

West African vulture persecution threat analysis report: Literature review and threat mapping



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Executive summary

West Africa has experienced the most significant vulture population crash across the continent. This document summarises work undertaken by an expert group of largely West African biologists to synthesize what is known or thought to be known about the threat posed by human persecution, with a particular focus on the impacts and drivers of poisoning for belief-based use, i.e. use of whole vultures or their body parts for supposed medicinal or mystical purposes.

Threats to African vulture species are diverse and multiple, including susceptibility to habitat conversion for agro-pastoral systems; loss of wild ungulates leading to reduced availability of carrion; and hunting for human consumption. Vultures are also poisoned as a perceived pest and killed indirectly. Of particular concern is the growing threat posed by direct human persecution. This often involves poisoning and among the main (but not the only) drivers are belief-based use.

Intentional poisoning of vultures, primarily for belief-based use, has been documented in: Chad, Nigeria, Ghana, Côte d'Ivoire, Burkina Faso, Niger, Senegal, Guinea, Guinea Bissau, Sierra Leone, Gambia, and Cabo Verde. A variety of poisons are employed in killing vultures, including insecticides such as Lindane, nicotine powder, strychnine, warfarin and the pesticide carbofuran.

Farmers and hunters are a primary group believed to be involved in vulture killing though others (including traditional healers) also participate in the practice. The selling of vultures or vulture parts is believed to involve men aged between 25-45 years old (coinciding with the demographic group that is often most active as hunters and where the greatest financial need may be). Several cultural groups have been documented to be involved in trading vultures or vulture parts for belief-based use. Medicinal traders involved often seem to inherit the profession from their parents pointing to the importance of generational linkages.

A range of vulture parts are sold, including heads, legs, eggs, feathers bones and even faeces, in the belief they can cure a variety of ailments be they physical, mental and spiritual in nature. The use of vulture parts for such purposes seems to be common knowledge, particularly in countries such as Nigeria.

There is evidence of significant cross-border trade in vulture parts, into countries including (but not restricted to) Nigeria, Senegal and Benin.

The killing and sale of vultures for belief-based use is likely to be fuelled by demand based on widespread belief and the high financial returns that can be achieved. The value of vultures in the trade has increased significantly in recent years. A lack of alternative livelihood options, limited

access to modern healthcare systems and a lack of relevant laws or law enforcement collectively provide the conditions in which the trade can flourish.

Conservation efforts designed to mitigate the threat of belief-based use and other forms of persecution will require serious recognition of the underpinning socio-cultural drivers of human behaviour. The process adopted to develop an effective plan of action will need to involve representatives of all stakeholder groups involved. It will need to ensure that all voices are heard and included in decision-making, to ensure that collective ownership of the plan and a desire to fully implement it is achieved.

Résumé exécutif

L'Afrique de l'Ouest a connu le plus important effondrement de population de vautours sur le continent. Ce document résume le travail entrepris par un groupe d'experts composé essentiellement de biologistes ouest-africains pour synthétiser ce que l'on sait ou ce que l'on pense savoir sur la menace que représente la persécution humaine, avec un accent particulier sur les impacts et les moteurs de l'empoisonnement à des fins de croyance, c'est-à-dire l'utilisation de vautours entiers ou de parties de leur corps à des fins supposées médicinales ou mystiques. Les menaces qui pèsent sur les espèces de vautours africains sont diverses et multiples, notamment la vulnérabilité à la conversion de l'habitat en systèmes agropastoraux, la perte d'ongulés sauvages entraînant une réduction de la disponibilité de charognes et la chasse pour la consommation humaine. Les vautours sont également empoisonnés et tués indirectement à cause de la mauvaise perception. La menace croissante que représente la persécution directe par l'homme est particulièrement préoccupante. Cette persécution implique souvent l'empoisonnement et l'utilisation basée sur des croyances traditionnelles est l'un des principaux facteurs (mais pas le seul). L'empoisonnement intentionnel des vautours, principalement pour des raisons de croyance, a été documenté au : Tchad, Nigeria, Ghana, Côte d'Ivoire, Burkina Faso, Niger, Sénégal, Guinée, Guinée Bissau, Sierra Leone, Gambie et Cabo Verde. Divers poisons sont utilisés pour tuer les vautours, notamment des insecticides comme le Lindane, la poudre de nicotine, la strychnine, la warfarine et le pesticide carbofuran.

Les agriculteurs et les chasseurs constituent le principal groupe impliqué dans l'abattage des vautours, bien que d'autres (notamment les guérisseurs traditionnels) participent également à cette pratique. La vente de vautours ou de parties de vautours concernerait des hommes âgés de 25 à 45 ans (ce qui coïncide avec le groupe démographique qui est souvent le plus actif en tant que chasseur et où les besoins financiers sont les plus importants). Plusieurs groupes culturels ont été documentés comme étant impliqués dans le commerce de vautours ou de parties de vautours pour une utilisation basée sur des croyances traditionnelles. Les tradipraticiens impliqués semblent souvent hériter de la profession de leurs parents, ce qui souligne l'importance des liens générationnels.

Une gamme de parties de vautours est vendue, y compris des têtes, des pattes, des œufs, des plumes, des os et même des fèces, dans la croyance qu'ils peuvent guérir une variété de maux, qu'ils soient de nature physique, mentale ou spirituelle. L'utilisation de parties de vautours à de telles fins semble être de notoriété publique, notamment dans des pays comme le Nigeria.

Il existe des preuves d'un important commerce transfrontalier de parties de vautours, dans des pays comme (mais pas seulement) le Nigeria, le Sénégal et le Bénin.

L'abattage et la vente de vautours à des fins d'utilisation basée sur la croyance sont susceptibles d'être alimentés par la demande basée sur une croyance répandue et les rendements financiers élevés qui peuvent être obtenus. La valeur des vautours dans le commerce a considérablement augmenté ces dernières années. L'absence d'autres moyens de subsistance, l'accès limité aux systèmes de santé modernes et l'absence de lois pertinentes ou l'application de la loi créent les conditions propices à l'essor de ce commerce.

Les efforts de conservation visant à atténuer la menace d'une utilisation basée sur des croyances et d'autres formes de persécution nécessiteront une reconnaissance sérieuse des facteurs socioculturels sous-jacents du comportement humain. Le processus adopté pour élaborer un plan d'action efficace devra impliquer des représentants de tous les groupes de parties prenantes concernés. Il devra garantir que toutes les voix sont entendues et incluses dans la prise de décision, afin d'assurer l'appropriation collective du plan et le désir de le mettre pleinement en œuvre.

