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Wildlife Conservation Research Unit

Part of the University of Oxford's Department of Zoology, WildCRU is a pioneering, interdisciplinary research unit in a world-class academic centre. We seek solutions to conservation problems through primary scientific research. Our approach is empirical, interdisciplinary and collaborative, seeking to include all four elements of our Conservation Quartet: research to understand and address the problem; education to explain it; community involvement to ensure participation and acceptance; and implementation of long-term solutions.

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RSPCA
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The international work of the RSPCA is constantly evolving in response to a changing world in which issues such as food quality and safety, public health, sustainable agriculture and the environment increasingly connect animal welfare and human welfare. The RSPCA recognises the clear link between animal welfare, wildlife conservation and development. We are committed to integrating our work on animal welfare in developing countries into human development and wildlife conservation programmes.

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Animals, the environment and people

Executive summary of the report *Animal welfare, international development, biodiversity conservation – the road to peaceful coexistence*[a].

Authors: Joanna Bagniewska and David Macdonald, Wildlife Conservation Research Unit, Zoology Department, University of Oxford, UK (2010).

Report commissioned by RSPCA International.

Contents

Introduction

Wildlife and humans coexist in an intricate relationship. People value wildlife as a source of income, food and medicine, as a cultural symbol or a charm. At the same time, communities living in proximity to wildlife may consider wildlife a nuisance, competition or threat.

This document is an executive summary of a report that investigates the relevance of wild animal welfare in the spheres of biodiversity conservation and international development.

Animal welfare *is the physical and mental fitness and wellbeing of non-human animals.*

Biodiversity conservation *aims to minimise biodiversity loss through the preservation, sustainable use and restoration of the environment and its component species.*

International development *works to increase the quality of life for humans and overcome poverty worldwide through improvement of livelihoods.*

This report considers two categories of interaction: **nuisance wildlife** and **wildlife as a resource.** Both have deep ramifications in the context of international development, as impoverished people may be less tolerant of wildlife (e.g. of predation by carnivores) and more prone to its unsustainable exploitation (e.g. bushmeat hunting). It is urgent both to alleviate poverty and to conserve biodiversity. Although these imperatives are fundamentally linked, they may represent opposing goals. The tangle of interests and needs makes it impossible to conserve wildlife and care for its welfare without also considering the wellbeing of the humans living alongside it[1].

These are all topics with which conservation biologists are very familiar, however, this booklet is targeted at those from different backgrounds, who may have had little exposure to wildlife issues, either in terms of conservation or welfare.

[a] The report *Animal welfare, international development, biodiversity conservation – the road to peaceful coexistence* is a literature review of more than 350 references (mainly scientific papers but also – where these are not available – reports, personal communication, press articles and websites). The review focuses solely on wild vertebrate species; it presents an international overview with a focus on Africa, Asia and South America, due to the abundant biodiversity, low incomes and higher percentage of rural communities in these continents. In the report, a quick, humane death is not considered a welfare issue.

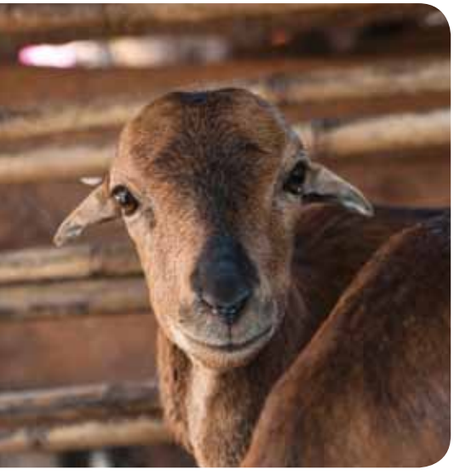
Nuisance wildlife

Due to increased human encroachment into natural habitats, as well as rapid population growth (especially in developing countries) and an ever-greater human 'footprint' on the environment, communities find themselves living in close proximity to wildlife – some of which may be threatened species and some destructive or even dangerous. Diminishing resources and new opportunities result in animals searching for food in areas occupied by people, which sometimes leads to human-wildlife conflict.

