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1 **Title:** Customary Ecological Conservation of Mwanda-Marungu Pastoral commons in Taita
2 hills, South-west Kenya

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18

19 **Abstract**

20 Rural commons in East-Africa have historically played key socio-economic and environmental
21 sustainability. Despite growing interest in this arena, there are still surprisingly few studies that
22 examine rural customary management of pastoral communities' in East-Africa. This is striking
23 given that this region is an exemplary area for pastoralism and thus ideal for communal systems
24 such as commons. Deficient studies and political support in this area could be linked to still
25 widespread prejudice of branding pastoralism as perilous to environmental. We set to conduct a
26 study to examine and test pastoralists' customary norms that underpin environmental
27 sustainability/unsustainability of pastoral commons focusing on Mwanda-Marungu, in Taita hills,
28 Kenya where the first author originates and brought up as a pastoralist up to the age of 24. Through
29 ethnographic approaches and semi-open interviews to 193 respondents conducted in 2019-2021
30 during water/pasture stress dry months of July-October, we examined whether customary
31 governance of Mwanda-Marungu would offer sustainable model that conforms to the IUCN's
32 Other Effective Area-Based Conservation Measures (OECMs). Our study evidences that pastoral
33 communities in this area have been developing for generations, inventive measures that proves
34 good management and ecological protection that may be tied to the principals of OECMs that
35 contests misconception about pastoralism.

36 **Key Words:** Environmental sustainability, norms, Other Effective Area-Based Conservation
37 Measures, Conservation, Pastoralism.

38

39 **Introduction**

40 There has been an increasing interest among the scientists and stakeholders in natural resources
41 conservation and on the important roles in which rural communities play in the account of
42 environmental protection in rural landscapes from the last decade (Imanishimwe, 2018; UN, 2021).
43 In this connection, there has been accelerated discourse between environmental conservation,
44 sustainable livelihoods and abilities of indigenous institutions to maintain resilient social-
45 ecological systems through community-based management and their potential for local
46 development (Charles, 2021; Schley et al., 2022).

47 This increasing interest may also be attributed to growing realization that local communities may
48 provide sustainable solutions to environmental crises that the planet is involved in, because they
49 are mainly driven by social and cultural values which are well ascribed by majority of community
50 members (Anup, 2016; Roka, 2019, Turner *et al.*, 2022). International environmental organizations
51 such as United Nations Environmental Program (UNEP), United Nations Development Program
52 (UNDP), the Convention for Biological Diversity (CBD) and the Indigenous Peoples and Local
53 Communities Conserved Areas Consortium (ICCAC) among many other organizations, are now
54 taking a lead position in promoting this dialogue and action (Dawson *et al.*, 2021).

55 International Union for Conservation of nature (IUCN) is fostering a new biodiversity
56 conservation paradigm of “Other Effective Area-based Conservation Measures – OECMs” which
57 among other systems, recognizes the role of local communities’ cultural values in environmental
58 conservation, increasing of livelihood opportunities whilst being important partners in helping to
59 fulfil the United Nation Environmental Program’s Convention of Biological Diversity (CBD)
60 Aichi Target 11- which had aimed at attaining at least up to 17% of terrestrial landscapes
61 biodiversity conserved areas by 2020 (Jonas, 2018).

62 Concretely, the definition of OECMs is a geographically defined area other than a Protected Area,
63 which is governed and managed in ways that achieve positive and sustained long-term outcomes
64 for the in situ conservation of biodiversity with associated ecosystem functions and services and

65 where applicable, cultural, spiritual, socio-economic, and other locally relevant values (CBD
66 Decision 14/8). According to IUCN/WCPA (2022), an OECM should meet the following: *a site*
67 *where management is addressing the threats; a site where management has the capacity to address*
68 *threats and there is a realistic probability that severe damage to the biodiversity value of the site*
69 *will be avoided; a site where legal means or other effective means (such as customary laws or*
70 *binding agreements with landowners) to address threats are in place; a site where sustainable*
71 *traditional or low-impact management of natural resources is consistent with the conservation of*
72 *important biodiversity values; a site with no current or future severe threats identified.*

73 Moreover, Aichi's Target 11 may have very probably not been fully met because there may be
74 other important stakeholders, especially rural communities, whose contributions are still very far
75 from being fully tapped. Their contribution can have great value because these commons'
76 livelihoods are derived directly from ecosystems, so the commoners are the first interested actors
77 in keeping their functionality and thus, their non-participation could have profound ecological
78 calamities (Zafra-Calvo *et al.*, 2019). In addition, the United Nations' Sustainable Development
79 Goals (SGDs) especially targets 1 [subsection-(i)-targets to eliminate extreme poverty; and
80 subsection-(v)-targeting to build environmental resilience and shocks] and target 13 [subsection
81 (i) -which targets to build climate change adaptation and resilience] may be attained if all
82 indigenous people and local communities are effectively included as important stakeholders in
83 nature conservation and on which in Eastern Africa and many other parts of the continent directly
84 concern pastoralism.

85 Despite the emergent focus on the link between local communities and empirically proved
86 environmental protection and contributors to sustainable development (Dominguez & Hammi,
87 2009; Alves-Pinto, 2021), there are still few studies that have systematically examined the roles of
88 customary management of pastoral commons of East Africa (Renom *et al.* 2020). In fact,
89 divergently, there has been growing resentment among scholars, governments and other
90 conservation agencies that have persistently linked pastoralism to environmental degradation
91 (Amwata, 2015; Basimba *et al.*, 2016; Kratli & Toulmin, 2021; Ntumva, 2022).

92 This is striking given that East Africa region is an exemplary area for pastoralism covering over
93 43% of the horn of Africa and directly supports over 20 million people in this region (Amwata *et*
94 *al.*, 2015; Nyariki & Amwata 2019). For instance, over 80% of Kenya's landmass which is

95 classified as arid and semi-arid lands and which are particularly fragile ecosystems, are at the same
96 time mostly wisely and sustainably shared among pastoral communities, which at the same time
97 host over 90% of wildlife (GoK, 2010; FAO, 2018;).

98 In fact, pastoralism as a means of livelihoods and mostly co-evolved through centuries and
99 millennia with local ecosystems, supports over 200 million households worldwide and is classified
100 as one of a potential sustainable system that if properly managed, will continue being an important
101 path that may lead to socio-economic and ecological development and has been evinced for
102 millenniums (Robertshaw, 2021; Bollig and Schulte, 1999; Behnke, 2008). It is so much so that it
103 directly links to global initiatives dominating international agendas (e.g. on 15 March 2022, the
104 United Nations General Assembly (UNGA) in New York unanimously declared 2026 the
105 International Year of Rangelands & Pastoralists (IYRP): <https://iyrp.info/>). Focus on East African
106 pastoral commons could therefore be on top or at parity with other rural livelihoods shaping
107 landscape considering that this pastoralism alone contributes directly up to 30% of Kenya's GDP
108 exclusive of other indirect and unaccounted benefits (GoK, 2010) and that commons are a
109 paradigmatic management of pastoralism.