Introduction

Although some West African countries still hold high densities of Hooded Vultures (*Necrosyrtes monachus*) (Buij et al. 2013, Henriques et al. 2018), this region is reported to have experienced the most significant vulture population crash across the continent (Rondeau and Thiollay 2004, Ogada et al. 2016). For example, the range of the White-headed Vulture (*Trigonoceps occipitalis*) has reduced by approximately 97% (Ogada et al. 2015) in recent decades and, within West Africa, is now largely restricted to Protected Areas where its presence remains precarious (Murn et al. 2016). Intentional poisoning of vultures for belief-based use is considered the primary threat to West African vulture species in this region (Buij et al. 2016, Botha et al. 2017). This document summarises work undertaken by an expert group of biologists ([Appendix I](#)), primarily from within the region, to synthesize what is known or thought to be known about the threat posed by human persecution of vultures in West Africa, with a particular focus on the impacts and drivers of poisoning for belief-based use.

Background

Threats to African vulture species are diverse and multiple, including susceptibility to habitat conversion for agro-pastoral systems; loss of wild ungulates leading to reduced availability of carrion; and hunting (Ogada et al. 2016). Of particular concern for vulture populations across Africa is the growing threat posed by human persecution. This often involves poisoning (Odino et al. 2014) and among the main (but not the only) drivers are belief-based use and to a lesser extent bushmeat (McKean et al. 2013). Belief-based use covers traditional or superstitious use of whole vultures or their body parts for supposed medicinal or mystical purposes. Vulture body parts are believed by some to aid in the treatment of physical or mental illness, or to bring good fortune (Buij et al 2016).

There is evidence of significant cross-border trade in vulture parts for belief-based and food source purposes (Rondeau and Thiollay 2004, Buij et al. 2016, UNEP-WCMC 2021). The sale of vulture meat for human consumption has been documented, sometimes alongside body part sale for belief-based use, suggesting that belief-based use and bushmeat trade may be connected (Saidu and Buij 2013, Buij et al. 2016), though this is not always the case (Awoyemi, *pers. comm.*). Vultures are also poisoned as a perceived pest (e.g., at slaughterhouses), and killed indirectly by hunters seeking other species (Deikumah 2020).

The 'Multi-Species Action Plan to Conserve African-Eurasian Vultures (Vulture MsAP)' (Botha et al. 2017) identifies poisoning as, '...by far the most significant threat that impacts the vulture species that are the focus of this Action Plan'. Objective 4 of the Vulture MsAP is, 'To reduce and eventually to halt the trade in vulture parts for belief-based use', involving conducting a situational assessment

of body part use and, ‘best practice for tackling the trade, body parts used, how vultures are acquired, key markets, socio-economic drivers of the trade and trade pathways’ (p99). Objective 10 of the plan is, ‘To substantially reduce levels of direct persecution and disturbance of vultures caused by human activities’, including actions to better understand the motivations behind this persecution, and to identify approaches that could mitigate this threat.

This document represents an early stage in responding to objectives 4 and 10 of the *MsAP*, through consolidating the best available information on the threat of persecution to build a model of the system, developed by a group of West African and IUCN SSC Vulture Specialist Group vulture experts.

Threat analysis process

In addition to multiple, online meetings of the expert group in 2021 (firstly to clarify the scope of the work being proposed) there were two key steps undertaken:

- 1) **Literature review-** Involving analysis of 24 peer-reviewed articles and publications investigating the threat of belief-based use of vultures in West Africa with additional input from the expert group.
- 2) **Threat mapping-** Involving two three-hour, facilitated virtual meetings of the expert group to develop a graphical representation of how they saw the threats and drivers of human persecution of vultures.

Here we summarise the results of this work.

Literature review

Threats reviewed

The following threats were included in the analysis of the literature:

- Indirect persecution
 - Poisoning of carcasses to remove predators (e.g. feral dogs/ predators), but also killing vultures as by-catch
 - Removing nesting/roosting trees for urban development etc.
 - Improved sanitation
- Direct persecution
 - Killing for belief-based use (traditional or superstitious use of whole vultures or their body parts for supposed medicinal or mystical purposes)
 - Killing for bushmeat

- Killing as perceived 'pest species' (E.g. at slaughterhouses, due to hygiene concern)
- Removing nesting/roosting trees where vultures are perceived as a pest

Other threats- included live trade in vultures- were excluded from this analysis as they were not perceived to be of most pressing concern for the species in West Africa.

Indirect persecution

Non-target species/ 'by-catch'

In West Africa, with the decline of mammal populations (Craigie et al., 2010), human-wildlife conflicts involving wild predators attacking livestock have increased, motivating retaliatory behaviour from farmers and livestock herders who attempt to remove the perceived threats posed by predators and feral dogs, by baiting poisoned carcasses. These end up poisoning vultures, who typically find these carcasses first. In Senegal and Southern Mauritania, there is a reported widespread use of strychnine to kill predators (Mullie et al 2017), and this is known to have resulted in vulture deaths. For example, there is a documented case of a cow carcass being poisoned near Goudiry, eastern Senegal; thirty-five dead birds were found at the site, twenty-seven of which were Hooded Vultures. In Guinea-Bissau, in 2021, more than one hundred Hooded vultures were found dead, a consequence of locals targeting livestock predators (Henriques *pers. comm*). Other unintentional cases of vultures being poisoned have been documented in Togo, Mauritania, Liberia, Benin, Mali, Cameroon, and Cabo Verde (Chandra, S. 2021).

An upsurge in the prevalence of rabies since 2009 in Senegal led to the establishment of a programme to reduce the feral dog population using meat soaked in a strychnine sulphate solution. Poisoned bait is placed where stray dogs concentrate, such as land-fill sites, beaches, cemeteries, barracks, hospitals, markets and slaughterhouses (Diallo 2010). Hooded Vultures have been found poisoned at the Dakar University campus roost with stray dogs being the target species (Mullie et al 2017). In Ghana, between 2011 and 2016, 21 329 stray dogs were eliminated nationwide (Anon. 2016, in Mullie et al 2017), raising fundamental questions about the potential impact on vultures if poisoned carcasses were used in all or most of these cases. According to Odino et al (2014) few data exist on the scale of stray dog poisoning in Africa, suggesting the extent of the impact on vultures has been underestimated.

Diclofenac- which is known to have been a significant cause of vulture population declines in Asia- is being actively promoted for livestock veterinary treatment to at least 15 African countries (BirdLife International 2008a). In Tanzania, a Brazilian manufacturer has been aggressively marketing the drug

for veterinary purposes (C. Bowden *in litt.* 2007) and exporting it to 15 African countries (BirdLife International 2008b). Thirty-five percent of respondents to one survey in Ghana reported both using diclofenac to treat cattle disease and not burying/ burning carcasses, thereby leaving them exposed to consumption by vultures (Deikumah 2020).

Roost and nesting tree felling for urban development

Removal of roosting trees can be particularly problematic where the roost trees coincide with areas zoned for human development. For example, urbanisation of the Senegalese population is expected to be 56% in 2021 and a major part of this urban population will be concentrated in the greater Dakar area which is a current nesting area for critically endangered Hooded Vultures.