Conflict affects humans on two levels: wildlife may negatively impact livelihoods by preying on livestock, destroying possessions or foraging on crops; it may also pose a threat to human life and health. Wildlife-inflicted damage can be especially acute in impoverished rural communities, and the ensuing fear, hardship and anger may lead to preventive or retaliatory killings of animals perceived to be the culprits. Persecution may also cause suffering to animals. As a result, concern for animal welfare is yet another factor to consider at the already complicated interface between conservation and development.

It is also not surprising that human-wildlife conflict fosters resentment towards conservation efforts in affected communities, especially towards the protection or reintroduction of conflict-causing species[2]. Modern conservation, therefore, is fundamentally about reconciling the activities and needs of humans and wildlife.

PICTURE © LEE STEWART



PICTURE © WORLDWIDE VETERINARY SERVICE

Livestock depredation

Background

Most large carnivores are classed as Threatened or Endangered[3]. These species often require extensive home ranges, and habitat loss or fragmentation combined with declining wild prey species frequently drives carnivores into competition with humans. Since rural communities – whether legally or illegally – often graze their stock in areas of relative wilderness with high carnivore densities, large predators may kill livestock. In some areas, domestic animals outnumber wild prey; the domestic animals may also be easier to kill than the wild prey[4].

WELFARE

Farmers fearing for their livestock may resort to lethal control of carnivores: shooting, poisoning and snaring – even dynamite has been used[2–5]. Neck snares and leg-hold traps have the potential to cause intense suffering, particularly if not checked regularly; they can also injure or kill non-target animals. Denning is an extreme example used to capture or kill coyote and wolf pups; this involves setting the den on fire or throwing explosives or fumigants inside[4, 6, 7].

CONSERVATION

Predator decline is of conservation concern since large carnivores can play a crucial role in ecosystem processes through top-down regulation of prey numbers. Persecution in response to livestock depredation has eliminated several carnivore species (e.g. wolf, lion, tiger) from significant parts of their former range[4]. In a study from Laikipia, Kenya, 17 of 18 tagged lions which died were killed in retribution for livestock raiding, with a 4 percent per annum population decline[8]. In 1994–1996, in Zimbabwe, 65 percent of African wild dog deaths resulted from retaliatory/prophylactic kills – accounting for 30 percent of the population at the beginning of the study[9].

LIVELIHOODS

Predation losses to farmers may depend on the location and size of the holding; herding techniques and other husbandry practices; the predator species concerned; and the type of livestock. Although the absolute financial losses may be greatest on large farms, the impact of livestock losses on small-scale farmers may be most damaging. Losses of even 80 percent of annual cash income are not unheard of on small land-holdings[10]. The knock-on effects of livestock predation are numerous and varied, e.g. children may be used as herders, which impacts on their education if they miss school to help with guarding livestock.

Limited involvement by local people in wildlife tourism and lack of access to the revenue generated, coupled with ready access to agricultural poisons, may also be motivations behind increasing levels of illegal predator control.

LOVERIDGE ET AL., 2010[11]

PICTURE © EGIL DROGE / ZAMBIA CARNIVORE PROGRAM

Potential solutions

Apart from their ecological importance and inherent value, large carnivores have an economic value, generating income through various forms of tourism, including photography and hunting. However, if local communities are to genuinely value wildlife and have a positive attitude towards it, the gain to these communities (e.g. through tourism) must outweigh the costs they incur from living alongside nature[12].

Improving livestock husbandry techniques

Improved livestock husbandry may remove the opportunity for predation and perhaps prevent predators from developing a 'taste' for livestock[10]. Diligent husbandry may include monitoring the herd frequently; using electric fences; corralling animals at night; providing special protection for young animals; and ensuring carcasses are burned or buried to avoid attracting scavengers[3, 13].

Deterrents

Guard dogs can be an effective deterrent to potential predators[14], and they are most efficient when working directly with shepherds. Donkeys and llamas have also been used to guard livestock[6, 15].

Other deterrent techniques include chemical repellents and learned food aversions, protective sound- and light-emitting devices and perhaps even hi-tech approaches such as equipping rare predators with dog-training collars that deliver an electric shock in the proximity of livestock[3, 16]. Because animals can quickly become habituated, disruptive light and sound devices work best when used irregularly[16]. In every case, animal welfare should be an element of the cost-benefit assessment of a particular strategy.

