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Community attitudes towards African Civet *Civettictis civetta* conservation in eastern sub-catchment of Lake Hawassa basin, Southern Ethiopia

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ABSTRACT
The African Civet *Civettictis civetta* is known for its production of civet musk that is used as fixative in perfume industry. Ethiopia is the world's main supplier of civet musk. In spite of such a remarkable economic importance, little is known about the current status

of the indigenous population and traditional knowledge of African Civet in the wild. Indigenous traditional knowledge and community attitudes towards African Civet were surveyed qualitatively and quantitatively in the eastern sub-catchment of Lake Hawassa Basin, from December 2011 to May 2012. A 'focus group discussion' involved 10 discussants were selected by group of researchers from the two target Woreda administration offices of the study area. More formal/quantitative survey targeted 96 rural households in two adjoining Woreda units. Interviewees were selected by stratified direct sampling. Local people apparently are highly familiar with behaviour and economic use of the species. Most people described their relationship with African Civet as neutral (44%) or positive (40%), respectively, and only 16% of 96 interviewees claimed an antagonistic relationship. Most respondents (92% of 66) identified maize as the most damaged crop. More than two-third (71%) of 70 respondents identified guarding, fencing and repellents as a means of minimizing the damage caused by the species, while others indicated that they use lethal trapping (10%), spearing/shooting (7%) and poisoning (3%), respectively. The remaining 9% mentioned that they tolerate civet damage.

Keywords: Civetone, Crop damage, Minimizing Damage, Population trend, Questionnaire survey, Traditional knowledge

1. INTRODUCTION

African Civet *Civettictis civetta* is a small carnivore from the family Viverridae which is native to Ethiopia and many other countries in equatorial and eastern Africa. It is well-known as a source of civetone, an important fixative in perfume manufacture (Ralls, 1971), and which is extracted from 'civet', a waxy substance produced by both sexes' perineal glands, for scent marking (Ralls, 1971; Eisenberg and Kleiman, 1972). Civet farming is an ancient practice in Ethiopia. The Queen of Sheba allegedly presented civet musk to King Solomon as gift about 1,000 years A.D., and even today civet musk is an important export commodity (Abebe, 2003). Perfume-producing countries import much of their musk requirements from Ethiopia (Dannenfeldt, 1985; Mohammed, 1999). Civet rearing is a means of livelihood for farmers (Wakjira, 2005) and is also economically important to commercial civetone exporters (WSPA, 2000). Civet musk is also traditionally used as medicine to treat various ailments (Mohammed, 1999).

Sustainable wildlife conservation often benefits from active participation of local communities. Hence, the present study was aimed at describing community attitudes towards *C. civetta* conservation in eastern sub-catchment of the Lake Hawassa basin, southern Ethiopia.

2. METHODS

2.1. Study area

The eastern sub-catchment of the Lake Hawassa basin lies about 263 km south of Addis Ababa, Ethiopia (6º57–7º08'N, 38º33–38º42'E; Figure 1). The 32 km^2 study area includes the Wondo Genet catchment forest and the various habitats in the adjacent agriculture-dominated landscape.

Administratively, the sub-catchment straddles the Southern Nations Nationalities and Peoples Region (SNNPR) and Oromia Nation Regional State. Four peasant associations (Kebeles) were covered in this study: Wosha-Soyema and Yuwo, administered by Wondo Genet Woreda of Sidama zone, SNNPR; and Gotu Onoma and Busa, administered by Wondo Woreda of West Arsi zone, Oromia Regional State (Figure 1). The population of each Kebele is settled on approximately 800 ha. The rural population density, averaging 9.5 people per ha, is one of the highest in Ethiopia.

2.2. Questionnaire survey

To examine community attitudes and traditional knowledge of African Civet, ten informants, were selected by group of researchers on the basis of their perceived traditional knowledge/local experience about this small carnivore species. These were brought together from the four above-mentioned Kebeles and were invited to participate in a focus group discussion. Based on this, an interview questionnaire to gauge broader community perceptions of African civet and its conservation was developed. Data were then collected from December 2011 to May 2012.