Improved sanitation and reduced food availability

Vulture declines recorded in large towns in West Africa may be partly linked to the construction of large, modern and well-closed slaughterhouses, leaving fewer leftovers for vultures. Renovation of slaughterhouses and the closure of landfill sites in cities such as Accra, Ghana, (Gbogbo et al 2016) is reducing anthropogenic feeding sites for vultures. According to abattoir operators, vulture numbers around abattoirs have declined dramatically since the year 2005 when the slaughterhouses were reconstructed to a closed system.

Competition for food at landfills and dumpsites with crows, feral dogs, etc. could be reducing food availability for vultures. Improvements in veterinary technology and care could also be reducing livestock mortality, impacting further on available vulture feeding opportunities.

Direct persecution

Targeted roost and nesting tree felling

In Ghana, property owners express their intent to cut or prune roost trees (Gbogbo et al 2016). For example, one of the identified roosts at the Ghana institute of journalism campus which had forty-five birds roosting was cut down. Nest and roost tree felling may be a way to act on existing prejudices against vultures: for example, in one survey the majority (76%) of respondents agreed that trees used as nesting and roosting sites by vultures should be removed (Williams et al 2021).

Killing for human consumption- bushmeat

Hunting for sale and human consumption of vulture meat has been documented in the region, for example in The Gambia and Cote D'Ivoire (Chandra, *pers. comm.*). There is believed to be trade in smoked vulture meat between Niger or Benin and Nigeria (Rondeau and Thiollay 2004), and meat is also traded internationally (Buij et al. 2016, Ogada et al 2016). Hooded Vultures are intensively hunted for meat in Nigeria across multiple communities and their bushmeat consumption has also been documented in Côte d'Ivoire.

Unintentional consumption of vulture meat (from the perspective of the buyer) does occur. For example, a man and three women were found selling vulture meat as chicken in Yenegoa, Bayelsa State, Nigeria (Williams et al 2021). Nigerians in Cameroon state that Hooded Vultures are served as chickens in Nigerian restaurants (Ogada and Buij 2011). In some countries killing of vultures for human consumption may be a recent phenomenon, such as in Ghana where the first documented case occurred in 2001 (Gbogbo et al 2016). In Ghana now, 83% of the documented cases in one study (Gbogbo et al 2016) involved vultures intended for sale to local restaurant operators or kebab sellers for onwards sale to the unsuspecting public. Based on studies conducted on the palates and tongues of poisoned vultures in Spain (Richards et al 2015) there could be a risk to human health should the carcasses of poisoned vultures be consumed as food or for other purposes.

Killing for belief-based use

A significant threat to West African vultures is killing for sale in traditional or belief-based use markets (Botha et al 2017). Twenty-nine percent of nearly eight thousand vulture deaths recorded across twenty-six countries in Africa were attributed to trade for belief-based use (Ogada et al. 2016). Intentional poisoning of vultures, primarily for belief-based use, has been documented in: Chad, Nigeria, Ghana, Côte d'Ivoire, Burkina Faso, Niger, Senegal, Guinea, Guinea Bissau, Sierra Leone, Gambia, and Cabo Verde (Chandra, S. 2021). Between 188-282 Rüppell's Vulture (*Gyps rueppelli*) are estimated to be killed annually across the region for belief-based use; this represents 9.4-14.1% of the regional population of the species (Buij et al. 2016). According to Buij et al (2016),

recent trade in White-headed Vultures for belief-based use may have claimed 4.3-8% of the regional population, annually. The decline and possible extirpation of White-backed Vulture (*Gyps africanus*) in Nigeria has been attributed to the trade in vulture parts for traditional juju practices (P. Hall *in litt.* 2011).

Killing methods

Vultures sold in stalls had been killed using a range of methods including agricultural chemicals, shotguns, traps, and ground tobacco powder (Saidu and Buij 2013). In Saidu and Buij's 2013 study, 14% of traders were supplied by poachers that killed vultures using shotguns or traps. The dominant technique stated by individuals who killed the vultures was poisoning using different chemicals. Approximately 17% of traders indicated that pesticides were most often used, notably the insecticide Lindane (frequently used on cocoa farms, vegetable farms, maize and marketed as Gammalin-20). Nicotine powder from tobacco was mentioned as the principal poison by 11.5% of respondents. Dealers in Garoua claimed that vultures were killed using WormForce, which contains the carbamate pesticide carbofuran (3%) and is produced in Nigeria. Note that the carbofuran is known to have detrimental effects on human health too, when ingested (Gupta 1994).

Further West, in 2020, >2 000 Hooded Vultures were found dead in the largest mass poisoning incident in Guinea-Bissau, and at least 200 vultures had their heads removed (Henriques et al. 2020); toxicological analysis of carcasses confirmed poisoning with methiocarb, another carbamate pesticide. Poisoning of vultures has also been documented in Senegal, where one event claimed the lives of thirty-five vultures (UNEP/WCMC 2021 report, p14), as well as in the Republic of Guinea (169 Hooded Vultures killed using poisoned goat carcasses and their heads subsequently removed); and in The Gambia >50 hooded vultures were found killed near an abattoir with parts removed (Camara *pers. comm*) and Ghana (>150 vultures killed near a slaughterhouse and their heads removed) (Henriques *pers. comm.*). Other poisons used include agrimet strychnine and warfarin (Chandra *pers. comm.*). Many of the incidents where vultures are poisoned are never reported, so the incidents mentioned here are likely a fraction of the number of birds that are poisoned for this purpose.

People involved

Killing vultures

In Nigeria, farmers and hunters have been identified to be a primary group involved in vulture killing (Atuo et al 2015). Other groups cited in this paper include traders, health workers and teachers, all of whom may own farms too and may supplement their income with hunting. In Guinea-Bissau, local youth was linked to killing vultures and removing their heads to sell for cross border demand for vulture body parts (Henriques et al., 2020).

Selling vultures/ vulture parts

Men between the ages of 25-45 were the most prominent group to be involved in selling of avian body parts (Atuo et al 2015), coinciding both with the demographic group that is often most active as hunters and where the greatest financial need may be (Coad 2008). In Ghana, the traditional use of vultures for belief-based use was forbidden under the country's former British colonial rule (Schuchmann 2011). According to this study and at this time there were few markets where wildlife items for traditional medicinal purposes were sold. Relevant items on the market were sold by Yoruba women traders from Nigeria with most items being imported from this country too.

Wildlife traders in Nigeria may be mostly of the Yoruba ethnic group from the southwest (Nikolaus 2001). Yoruba traditions involving animals have been preserved through generations, and these traditions still have a major influence today (Owoseni 2014). Outside of Nigeria, the Yoruba live in southern Benin, Togo, Sierra Leone and Ghana, as well as countries outside Africa such as Cuba, Brazil, and Trinidad and Tobago (Owoseni 2014). However, the trade is not restricted to the Yoruba.

