



Cultivating beneficiary 'entrepreneurship' for environmental sustainability and justice in A1 farms of Chiredzi district, Zimbabwe. The new focus of 21st century African land reforms.

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Abstract

While FTLRP led to a land-use quagmire by resettling some communities in wildlife zones, reports of wildlife poaching masks innovative capacities of settlers to sustainably manage Human-Wildlife Conflicts (HWC). Using data collection methods inspired by phenomenological research, this study examined how 'Fast Track' had remade A1 settlers in Chiredzi district to be environmental entrepreneurs despite bearing the brunt of HWC. The objectives were twofold: (i) to check if environmental subjectivities towards wildlife changed with land access (ii) to discuss local initiatives to sustainably manage HWC. This paper argues that FTLRP was not only about land but people, especially remaking self-sufficient people who could sustainably manage HWC and associated environmental injustice by re-invigorating traditional knowledge and inventing sustainable methods. However, many of these local initiatives (e.g. night vigils) compromises settlers' right to a safe and secure environment (environmental justice) by exposing them to mosquitos, bad weather and/or confrontation with unyielding animals. In view of this, it is argued that, for FTLRP to realize its intended objectives of sustainable utilization of environment, Zimbabwean authorities should recognize wildlife as a land-use and potential source of livelihoods by fully implementing a wildlife land reform policy and shared environmental governance.

Key words: Environmental entrepreneurship, environmentality, responsible citizenship, FTLRP, wildlife

1. Introduction

African colonization created exclusive homelands for Africans in environmentally degraded areas (Gonese et al., 2002) resulting in exposure to unfriendly environments (Tsabora, 2010). Colonial land policies threatened environmental sustainability due to overcrowding of people and their livestock. Hopes to meet people's environmental rights and environmental sustainability were then pinned on post-independence policies such as land reform. The transition into independence provided an opportunity to put land reform on the development agenda to address several dimensions of the land question that include justice and equity (Binswanger-Mkhize, Bourguignon & Brink, 2009), efficiency and sustainability (Kanyinga, 2009) and citizenship (Chipenda, 2020). However, a single land reform could not 'answer' these land questions, hence some African countries launched evolving land reforms (with no synchronized timelines) that varied in focus and objectives. They are put in three phases: second decolonization, structural adjustment and 21st century phase (Mutanda, 2020).

Second decolonization land reform was socio-politically (Mendola & Simtowe, 2013) framed to finish the unfinished business of decolonization (Chimhowu, 2006) and the need to deracialise the land question. South African's Settlement/Land Acquisition Grants (SLAG) and Zimbabwe's first phase of land reform (1980-1990) were largely



welfarist with the main target being the poor (Hall, 2004; Mandizadza, 2009). A few years into independence, some African governments implemented structural adjustment land reforms that shifted from being welfarist to productivity (Marongwe, 2011, Mutanda, 2020), pro-poor to pro-rich (Zamchiya, 2011). SA market-based Land Redistribution for Agricultural Development (LRAD) and Zimbabwe's (economic) land reform (1986-1999) reoriented themselves to technically capable and financially stable black commercial farmers to stimulate economic development (Deborah, 2013; Mendola and Simtowe, 2013).

Twenty first century land reforms' focus broadened beyond livelihoods and economic outcomes (Vengeseyi, 2012; Chirere, 2015) to citizenship renewal and reconfiguration (Chipenda, 2018). Matondi (2012) argues that these land reforms were not simply about land, but also people. SA's LARD, Zimbabwe's late 1990s land reform, Namibia's Vision 2030 of land reform shifted from an economic thinking (Gutto, 2014) to remaking self-sufficient and productive black farmers who can forge their own way (Werner and Gonese and Mukora, 2003; Kruger, 2007; Deborah, 2013;). While critics interprets lack of post-transfer support by the South African, Namibian and Zimbabwean government during 21st century reforms as lack of political will, from an entrepreneurial perspective, it might be intended to 'remake' a new breed of beneficiaries who are innovative and can attain success through self-reliant struggles when faced with challenges of any nature (Deborah 2013). Government had to covertly decentralise and devolve substantial responsibility to local people (Gonese & Mukora, 2003; Mamimine, 2003) to implement initiatives to solve own problems (Jacobs & Chavhunduka 2003). Malawi's latest land-reform and Zimbabwe's FTLRP also mainstreamed the 'promotion of environmentally sustainable use of land' among their objectives and principles (UNDP, 2002; Mendola and Simtowe, 2013) since land access is important to the country's sustainable development agenda (Chitsike, 2003). Matondi (2012) argues the term FTLRP pointed to much deeper transformative change that required better understanding. FTLRP can be described as environmental land reform that sought to promote beyond economic development but also environmental quality (Boyce, Rosset and Stanton, 2005) through environmentally sustainable management of land and wildlife resources. Mendola and Simtowe (2013) further argues that land reform is a powerful strategy for poverty eradication, agricultural production and entrepreneurship.