A total of 96 rural households (12 per rural village) were targeted by house-to-house verbal/interview questionnaire of semi-structured and structured questions. Interview was carried out with two local languages, Oromic and Sidamo tighter with the National language Amharic. The questionnaires were all carefully translated in to Amharic languages and in to the two loca langues when need araised. Stratified direct sampling was employed to select the households. Two Kebeles from each Woreda, with two villages per Kebele were selected on the basis of their proximity to the Wondo Genet Catchment Forest Area. This was because the species was known to be frequent in the villages near to the catchment forest (Birhanu, 2006). The households from the sampled villages were selected for interview based on the length of stay in the area, knowledge of the Wondo Genet catchment forest and traditional knowledge about the species. This catchment forest occurs along the southern foothills of Mount Abaro, the northernmost part of the study area (Figure 1).

Data collection focused on socio-economic profile of the community, human–African Civet conflict, traditional uses, population trends and local attitudes towards African Civet, including its habitat preference in the study area (Appendix 1). Two Development Agents (DAs) (responsible for agricultural and natural resources developments in their respective village community) and 3–4 representatives (Kebele residents) from each Kebele administration office were given prior orientation twice for three hours by the

team of two researchers on the selection of sample units (at village and household levels), the use of the checklist of formal questions, including the collection and entry of the quantitative data into the field data collection format. The level of formal education, knowledge about African Civet (information obtained during the focused group discussion about how deep the informants are familiar with species and they clearly distinguish it from other small carnivores in the area) and level of understanding of the data collection procedures were used as evaluation of aptitude.

2.3. Data analysis

Goodness-of-fit chi-square tests were used to determine whether the observed proportions of respondents differed from an even distribution. Analyses were run with SPSS, version 20.

3. RESULTS AND DISCUSSION

Ninety percent of households (n = 96) involved in the questionnaire survey had resided in the eastern sub-catchment for more than 20 years. The remaining 10% immigrated during the last 6 to 20 years. Most (96%) of rural households relied on agriculture, while the remaining used small business (2%) and civil service (2%), respectively for livelihood.

Fifty-eight percent (n = 96) of the respondents were very familiar, 34.5% were somewhat familiar with African Civet, while only 3% of respondents had no idea about the species, and 4.5% did not reply. These variations were statistically significant (χ^2 = 37.563, df = 2, P < 0.05; the last two categories were merged for the purpose of the analysis). This might indicate that most local people have some real knowledge of the species and that participation of local people could assist wildlife conservation. Villagers from nearer to Wondo Genet Catchment Forest Area were found to be more familiar with Civets than the respondents from those villages located far away from the catchment forest, hence reflecting that African Civet prefers natural forest habitat (see Admasu *et al.*, 2004 and Birhanu, 2006). This is also in line with Bekele *et al.* (2008) who found African Civet to prefer habitats of natural forest, plantation forest, natural and plantation forest mixed land and farmland in Menagesha–Suba State Forest, that is located about 260 km away from the present study area, but with more or less similar altitude and habitats.