In Saidu and Buij's 2013 study in Northern Nigeria, most medicinal traders were of the Hausa group (67%), and a further 11% were Fulani, with a further eleven ethnic groups also being implicated, including Abewa, Bagobiri, Kanuri, and Zabarma. Ninety percent of the traders in this study inherited the profession from their parents, pointing to the importance of generational links, with a further 8% learning the trade from people outside their family. Most of the traders who contributed to the study began in the trade more than 20 years ago. Market surveys conducted by BirdLife partner Nature-Communautés-Développement (NCD) in Senegal also found that most traditional healers and traders in the market belonged to the Hausa group (Diallo, B. *pers. comms*).

In buying vultures/ vulture parts

A suggested reason for the increase in belief-based use markets in Nigeria has been patronage by politicians who visit traditional healers for success in elections (Muhammad and Mustapha 2020; Williams et al 2021). However, in at least one study, in the Cross River State of south-eastern Nigeria, 94% of respondents were aware of trade in avian body parts within their communities while 66% had participated in the trade within the previous two years (Atuo et al 2015). Purchase of vulture parts for belief-based use may therefore be a common societal practice, at least in Nigeria. The use of vulture parts for traditional medicine seems accepted and practised across society, independent of social status or level of education (Saidu and Buij 2013).

Uses

Many values have been ascribed to vulture parts (**Table 1**). Two broad categories of use for vulture parts are their perceived medicinal value and for more charm-oriented, mystical reasons, such as to bring good luck. It is helpful to recognise this distinction when determining how to mitigate this threat, due to the potentially greater difficulty in shifting socio-spiritual drivers (Boakye et al 2019).

Multiple vulture body parts are used in the trade including eggs, feathers, bones and skulls (Deikumah 2020) and the whole body (Gbogbo 2016). Vulture faeces is sold for ‘black magic,’ and their legs, heart, eyes and nests are also sold for belief-based use (Dunn 2010).

Perceived value	Authors*
Medicinal values ascribed to vulture parts...	
Cures for diabetes, cancer and for psychiatric disorders	Muhammad and Mustapha (2020)
Remedies for leprosy, stomach-ache, sore kidneys, parasites	Reynaud 2007
Treating insanity, strokes, ease of childbirth in women and to stimulate walking in infants	Saidu and Buij (2013)
Cure for infertility	Deikumah (2020)
Curing bad eyesight	Schuchmann (2011)
Charm-oriented values ascribed to vulture parts...	
For political success	Williams et al 2021
Spiritual protection against witches and witchcraft/ evil spirits	Saidu and Buij (2013)
To bring good luck in gambling, competition/ contests and to gain supernatural powers. Vulture heads believed to have clairvoyant powers	Saidu and Buij (2013)
The West African <i>Serere</i> people believe vulture parts can make you invulnerable; both <i>Sere</i> and <i>Wolof</i> people of Senegal believe vulture parts can help you pass exams or be appointed to positions of authority.	Reynaud 2007
To provide protection and strength, winning in the lottery, intelligence for school children and for success in businesses	Deikumah (2020)
Hooded vultures used to bring good luck when buried in the ground before building a new house	Schuchmann (2011)
Enable an individual to disappear at will	Williams et al (2021)
The eye or head of a vulture can be used to predict the future	Williams et al (2021)

Table 1. Reported uses of vultures or vulture parts in belief-based practices. *Where multiple authors referred to same uses of vulture body parts, only novel uses are listed to avoid repetition.

Geographic occurrence

Belief-based use of vultures has been documented across West Africa (**Figure 1**), and although major knowledge gaps remain across the region, it does appear to be particularly prevalent in Nigeria (Ogada and Buij 2011; Williams et al 2021). Estimates based on data extrapolation suggest that 73% of vulture carcasses traded in West Africa were traded in Nigeria, with a further 21% in Benin (Buij et al 2016). Ninety-three percent of traditional medicine dealers in Nigeria in one study (Saidu and Buij 2013) had vultures, or their body parts, on sale. Kano State (in north/central Nigeria), the city of Ibadan (in Oyo state in the southeast of the country) and Ikare in the southern state of Ondo, are important hubs of vulture sales in Nigeria (Muhammad and Mustapha 2020).

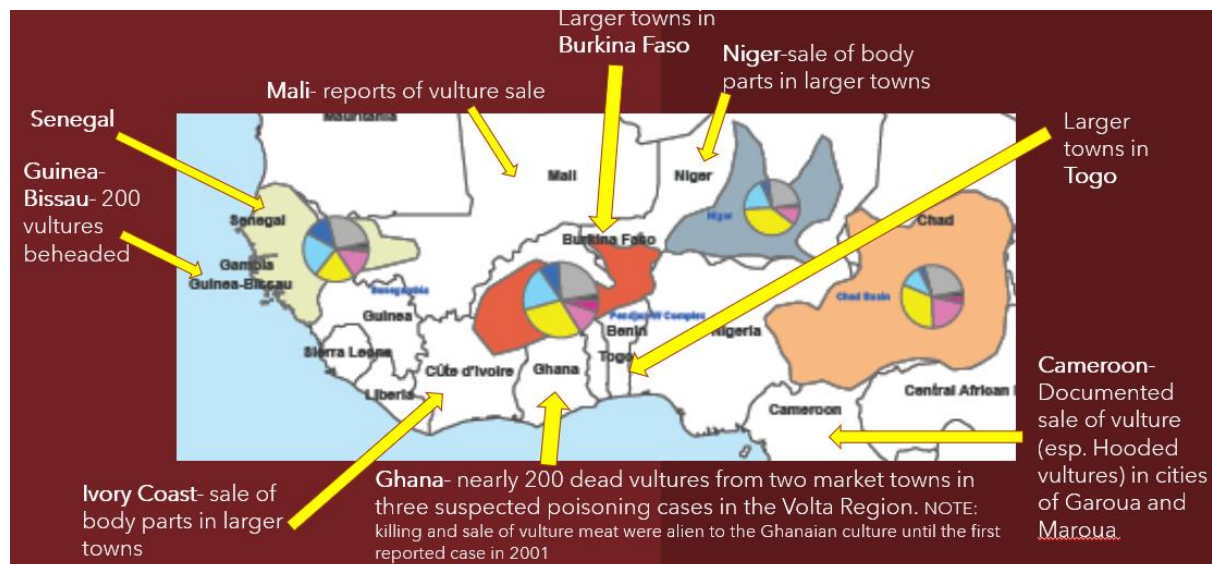


Figure 1. Recorded incidents of belief-based killing, trade or purchase in vulture parts in West Africa. Modified from Saving Space For Africa’s Vultures poster. Pie charts represent threat types, yellow representing threat from belief-based use.