110 Communal landscapes are well known to support innumerable ecosystem services such as in-situ
111 biodiversity conservation, carbon sequestration, soil and water retention, sustainable livelihoods,
112 wildlife buffer zones and many other. Therefore, pastoral commons being such a system also ought
113 to deserve scholarly attention in bid to strengthen these pastoral communities and therefore these
114 ecosystems, especially in a fragile arid and semi-arid region like East Africa (Bikila et al., 2016;
115 Little, 1996). In fact, Niamir-Fuller, (2022) describes pastoralism as proven a nature-based
116 solution that can help achieve many of our global development goals. Traditional pastoral
117 communities are most often custodians of cultural environmental conservation models that most
118 have been tried over and over through centuries of ever-evolving in-depth local knowledge and
119 thus in many cases are very interesting systems in terms of offering sustainable conservation
120 models of natural resources tested and consolidated through time.

121 Deficient studies in this area could be linked to prejudice/fallacy among scholars and policy
122 makers that views pastoralism as perilous and regressive to environmental sustainability (IRIN,
123 2013; Shanahan,2013; Basimba *el at.*, 2016). For instance, CBD (2010) noted that most press
124 articles published covers pastoralism in bad light of droughts and conflicts and thus painting a

125 depraved depiction of pastoralism being a conflict fermenting type of livelihood and thus not
126 befitting to offer environmental management solutions.

127 In addition, many studies may have used weak study tools in interrogating the relationship between
128 pastoralism and environmental protection by not using pastoralists' lenses or analysing more in-
129 depth their communal governance bodies. Consequently, these studies may not reflect a true
130 picture especially considering that pastoralism is a way of life which is deeply embedded in culture
131 of the practicing communities. Therefore, it would be ideal for future studies to interrogate this
132 subject of pastoralism and environmental protection by understanding socio-cultural organizations
133 within pastoral landscapes and how local pastoralist relate to their landscapes on day-to-day basis.
134 This will help us to understand how pastoralists' actions and motives may contribute to
135 sustainability or unsustainability of these systems (Jobbins *et al.*, 2021). This will be possible if
136 study approaches will directly involve the real 'practitioners' of pastoralism in having sovereignty
137 of reporting what they do on day-to-day basis, their motives and aspirations behind each action
138 they undertake, and how they interact with their environment and their goals.

139 The first author being brought up and practiced pastoralism for his first 24 years of life as a Taita
140 hills community member in South East Kenya, vividly understands customary norms for his local
141 community as being fairly 'environmentally friendly' contrary to popular perception in urban
142 areas, as being not. The communities there still enjoy ecosystem services such as water, herbal
143 medicines, wild fruits and vegetables, pasture for their livestock and they still co-exist with wildlife
144 in their territory- which may be attribute to relatively sound customary management of these
145 pastoral commons and landscapes administered by Elders amid global climate change challenges
146 and market forces as described in the results section.

147 In such context, we then set out to conduct an ethnographic study to examine and demonstrate
148 pastoralists' customary values that underpin cases of environmental sustainability or
149 unsustainability in management of pastoral commons focusing on agro-pastoralists of Taita
150 community in Mwanda-Marungu, Taita hills. We aim at giving an opportunity to pastoralists to
151 share to global audience about their practices, beliefs, traditions, taboos and local values attached
152 to the management of natural resources in their communal land because what this work shows is
153 that they are the custodian of such sustainable practices. Through this study, we hope to raise

154 awareness and change the global outlook about pastoralism and bring appreciation towards their
155 environmental conservation efforts and capacities.

156

157 Furthermore, this interest was also driven by the zeal from the first author's fellow herders to counter
158 constant pressures from environmental activists and leaders that they abandon pastoralism in favor of
159 subsistence farming of growing crops as it is perceived by these predominant actors in the region that
160 pastoralism is an 'outdated' livelihood activity and injurious to the environment. We perceive this as ill-
161 informed because Mwanda-Marungu receives low rainfall (650mm per annum) where it is difficult to
162 practice other rain-dependent agricultural activities, while pastoralism has proved through the generations
163 to be the most suitable option at the same time as co-creating the present landscapes that want to be
164 conserved. To not go even far with the proofs of this, nearby settlements that abandoned the traditional
165 pastoral commons in favor of more intensive farming, proved to provide important immediate benefits
166 but rapidly failed to prevail when the first important droughts appeared (Nyariki, 2019), while the
167 traditional and "less" productive commons continued sustainably existing like for generations before. In
168 addition, locals would wish to air their voices to international community and conservation agencies to
169 help them protect their landscapes and ways of life, and one way of doing so is through demonstrating
170 that the Taita community pastoralists have 'home grown' capacity and that their pastoral commons are a
171 valuable tool in the protection of environment. In such context the present paper was launched.

172

173 **Methodology**

174 **Study Area**

175 The Taita community- are a Bantu speaking group who migrated from Central Africa from 1000
176 BC to 1700 AD and occupying Kenya's south at the East African mountains of Taita hills which
177 borders Tanzania and are surrounded by Tsavo East and West National Parks (Bravman, 1987).

178 The Taita population is currently estimated to be over 360,000 according to the population census
179 conducted in 2019 (GoK, 2022). Research based on oral sources suggests that Taita community is
180 made up of clans/lineage called *Vuchuku*- each having their territorial land where livestock keeping
181 is done in community-based ranches, and family/kinship livestock owned grazing bands called

182 (*Maranu*) which are mainly situated in areas surrounding Tsavo West National Park at the lower
183 ecological zones between the altitudes of 750m-1200M above the sea level (Mkangi, 1983).

184 According to oral sources, Taita Community villages are governed by elected Elders with good
185 reputation, married, knowledgeable in matters of customary norms among other qualities, and are
186 elected and given mandate by community members to manage communal resources (called
187 *Mitengo*) such as communal pastoral grazing lands, forests, water resources, caves, shrines,
188 wildlife for a 5-year term. Elders also may delegate some administrative duties to Youths (aged
189 25-35) such as monitoring of commons' resources, managing pasture, water and adherence of
190 norms in the community and also mandated to punishment to community members who contravene
191 norms of the community.

192 Some of the Taita community own areas such as caves, rocks, water springs and indigenous
193 forests- are believed to be sacred and are associated with their traditional religion and *Figghi* which
194 had been an essential tool of *in situ* conservation of biodiversity (Mwamidi, 2012). Besides, *Figghi*,
195 Taita community still protect areas of worship called *Seso* which are conserved strictly by Elders
196 from specific lineage and are highly respected by all community members. According to oral
197 sources, *Seso* are considered sacred places and are out of bounds to youths, women who are of
198 children-bearing age brackets or to 'wicked' persons. It is forbidden to cut any tree, and fallen logs
199 are left to decompose. Areas that have *seso* sites are: Mghange, Mulondo, Mghambonyi,
200 Wumingu, Iziri, Mwanda, Marungu, Murughua, Chawia, Rong'e and Mbololo. These *seso* were
201 initially established strategically along boundaries of pastoral commons so as to 'protect' pastoral
202 resources such as pasture, livestock, wildlife from external aggression such as cattle rustling and
203 other resource theft from neighboring communities.