Providing compensation for monetary losses

Financial schemes exist to compensate stock owners for losses due to predators, but need careful monitoring as they are clearly open to abuse (e.g. the perverse incentive of encouraging farmers to be lackadaisical in their husbandry or to submit false claims)[12]. There might be more potential in developing incentives to encourage farmers to improve their husbandry and tolerate predators.

Eliminating problem animals

Lethal control is clearly highly undesirable for endangered species. Where culling is employed, it should carefully target only those individuals that cause significant depredation, but this requires accurate identification of the individuals involved. Translocation may be effective if animals can be moved to less conflict-prone areas, however it is time-consuming and expensive and translocated animals often return to their original ranges[17]. For all translocation, attention should be given to the welfare implications of capture methods and the selection of release sites. Trophy hunting is sometimes proposed as a means of targeting a problem animal, or to generally lower predator density. Sustainable sport hunting can generate revenues for the local community, perhaps thereby causing people to regard large carnivores as assets rather than liabilities[18].

Case study

The Cheetah Conservation Fund (CCF)

The Cheetah Conservation Fund's Livestock Guarding Dog (LSGD) programme in Namibia trains Kangal and Anatolian shepherd dogs to protect livestock from predators, including cheetahs. Puppies are raised with the herd so that they bond with the livestock instead of with humans, and thus assume the role of protector. This programme is an extension of a livestock management practice already used by Namibian farmers.

CCF breeds the dogs and carefully matches them to recipient farmers. Farmers are taught how to train their dogs to ensure they become successful guard dogs and the programme keeps in touch to ensure the dog is doing well.

www.cheetah.org

PICTURE © ISTOCK

PICTURE © SIMONE ECKHARDT / STICHTING SPOTS

"In Namibia, guarding dogs were very successful in terms of reducing livestock losses, with 73 percent of responding farmers reporting a large decline in losses since aquisition of a guarding dog, and the same percentage seeing an economic benefit to having a dog."

MARKER ET AL., 2005[14]

PICTURE © LEE STEWART

Crop raiding

Background

Crop raiding by vertebrates is a perennial problem in Africa, Asia and South America. Crop plants, bred for palatability and limited chemical defence, are a very attractive food source for wildlife, ranging from rodents to elephants[b]. The large mammals (such as primates, elephants and ungulates) drawn to agricultural fields create multiple problems: they may eat and trample crops, causing economic losses to the local farmers; pose direct risks to human lives; and transmit disease[19].

[b] The report only discusses crop-raiding species that are of conservation concern, rather than conventional pest species (e.g. mice, sparrows, pigeons) or domestic animals.