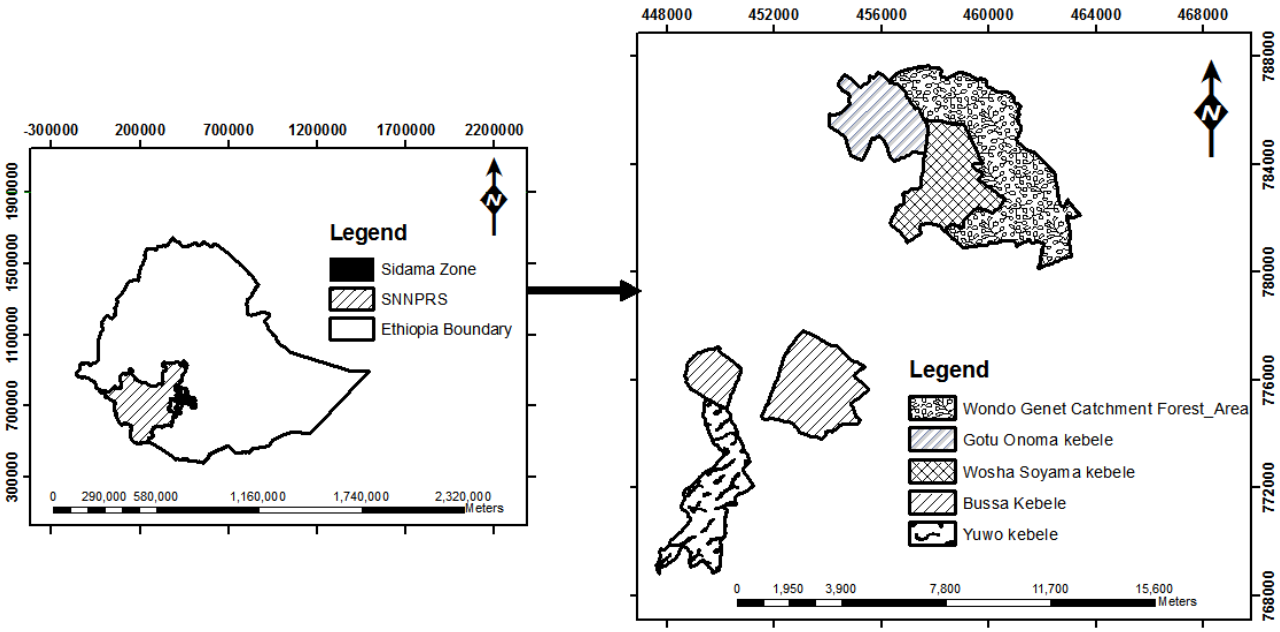

Figure 1

Location map of the study area (NASA Landsat Program, 2003; Landsat ETM+ scene L71168055205520051203. ETMGLS, 2005, SLC-Off, USGS, Sioux Falls, 03/12/2005

Table 1

Types of Food crops that are reportedly affected by African Civet

Kebele	Respondents abundance by crop category						
	1	2	3	4	5	NA	Total
Bussa	2	-	-	-	-	6	8
Gotu Onoma	16	-	-	2	-	22	40

Wosha-Soyama	19	-	-	-	3	-	24
Yuwo	24	-	-	-	-	-	24
Total	61	-	-	2	3	30	96

Key notes: 1 = *Zea mays*, 2 = *Eragrotis tef*, 3 = *Saccharum officinarum*, 4 = Fruit trees (mainly *Persea americana*, *Mangifera indica*, *Coffea arabica* and *Carica papaya*), 5 = Vegetables (mainly *Brassica* sp. and *Allium* sp.), NA = Interviewees did not reply.

Habitats where the 96 residents normally encountered African Civet varied, with 8%, 20% and 38.5% claiming to experience seeing the animal 'in one's own home stead', 'in one's own agricultural field', and 'in the upland forest', respectively. In addition 33.5% of respondents reported the species in more than one habitat. The variation between the total number of respondents who claimed to encounter the species in a single locality and those who sighted the species in more than one habitat was statistically significant (χ^2 = 21.083, *df* = 3, *P* < 0.05). Birhanu (2006) indicated that African Civet is relatively common in and around Wondo Genet catchment. African Civet often roams around farm lands and human residence areas in search of food (Admasu *et al*., 2004 and Bekele *et al*., 2008).

Most (58.5%) respondents (n=96) reported that they encountered the species quite often; 37.5% reported that they encountered it very rarely and the remaining 4% reported that they had never seen the species at all. A majority of interviewees (70%) replied that African Civet caused damage to people's property; 29% replied it didn't cause any damage and 1 person did not respond. The variation between the number of the respondents that reported African Civet does not cause damage (67) and causes damage (28) to their property was statistically significant (χ^2 = 41.813, *df* = 1, *P* < 0.05).