204 Unfortunately, the areas where pastoralism is practiced (Mwatate, Kasighau, Maktau (Mwakitau),
205 Taveta, Kishushe, Wanjala, Mwanda-Marungu and Paranga) are situated in the mineral rich zone
206 of upper Proterozoi lower Paleozoic structural/metamorphic unit of the Mozambique Belt, which
207 extends along the east coast of Africa (Horkel et al., 1976). Some of the industrial minerals such
208 as iron ore, limestone; copper, manganese, marble, magnesite, asbestos, graphite, kaolin clay, mica
209 and building stones (Horkel et al., 1976; Alexander, *et al.*, 1979).

210 There is growing concerns by local communities in Taita hills brought by about mining activities
211 in livestock rearing zones that supports over 179,864 cattle, 480,125 goats, 55,540 sheep, 671,174

212 poultry, 3,568 donkeys and 1,286 camels, and thus very important for local community's
213 livelihoods (GoK, 2012, KNBS, 2016). According to Mghanga (2011), mineral mining may have
214 some long-term consequences to pastoralists' livelihoods because of irreversible land degradation
215 since the proceeds of minerals goes to multi-national companies and does not benefit local
216 communities who bears the burden of land degradation.

217 In addition, Mwanda location where Mwanda-Marungu pastoral commons are situated (study
218 area), borders Tsavo west national park on the north-west and Vuria montane forest that are
219 classified as Important Bird Area (IBA) with species of global importance which are endemic to
220 this region and pasturing dependent (Bennun & Njoroge, 1999). Therefore, this study is timely
221 because strengthening these pastoral commons will not only benefit the locals, but also myriad of
222 species of flora and fauna because Mwanda-Marungu commons act as migratory corridors for
223 wildlife crossing from Tsavo west national park to Tsavo East National park as wildlife move from
224 Bura region to Wanjala to Mtito Andei. Even though Mwanda-Marungu borders Tsavo west
225 National park near Mwakitau, and pastoral commons area are not under protected zone, but a
226 community land owned and managed by locals (see figure 1 and 2).

227 Data was collected in 3 villages (Maranu gha Mkamwasi, Itinyi and Marungu) located in Njawuli
228 sub-location Mwanda ward in Taita Taveta County. We selected these three villages because they
229 are restricted only to local members to graze- thus are not free access as it is a situation with
230 neighboring communal lands such as Wanjala, Kishushe, Kisima, Paranga, Sangenyi and
231 Mwakinyambu where herders from outside locale can graze freely without restrictions.

232

233



234

235 **Figure 1:** Mwanda Marungu pastoral commons found in Njawuli Sub-location, in Mwanda Location, Wundanyi
236 Constituency, Taita Taveta County, South West Kenya. The study area is located within Elevation: 1499 m
237 (highlands); and 900M (Low lands) Above Sea Level; Latitude -3.400335 S and Longitude 38.253707 E- ©Google
238 Maps.



239

240 **Figure 2:** The view of Mwanda Marungu pastoral commons (from the north-west) at Njawuli sublocation in Mwanda
241 location, Taita Taveta County. Mwanda-Marungu pastoral commons are divided into 3 communal grazing zones:
242 Maranu gha Mkamwasi, Itinyi (upper zone at the highlands/escarpment and Marungu (lower plains). © **Daniel**
243 **Mwamidi**

244

245 **Study Approach**

246 Since our study was geared towards establishing pastoralists way of conserving pastoral
247 landscapes and environmental protection through their lenses, we had to adopt ethnographic
248 approaches which would empower respondents to give their views as much as possible. These
249 included, participant observation (which was ideal to unearth hidden and salient actions in relation
250 to environmental conservation)- data collected through free listing of pastoral activities the herders
251 and elders do on their day to day herding of livestock throughout the pastoral commons for a total
252 of 4 months, whilst interrogating the relevance of each action to the protection of the environment.
253 After participant observation, we employed semi-structures interviews- through purposive
254 sampling involving elders and herders as main respondents since they are most knowledgeable in
255 the subject of pastoralism/herding and are the main custodians of cultural norms. In addition, they
256 are the ones who actively participate in administration of day-to-day norms in relation to

257 management of pastoral commons. Therefore, we interrogated respondents about: ways in which
258 Mwanda-Marungu pastoral commons are governed, how rules are decided and implemented;
259 pastoral commons' physical/geographic boundaries that defines the area of jurisdiction; the
260 norms, taboos and/or values attached to wildlife found in Mwanda-Marungu within pastoral
261 commons; and customary values that promotes co-existence of livestock-wildlife within Mwanda-
262 Marungu pastoral commons.

263 For the purposes of examining the resilience of community regulations and their implementation,
264 we conducted our study during all agro-pastoral seasons, in order to also have a good overall vision
265 of the system from 2019 to 2021. Nevertheless, fieldwork was particularly intense on water/pasture
266 stress dry months of July and October of 2019 to 2021, which as observed in situ and as confirmed
267 also by Benjaminsen *et al.*, (2012), is the period where customary rules become most apparent due
268 to the increased scarcity of the given finite pastoral resources. However, data was also collected
269 during wet seasons of long rains March-June of 2019 to 2021. In fact, it is the results for the dry
270 seasons where competition for resources become higher and the customary rules go under greater
271 pressure, that we can best demonstrate through this study the good governance of these pastoral
272 commons by locals even during the most uncondusive weather conditions.

273 With 193 respondents (Elders and Herders) to a semi-structured interview and FGDs, we
274 examined whether customary management systems of Mwanda-Marungu pastoralists are in
275 tandem/conforms to the IUCN's OECMs conservation paradigm.

276 We used a site-level tool for identifying if an area and its administration regimes may be considered
277 as OECMs for 2020 – [now revised as (IUCN/WCPA, 2022)] and qualitatively examined: a)
278 geographically delineated boundaries which is not a protected area; 2) sustained governance
279 authority and management regime (in this case customary governance); 3) important biodiversity
280 values; 4) promotes *in-situ* biodiversity conservation. In the following section of results, we give
281 descriptive account of pastoralists' customary management regimes with associated indicators that
282 qualifies them to be considered as potential OECMs and thus highlighting the importance of these
283 commons as a tool of environmental protection.

284 We first obtained Free, Prior and Informed Consent from each village and individual participating
285 in this study, as well as the agreement from the relevant Government and regional administration.

286 In addition, we did not coerce locals to give information or avail ‘tokens’ to solicit favors from them-
 287 which is in unison with legislation and ethics.

288 Data verification was done through series of fifteen-sessions of focus group discussions (FGD)
 289 consisting of between 5 and 8 respondents per session (see table 1). In FGD, the panel would
 290 discuss data collected through participant observation and semi-structure interviews so as to ‘refine
 291 data to more accurate facts’, and secondary data was also utilization. Data analysis was done
 292 through organizing data in themes (descriptive concepts).