WELFARE

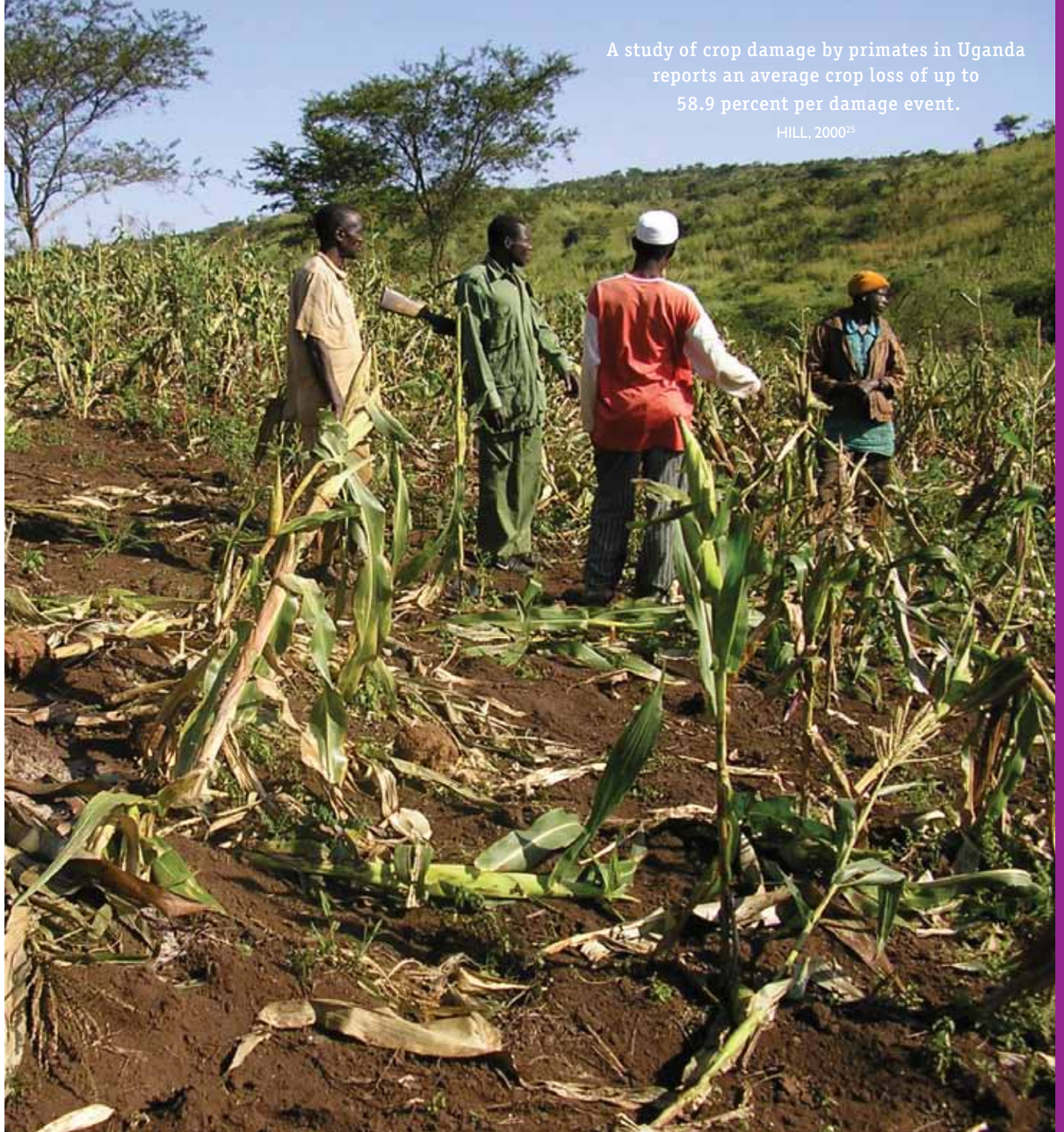
Rural communities may resort to killing wildlife in an attempt to prevent crop raids, and in retaliation. Poisoning is widespread and also affects non-target species[20]. Poisons include anticoagulants, used mainly on rodents, and pesticide derivatives used on larger animals[21,22]. Death from consumption of anticoagulants can take up to 20 days[21]. Carnivores can also suffer secondary poisoning through eating carcasses of legitimately poisoned animals. Wire neck and foot snares are commonly used in an effort to limit crop-raiding; animals are also speared, shot and injured by domestic dogs[20].

CONSERVATION

Crop raiding often needs to be considered at a landscape scale, taking account of the relationship between protected areas, buffer zones and farming areas. Lethal control of crop pests is common, not only for rodents but also for larger species including some that are listed as Endangered or Threatened on the IUCN Red List (e.g. gorillas, chimpanzees and elephants)[2]. More research is needed to ascertain when lethal control is cost-effective, and to determine its impact on wildlife populations.

LIVELIHOODS

Farmers cannot be expected to be sympathetic to wildlife if they perceive that it threatens their livelihoods or even lives (as some large raiders, such as elephants and gorillas, inevitably do). In Tanzania crop-raiding bush pigs attract lions to the vicinity, leading to the killing of people guarding the crops at night[23]. In some areas, traditional or religious beliefs prohibit people from any contact with swine, which impedes the control of bush pig populations. Estimated crop losses to wildlife can be severe, and tend to be especially acute during the dry season[25].



A study of crop damage by primates in Uganda reports an average crop loss of up to 58.9 percent per damage event.

HILL, 2000[25]

PICTURE © FRANCISCA MALEMBEKA

Potential solutions

Those perceiving wildlife as a problem often seek a solution in culling, which may be more or less targeted and can involve inhumane methods. In cases where the problem species are endangered, wildlife managers and conservation organisations seek to reduce conflict. More research is required on non-lethal methods of control which may not only be effective but also have a lower welfare impact. There is a pressing need for reliable, low-cost and effective systems of crop protection, implemented with the cooperation and involvement of the local farming communities.