Cross-border movement of vultures does occur, with birds ending up in markets in Nigeria. Vultures have been reported to be smuggled from Ghana to Nigeria (Gbogbo 2016), and two Burkinabe people and a Nigerian woman were given suspended sentences in Ouagadougou, Burkina Faso, for trafficking seventy-one vultures and three vulture heads with Nigeria as the intended destination (Fondation 30 million d’amis, 2012). Saidu and Buij (2013) reported that vulture parts are supplied to northern Nigeria from various West African countries, including Niger. Interviews with 113 market traders in northern Nigeria provide evidence that vultures are being sourced from countries including Niger, Benin, Sudan, Cameroon and Chad (UNEP/WCMC 2021). There is also recent evidence of birds being smuggled inter-regionally from Senegal and Guinea Bissau (Safford, *pers. comm.*). Rising prices for vulture parts, discussed below, may further encourage sourcing from other countries in the region or potentially from beyond.

Threat drivers

Financial incentives

A lack of financial alternatives may be one driver for those involved in the killing of vultures for sale into the belief-based trade (Atuo et al 2015). Once in the trade there are potentially strong financial incentives to sell vulture parts due to the soaring prices that can be charged (Deikumah 2020). In Nigeria, between 2001 and 2021 the price for a whole vulture has increased 100-fold, a carcass now fetching c\$92US and a live bird \$210US (UNEP/WCMC 2021). In Ghana, whole vulture carcasses may reach \$140US (Gbogbo 2016) and vulture eggs may be sold for up to \$127US (Deikumah 2020). Saidu and Buij (2013) found the vulture treatment offered for insanity or epilepsy was estimated at \$64US by one trader.

Insufficient laws or law enforcement

It is likely there is a patchwork of approaches adopted by governments and law enforcement agencies within West Africa to the killing and sale of vulture parts. In countries where the belief-based use of vultures may be considered part of the cultural heritage, governments may support the trade, such as in Benin (UNEP/WCMC 2021). The absence of coordinated regulations to stop this trade in Nigeria may be compounding its prevalence (Muhammad and Mustapha 2020). In Nigeria, concern has been expressed that a primary problem facing vultures in the country is that law enforcement agencies and national and international laws are currently 'dormant' (Williams et al 2020).

Cultural belief

There appears to be a widely held belief in the region, and within Nigeria, that vulture parts are effective at curing a wide range of medical ailments and as charms, often to bring good luck, as discussed earlier in this paper. In one northern Nigeria study (Katsina State), the recent rise in the abundance of fetish stalls was attributed by respondents to a surge in spiritual and degenerative ailments such as diabetes, cancer and psychiatric disorders (Muhammad and Mustapha 2020). In this study, consumers came from both within Nigeria and from neighbouring Niger to purchase such products. Ninety-three percent of traditional medicine healers interviewed in a different study had vulture parts for sale on their stalls (Saidu and Buij 2013), indicating the level of interest in purchasing these items. This, along with the apparent rise in prices for vulture parts, point to an increase in interest in the perceived power of these body parts to satisfy needs. Whilst there does seem to be involvement of certain tribal groups in the sale of vulture parts (e.g. Yoruba and Hausa), the studies reviewed point to a much wider section of society that is interested in their purchase and use.

Public perceptions

Vultures do have a prominent place in the cultural belief systems of people across the region, and both negative and positive perceptions of vultures are propagated. There are marked variations in the public perception of vultures and their drivers among West African countries, and even among different regions within some countries. This exemplifies the complexity and challenge of changing negative perceptions in favour of West African vulture conservation.

Male butchers and female meat buyers interviewed in one Ghanaian study (Campbell 2009) pointed to the value of vultures in cleaning up discards, even if they did also steal meat when available. In the same study, older women interviewed expressed a belief in the spiritual power of vultures. In response to this claim, other study respondents attributed the older women's beliefs to a lack of westernised education and traditional training in rural areas where traditional religion and religious leaders were much more respected. Killing vultures can be associated with bringing bad luck (Campbell 2009).

In Burkina Faso vultures are associated with sacredness which may contribute to their protection (Daboné et al. 2019). In Deikumah's 2020 study of attitudes towards vultures in Ghana, 56% of respondents identified vultures as being used as cultural emblems (totems) and a sign of strength and peace. About 88% of respondents still linked vultures to witchcraft, bad omen and as creatures with mystical powers. Seventy-five percent of respondents indicated that vultures were important and needed to be protected.

In Guinea Bissau, 66% of interviewees expressed the opinion that vultures played a positive role whilst 21% perceived them negatively (Henriques et al 2018). Vultures were perceived as providing useful services (e.g. consuming urban waste and carcasses of dead animals) and never causing harm to people or other animals. Links were made between vultures and 'divine deities' and positive links with God. Negative perceptions were mostly linked to a fear of vultures being vectors of disease transmission, or because of their presence annoying meat sellers and livestock-farmers. In the same study, most interviewees (61%) were aware of the use of vultures in 'witchcraft'. A third perceived this use negatively, though an equal proportion did not oppose it or were positively disposed to this use; 50% interviewees involved in the threat analysis part of this study did not believe there was a threat to vulture populations in the country.

Williams et al's 2021 study in north-central Nigeria paints a different picture of public perceptions of vultures. Many people interviewed believed that vultures were evil, and so were persecuted on sight. Seventy six percent of the 204 people interviewed believed that vultures could cause conflict and violence between people. A belief was expressed that, when a person sees two or more vultures at a place, there will soon be a crisis or fighting that will result in death. This was attributed to the 'magic' of the vultures. Consequently people chased away vultures, or even killed them because they did not want trouble in their community. In the same study 68% of respondents concurred that vultures were killed, or their nests destroyed because of the belief that when they lay eggs the rains will stop. Killing vultures by hunters or traditional practitioners was believed to result in vultures leaving the area for years.

Amongst specific ethnic groups, myths about vultures are prevalent (Awoyemi 2021). The Yoruba have an ancient proverb which states, *"we do not kill the vulture, we do not eat the vulture and we do not use the vulture as a sacrifice to the gods to remedy human destiny"* (Adewoye 2007, p54). In Ghana vultures appear to be used as cultural totems and represent a sign of strength and peace (Deikumah 2020). Approximately 88% of respondents in one Ghanaian study (Deikumah 2020) still linked vultures to witchcraft, bad omen and as creatures with mystical powers. In the same study, seventy-five percent of respondents indicated that vultures were important and needed to be protected.