It's not by coincidence that 21st century land reforms advocated for entrepreneurship (innovative mindset) while FTLRP mainstreamed the promotion of environmentally sustainable use of land and wildlife. FTLRP's lack of technical support and inclusion of environmental sustainability among its objectives might have been intended to create environmental entrepreneurs who were able to address environmental problems and injustices they faced in A1 farms. Since FTLRP was about people (Matondi, 2012), especially the creation of beneficiaries who care and use the environment in a sustainable manner, this study utilizes Agrawal's theory of environmentality. FTLRP integrated entrepreneurship and the environmentality discourse. According to Agrawal (2005), 'environmentality' denotes a framework of understanding how and when 'technologies of government' are involved in the creation of subjects



concerned about the environment. Forsyth and Walker (2014) argues that, besides confrontational approaches to promote environmental stewardship, the state can use 'technologies of government' such as land redistribution to influence modes of environmentality (environmental subjectivities) deployed across different periods when people are landless and when they have been 'assetted' (Forsyth and Walker, 2014; Mutanda 2020). Agrawal (2005) urges the adoption of the environmentality discourse in researches on state development policies to understand how modern policies achieve state and environmental targets without force.

1.2 Juxtaposing redistributive land reform and wildlife conservation

In Africa, a large proportion of the human population is dependent on land for their well-being. The need for land and the escalating population has led to compulsory acquisition of privately owned PAs for redistribution, thereby bringing humans closer to wildlife zones threatening both the human population and wildlife (Guerbois et al., 2003; Vien, 2011). As wild-lands become increasingly transformed into farmland (Thornton et al. 2011; Chomba et al. 2012), wild animals often depredate crops, livestock and other resources (Seoraj-Pillai, 2016). The resulting human-wildlife conflicts (HWC) often undermine local support for conservation (Gandiwa et al., 2013) as evidenced by wildlife retaliatory and unsustainable control methods (Seoraj-Pillai, 2016). In India, farmers deliberately electrocute crop-raiding elephants or package explosive baits for crop-raiders (Woodroffe et al, 2005). Crop raiders in SA are being managed by unfriendly methods such as use of poison and snares rather than sustainable methods that promotes co-existence (Stadler, 2006). Zimbabwe's Save Valley (SVC), Gwayi and Matetsi conservancies lost 50%, 85% and 95% of their land respectively to FTLRP resulting in mixed farming but to the detriment of people and wildlife (AWF) (2011). Lack of spatial planning during the FTLRP has resulted in a land-use quagmire as some people have been resettled in inappropriate locations and wildlife habitats leading to a significant increase in HWC (AWF, 2011).

Vien (2011) argues that land reforms have increasingly driven degradation and reduction in some species (Wolmer et al., 2004) since wildlife does not combine well with other land-uses that involve presence of many people. Zimbabwe's FTLRP resulted in unsustainable natural resource management in newly resettled areas such as Verifaight Sott South Farm due to competition between wildlife, livestock and people (Ndlovu, 2015). This is further supported by AWF (2011) who explains that 'fast track' reduced flora and fauna due to an upsurge in both poaching of animals, land for settlements and farming and disruption of wildlife habitats. International media is awash with news that occupation of PAs especially SVC was motivated not by the need for land but poaching of wildlife (Wolmer et al., 2004). Though FTRLRP was peasant-instigated, formalization of the 'chaotic' programme by the government even in PAs appears to have permitted poaching in these wildlife zones (Degeorges and Reilly, 2007) as edible game were being shot to feed the starving villagers (Ndlovu, 2015). Fences marking the boundaries of many conservancies were also removed and used as wildlife trapping snares (Marecha, 2017).