Passive barrier techniques

One traditional non-lethal approach uses electric fencing to protect crops from mammalian pests, but it is expensive to install and maintain, and has the potential to hinder natural behaviour including, at an extreme, migrations and dispersal[26]. Conflict with elephants illustrates an 'arms race' with electric fences, necessitating progressively higher voltages[2]. Moreover, elephants may come to associate fences with a food reward concealed within, and thus be drawn towards them[19]. Thorny plants or barriers made from stone, wood or barbed wire can protect against some species, but are generally ineffective against elephants.

Other passive forms of protection include scarecrows, digging ditches and trenches or nailing smooth metal sheets around tree trunks to prevent climbing animals from reaching crops.

Active protection methods

GUARDING Human presence may be sufficient to keep crop-raiders at bay, but active harassment may enhance the protection, reducing the time raiders spend in fields. Prevention is better than cure, so a proactive system of early warning and neighbourhood watch, coordinated within a cooperative community, is desirable. Guarding can be integrated with various forms of deterrent such as bright lights, fire and noise (e.g. firecrackers, banging tins and drums or firing gun shots in the air)[11, 24]. A recurrent problem is that wild animals often habituate to sound or light deterrents. Guarding may bring occupational hazards, such as exposure to risk (e.g. direct injury from the raiders or catching malaria) or, for children, reducing school attendance.

CHEMICAL REPELLENTS These have a long history in crop protection; a more recent innovation, however, is the use of *Capsicum oleoresin* (a derivative of chilli that causes a burning sensation). It can be applied as grease to fences, added to elephant dung briquettes that are lit at night, or blasted in the air as a powder[27], and has been used against elephants, bears and ungulates. Farmers may grow chilli for crop-protection, selling any surplus for human consumption. However, labour requirements are high: replenishing the repellent on fence lines, burning briquettes or blasting chilli at night all involves work, and sometimes danger.

If local solutions fail, translocation may be an option. Yet transporting the raider elsewhere is technically demanding and, again, labour expensive, and may risk nimbyism and welfare problems.

Case study

The Elephant Pepper Development Trust

The Elephant Pepper Development Trust aims to promote the livelihood of farmers through training, deployment of appropriate conflict mitigation methods and the development of agricultural techniques that support elephant conservation. In an effort to reduce the short-term impacts of crop raiding, methods to keep elephants out of crop fields were developed and tested over several growing seasons. By at least partly alleviating the problem, farmers may become less antagonistic toward elephants – hopefully a first step toward co-existence. Growing chillies for use as a deterrent can also provide a diversified business opportunity for farmers, perhaps supported by microfinance. The Trust was set up to train farmers in these methods and to identify markets to which farmers may sell their excess chilli crop.

www.elephantpepper.org

PICTURE © ISTOCK

Human injury

Background

Increased human density and encroachment into wilderness areas has resulted in more frequent human-wildlife encounters and fewer places free of human activity. Apart from exerting economic pressure on neighbouring human communities, wildlife can also inflict damage upon people[28]. In rural societies wild-animal attacks often occur during everyday domestic duties. Understandably, where wildlife is a threat not only to livelihoods but also to life and limb, local communities may be hostile towards conservation of, for example, large carnivores in the vicinity of their households. Indeed, their tolerance of wildlife is often more remarkable than their hostility towards it.

WELFARE

Animals regarded as dangerous are very often killed in retaliation or in the hope of preventing anticipated attacks. Poisoning is a common killing method and can be one of the least humane, often causing intense suffering and leading to a protracted, painful death (asphyxia, internal haemorrhages, convulsions). A clean shot may have no direct welfare implications (although the death of a social animal may be stressful for surviving companions), however, shooting is often inaccurate, leading to wounding and associated welfare problems. Other control methods include snaring, spearing, crushing, and destroying or poisoning nests, dens and young.

CONSERVATION

Increasingly, traditional animal routes are blocked by urban development[28], resulting in mega-herbivores (e.g. elephants or buffalo) finding other routes through human settlements, destroying property and occasionally killing people. Resolving such hazards is a major challenge for conservation and development in the face of the need to accommodate human livelihoods and wellbeing. The species involved may be threatened or endangered (e.g. tiger, chimpanzee, elephant). Injuries and human fatalities are clearly an unbearable burden for local communities, and often prompt retaliatory killing, which may cause deaths of other, non-culprit individuals and species[11].