293

294

295

	Men	Women	Age			Total
			< 31	31–50	> 50	
Semi-structured interviews	87	21	27	60	21	108
Focus group discussions (15)	60	25	25	35	25	85
						193

296 **Table 1:** Table indicating characteristics of 193 respondents ($n=108$ for semi-structure interviews and $n=85$
 297 for focus group discussion).

298

299 **RESULTS**

300 In this section, we will present results based on four criteria of OECMs as we have outlined in
 301 methodology which qualifies pastoralists’ responses- whether their customary norms on
 302 management of their pastoral commons does qualify to be worthy to be considered as an ideal
 303 environmental protection approach.

304 **a) Evidently geographically delineated boundaries (which is not a protected area)**

305

306 **i) *Geographic boundaries***

307 *Question: Does Mwanda-Marungu pastoral commons have physical/geographic boundaries*
308 *that defines the area of jurisdiction?*

309 Ninety-eight percent (98%) of respondents reported to know exact boundaries of their villages and
310 grazing lands, with 2% could not because they were married to this region and thus could not have
311 known the exact boundaries of their locality. A seventy-six years old elder reported that “*We*
312 *normally show boundaries to all our children so as to ensure all of us in the village understand*
313 *each and every inch of our ancestral land and that way nobody may deceive them by grabbing our*
314 *community land because this is where all our livelihoods is derived from. We all get food, milk,*
315 *herbal medicines, pasture, wild fruits and vegetables, insects, wild tubers and water from this area.*
316 *Also, we have been living with wildlife among us and they are part of us, so if we forget our*
317 *boundaries we will forfeit all these benefits to strangers”.*

318 Boundaries are demarcated by seasonal rivers, village earth roads and by escarpments. A seventy-
319 four years old village elder/herder reported that “*God loved us so much because he gave us a*
320 *natural boundary of a huge rock and escarpment which has been beneficial for protecting us from*
321 *intruders on the eastern side and these rocks have big caves which are habitats for wild animals*
322 *such as snakes of all kinds like African python, cobra, black mambas etc. We have leopards,*
323 *hyenas, porcupines and many wild animals. If there was no natural boundary of this long ranged*
324 *escarpment, poachers would have long invaded and killed those pythons and leopards for their*
325 *skins”.* This elder’s sentiment was supported by all 5 members on the FGD panel. See the
326 rock/escarpment they referred to in figure 3.



327

328 **Figure 3:** The rock/escarpment with steep falls acting as a physical boundary for Mwanda-Marungu pastoral commons
329 in Njawuli sub-location, Mwanda location in Taita Taveta County, Kenya. According to Elders, these rocks are habitat
330 to many wildlife species and also source of water springs, salt licks and used as traditional religious shrines called
331 *fighi* and *seso* © **Daniel Mwamidi**

332

333

334 *ii) Community's deep connection to their pastoral commons territory*

335

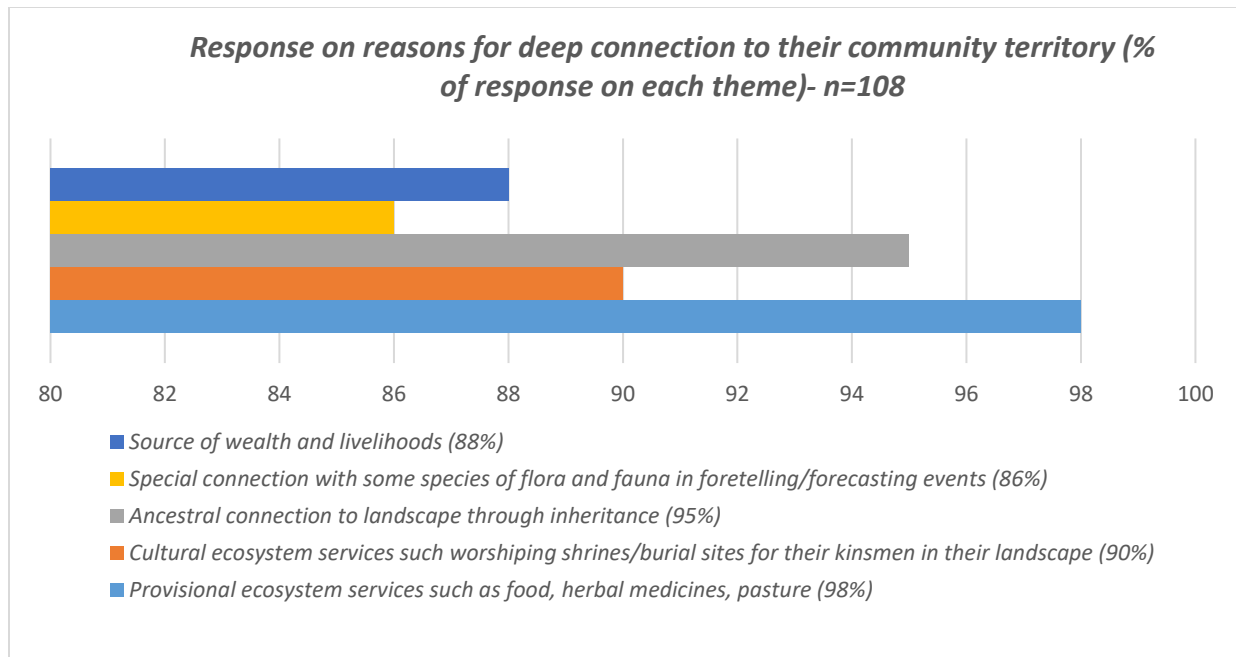
336 *Question: What are the community's perceived importance of Mwanda-Marungu*
337 *pastoral commons territory?*

338 During interviews and FGDs, Elders and herders reported that they have local spiritual shrines
339 called *fighi* and *Seso* which were used for worshipping their god called *Mulungu* and have existed
340 for centuries and thus locals are attached to them. They often make periodic sacrifices by
341 slaughtering animals to appease the spiritual being and also to ask for blessings of their land,
342 livestock, pasture as well as for making rain, ward off human and livestock diseases. Elders and

343 herders reported that big rocks and caves within pastoral ICCAs were used as burial sites by the
344 locals and religious shrines and that some of these sites have since been abandoned but still remain
345 sacred as they were used for sacrifices in case of disease in the family and livestock.