While the story of inhumane and unfriendly control of wildlife appears to be the dominant story for African communities that live closer or within wildlife zones, some empirical studies tell the positive side of co-existence. Around Uganda's Kibale PA and Ghana's Kakum PA, locals relied on human vigilance to protect crops (FAO, 2009) while majority of farmers in northern Benin's Pendjari Biosphere Reserve ranked guarding, use of watch dogs at night and day-time herding as the most effective measures to protect crops and livestock (Nyhus, 2016). Communities that live around PAs in countries like Botswana, Kenya and Mozambique make use of guard animals like dogs and donkeys because of their higher defence instinct and are naturally more alert of predators than cattle and shoats (FAO, 2009). Locals around Namibia's Kasika conservancy placed traditional thorn bushes and later wire fences at cattle drinking points in the river to prevent crocodile attacks while many households in Malian Gourma erected dead thorny branches as kraals against livestock raiding animals (FAO, 2009). Placing of beehives on edges of fields as a live deterrent is under experimentation in Kenya (WWF SARPO, 2005). In some extreme cases, some households deserted their agricultural fields on the edge of Gashaka Gumti National Park, Nigeria and SVC respectively due to destruction caused by wild animals (Eniang et al., 2011; Matseketsa et al., 2019b). Matseketsa et al., (2019a) also observes that local communities adjacent to the western side of SVC adopted pro-active guarding of their fields, beating drums and hurling rocks to deter elephants. Although Rio Summit principles advocated for the participation of local communities and use of IKS in environment management, Matseketsa et al., (2019b) describes these sustainable, entrepreneurial mitigation measures as an insignificant set of traditional deterrent methods. There appears to be a media onslaught in terms of the capabilities of communities that were resettled around and in wildlife zones to promote wildlife conservation. However, Johnson et al (2018) is of the view that, the idea that increased human-wildlife interactions necessarily leads to inhumane control methods remains contested within the conservation and development literature. Mekonen (2020) further articulates that, though research on human-wildlife interaction has grown exponentially from 2000 to 2019, work on negative outcomes outpaces by threefold work on coexistence (which is defined as a dynamic but sustainable state in which humans and wildlife co-adapt to living in shared landscapes). While the old thinking has been focusing on negative outcomes of interactions, a new thinking about these interactions should now focus on positive relations between wildlife and humans. Reports on negative outcomes of interaction between people around PAs and wildlife masks some community based entrepreneurial strategies being adopted to sustainably manage HWC as social and natural systems manifest and evolve in a dynamic interdependence (Gurau & Dana, 2017). While protection of the natural environment is a vertical responsibility of the state (Gurau and Dana, 2017), lack of technical support to help A1 settlers to deal with HWC can be interpreted as meant to remake self-reliant environmental entrepreneurs who could harness local resources (including IKS) to sustainably manage wildlife. Although environmental entrepreneurship is becoming increasingly relevant from a sustainable development perspective, it is under-researched and few literature has given attention to initiatives of environmental entrepreneurship by small sized enterprises (Sirb, 2017) as well as local communities that were resettled within wildlife zones. In view of this, the objectives of this paper were twofold: (i) to check if



environmental subjectivities towards wildlife changed with land access during 'Fast Track and (ii) to establish local initiatives to sustainably manage HWC by A1 settlers.

2. Materials and Methods

This article is a product of empirical findings from two A1 communities (Maware & Peter Wenhamo (PW) in Chiredzi district, Zimbabwe. Data was collected using tools inspired by the tradition of phenomenological research to understand how FTLRP had transformed beneficiaries resettled nearer and within wildlife zones into environmentally sustainable entrepreneurs. The research design allowed resettled communities to share experiences on their environmental subjectivities pre- and post-FTLRP. The two A1 schemes are in agro-ecological region four characterised by severe dry spells, unreliable rainfall and main economic activities such as cotton, small grain, sugarcane production and wildlife management. A multistage sampling technique was used to select the sampling units (Matseketsa et al., 2019a). Maware and PW farms were selected from a total 7 farms using purposive sampling. Purposive sampling was found suitable as the communities were in close proximity to Matutu Ranch and SVC boundary respectively. Matseketsa et al., (2019a) articulates that these communities are therefore believed to have much interaction with the PA. This was followed by random selection of a total of 60 households. Data was collected using interview-administered questionnaire to reduce spread of COVID-19 through sharing of material. Open ended questions allowed settlers to share their experiences on their wildlife management responses. Transect walks and field observations allowed the collection of images to tell the real story on some traditional and entrepreneurial methods being used to manage HWC. Use of photographs has been used in socio-ecological research in a state owned Gonarezhou National Park in Zimbabwe (Gandiwa, Gandiwa & Muboko, 2012). Direct quotes and images were used to present and analyse research findings. Views of A1 settlers were further complemented with scholarly work from the literature review that corroborated or contradicted current findings.