LIVELIHOODS

In rural populations wildlife attacks on humans occur during everyday activities; living in constant fear of predators is a terrible burden for local people that can impinge on many aspects of their lives. Farmers may reduce time in the fields to avoid contact with, for example, lions, and this may affect their livelihood. Some fishermen take risks by working in waters inhabited by crocodiles and hippopotamuses. Wildlife attacks can maim, kill and spread diseases to humans[29]. Compensation is often non-existent or grossly inadequate – sometimes as little as US$30–50 for the loss of a human life[30].

PICTURE © ISTOCK

The exact number of lethal attacks by vertebrate wildlife is unknown, but regional estimates range between 0.01 people/1,000 km²/year in scarcely populated areas of the Russian Far East[31] and 50–55 people/1,000 km²/year in parts of Tanzania, where lions specifically target people as prey[30].

MIQUELLE ET AL., 2005[31]; BALDUS, 2004[30]

Potential solutions

Education

ON WILDLIFE.

Communities need access to knowledge about the presence, activity patterns, ecology and diet of species regarded as hazardous, in order to reduce chances of conflict. Folk beliefs and perceptions should be addressed to avoid persecution of harmless animals that are erroneously believed to harm humans, e.g. chameleons[32].

ON AVOIDING WILDLIFE.

People living close to protected areas need to be better informed of the risks connected with their everyday activities and how to reduce these risks. Some avoidance may be very simple, such as walking in groups and avoiding wildlife habitats during foraging hours[23, 33].

ON BEHAVIOUR DURING WILDLIFE ENCOUNTERS

Communities need to know how to react to danger and prevent an attack. For example, aggressive responses such as shouting, waving arms or threatening with sticks or rocks can avert a carnivore attack, whereas running may provoke one[34].

Research

REPORTING

The reporting of wildlife attacks provides the authorities with statistics on attack frequencies, temporal and spatial patterns, and circumstances and causes. These data are important for estimating the magnitude of the problem; elucidating factors that affect risk; development of mitigation methods; and education on the best defence against attack.

STUDYING THE TARGET SPECIES

Further knowledge of the species' ecology, habitat needs, etc., may help in devising solutions to mitigate conflict and risk. For example, knowledge of animal movements may inform the design of buffer zones or nature reserves on a landscape scale – an approach facilitating the coexistence of protected and developed areas. The balance of segregation and integration of people and wildlife can best be informed by scientific study of the root causes of their conflicts.

Removing problem animals

The culling and translocation of specific problem-animals are possible solutions but both are likely to be expensive, labour intensive, and have associated welfare costs[11].
A crucial factor in the success of translocation is the availability of suitable sites where large carnivores can be released, suitable in terms of proximity to both humans and resident populations of their own species.

Other methods

In the Sundarbans, Bangladesh, attempts have been made to condition tigers using electrified human-like dummies, with mixed results[2]. Another fairly successful technique involved people working in fields wearing plastic masks on the back of their head – these were supposed to deter tigers, which avoid frontal attacks on prey[2]. Chilli pepper spray can be used as a non-lethal repellent against bears[35].

Case study

Slovak Wildlife Society

The Slovak Wildlife Society (SWS) is a not-for-profit Anglo-Slovak initiative for the conservation of Carpathian wildlife. Its goal is to help ensure the long-term survival of Endangered and Vulnerable species and their habitats in Slovakia by finding sustainable solutions for co-existence with people. Particular attention is given to two conflict species, wolves and brown bears, in the context of livestock depredation[36] and attacks on humans. The BEARS project promotes bear education, awareness and research in Slovakia. It also provides safety advice, promotes the use of non-lethal deterrents such as chilli spray, and promotes guidelines on avoiding dangerous situations.

www.slovakwildlife.org

PICTURE © ROBIN RIGG, SWS / BEARS PROJECT

Bears project: www.medvede.sk

Wildlife as a resource

With population growth, better access to forests, and the development of a consumer economy, the use of wildlife for food and ornamental, medicinal and recreational purposes has become highly commercialised. The massive demand for wild meat has grown as people abandon former food taboos, while animal-derived ornaments and exotic pets are sought for prestige and fashion. Trade in wildlife products can be extremely lucrative at every level, from poachers through the middlemen, with the highest profit margins towards the top of the trade ladder. While tiger skins can reach market prices of US$16,000 (after a minimal initial input of a few dollars for bullets or snares), "fines in India can be as little as US$440 and even the maximum fine in Nepal, of US$1,420, is less than the value of a single skin"[37].