346 Ninety-seven percent (97%) of the Elders and herders interviewed reported that they have very
347 deep connection to their pastoral commons territory because it provides: Source of wealth and
348 livelihoods; myriad keystone species for prediction of events and ecosystem integrity; Ancestral
349 connection; Cultural ecosystem services; and provisional ecosystem services. For instance, during
350 the interview, a seventy-nine years old elder referred Mwanda-Marungu pastoral commons as
351 ‘hospital’. Upon further inquiry as to why he referred the commons as a hospital he said: *“As you
352 see, we do not have a conventional hospital in the entire region and the nearest is about 50 km
353 away in Mwatate town which is difficult to reach at night especially in cases of snake bites which
354 are very common in this area. So we have our own indigenous herbal medicines to treat our
355 families and livestock from many diseases. We all depend on these indigenous trees you see around
356 to treat deadly diseases such as cancer, schizophrenia, paralysis and many more diseases. If you
357 destroy one tree, you may have killed more whole village because these indigenous trees may take
358 hundreds of years to grow to maturity before one is able to use them as medicine”*. Sixty-nine
359 years old elder added by supporting the elder and said *“besides herbal medicines, we live here in
360 harmony with nature because even we use animals around us to forecast events. Like now we are
361 worried because the populations of bird species have gone down and it is not a good indicator,
362 and there could be an impending disaster that is about to happen, such as extreme drought, famine
363 or diseases outbreak. We never went to school but we can foretell events by observing wildlife
364 around us and with accuracy than those who even went abroad to study”*.

365



366

367 **Graph 1:** A summary of interviews responses on perceive reasons for deep connection of the
 368 locals to their pastoral commons lands in Mwanda-Marungu.

369

370 **a) Sustained Governance Authority and Management Regime of pastoral commons**

371

372 *Question: How is Mwanda-Marungu pastoral commons governed?*

373 Management of pastoral commons is conducted by Elders called “*Waghosi wa Kireti*” translated
 374 to “Elders of pastoral commons”. In all three villages in Mwanda-Marungu pastoral commons
 375 (Maranu gha Mkamwasi; Itinyi, Marungu) each elect 5 Elders who are given community mandate
 376 to serve for 5 years’ term (which can be renewed) depending on Elder’s performance during their
 377 tenure. These Elders are responsible to oversee over all pastoral resources such as water, pasture,
 378 indigenous forests, wildlife, cultural norm reinforcements through punishments and fines. They
 379 are also responsible to oversee and enhance protection of community shrines called *fighi* and *seso*
 380 which are the ‘sacred grooves’ and community sacrificial sites.

381 In case of anything to be communicated to all fellow villagers, they do it through 3 locally elected
 382 Elders one from each of the 3 villages whose roles are to blow a wooden whistle (*firimbi*) so as to
 383 notify villagers of any new development or a problem within their community land. This may

384 include anomalies such as breaking of pastoral norms set by Elders thus calling for an assembly to
385 execute punishment or fines, intrusion of their pastoral landscapes, outbreak of pests or diseases
386 or a message from the National/Regional Governments such as livestock vaccination or other
387 information. These Elders who blow whistles are called “*Mghosi wa firimbi*” and they are also
388 mandated to spearhead keeping of vigil (alongside youths) in cases of intruders who may enter the
389 pastoral commons with wicked intent of burning charcoal, cutting down of indigenous trees of
390 harvesting of herbal medicines or hunting of wild game meat within commons. Youths who have
391 attained ages of over 25 years are tasked by Elders to block any attempt by the intruders to enter
392 their pastoral commons to graze or utilize resources found there. In cases of rebellion to the youth’s
393 move, intruders are thoroughly beaten and sent away or their livestock confiscated.

394 Assemblies are conducted bi-monthly (after every two months) so as to closely monitor wellbeing
395 of the pastoral landscape. According to Elders and herders, all villagers are required to attend the
396 meetings and absconders are penalized a fine of one goat (normally a male goat (buck) which is
397 slaughtered and eaten by all villagers. Elders reported that they highly favor youths and are given
398 bigger stake in surveillance of community landscape because of what they said about youths being
399 future Elders in their community lands and thus they need to be involved at every stage of decision
400 making. Women are also given opportunities in village committees such as pasture harvesting
401 during wet seasons so as to be used during the dry seasons. They are also involved in selling of
402 dried pasture to other livestock owners outside their pastoral common.

403 During the Focus group discussion of a panel of 8 members, a seventy-one years old Elder reported
404 that “I have been elected since I was at the age of 36 years and until now; *I have been very faithful*
405 *to discharge my duties of protecting our pastoral commons because lives of all these local*
406 *community members that you see here and our future generations are entirely dependent on this*
407 *land. The Elder continued saying “ we are mandated to train our youth to be zealous in protecting*
408 *their ancestral land because if they destroy it they have nowhere to go. That is why we are very*
409 *strict not to admitting foreigners to settle in our land, because after welcoming them, they may*
410 *start destroying the environment because they will not understand our norms and it will be difficult*
411 *to train and old man new skills. They may destroy the community resources such as indigenous*
412 *trees, wildlife, water and afterwards vanish-never to see them again, thus leaving us behind with*
413 *irreversible problem of ecological degradation”.*

414 According to six Elders in FGD panel, they have put strict rules that no one from outside Mwanda-
415 Marungu is allowed to graze livestock in pastoral landscape because they reported that outsiders
416 (*Wachea mbai*) may not adhere or stick to their rules of pastoral commons' management. During
417 FGD, Elders said they fear that outsiders may view community rules as being 'oppressive' and
418 thus becoming rebellious and influencing others not to obey, consequently leading to degradation
419 of their pastoral commons and resources found in their territory. A sixty-five years old elder
420 reported that "*You see our neighboring Kishushe community grazing lands (situated about 20*
421 *kilometers north-west of Mwanda Marungu) have been destroyed because of bad leadership where*
422 *their elected Elders became greedy and were compromised by foreigners (Wachea Mbai) and*
423 *brought them inside at the heart of community land. After a while, those foreigners became*
424 *rebellious to the norm that governs Kishushe pastoral commons and introduced bad practices such*
425 *burning of charcoal, cutting down of indigenous trees and selling them as logs to town, hunting*
426 *for game meat, burning of bushes to cultivate-which has now made Kishushe community land look*
427 *like a desert. They also introduced corrupt practices such as selling community land without the*
428 *consent of the local community members. At the moment, Kishushe commons have been further*
429 *destroyed after they allowed Wanjala iron ore mining company to do mining which has destroyed*
430 *vast area of community grazing lands. You can go there and see for yourself the environmental*
431 *disaster that is in Kishushe pastoral lands. Because locals elected bad leaders, they are now seeing*
432 *consequences that will affect them and their entire future generations*".

433 The above elder's sentiment was supported by 100% of the six FGD members and a sixty-two
434 years old herder added that "*We avoid at all costs electing individuals who have tendencies of*
435 *being corrupt by seeing how they manage their own families, livestock and homestead. You cannot*
436 *elect an elder to rule over thousands of locals, whilst he cannot manage his own family with less*
437 *than ten members. We make it mandatory that for an elder to be elected, he must have over 50*
438 *livestock and he must be married and have children because that way, he will have interest at*
439 *heart to protect the pastoral commons since if he fails, his own livestock and family will also*
440 *suffer*". The herder's sentiment was also supported by 100% of six FGD panel.