Threat mapping- expert judgement

Expert group discussion

Following the literature review the experts involved in generating the information contained in this document convened to share their personal thoughts and any recent research findings to deepen understanding of the persecution of vultures in West Africa. In the first of a series of meetings the group pooled their initial thoughts on this over-arching threat to vultures, with a particular focus on belief-based use ([Appendix II](#)). These early discussions highlighted variations in the cultural or economic value attached to different vulture species and to their body parts within distinct cultural groups and geographic locations, both within and between countries. Strongly held cultural beliefs along with growing financial incentives are key drivers in the killing (particularly using poisons) and sale of vultures for belief-based use, with certain communities and nationalities being important suppliers and others being important consumers of the species. Whilst perceptions of vultures as health pests, or 'evil spirits' may be a driver of killing in certain areas (e.g. Guinea Bissau), along with killing for human consumption primarily for subsistence purposes, neither are as important as the

incentive to kill them for belief-based use. Finally, whilst the trade in vultures and vulture parts was perceived to be prevalent within the region, there does not appear to be much evidence of the trade reaching markets outside of West Africa.

This initial analysis surfaced multiple additional questions, many of which could not be answered at this time ((Table 2).

Questions generated by expert group relating to vulture persecution in West Africa
Killing of vultures for Belief-based (BB) use trade
<ul style="list-style-type: none"> • Which species of vultures preferred or most easily killed by hunters? • Regional illegal wildlife traders may use vultures for own belief not to be caught when dealing with other, more highly prized items- potential indirect link to broader illegal wildlife trade movements? • Where the behaviour is illegal, what is the level of concern about penalties/punishment? (Thinking about barriers in addition to the understanding of the motivations...) • Who are the community and spiritual leaders, and do they play a relevant role in the spread/maintenance of key beliefs? • Any idea what the proportion of communities are suppliers/ drivers by region, if it is not uniform? • Which species of vultures preferred by buyers and sellers and for what purposes? • Could political unrest (e.g. Guinea Bissau) drive trade/ have some impact? • Are there links to wildlife trade syndicates? • Do most customers buy direct from the market, or are intermediaries involved? • Who are the customers primarily? Social demographics - do we know? • What is the take of the official medical authorities about medical use of vulture parts? • Any important patterns in the prevalence/strength of these beliefs (e.g. urban v rural, adult v youngsters)? • To what extent are beliefs supported by evidence? • Any difference in the importance of beliefs about 'physical world` (e.g. improve bad eyesight) versus spiritual world (e.g. bad omen)? (The latter is harder to tackle)
Killing of vultures for bushmeat trade
<ul style="list-style-type: none"> • Who are the community and spiritual leaders, and do they play a relevant role in the spread/maintenance of key beliefs? • Younger people doing this in Ghana. • Is lack of ALTERNATIVES part of the motivation behind the consumption and trade? • What are eggs harvested and used for? • Do we know which countries where vulture meat is desired beyond R of Guinea? We do not know if consumption in Guinea is linked to food or for BB use • Republic of Guinea- vulture meat eaten knowingly, but in other countries this is not the case. Country-specific? • What is the risk to consumers if vultures are hunted using poison? • What is the risk to human health associated with this practice?
Killing of vultures as perceived pest
<ul style="list-style-type: none"> • Superstition-driven action? What are the negative perceptions?

Table 2. Questions raised during expert group discussion on vulture persecution in West Africa

Threat mapping

The expert group used the initial discussion to then develop a threat map to graphically represent the system they saw existing within West Africa to help explain potential causal relationships (**Figure 2**). The map was based on a combination of known facts and informed assumptions.

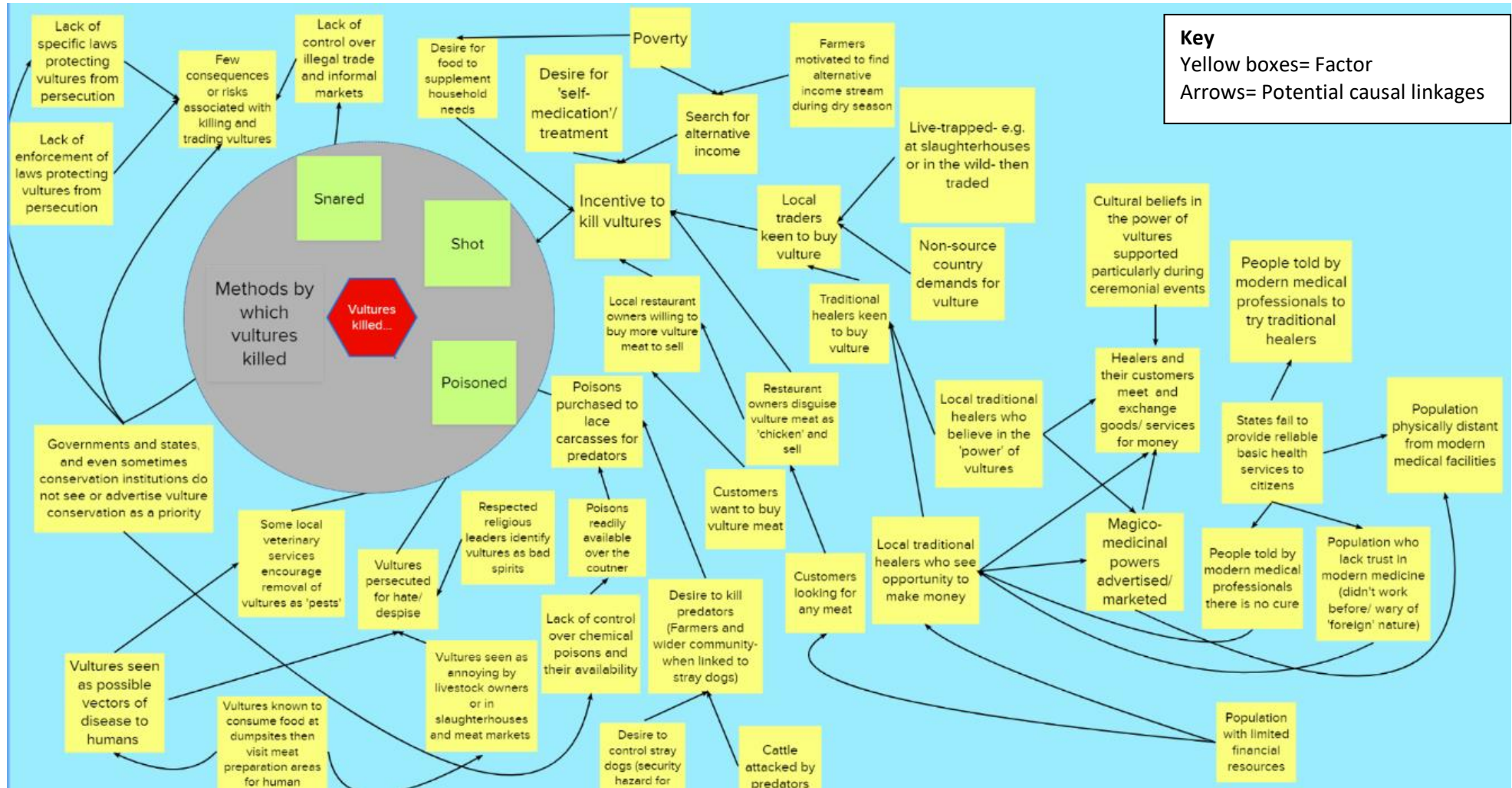


Figure 2 illustrates the complexity involved in driving persecution of vultures in West Africa, and in particular the threat of belief-based killing. Further detail was added to the threat map once produced by individuals within the threat mapping group, specifically examples to illustrate certain factors identified, and questions that remain unanswered.