The exploitation of wildlife is often conducted unsustainably: animals are frequently sourced from protected areas and the volume of the trade poses a serious threat to species survival. While habitat loss is the major long-term cause of species decline, poaching for wildlife is an important short-term cause of the overexploitation of a number of wild-animal populations[38]. Poaching methods such as snaring are often unselective, wasteful and inhumane[39], and the transport of live animals destined for slaughter or the pet trade leads to gross welfare violations and high mortality rates[40].

Nonetheless, in some countries bushmeat is the cheapest available protein and poor healthcare provisions perpetuate the use of traditional animal-based medicines[41, 42].

PICTURE © ISTOCK

PICTURE © KATE NEWAK

Wild meat trade

Background

Wild meat or 'bushmeat' is meat for human consumption derived from wild animals, excluding fish. The term applies mainly to animals hunted in the tropical regions of Africa, Asia and South America for subsistence and commerce. In the Congo Basin, bushmeat is a major source of animal protein for forest-dwelling people, with intakes estimated at 0.013–0.29 kg/person/day[43]. Recently, socio-economic, technological and demographic changes have caused a rapid increase in the consumption of wild meat in tropical areas, with estimated annual harvests reaching 23,500 tonnes in Sarawak, 67,000 –164,000 tonnes in the Brazilian Amazon, and 1 million–3.4 million tonnes in central Africa[41,44]. Recently, commercial logging and the development of road and rail networks have increased access to the forest[41,44].

WELFARE

Although illegal throughout central Africa, cable snares are commonly used because of their durability, accessibility, high efficiency and low cost[39]. Snares are an indiscriminate hunting method and can cause extreme suffering and prolonged death from shock, strangulation, blood loss, exhaustion, starvation or predation; for every three animals captured, two more escape injured[39]. Some injuries are fatal; others may have implications for reproduction by reducing an animal's ability to find a mate or raise young[39]. Live animals taken to market may be transported and butchered inhumanely.

CONSERVATION

The bushmeat trade, as it is today, is unsustainable[45]. For many large-bodied and slow-growing species, commercial hunting of bushmeat exceeds the rate of replacement[46,47]. Data from Amazonia show that in hunted areas the biomass of large primates is up to 93.5 percent lower[48]; in these areas tree species richness is also 55 percent lower, as loss of frugivores affects the seed dispersal potential of trees[49]. Overhunting these species will result in declines in carnivores that rely on game species as prey[50], or force them to search for alternative food sources, such as livestock or humans.

LIVELIHOODS

Bushmeat consumption is driven by cost, taste preference and culturally mediated factors, such as familiarity, tradition and prestige[51]. In some regions livestock meat is scarce and more expensive than bushmeat[41,47]. Livestock is often treated as a 'living bank' and hence consumed less readily[43,44]. From 1900–2000, Africa's population increased eightfold[44]. To satisfy the growing demand in both rural and urban communities, subsistence hunting has shifted to commercial hunting[43,44,52], which forms a major income-generating activity[53]. Bushmeat processing and consumption carries with it the risk of zoonosis transmission[54].

Potential solutions

The bushmeat crisis should be tackled from several angles and requires a multi-actor approach targeting commercial hunters, farmer hunters, wholesalers and market traders, as well as the general public[56].

Development of substitutes

Before wild populations are irreparably depleted, it is important to consider alternative protein sources[45] such as livestock, fish, high-protein plants or perhaps farmed wildlife. Consumption of wildlife decreases with price[57], hence market prices of bushmeat and domesticated alternatives should be monitored regularly so that the levels of taxation can be kept high enough to curb consumer demand for wild meat[43].