3. Results and Discussion

3.1 Environmental subjectivities and practices of A1 settlers pre and post FTLRP

FTLRP mainstreamed sustainable environmental utilisation among its objectives and its focus broadened to include the creation of environmental entrepreneurs and self-reliant citizens able to solve problems they were facing. The programme might have influenced modes of environmentality towards wildlife among beneficiaries who were once denied access to wildlife during colonial times. Research findings show that Maware and PW settlers had a pre-fast track feeling that wildlife in Matutu Ranch and SVC were white 'owned' since they were not allowed access to the ranch. A land beneficiary who previously lived on the edge of PW farm revealed:

We were not allowed access to any environmental resource on the farm or just passing through this farm. People used to refer to stray elephants as, 'Peter Weinham's elephants'. Liberation war and farm invasion song, 'zvinhu zvose ndezvaMbuya Nehanda' (all things belong to spirit medium, Nehanda) was a reaction to the 'privatisation' of wildlife by white farmers.



Although wildlife conservancies were created to promote conservation of wildlife, one would speculate based on the above perspective that it was accompanied with conservation injustice on the part of communities that lived on edges of PAs. Furthermore, it would not be an exaggeration to argue that, communities that lived on edges of PAs pre-Fast track had no sense of ownership of wildlife and environmental identity. Wildlife in white owned PAs were viewed not as a monopoly of white people to serve white interests. Edifying this observation Matseketsa et al., (2019a) argues that fortresses around conservancies protected what was kept inside (wildlife) from being benefited by those living outside (bordering communities) not vice-versa. The motivation behind farm invasion song, *'all things belong to Nehanda'* was driven by the feeling that Zimbabwe had not yet gained total independence because land and wildlife were still owned by the white minority. From a point of view, one can then argue that A1 settlers felt that colonial land and conservation policies had not only subjugated *'Nehanda's'* people but her land, wildlife and other environmental resources. The 1980 independence was cosmetic because there was continued ownership of land and wildlife resources by the few white ranchers. National identity remained a nightmare as environmental resources especially wildlife that defined their identity and totems had not been 'liberated'. So, liberation of man politically without making black Zimbabweans the owners and custodians of environmental resources was a facade in the eyes of A1 beneficiaries in the study sites and Zimbabwe at large.

Protectionist conservation policies that disregarded sustainable utilization of wildlife resources pre-Fast Track 'birthed' an environmental thinking that wildlife in PAs were all for the 'white men' thereby leading to poaching of wildlife and use of lethal means to manage HWC. A woman from PW farm reported:

Our 'reward' for staying close to PW was crop and livestock raids. No meat, no timber, nothing. To us, it was a double tragedy) but we dealt decisively with all stray wild animals...we harvested forest resources against their will.

Based on the above two perspectives, it would be plausible to argue that lack of access to wildlife pre-fast track seemed to be a double tragedy for communities that lived on edges of PAs as they were denied usufructs-ownership rights and environmental identity that was associated with these wildlife. Poaching and use of lethal means to deter problem wild animals was both retaliatory act, an 'insurgent form of citizenship' to fight their exclusion from the use and ownership of wildlife and also a tool to promote their right to live in a safe environment. Poaching can be interpreted as an 'insurgent form of citizenship' where the excluded blacks fought for the inclusion in the use and ownership of environmental resources. Edifying this observation, Matseketsa et al., (2019a) argues that local people resort to covert forms of resistance also termed "weapons of the weak" like snaring terrestrial animals when open confrontation with powerful private owners of wildlife carries the real prospect of a massive retaliatory response. During a transect walk in PW farm, researcher observed a sign post (Fig 1) that was on the boundary between the PW farm and SVC that supported the idea that ranches and conservancies had entrenched exclusive use and governance of environmental resources pre-fast track, thereby generating negative environmental subjectivities and actions towards wildlife.