441 Elders also monitor the Kraal as it is not supposed to be destroyed when one is migrating to other
442 areas. It is a curse to destroy kraal structure locally called (*Waza or maranu*). The motive behind
443 this is to safeguard environmental protection because building new *Waza/maranu* demands a lot

444 of trees to build to protect many livestock. A clan kraal is made of acacia thorny twigs so as to
445 keep away predators (lions, leopards, cheetahs, hyenas) and it may hold over 500 cattle, Over 700
446 goats and 500 goats including donkeys.

447

448 **b) Important cultural values that could contribute to conservation of biodiversity in**
449 **Mwanda-Marungu pastoral commons**

450

451 *Question: what are the cultural norms, taboos and values attached to wildlife found in*
452 *Mwanda-Marungu pastoral commons?*

453 Elders and herders reported that they have a very close connection to their community landscape
454 and biodiversity found in their pastoral commons. They acquire ecosystem services such as wild
455 vegetables, root tubers, pasture (and hay for sale to neighboring communities during dry seasons),
456 fuel, (firewood) water, herbal medicines provision, wild game meat, wild mushrooms, gums, wild
457 fruits to supplement their diets (see figure 4).



458

459 **Figure 4:** An artistic expression of Mwanda-Marungu community pastoral commons and the services associated with
460 this communal landscape: **1).** Wildlife habitat and livestock/wildlife co-existence; **2).** Provisional services (firewood,
461 water, thatching grass, hay sold to neighboring community during dry seasons- thus local revenue); and **3).** Shrines
462 for worship and cultural values. © Sage Maghanjo.

463

464 During FGD, Elders reported that they have use several wild animal species found in their land to
465 foretell events. They mentioned of the use several bird species to predict different occurrences in
466 their landscape and some serves as warning to dangers of wild animals' attack to humans or
467 livestock. For instance, they mentioned to use Lesser Honey-guide (*Indicator monor*)-locally
468 called (*kawuki* bird) to search for wild honey in *kireti* (pastoral commons). Seventy-eight percent
469 (78%) of herder reported that whenever one sees or hears (*Ngelekele*) Bearded Woodpecker
470 (*Chloropicus namaquus*) singing and flying over you, it may be a sign of danger such as lion,
471 snake or death of livestock due to a disease or death of very close family member or within your
472 clan. A fifty-three years old herder reported that “woodpecker is a very important bird species that
473 no one is allowed to kill because it our ‘watchtower personnel’ and it informs us of impending

474 dangers ahead and thus we have a cultural duty of conserving and protecting it". All FGD seven
475 panelists alluded to the herder's sentiments about woodpecker and an elder (69 years old) referred
476 woodpecker as a gift from God because it protects them and their livestock".

477 Eighty-three percent (83%) of herders interviewed reported that when (*Kiarara*) Common Cuckoo
478 (*Cuculus canorus*) make loud noise, there must be a big snake within that area such as python,
479 cobra, puff udder, green mamba or black mamba, so they regard this bird as an important for early
480 warning to herders to avoid passing or grazing in such areas. Elders reported that normally predict
481 abundance of pasture, rain or food harvest if many (*Irewu*)-D'Arnaud's Barbet (*Trachyphonus*
482 *darnaudii*) nests in *Acacia tortolis* (*shighiri*). They said that when barbet birds build many nests,
483 it signifies abundant rainfall for that year and but in the event of absence of barbet nesting, it
484 correlates to very low rainfall and thus it informs herders to conserve pasture as hay or silage for
485 use during drought seasons, thus they all said that it is a taboo to kill barbet bird.

486 Ninety-three percent (93% of respondents during FGD Elders reported that owls are indicator
487 species as they signify healthy and productive pastoral commons and also as a very important
488 biological control of rodents such as rats, squirrels and also snakes. They said that it is a taboo to
489 kill an owl and it is linked to curse to the one killed it. At the same time, Elders reported that they
490 are worried that of late they have seen fewer and heard less hooting of owls and thus probably their
491 pastoral commons could be degrading.

492 Eighty-six percent (86%) of herders interviewed associate *Nyagha* (ostrich) with safety of their
493 livestock. They reported that they prefer taking their livestock to graze in areas that have ostriches.
494 Elders alluded to this saying that since the time of their forefathers, ostrich is associated with
495 wellness and calmness and thus you will be safe if your animals graze by it.

496 Ninety-three percent of herders (93%) of herders said that they monitor movement of (*Indoindo*)
497 white headed vulture (*Trigonoceps occipitalis*) because whenever they are seen flying near, there
498 could be lions, leopard, hyenas or cheetahs nearby, so herders reported that they normally avoid
499 taking their livestock to such areas as they may be attacked.

500 Ninety-two percent (92%) of respondents reported that there have put restrictions by cursing
501 anyone who destroys indigenous trees in water point or riverine ecosystem which they said are
502 very important for survival of the community, livestock and provide habitats to myriad of wildlife

503 species such as baboons, monkey, birds, bats, insects, monkeys etc. Some of the riverine
504 indigenous tree species they mentioned are *Ficus thuningii* (Mvumu), *Ficus sycomorous* (Muku),
505 *Acacia tortolis* (Mughunga) and *Acacia melliferra*. During the FGD, one elder reported that “All
506 community members have equal duty to conserve and protect riverine forests because we get
507 pasture for our goats and goats because trees normally shed leaves during dry season. It is
508 punishable offence to cut a tree in riverine because it also protects water sources and prevent
509 erosion on seasonal river banks”. All seven respondents (Elders and herders) in the panel
510 supported the elder’s sentiment.

511

512 **c) Community’s customary norms that may promote *in-situ* biodiversity conservation**

513

514 **Questions:** *Are there taboos, norms that promotes co-existence with wildlife within*
515 *Mwanda-Marungu pastoral commons?*

516 Seventy-three percent (73%) of the Elders and herders reported that they have put restrictions of
517 not to kill wild animals within their territory and in extreme cases such as famine such as that of
518 1991/1992, 1995/1995, 2000 and 2009 they reported to have killed a male wild animal such as
519 antelope for food and they restrict killing a female animal because of what they call as ‘killing the
520 entire generation of species’. According to Elders, such strategy has helped to maintain population
521 of antelopes in their region. They however reported that there had been few incidences where
522 hunters from outside have indiscriminately killed wild animals at night regardless of this and thus
523 endangering wildlife stocks.

