possible futures (e.g. ‘Battleground 2050’), compete with traditional agricultural land uses such as rainfed crops, irrigated crops and livestock production (Cumming et al., 2014). They would require a new paradigm in which African populations take ownership of the buffalo as an indigenous species replacing the exotic breeds of cattle imported during the colonial era (as in ‘African renaissance’). This paradigm could percolate into the tourism industry by developing tourism products that offer the exploration of these rich and diverse landscapes in which biological and

cultural diversity are nurtured. These products could attract emergent African middle and rich urban classes that may desire to reconnect with their culture and localities. In this future, African buffalo would thrive in and outside protected areas and be a symbol of the decolonization of Africa and the ownership of its landscapes and natural resources.

African worldviews also could fail to embrace the conservation of nature and do the minimum for conservation to respect signed treaties (as in 'Battleground 2050') or completely ignore their wildlife in order to make sure they reach food security through conventional agriculture (e.g. 'AgroAfrica' and 'Self-service'). These contexts would restrict buffalo populations in protected areas while raising issues related to genetic bottlenecks if metapopulation management does not exist. The relationship with non-African states would be important as the funding for conservation would be, as it is today, dependent on external sources. Modalities for subsidizing nature for its conservation by local stakeholders would be a way to maintain protected areas in good shape. The conditions linked to this funding would be important if a sustainable management of natural resources and habitats is targeted; notions of appropriation, empowerment and recognition would still be important in these contexts.

Among possible futures, the commodification of buffalo through private ownership and under semi-extensive or intensive management (Chapter 13) could spread beyond South Africa as a business model in which buffalo already play an important role. However, this alternative raises two important questions: can this model produce enough benefits (through employment) to local communities to be accepted, and not only for a rich elite (as in 'Self-service' or 'Conservation 'islands')? To what extent can artificially genetically selected (e.g. for horn size) or disease-free buffalo (including endemic diseases to African wildlife) still be considered as suitable to join free-roaming populations and benefit conservation? In recent decades, a few countries in southern Africa have also experienced strict sanitary measures regarding important cattle diseases (the main one being foot-and-mouth disease – see Chapters 9 and 12) that imposed strict separations between buffalo and cattle land uses, with devastating consequences for wildlife populations and small-scale subsistence farmers living close to protected areas with buffalo (Ferguson and Hanks, 2010; Cumming et al., 2015). In a context of higher economic dependence on external states, fencing to control diseases with consequences for wildlife and costs to the poorest farmers could spread to other region of Africa, mainly to the benefit of states. Due to these consequences, and to the fact that Africa needs to produce for itself, the disease issue did not appear as

very important in the synopses. However, this vision could become a possible future for southern Africa.

The synopses of Table 18.4 draw possible futures that may or may not seem relevant for the different regions of Africa regarding the context and the future of African buffalo. Projecting current trends into the future, buffalo populations in West and Central savannas appear to follow some elements of the synopses 'AgroAfrica', 'Self-service' and 'Conservation islands' with a restriction in protected areas under pressure from human activities. The existing harsh competition between agro-pastoralists and pastoralists in these areas would require massive investments to keep conservation land as it is, and neo-military approaches currently appear to be the only short-term solution to protect what exists in war zones. Too little information exists on the state of the forest buffalo in West and Central Africa (albeit to a lesser extent in the latter; Chapter 4); the connectedness between populations, the impact of hunting, subsistence slash-and-burn agriculture and the relation with extractive industries are unknowns (Chapter 17), which prevent wild guesses. Sustainable management of forests by the timber industry is emerging and it could be interesting to further consider the place that the African buffalo could play in these managed forests, and likewise in well-managed, well-guarded oil concessions. Finally, Eastern and southern Africa are the regions in which pockets of the future are currently visible, such as some innovative conservation models (e.g. Kenya, Zambia, Mozambique) and experiences of the commodification of buffalo through private ownership.

The selected methodology has some inherent limits. It is widely acknowledged that the 2×2 matrix carries a very reductionist and quite Manichean view of the world, based on the opposition of extremes. This methodology helps to define a 'framework of the extremes' within which potential futures will likely be located on a region or country basis. In addition, one could very well criticize the results as ultimately the products of Westerners' perceptions about Africa and the dynamics of the African buffalo. While this seems quite opposed to the philosophy of some recent publications about decolonizing the future (Bourgeois et al., 2022), what needs to be taken into account here is that in this process our ways of imagining the future do not intend to frame anyone's future. To the contrary, we wish to contribute to opening imaginaries and not closing or restricting them. If this work and its methodology give ideas to different people with different origins and backgrounds to undertake such a study, producing additional non-Western imaginaries, we would consider our endeavour successful.

Table 18.5 *The seven synopses ranked according to what is perceived as good for African buffalo.*

#1	African renaissance	Excellent for buffalo and probably stable	Because this is so good for buffalo, conservationists should support these factors in the coming years.
#2	Happy nature	Very good for buffalo but undermining perhaps in the long term	Even though this is good for buffalo there may be inherent danger of changing the genetic disposition of the species, thus making it less resilient. Conservationists should support these socioeconomic factors now, but probably not the selective breeding.
#3	Pauper's hell	Excellent for buffalo but probably not stable	Even though this is very good for buffalo, its inherent risk of lack of (social) stability leads to the conclusion that the factors leading to this scenario should not be supported by conservationists at present.
#4	AgroAfrica	Reasonably acceptable for buffalo	This appears to be reasonably good for buffalo, but this scenario necessitates on the long term the exchange of buffalo between large protected areas as already is the case for African wild dogs (<i>Lycaon pictus</i>) in southern Africa.
#5	Battleground 2050	Not good for buffalo	This scenario is quite bad for buffalo, necessitating present-day conservationists not to support this political reality and avoid unsustainable use in a land-sharing context.
#6	Self-service	Bad for buffalo as this will not sustain them in the longer term	Even though this appears to be reasonably good for buffalo in the short term, this synopsis is not sustainable, leading to the conclusion that the factors leading to this scenario should not be supported by conservationists at present.
#7	Conservation islands	Very bad for buffalo	Even though this appears to be reasonably good for buffalo in the short term, this scenario is not sustainable, leading to the conclusion that the factors leading to this scenario should not be supported by conservationists at present even though it appears to be the mainstream conservation model at present.



Figure 18.8 West African savanna buffalo female, Konkombri Hunting Area, Benin. © Christophe Morio.

Implications for the Futures of the African Buffalo

The seven synopsis that emerge from Table 18.4 generate different possible futures for African buffalo based on extreme states of the most influential factors on buffalo populations. Among these, some are more or less ‘good’ for African buffalo populations, at least if we consider the number of buffalo as a good indicator of the robustness of the species (as one cannot yet measure the well-being of a buffalo and they cannot tell us when and where they are happy). We have therefore ranked these seven synopses in a gradient of what we perceived as good for buffalo in Table 18.5 and their consequences for conservationists (and others of good will).

The best scenario appears to be characterized by (i) good governance for all, (ii) sparing land for conservation, (iii) economic intensification on agricultural lands and (iv) land sharing with conservation in combination with sustainable use. The worst scenarios appear to be characterised by (i) African autarky, (ii) high numbers of people farming and/or high numbers of livestock in the countryside and (iii) any unsustainable use of natural resources, including buffalo. A futures analysis can thus objectively guide present-day priority setting and conservationists’ programme choices in a way that is independent of political leanings or contemporary foibles (Figure 18.8).

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