Fig 1. Trespassing Signpost. Field-based surveys, ((Fbs) 2020)

Although the exclusion of neighbouring communities to benefit from wildlife in former ranches and SVC pre-fast track had forced them to engage in 'insurgent forms of citizenship', access to land resources during FTLRP managed to change their mode of environmentality. Though cases of unsustainable HWC management were high at the onset of FTLRP, long period of co-existence with wildlife made A1 beneficiaries to understand wildlife behaviour, innovate friendly methods to manage and coexist with them. One crop farmer reported:

When we arrived here, people used lethal means to protect themselves against problem species....otherwise we could have lost many lives, animals and our crops at the onset of FTLRP. It was due to lack of knowledge on how to manage these animals but these cases of HWC have greatly declined.

Although FTLRP is criticised for an upsurge in killing of wild animals at the onset of the programme, the above remarks seem to suggest that massive killings were driven by lack of wildlife management training of A1 settlers resettled within wildlife zones. It will not be an overstatement to further argue that, unfriendly means to manage wildlife were 'invented performances of citizenship' by settlers' to actualize their environmental rights in the absence of state support to provide training on wildlife management practices. Building on this observation, Bowora (2015) is of the view that, absence of state support and public health policy drove resource constrained A1 beneficiaries in Hwedza district, Zimbabwe to use fire as a pest control strategy to enhance their constitutional right to live in a safe and healthy environment. This is further supported by Marecha (2017) who argues that the government has the vertical responsibility of protecting citizens' environmental rights and curbing conflicts in PAs in order to allow the coexistence of humans and wildlife whilst protecting wildlife in order to promote intra and inter-generational dimensions of environmental justice. While the above remarks appear to suggest that, use of lethal means to manage wildlife was declining due to better understanding of wildlife behaviour, one can speculate that, this also due to removal of the 'race tag' on wildlife and recognition of indigenous people's right to environmental resources (especially wildlife) and heritage from their 'living dead'. Edifying this observation, Tsabora (2010) is of the



view that African land reforms broadened out the concept of environmental justice beyond USA's principles of fairness and meaningful engagement to include equal access to natural resources previously denied by colonial policies.

3.2 A1 settlers' wildlife management responses to crop raiding animals

Maware and PW residents bore the brunt of crop and property destruction because they had been resettled in former wildlife ranches and also shared boundaries with SVC. Underscored in the above quotation is the fact that 'ownership' and coexistence with wildlife does not only change people's environmental identities and subjectivities but also enrich them with knowledge of animal behaviour, traditional and innovative methods to sustainably manage them. Close interaction with stray wildlife from SVC made households to devise environmentally friendly methods such as building of 'guard rooms on arable plots to manage crop raiding animals at night. Edifying the above perspective, research participant from PW narrated:

During the cropping season, I sleep in a makeshift house on my plot to deter crop raiding animals. Households with neighbouring plots built makeshift houses close to each other so that we alert one another when wild animals invade our farms.

Judging on the above perspective and information in Fig 2, it can be argued that human vigilance was one of the strategies to deter crop raiders at night. Edifying this finding, Barnes et al., (2003) and FAO (2009) observes that locals around Kibale National Park, Uganda and Kakum conservation area, Ghana relied on human vigilance to wade off raiders. Maware households with neighbouring plots made shifts to guard their plots because the farm was close to Matutu ranch which had small bodied and non-lethal wildlife. While human vigilance was an innovative and friendly method to manage conflicts and promote environmental stewardship, it affected A1 beneficiaries' right to a safe and secure environment which is an important dimension of substantive environmental rights as 'watchpersons' were exposed to the vagaries of weather and poisonous insects at night. It is therefore plausible to say while FTLRP had recorded a success in promoting one dimension of EJ i.e. providing natural resources (land and wildlife) to A1 settlers, their innovative actions to sustainably manage wildlife through guarding compromised another component of EJ, right to a safe environment (house) (Fig 2). It will not be an exaggeration to say FTLRP had created not only settlers with an entrepreneurial mindset to solve the challenge of crop raiding but willing to forgo some environmental rights for the sake of wildlife survival.