Most respondents (61 of 66) identified maize as the most damaged crop by African Civet, while very few of them (2/66 and 3/66) identified fruit trees and vegetables, respectively to be damaged by the species (Table 1). African Civet is mainly fed maize in captivity; a maize diet is also related to high musk production, and faecal analysis confirms that wild Civets eat maize (Sifu *et al*., 1996; Mohammed, 1999; Birhanu 2006 and Bekele *et al*., 2008). A group of discussants stated that African Civet relishes maize only when it is still fresh, not dry. *Eregrotis teff* and *Saccharum officinarum* were not reported to be consumed by the species, despite their high abundance in the study area. Both are predominately fibrous foods and small fruit and woody stem bearing crops, respectively with less nutritive value and less digestibility.

Local people reported economic loss as a result of damage caused by African civet to their property. Accordingly, respondents from three target Kebeles, 29/72 had indicated the amount of their total annual loss was 5% and above of their annual income. While the remaining: (20/72 and 12/72) respondents had reported an estimated annual total loss of 3–5% and 1–3% their annual income, respectively. Three of the respondents reported that African civet causes negligible economic loss. However, 32/96 respondents of the targeted households did not provide their estimation and 22 of these were from Bussa Kebele. This was stated to be resulted from to the loss and constriction of the habitat of the species, which on its part is attributable to the growing agricultural expansion and human settlement. The recent development in terms of converting farm lands (which in the past was reportedly used to grow maize) in favour of commercial crops, such as chat (*Catha edulis)* and sugar cane, in particular, was seen by focus group discussants to pose the most devastating effect on the availability of suitable living condition for this species in the area. It is feared that such a development may lead to increased human–African Civet conflict and thus endangering the long term survival of the species in the area.

Local people affirmed the use of traditional prevention methods to minimise civet damage. Most (50 of 70) of respondents identified guarding, fencing and repellents; 5 of 70, 7 of 70 and 2 of 70 told that they used spearing/shooting, lethal trapping and poisoning, respectively; while 6 of them said that they tolerated Civets and did nothing. Twenty six of the total households targeted by this survey did not respond to this question. This is worth mentioning that local people in both Woredas are already using non-lethal deterrents, as a means to reduce the damage caused by African civet. This is very good news, and this method should be upheld at the expense of lethal. In particular, poisoning and trapping may affect other species, both wild and domestic.

More than one half (55 of 96) of the respondents claimed to know that the species has some traditional or economic uses, while 39 of them replied that they did not know if the species is used for any purpose and the remaining two did not give any information. Accordingly, 24 reported that they knew people that live-trap and sell this animal for income and 30 reported some use of the musk as a traditional medicine. Three mentioned using the skin/fur for cultural purposes. The use of civet musk for traditional medicine is of high economic importance to the local community who have developed this with centuries of experience (Sifu *et al*., 1996; Mohammed, 1999). Traditional medicine from plants and animals is especially important where modern medicine is inaccessible and/or unaffordable (Mohammed, 1999). However, illegal trapping/capturing of the species for selling to traditional civet framers and poaching for fur and skin can cause injury to the animals and can contribute to the declining population of the species in the long run. World Society for the Protection of Animals (WSPA) has raised concern about this, especially the handling of the animal during capturing and transportation for captivity for musk production, to the extent of lobbying perfume industries not to import civetone from Ethiopia (WSPA, 2000). Wild civets are often captured and kept in poor conditions by farmers. Similar studies elsewhere in Ethiopia have revealed this fact (FAO, 2000; WSPA, 2000; Bekele *et al*., 2008 and Taye, 2009).