524 Ninety-four percent (94%) of Elders and herders reported of restrictions of grazing or taking
525 livestock/salt lick points past 3 pm every day, so as to pave way for wildlife to drink and lick salt
526 as well. Elders explained that the 3 pm rule was put by their forefathers because this strategy
527 promotes co-existence with wildlife and minimizes contact between wildlife and livestock. A
528 forty-three years old herder said that “we normally avoid taking our livestock at water points past
529 3pm because at that time wildlife would also come out to drink as well, so we give them the
530 opportunity because if not they will suffer. Wildlife just like our livestock are God’s creation, and
531 thus they also have right to enjoy common resources such as water and salt lick because it is God
532 who created for us all”. During the FGD, a sixty-seven years old herder said that “we also avoid

533 *taking our livestock past 3pm to water points and saltlicks because in the event of wildlife and*
534 *livestock meeting, predators such as leopards, lions, hyenas may be tempted to attack and kill our*
535 *livestock, and once this happens, it would be a disaster because they those predators will develop*
536 *taste of our livestock and intensify attacks instead of hunting wildlife such as antelopes”.*

537 All FGD members supported the herder’s sentiments and one elder (seventy years old) reported
538 that they also have a norm that restricts their people in pastoral commons from introducing plant
539 crops that are not indigenous in this area. Fifty-nine years old herder agreed to elder’s sentiment
540 and he added that: *“if wild animal taste new crop, they often develop likings of it and thus making*
541 *them coming frequently to human settlements to look for the crop thus increasing conflicts”*. A 69
542 years old elder agreed by saying that: *“we used to live well along with wild animals, but conflict*
543 *with wildlife has increased due to some few locals who have planted exotic crops that are not*
544 *indigenous in this area. If wild animal tastes the crop, they often develop likings of the crop and*
545 *thus making them coming more frequently to villages to look for the crop. For instance, elephants*
546 *now frequently come to our villages looking for maize, banana stalks, pawpaw and cassava which*
547 *were introduced by some locals in these areas in early 2000s”*.

548 A sixty-one years old lady said that *“there was a non-governmental organization (NGO) which*
549 *introduced drumstick tree (Moringa oleifera) tree species in this region that has attracted*
550 *antelopes, dikers (mwakuli) baboons and monkeys and now these animals are raiding village*
551 *farms. Few people, who opted to plant drumstick trees, sold their livestock after a promise that*
552 *they will quickly become rich by planting and selling this tree species, but the NGO has since*
553 *become non-operational and now those who planted moringa do not know where to to sell the*
554 *produce. We advised them not to accept the moringa project, but some were greedy, and now are*
555 *very poor without livestock. They have problems with wildlife coming to feed the plant. This place*
556 *is only good for keeping livestock but not for farming of crops especially exotic ones”*.

557 Ninety-seven of respondents reported that they have restriction on charcoal burning and burning
558 of fire in pastoral commons so as to conserve indigenous trees, wildlife and soil fertility.

559 Herders reported that before the introduction of electric fence in Tsavo national park, elephants
560 used to graze alongside their livestock in Marungu village pastoral commons and they used to offer
561 ecosystem services to the community and livestock. An elder called Maghanga from Marungu
562 village aged 79 years reported during the FGD that *“Elephants are our servants because they*

563 normally prune canopy on trees such as acacias and thus enabling sunlight to get to the ground,
564 and this helps grass to grow and thus providing pasture for our livestock free of charge! We do
565 not pay elephants, but hey help us. In fact, they also help our women with firewood for cooking
566 because the felled trees dry up and we use them to cook our food. We now benefit if they come to
567 our grazing lands occasionally, but the frequency of coming has reduced because of electric fence
568 at the Tsavo west national park. We fear that if they come fewer times, we are going to have
569 reduced grass to feed our livestock and thus impoverishing us day by day. We heard that elephants
570 are killed inside the National park by 'wadiwi' (poachers). When elephants are within our
571 landscape, nobody kills them, but now they are being killed in the protected area" His sentiment
572 was supported by all respondents in Focus group discussion.

573 Elders said to have put strict norms that ensures sustainable utilization of pasture in their
574 landscapes. No herder, person is supposed to burn charcoal or smoke cigarettes within the
575 commons as this many pose dangers of fire and destroying pasture and what Elders described as
576 "lwala lwa mbuwa" (hardening of ground and bareness of land). A 69-year-old elder said "Fire
577 may make us poor within few minutes. If this beautiful land you see is razed by fire, all wild animals
578 that we live with them are killed plus their young ones, eggs, insects, snakes and also all pasture
579 will be destroyed. Fire will scare away baboons, elephants and monkeys which help our goats
580 during dry seasons by dropping acacia pods (muzaule) which are excellent food for our goats. So
581 we cannot allow anyone to put on fire that will cause suffering to innocent creation of GOD". His
582 sentiment was supported by all members and a herder aged 48 years (Mwanyika) said "I have seen
583 fire causing dangers in Kishushe commons. When I had visited my friend last month in Kishushe,
584 I saw a barren land because in December, 2016, another evil man set on fire huge pastoral land
585 because he was denied access to graze, and today this area has very little vegetation, not as it used
586 to be before (see figure 5 on what the respondent referred to). In fact, herders from Kishushe,
587 Paranga, Werugha, Wumingu, Mbulia, Mbololo, Voi, Mwatate and other neighboring area come
588 to purchase pasture from our pastoral commons during dry seasons because. Our land will
589 continue providing pasture for as long as we restrict the use of fire to burn bushes and forests.



590

591 **Figure 5:** The view of Kishushe/Paranga community grazing land. According to a respondent, this area's vegetation
592 was burnt by a person who was denied access to graze and did so in retaliation. According to Elders, this area has
593 diminished its productivity and can no longer support the livestock as before thus demonstrating the dangers of fire in
594 ecological integrity. The photo was taken at the elevation of 735 M Above Sea Level ;Latitude -3.29269° or 3° 17' 34"
595 South; Longitude 38.3997° or 38° 23' 59" East. (© Daniel Mwamidi.

596

597 **DISCUSSION**

598 Basing on responses from the Mwanda-Marungu residents' pastoral commons in this Southern
599 Kenyan territory, it provides evidence from the community members on how their pastoral
600 landscape meets the description of being considered as Other Effective area based Conservation
601 Measures (OECMs) described by CBD (2018).

602 The results clearly indicate that Mwanda-Marungu locals are knowledgeable of their territory
603 through boundaries and have clear understanding of every part of their ancestral landscapes. This
604 may be a driver as to why Mwanda-Marungu enjoys relatively 'robust' ecosystems (basing on the

605 number of livestock that is supporting and myriad ecosystem services such as pasture, water,
606 herbals, wild edible vegetables, fruits, insects among many that locals have reported to get,
607 landscapes attracting tourism, etc.) as opposed to other neighboring areas in Taita hills for example
608 Kishushe, Paranga, Mbulia community landscapes where private mining companies, sisal
609 plantations were established in communal land thus also distorting community leadership
610 jurisdiction. According to Wagner (1999), local people have higher tendencies to know their
611 boundaries precisely if they have a close attachment to their landscapes either through aesthetic
612 enjoyments and moral religious meaning they accrue from it. This is true with residents of
613 Mwanda-Marungu who reported to have a very close attachment to their landscape and Elders
614 teach their children each boundary of their community landscape. They even describe their land
615 as a 'hospital' which shows the extent that this land is important for their day-to-day life. This has
616 been demonstrated by Borrini-Feyerabend et al. (2004) in which they have observed that
617 indigenous peoples and local community have higher chances of success in conservation of nature
618 because they conserve what is theirs, what they know and what they benefit from, and thus they
619 perceive their ancestral landscape as all what they have and thus they have moral obligation of
620 protecting it.