Fig 2: 'Guard rooms' on arable plots. (Fbs, 2020)

A scrutiny of the remarks below suggests that threats of crop raiding by stray wild animals increased as households moved from Maware farm to PW because the later shared boundary with SVC, largest conservancy, hence households had to complement guarding with the use of sniffer dogs. A male participant from PW farm narrated:

During the rainy season, crop raiding animals graze on the edge of SVC and easily stray into our plots. Here, you have to guard your crops with the help of dogs because we are close to SVC....see.... there is no fence, nothing. Dogs alert me of crop raiders if I oversleep, otherwise you will wake up to a 'razed' crop field.

Based on the above perspective, it would be plausible to say there was correlation between threats caused by crop raiding animals, proximity to PAs and adoption of multiple innovative strategies to deter problem animals. Despite increasing potential of HWC, many A1 settlers especially in PW rarely resorted to the use of lethal means to ward off problem animals. 'Night watchpersons complemented human vigilance with sniffer dogs to alert them on the presence of crop raiders whilst at a distance. Building on this observation, Nyhus (2016) reports that majority of the farmers in northern Benin's Pendjari Biosphere Reserve ranked guarding, use of watch dogs at night and day-time herding as the most effective measures to protect crops and livestock. This is further supported by FAO (2009) which explains that communities that live around PAs in Botswana, Kenya and Mozambique make use of guard animals like dogs and donkeys for they have high defence instinct. Households in PW ensured they had at least two dogs to help them in manning arable plots and the homestead since many settlers had been given residential plots far away from their arable lands.

Human vigilance at night was either complemented with guarding dogs and/or fire. Fig 2 show heaps of ash outside makeshift houses. The same male participant from PW farm continued:

While the dog is important for alerting me and for my safety... a dog can disappear whilst you are asleep. We make fire outside the 'guardroom' to scare away wild animals. For stubborn crop raiders that come closer to the guardroom, we then throw burning logs at them.



Basing on the above perspective and information in Fig 2, it can be concluded that the more vulnerable households were due to their proximity to PAs, the more they adopted multiple and complementary wildlife control methods such as human vigilance and making of fire outside guardrooms to ward off intimidatory species. Building on this observation, FAO (2009) observes that some species such as baboons show less fear while large bodied animals capitalize on their size making simple human vigilance less effective in protecting crops and livestock. However, Matseketsa et al (2019a) also observes that Bikita communities adjacent to SVC, complemented night vigil over their crops with hurling rocks to deter elephants while A1 settlers in Chiredzi district used fire. It will not be an overstatement to argue that, use of fire scored a double by sustainably managing lethal raiders and protecting 'night watchmen' from raiders and bad weather, hence making them to partly enjoy their right to a 'safe' environment.

Small bodied animals from SVC and Matutu ranch were also a menace in PW and Maware farms respectively as they destroyed crops anytime of the day and A1 settlers had to surround planted crops with physical repellents such as shiny ribbons. One village head from Maware farm revealed:

Problem animals that regularly destroy our crops here are baboons, kudus and antelopes. We put shiny ribbons around planted crops that can be seen from afar by wild animals. Blowing wind also makes them to vibrate and 'whistle', thereby scaring crop raiders. However, baboons quickly get used and you need to complement strategies.

Underscored in the above quotation is the view that ribbons were both visual and acoustic deterrents as they naturally appealed to the sense of sight and hearing of raiders. Matseketsa et al., (2019a) also explains that Bikita residents close to SVC mainly used separate acoustic deterrents such as shouting, beating drums, and scarecrows as visual deterrents. It shows that only the material used varied but they were both meant to be visual and acoustic deterrents. This contradicts findings by WWF SARPO (2005) where locals around PAs in Kenya placed beehives on edges of fields as a live deterrent (WWF SARPO 2005). While A1 beneficiaries in the study sites had scored a double through the use of shiny ribbons as visual and acoustic deterrents, the above sentiments further suggests that this method was only effective to small bodied animals and the continued use made their efficacy to diminish as some animals adapt to them. This is in confirmation with FAO's (2009) findings that baboons adapt rapidly to measures taken against them and are remarkably quick to find weaknesses in the guarding of crops. Edifying the above perspective, another female research participant from PW stated:

When crop raiders approach our fields, our men scare them away by beating drums and only throw burning logs at stubborn elephants and buffaloes. Women usually take care of grain crops like sorghum and millet. We deter birds by beating tins, ringing home-made bells and also erecting human like scarecrows in the fields.