Further information provided within the threat mapping exercise

Shooting (e.g. in Ghana), snaring (e.g. using baited fishing lines and hooks in Guinea Bissau) and poisoning of vultures are recognised as being the primary methods of vulture persecution. Methods used are influenced by the desired use. For example, certain ceremonies require the vulture to remain alive. It is possible to see vultures flying around with a red string attached to their legs or head. This is a way of performing witchcraft, the vultures being used in this way to cast bad spells over someone, or to ensure safe travels to someone else.

Indirect persecution of vultures is believed to occur as farmers and other community members seek to remove large predators, or to control the abundance of feral dogs. Vultures are also known to be persecuted as they are perceived vectors of disease. For example, in Guinea Bissau local vets are known to promote the control of vulture populations as ‘pests,’ based on biased and false perceptions of vulture super-abundance.

Disincentives for killing vultures are limited in the region. In countries such as Guinea Bissau specific laws protecting vultures are lacking and penalising perpetrators of vulture killing is a rare occurrence. Poverty is believed to be a driver of vulture killing, with certain groups (e.g. farmers) requiring additional sources of income and food at certain times in the year. In Côte d’Ivoire, people kill and consume vultures when other foods may be difficult to acquire. This may not be something that people are willing to admit as in some countries in the region (e.g. Guinea Bissau) consumption of vulture meat is perceived as ‘dirty.’

Limited finances may restrict full access to modern medical care, encouraging people in this position to seek more traditional forms of medical or spiritual intervention. Insufficient access to or availability of modern healthcare across the region increases the likelihood that people will seek other forms of medication, turning again to traditional healers. It has also been reported in countries such as Benin, Nigeria, Sierra Leone, Senegal and Guinea Bissau that modern medical practitioners themselves are directing patients to traditional healers, for example, when they feel they are not able to offer alternatives.

It is widely held cultural beliefs in the value of species such as vultures to convey some form of physical or spiritual power that is believed to underpin much of the killing of vultures within the region. Spiritual leaders can reinforce this belief, for example, proclaiming that vulture parts can help protect people during times of unrest. In Burkina Faso vulture parts are used in ceremonial events to bring good luck. These cultural attitudes are not restricted to certain age groups in society. In at least the Republic of Guinea, Senegal and Guinea Bissau, younger generations are known to report similar views.

In certain countries (e.g. Guinea Bissau) individuals will seek out vulture parts themselves for self-treatment of certain ailments or for spiritual reasons, without involving a traditional healer, though the more common route in West Africa is through a traditional healer. For example, in Guinea Bissau there is a belief that vultures can be used to cure psychiatric diseases, and so family members of the person who is ill will go out, pay someone to help them catch a vulture alive, then bathe the animal and give the water from the bath to drink and wash the head of the ill to cure them. In other situations, traditional healers are consulted, but it is up to the individual to then go out and acquire the vulture parts for the prescribed use. Such independent acquisition of vulture parts may be more common in areas where belief-based markets do not exist.

There may be a gender-based influence in who is buying and selling vulture parts. In at least one set of interviews conducted in southwest Nigeria, those purchasing the vulture parts were all men, whilst it was women who were selling them. It is not known though if this pattern is replicated elsewhere.

Questions generated during threat mapping

Gaps in our understanding of the threat of persecution to vultures in West Africa remain. **Table 3.** captures the questions raised during the threat mapping exercise that, if answered, could shed further light on belief-based use of vultures in the region.

Questions to be answered
Understanding capture and kill methods
<i>Is there any relationship between mode of capture and type of person/ desired use of vulture?</i>
Understanding profiles of people involved in killing or use
<i>Are there particular groups of people who are susceptible to messages from spiritual leaders to kill vultures?</i>
<i>What are the social demographics of the people going to healers/consuming vulture parts?</i>
<i>To what extent are vulture parts considered to be 'luxury' items and so sold to affluent people?</i>
Understanding profiles of people drawn into the 'healing' profession
<i>To what extent are people 'drawn' into traditional healing as a profession more now than before?</i>

(Example: One individual who reported being inspired to become a healer in a dream. He moved from a job in the gas industry to become a healer, and now works from an office, advertises through a website etc. Is this a typical route in?

Do we know the proportion of 'trained' healers vs self-professed healers/fakes?

Understanding attitudes that could be encouraged

What positive or other beliefs are there about vultures that might contribute to saving them? Is there a perception or awareness among consumers of a declining supply of this important 'resource' because of an unsustainable harvest?

Understanding drivers

*What is the relationship between source and supply countries?
 What proportion of vulture parts are sold by local traders direct to consumers v to healers or to people coming from outside the country?
 Who is really driving the demand, the healers or the people who go to them?
 To what extent is the trading part of the system driving this behaviour?*

Table 3. Questions generated during threat mapping exercise

Conclusions

There is convincing evidence that persecution of vultures in West Africa may significantly impact vultures within the region. Nevertheless, additional knowledge is required to understand and quantify the relative importance of the different forms of persecution in the scope of ongoing population-level declines. A range of indirect and direct means of persecution have been documented and may be more important in certain countries. However, the primary persecution-related threat to the species group in the region is through the widespread interest in their use for belief-based practices. Vulture body parts are used for a wide variety of reasons, ranging from their value as positive or negative charms through to their perceived value in curing a diversity of physical and mental ailments. The motivation to purchase vulture parts comes from multiple sources, including the lack of availability of effective modern healthcare to insufficient financial resources to access such healthcare.

Cultural beliefs in the 'power' of animal parts as curative remedies are strong and widespread within the region, supported by the views of spiritual and political leaders. There is evidence that certain ethnic groups are more likely to trade and use vulture parts for belief-based reasons, and particularly, poorer sections of society may be drawn into capturing or killing vultures to meet their financial needs. A lack of legal protection or enforcement of that protection across the region is likely to reduce the barriers to those involved in the industry, from those involved in killing, to those trading and then using vulture parts for belief-based use. The cross-border trade in vulture parts presents additional challenges to interventions designed to reduce the threat and highlights a need for a regional approach. Positive attitudes towards vultures and the need to protect them do exist,

although the deep-seated cultural beliefs driving the trade appear to be having a stronger impact; at least at present.