621 Basing on the Mwanda-Marungu herders and Elders, it appears that they have great zeal and ability
622 to sustainably manage their landscape and resources in the long-run because by involving their
623 youths in identifying and protecting their landscapes and resources, then we can deduct that
624 Mwanda-Marungu pastoral commons may still be protected if there are no external factors that
625 may come to degrade the drivers that underpin its sustainability. This corroborates with
626 Krettenauer, (2017) who observed that youths who are taught about environmental protection
627 matters by their parents/societal Elders have high possibilities of becoming environmental
628 protectors later in their later lives.

629 As noted, Mwanda-Marungu is not a free access area where external or internal members freely
630 get in to graze or utilize resources, but it strictly belongs to the local residence and must be used
631 according to very concrete rules decided by a collective of leading and knowledgeable male Elders,
632 which qualify as OECMs and further meeting ICCAs criteria as described by Kothari et al. (2012).
633 Kothari's criteria is handy in ensuring that there are rules governing the territory of an area
634 occupied by the indigenous people / local communities and that local members have regimes that

635 protects resources that are found in the land so as to guarantee sustainability as opposed to free
636 access where Hardin's tragedy of commons (1968) may set in. This is not the case with Mwanda-
637 Marungu pastoral commons where Elders themselves reported that they do not allow foreigners to
638 graze inside their pastoral commons and block the attempt of other community members to enter
639 their pastoral commons if they do not adhere non-adherence to the rules and norms that governs
640 grazing in their landscapes in fear of severe punishments by the community. The authors
641 (Mwamidi *et al.* 2018) had similar observations of boundary protection of pastoral commons by
642 Daasanach community at the northern Kenya, where they restrict other communities from grazing
643 in community protected areas in fear of non-conformity to the norms that governs the sustainable
644 use of pastoral resources in their communal land. According to Kothari *et al.* (2012), free access
645 to community resources may be unsustainable in the long run because it is free for all, thus a
646 tragedy may come in (Hardin 1968), whilst this is contrary to Mwanda-Marungu pastoral
647 commons whereby only members access and graze, while they have to do so in adherence to the
648 norms set, and thus qualifying Mwanda-Marungu as a potential OECMs, and following Ostrom's
649 principles of commons (Ostrom, 2015).

650 It is interesting to note that Mwanda-Marungu continues to get ecosystem services as Elders and
651 herders continuously report. It is a clear indication that territorial protection may help to conserve
652 natural resources in the landscape and can guarantee future prosperity of the region. If such
653 pastoral systems are supported and strengthened, they may help in attaining the UN's Millennium
654 Development Goals (SDGs) such as target 1 (ensuring poverty eradication); and target 13 of
655 building climate change resilience (UN, 2015). *In-situ* biodiversity has been reported to be of the
656 desirable strategy of coping up with effects of climate change especially where there is key
657 endogenous vegetation, species may cope easily than in areas where it would have been greatly
658 modified (Greenwood *et al.*, 2015). Greenwood's finding can be seen in action in Mwanda-
659 Marungu whereby Elders reported that they protect endogenous vegetation and species of fauna
660 found in their landscapes and have even restricted locals from introducing exotic plant species that
661 may interrupt nature and wildlife co-existence. In addition, Elders mentioned how they enjoy from
662 beneficial symbiotic relationship with baboons, bird species and elephants alongside their
663 livestock, which demonstrates that they encourage in-situ biodiversity conservation and co-
664 existence.

665 United Nations Development program (2015), pointed out that one of their strategies of
666 eliminating poverty is through building local communities' resilience in food reliance through
667 environmentally friendly mechanisms which are less costly and highly consistent and resilient.
668 Mwanda-Marungu Elders mentioned how they derive their livelihoods within their communal
669 lands and the strategies they employ so as to ensure that there are sustainable supply of ecosystem
670 services such as food, wild fruits, edible tubers, fruits, insects, vegetables, herbal medicines, water
671 resources, etc., it clearly shows that pastoralists can provide important solutions for sustainability,
672 and if well approached (e.g. participatory process of adding value to the different food chain
673 production, inclusion of their service for environmental protection attractive for emerging tourism,
674 etc.), can also contribute in poverty eradication in rural areas, especially where there other forms
675 of livelihoods cannot or very difficultly be practiced such as in 80% of Kenya's landmass which
676 lies in arid and semi arid regions.

677

678 **CONCLUSION**

679 Sound customary norms and rules are linked to the well-being of the studies commons and this
680 work opens the door to stimulate further studies in the area and other similar pastoral commons in
681 the region, to quantify their exact effectiveness. Although we did not do a quantitative species
682 assessment or others of the sort, report from Elders and our observations indicated that these
683 pastoral commons in Mwanda-Marungu are relatively well conserved in comparison to others
684 nearby without such systems, and may offer a lesson learnt to other degraded pastoral ecosystems.

685 We can base our conclusion on the results that we have provided, by pointing that despite the
686 neglect of customary pastoral commons in East Africa and especially in Kenya, and also
687 assumptions that pastoralism may be irrelevant or even counterproductive in solving
688 environmental crises, there are clear indications that the studied pastoral commons may offer
689 sustainable models for environmental conservation and for attaining the Sustainable Development
690 Goals -Target 1 of extreme poverty eradication and target 13 of building resilience on climate
691 change effects and enhancement of adaptation, which is for the moment contrary to many
692 perceptions and previously held notions about these important communal systems.

693 These commons provide myriad of ecosystem services as indicated in the results section and by
694 other authors cited here, while locals are so very closely linked economically and culturally to
695 these ecosystems that they also have a big stake *in-situ* biodiversity conservation of nature and
696 biodiversity which is one pillar of sustainable environmental conservation.

697 Mwanda-Marungu clearly meets the characteristics of both OECMs and also Indigenous and
698 community Conserved Areas (ICCAs) in all fronts such as: a) a community having a deep
699 connection to their territory through historical, religious, ecosystem services (socio-ecological
700 outputs) that are accrued in the landscapes; b) the local community have legitimate authority to
701 safeguard and reinforce rules and norms that governs their area and all members ensures that their
702 land is protected.

703 This seems to be essential in guaranteeing sustainability of natural resource protection such as
704 pasture, water, biodiversity, wild animals as well as cultural aspects attached to landscape elements
705 through worshiping shrines, beliefs, etc. And this is just an example of how many more pastoral
706 commons work around all Kenya and East Africa, so the Mwanda-Marungu commons are
707 important in themselves to demonstrate their autonomy and capacity in building sustainable and
708 resilient socio-ecological systems at local level, but also as a symbol and indicator of what exists
709 over thousands of squared kilometers of fragile ecosystems and populations throughout all the
710 Horn of Africa that are for now still mostly ignored or even degraded by state actions or that of
711 other international agencies that ignore such systems.

712

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726

727

728

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