Although ribbons naturally emit unexpected sounds that deter wildlife, they appeared less effective as the sound was low and determined by wind movement. It is also indisputable to argue that while human vigilance was complemented with acoustic deterrents, it appears women rarely guarded crops and the few did so during the day when the risk of visit by intimidatory or large bodied raiders was low. Edifying this observation FAO (2009) reports that determined herds of elephants and troops of baboons from Kakum Conservation Area in Ghana intimidated



guardians, particularly women who were often chased away if they used only simple vigilance. The above remarks seem to suggest further that the presence of a human being and beating of tins emitted unexpected loud sound that was more effective in warding off wildlife than wind instigated sounds emitted from ribbons in the absence of humans. A1 beneficiaries had to combine acoustic deterrents that naturally and artificially emit sounds to scare wildlife in case there was limited manpower to guard crops and work on the fields at the same time. It will not be an exaggeration to argue that combining acoustic deterrents that naturally and artificially produced scaring sound and use of scarecrows was not only a response to limited manpower but also meant to deal with several wildlife since their reaction varied with each deterrent. From a point of view, one can then argue that use of innovative methods to manage wildlife was as a result of A1 settlers having gained enough knowledge about wildlife behaviour. FTLRP addressed not only conservation justice and indigenous people's environmental identity but also gave them a platform to re-invigorate IKS used before the colonial period when their ancestors coexisted and managed wildlife in a sustainable manner.

The dry climate associated with Chiredzi district's made farmers to grow small grains but these were vulnerable to bird attack. While the dry climate was favourable for small grains, previous ranching activities and wildlife land-use in SVC and Matutu ranch were favourable for the breeding of birds. However, threats of crop raiding birds became an 'incentive' for settlers to innovate sustainable 'bird proof' methods that reduced and spread the risk of attack on small grains. One village head from PW farm explained:

Here, we mainly grow small grains as food crops because this place is dry, but birds are a challenge. As a village, we agreed to grow and harvest these small grains early and during the same time. If grown early, they will ripen at the same time with some grasses that produce seeds eaten by birds....and it is working. If you grow earlier or later than others, you won't harvest anything here.

Although crop raiding birds posed threats to food security, they lead to convergence of minds among farmers to adopt community-based initiatives such as harmonization in the planting and harvesting of small grains to spread the risk of crop attack among farmers. Households also ensured that small grains were grown early so that they ripen at the same time with seeds from some grasses eaten by birds feed to reduce crop raiding due to availability of a variety of food sources. It is therefore plausible to argue that the contradicting phenomenon of the presence of many birds and production of small grains made farmers to adopt innovate 'bird proof' strategies that protected their crops. From a point of view, one can then argue that coexistence with wildlife helps local people to study their feeding habits, thereby innovate strategies that promote sustainable farming and wildlife management.

3.3 A1 settlers' responses to problematic carnivores

As alluded to earlier on, the period before and soon after the launch of FTLRP was characterized by an upsurge in HWC due to lack of ecological training on strategies to sustainably manage these predators. However, prolonged



coexistence with wildlife created subjects (settlers) with knowledge on sustainable wildlife management practices. Settlers used fire as a traditional deterrent to responsibly wade off crop and livestock raiding animals. One elderly man from PW farm reported:

When we first settled in this place, we responded to crop and animal raiding using retaliatory practices. Interaction with these raiders made us to learn more about them. Do you know that many wild animals, even lethal predators are scared of fire? Almost every household make daily fire nearer to the livestock pens to scare away predators.

Underscored in the above quotation and information in Fig 3 is the significance of fire in sustainably managing livestock-raiding predators, securing livestock and the homestead. Prolonged barking of dogs usually signals the presence of unyielding predators around the homestead making people to hurl burning logs and hot charcoal. Fire is a traditional deterrent to protect livestock and the settlers as the predators are a threat to people's security and right to a safe environment. Bullard (2005) is of the view that environmental injustice (right violation) exists where there is potential of harm even in the absence of injury. It would not be an overstatement to argue that while some innovative actions adopted to responsibly manage wildlife by A1 settlers promoted environmental stewardship, they also actualized their environmental rights (an important dimension of environmental justice).