A high proportion (75) of respondents perceived that African Civet population is declining, while 12 and 9 indicated 'to the contrary' and 'no idea', respectively. Some respondents pointed out factors that they thought contributed to the decline: habitat loss through deforestation and agricultural expansion (21): both habitat loss and illegal trapping (23), poaching by local people for

domestic use (21); illegal live-trapping to supply traditional civet keepers elsewhere (21); and no opinion (10). Relationship with African Civet was described as neutral (42), positive (38) or antagonistic (16). Nevertheless, the fact that around 80% of respondents described their relationship with African Civet as positive or neutral is good news for conservation.

4. CONCLUSION

From the results it is concluded that traditional people have indigenous knowledge about the biology and ecology of African civet. It can also be concluded that traditional people acknowledge the ecological and economic value of African civet and coexist with the species through using traditional menses to control the species from crop damage and small domestic animals predation.

SUMMARY OF THE RESEARCH

1. Fifty-eight percent of the respondents were very familiar with African civet
2. Most respondents identified maize as the most damaged crop by African Civet
3. Local people affirmed the use of traditional prevention methods to minimise civet damage. Most (50 of 70) of respondents identified guarding, fencing and repellents; 5 of 70, 7 of 70 and 2 of 70 told that they used spearing/shooting, lethal trapping and poisoning, respectively; while 6 of them said that they tolerated Civets and did nothing.
4. A high proportion (75) of respondents perceived that African Civet population is declining, while 12 and 9 indicated 'to the contrary' and 'no idea', respectively.

FUTURE ISSUES

We believe that this study will act as first hand ecological information about African civet in the study area. Apparently, it paves the way for detail study of biological and economic use the species.

DISCLOSURE STATEMENT

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Appendix 1 Checklist of semi-structured questionnaires for formal/quantitative survey

Coding								Checklist of Questions
Y	N	0	1	2	3	4	5	
								1.1 For how long have you lived in this village or in WG? [1 = <5 yrs, 2 = >5<10 yrs, 3 = >10 years]
								1.2 What do you do for a living? [1 =1=farming, 2=small business, 3= civil service]
								2.1 Are you familiar with the areas outside this village? [Y/N]
								2.2 How about with areas outside this Kebele? [Y/N]
								2.3 Are you also familiar with adjacent forest land? [Y/N]
								2.4 Do you know some of the wildlife that is found in this area? [Y/N].
								2.5 If Yes, would you list at least five of them in a declining order of relative importance?
								3.1 How much are you familiar with the wild animal known as 'Tirign' in Amharic. [0 = no idea at all, 1 = very little, 2 = very well]
								3.2 How often do you come across 'Tirign' in your area? [0 = never at all, 1 = very rarely, 2 = quite often]
								3.3 Where do you normally experience seeing the animal 'Tirign'? [0 = in one's own homestead, 1 = elsewhere in one's own village, 2 = in agricultural fields, 3

								= up in the forested areas, 4 = other (specify)]
								3.4 What is your own observation about the population trend of 'Tirign' in this area? [0 = no idea, 1 = increasing, 2 = no visible change, 4 = declining, 5 = other (specify)]
								3.5 If declining, what are the main reasons? [0 = not quite sure, 1 = habitat loss due to deforestation and agricultural expansion, 2 = illegal trappers, who supply the animals to traditional civet keepers, 3 = retaliatory killing by local people, 4 = overhunting by local people for domestic use, 5 = other (specify)]
								4.1 Does 'Tirign' cause any damage to local people's property? [Y/N]
								4.2 If Yes, which of the following types of damage does this animal is known to cause? [0 = agricultural field crop, 1 = fruit trees, 2 = small domestic livestock, 3 = attacks people, particularly small children, 4 = other (specify)]
								4.3 If it does, what measures do people take to prevent the damage? [0 = I do nothing, 1 = I use preventive methods, such as guarding, fencing, repellent, 2 = I attempt killing the animal using spear/shooting, 3 = I attempt killing the animal using kill-traps, 5 = I attempt killing the animal by poisoning, 5 = no answer]

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