Conservation efforts designed to mitigate the threat of belief-based use and other forms of persecution will require serious recognition of the underpinning socio-cultural drivers of human behaviour. The process adopted to develop an effective plan of action will need to involve representatives of all stakeholder groups involved. It will need to ensure that all voices are heard and included in decision-making, to ensure that collective ownership of the plan and a desire to fully implement it is achieved.

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Appendix I Expert group involved in threat mapping

The table below presents the list of individuals involved in the development of this threat mapping process, listed in alphabetic order.

Name	Institutional affiliation	Country
Stephen Awoyemi	Central European University	Nigeria
Andre Botha	IUCN SSC Vulture Specialist Group	South Africa
Salisha Chandra	BirdLife International	Kenya
Geoffroy Citegetse	BirdLife International	Sierra Leone
Jamieson Copsey	IUCN SSC Conservation Planning Specialist Group	United Kingdom
Clément Dabone	Université de Ouagadougou	Burkina Faso
Justus P. Deikumah	University of Cape Coast	Ghana
Mohamed Henriques	University of Lisbon	Guinea Bissau
Darcy Ogada	The Peregrine Fund	Kenya
Roger Safford	BirdLife International	United Kingdom

Appendix II Consolidated comments from expert group

Initial thoughts on human persecution of vultures in West Africa

Killing and sale of vultures for belief-based use

- **The value attached to different vulture species (and body parts) varies geographically**
 - There seems to be a connection between local abundance of species and the species that are most traded (availability, basically). But also, Hooded Vultures seem to be easier to capture than *Gyps*-species because of mutualism with humans in West Africa
 - The Hooded Vulture is culturally iconic and is at the forefront for belief-based use for Southwest Nigeria
 - In Ghana, no preference is attached to different vulture species, though there is a difference in what is available- Hooded Vultures are most common, and so this is what is known as 'vulture'
 - A couple of studies have also suggested that White-backed and Rüppell's are more "valuable" than Hooded Vultures (in Benin for example)
 - Different values and uses are attached to distinct species within Guinea Bissau. White-backed Vulture considered the King of vultures- have a head prized in the East - Poula ethnic group. In the Northwest, another cultural group (*Manjaco*) value Hooded Vultures more as they are perceived to be smarter; used to help you avoid being caught when doing illegal things or trying to outsmart other people, etc.
 - Hooded Vultures and Rüppell's Vulture heads or carcass/live birds may be used for different purposes. Hooded Vultures are more expensive (due to spiritual beliefs surrounding the species). Igun- long-life. Convey long life on consumer
 - Seems like heads/skulls are most preferred

- **People kill vultures (sometime opportunistically) for financial and belief-based reasons**
 - Livelihoods - this is a way of providing sustenance
 - Vulture killing can be motivated by financial reasons or belief-based
 - Opportunistic - bushmeat traders might also kill vultures as not primary target but then still kill
 - Vulture killing is motivated by the demand for vulture parts from traditional practices that involve ritual or purported medicinal purposes
 - Killing of vultures is to meet the demand for trade in belief-based use. So, hunters kill vultures for financial reasons to supplement their farming income. While for the traders, two factors are in play. First, the trade practice is inherited, and traders participate in the trade from an early age before knowledge of economic opportunity. So, cultural transmission is antecedent to financial reasons
 - In Burkina Faso there is ceremonial use of vulture parts to bring good omens to ceremonies. Maybe not a huge driver of mortalities though

- **Vultures are killed using poisons**
 - Vultures are often killed using poisons
 - Poison availability may be one of the key facilitators
 - Multiple chemicals can be combined to create poison for baiting. e.g. snuff bought and used this make vultures drowsy to catch. No clear policy/ restrictions on who can buy what.
 - Many chemicals available for agricultural purposes- widely available.
 - Trapping, poisoning are methods of killing

- **People use vulture/vulture parts as they believe in their efficacy and may lack access to alternative treatments**

- Common knowledge for medical professionals to direct people to traditional healers/ prayer camps- due to not being able to help the patients themselves. If they cannot help, then they may direct to traditional healers
- Poor modern health systems may encourage people towards using traditional healers
- **Demand is local and regional, but not international (i.e. outside of West Africa)**
 - Note- vulture trade potentially not on the international donor funding radar as the trade not at similar scale to ivory etc.
 - Assumed that the financial returns are insufficient to be of interest to the illegal international wildlife trade. Locally driven demand? Links to local trade but not international trade, though regional traders may use vulture parts to provide 'protection' from being caught trading other items.
 - Birds are not necessarily killed in the country of use
 - Certain countries/communities are drivers while others are suppliers
 - Major trade routes into Nigeria. Even in countries that have belief-based use like Senegal a portion flows to Nigeria
- **Strong cultural beliefs, secretive practices and lack of law enforcement makes changing behaviours hard**
 - Lack of enforcement
 - Weak laws/ law enforcement
 - Poverty is a driver
 - Deep-seated cultural beliefs
 - Belief-based use in Guinea Bissau and Gambia is something that is very secretly managed, much more than for e.g. in Benin
 - Spiritual head announced that vulture parts could help protect people during time of unrest
 - Cultural beliefs make this extremely hard to tackle given the urgency of the situation
 - Motivated by generational transmission of cultural traits to trade in vulture parts that flows matrilineally
- **Uncategorised comments**
 - It is the presence or the arrival of live Hooded Vultures at traditional ritual and ceremony that is regarded as good omens for the success of the ceremony
 - Potentially where markets do not exist (e.g. in Guinea Bissau) traditional healers must get themselves rather than using 'middlemen'

Killing and sale of vultures for human consumption (food)

- **What we do know about consumption of vulture meat for food suggests it is for subsistence, not as a luxury**
 - We know little about how big of an impact this is
 - In places like Côte d'Ivoire there might be more indiscriminate killing of wildlife including vultures because of the apathy towards conservation and the need to maintain livelihoods. So in places the driver is livelihoods, not necessarily that for which it is getting used.
 - Killing of vultures could be for survival for certain marginalized groups- may be eating it and may also be killing for sale
 - In Côte d'Ivoire, they would consume this because it is available - not purchase but subsistence killing. Unconfirmed.
 - Limited interest in vulture meat as 'delicacy'. Instead disguised as other meat (e.g. chicken)
 - We do not know if consumption in Guinea is linked to food or for belief-based use

Killing of vultures as perceived pest

- **Whilst not a major factor, perceptions of vultures as a health pest or spiritually 'evil' can contribute to them being actively killed**
 - A minor factor in the overall scheme of things
 - In Guinea Bissau at least was the main driver of killings of Hooded Vultures in key areas in the East, perpetrated by local veterinary officers
 - Killing of vultures may simply be because they are not perceived as of value. Can be perceived as evil (e.g. pastors may refer to the species as linked to evil). Species not necessarily consumed or used in any way. Religion plays a role.