Fig 3. Heap of ash nearer to livestock kraal. (Fbs, 2020)

Although the use of fire as a traditional and low-cost method to deter livestock predators, the perspective below seems to suggest that it was partly effective and locals complemented construct kraals using thick mopane poles and fencing using thorn tree branches. One elderly widow from PW farm reported:

As an elderly widow, I can't ward off unyielding predators by hurling fire on them, so I had to construct my livestock pens using thick mopane poles which were then fenced with thorn bushes. I complement this by making daily fire nearer to the kraals.

The above perspective and information in Fig 4, seems to suggest many households constructed kraals using thick mopane poles complemented by thorny branch fences. Edifying this observation, Maiga (1999) reports that 32% of the preventative measures used by communities around Malian Gourma PA involved the erection of cattle kraals using low cost but less permanent fences made of dead thorny branches. Use of double predator proof methods pointed to the less effectiveness of some traditional proofing methods as well as the high magnitude of risks posed to A1 settlers themselves and their livestock. Despite these risks, households adopted non-violent and sustainable 'practices of citizenship' to protect their livestock. Building on this observation, Njaya and Mazuru (2014) are of the view that despite lack of enough environmental officers in A1 farms, locals are using traditional and local practices in preserving natural resources in their areas. Thus, FTLRP had not only remade settlers who are responsible but made the achievement of the programme's objective of promoting sustainable utilization of the environment a reality.



Fig 4. Predator proof livestock kraals. (Fbs, 2020)

Use of natural fences such as thorny bushes to protect livestock against crocodiles was a common practice at livestock drinking points along Chiredzi river in Maware farm (Fig 5). A land beneficiary and owner of large cattle herd from Maware farm commented:

Here, water for livestock is a problem and Chiredzi river which is the main source of water is a distant and infested with crocodiles. We take our livestock to the river once in two days. We then put thorny bushes at livestock drinking points for crocodile proofing....otherwise many would have lost all their livestock.

The above remarks make one to speculate that human vigilance complemented with use of thorny branches were the most popular methods to control livestock predators in the study sites. Guardians accompany livestock to the river so that they can direct them to safer drinking points and rescue those that would have been preyed on by

crocodiles. It therefore shows that while livestock herding and protection in the study sites was a daily activity, many settlers did not resort to lethal methods to control these predators.



Fig 5. Chiredzi River. (Fbs, 2020)

Traditional fences protected livestock in kraals, at drinking water points and also people when fetching water for domestic or garden purposes. FAO (2009) explains that locals around Namibian Kasika conservancy initially placed traditional thorn bushes and later wire fences placed at cattle drinking points in the river to prevent crocodile attacks. However, the use traditional fences around kraals and at water points as predator proof method was short term as they are vulnerable to termite attack and washing away by channel flow during the rainy season. Households had to replace these traditional fences to provide livestock and human protection thereby bringing a number of environmental challenges such as deforestation which then compromises the very objective (environmental sustainability) FTLRP seeks to achieve.

4. Conclusion and Recommendations

While FTLRP was 'unplanned' and led to resettlement of some communities in or near wildlife zones, reports of an upsurge in HWC masks the adaptive and innovative capacities of settlers to sustainably deal with HWC. Land beneficiaries nearer to SVC and Matutu ranch in Chiredzi district bear the brunt of HWC and lack technical support to manage these conflicts but coexistence with wildlife had made them to invent sustainable methods to control wildlife. However, efficacy of the new techniques adopted remains a cause of concern as they work in complementarity for them to be effective. Many of these traditional wildlife management methods such as night vigils compromise settlers' right to a safe environment by exposing them to mosquitos, bad weather and confrontation with unyielding animals. Hurling of fire and use of thorny fences also affect the broader



concept of environmental sustainability as they contribute to air pollution, deforestation and occurrence of veld fires if the fire around kraal is not well managed. It is thus recommended for the government to fully implement its wildlife land reform policy by recognising wildlife as a land-use and potential source of livelihood for households allocated arable land around conservancies. Private wildlife owners should tap into positive actions by resettled communities to promote joint environmental governance and access to ecological training on wildlife management. Future researches can take this further to assess the effectiveness of community initiatives to sustainably manage wildlife.

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The authors declare no conflict of interest.

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