Public awareness

Building public awareness of the impacts of the trade in bushmeat is vital both in the developed world (to influence policies) and in countries directly affected by the problem (to enable individuals to make informed decisions regarding their purchasing practices). Campaigns may build upon links between wildlife and traditional culture, existing conservation laws, and the health risks of handling bushmeat. They should promote open discourse on livelihood issues associated with bushmeat hunting and consumption[44]. Trade in endangered species (usually a relatively small proportion of the overall trade[58]) should be actively discouraged.

Controlling transportation

Controlling the delivery of bushmeat from the sources of supply (such as protected areas) to the market directly impacts the profitability of commercial hunting. The trade is largely reliant on access to (and the costs of) transportation, since meat that does not arrive at the point of sale in time rots and becomes worthless[43]. Curbing the transportation of bushmeat on logging vehicles owned by transport companies may be the key to reducing commercial hunting[43].

Legislation and law enforcement

Despite strict legislation concerning the possession of firearms and the use of wire snares in some countries, much hunting is carried out illegally. Strict national regulations prohibiting the sale and hunting of protected and endangered species should be implemented and enforced, and inspectors ought to be better trained in recognising these species in marketplaces[41]. However, the difficulty with banning unselective methods, such as snaring, is that hunters only know what they have killed after they have killed it – with the ban on snaring common species, they would lose a potentially sustainable food supply.

Further research

It is important to assess the population viability of quarry species and the sustainability of hunting. Monitoring is necessary to document trends in species use.

In places such as Equatorial Guinea, up to 67.8 percent of hunted animals were destined for the market.

FA AND GARCIA YURSTE, 2001[55]

PICTURE © LISE ALBRECHTSEN

Case study

The Pole Pole Foundation

The Pole Pole Foundation (POPOF) is an NGO created in 1992 by workers in and around the Kahuzi Biega National Park (KBNP) in the Democratic Republic of Congo. Its objective is the long-term protection and conservation of the wildlife in the park (particularly the eastern lowland gorilla) through the reduction of human pressure on natural resources by involving and supporting communities in the vicinity of the park.

Despite years of war in the area, POPOF continues to run projects that encompass reforestation, environmental education and, most significantly, job creation for families that formerly relied on poaching and foraging in the park for survival. Since the 1990s, POPOF has recruited more than 47 former poachers and trained them as wood carvers; more than 24 Batwa women, also former poachers, have been trained as tailors. In 1997–2008, POPOF distributed over 1.5 million young trees to the communities and now these trees are playing a role as a buffer zone, which the KBNP didn't have at the time of its creation. Mature trees can be harvested for firewood, coal and building materials, resulting in fewer cases of intrusion into the park to look for wood.

www.polepolefoundation.org

PICTURE © DOMINIQUE BIKABA / POPOF X 2

PICTURE © MET POLICE WILDLIFE CRIME UNIT / OPERATION CHARM

Traditional medicine

Background

About 80 percent of the world's population is reliant on animal and plant derivatives for primary healthcare[59]. Traditional medicine (TM) still uses animal products such as tiger and leopard bone, bear and snake bile, antelope and rhino horns, seal penises and pangolin scales – many from endangered or threatened species. Trading in medicinal components can bring vast profits, e.g. musk can reach prices of US$30,000–100,000/kg[60], rhino horn of up to US$50,000/kg[61], and virility pills containing tiger penis up to US$15,652/50g[62]. Steep market prices and increased demand have lead to overexploitation, with some species already threatened with extinction. Inefficient legislation and law enforcement allows international smuggling of wildlife components and live animals.

WELFARE

Some species (e.g. musk deer, tigers) are shot or caught in snares; others (e.g. pangolins, turtles) are sold live at markets, following transportation that many do not survive. At markets animals are kept in poor, overcrowded conditions, which often lead to crushing, suffocation and broken limbs, as well as a rapid spread of disease[63]. Medicine preparation may involve ceremonial killings, which cause great suffering e.g. scalding or cooking alive[42, 64]. Bear-bile farms inflict extensive mental and physical distress on bears[65].

CONSERVATION

TM is a major cause of the decline through overexploitation of many wild-animal populations. Meeting demand by supplying animals from neighbouring countries depletes the biodiversity of the exporting area and risks disease transmission across populations[63]. The benefit of wildlife farming, proposed to alleviate the pressure on wild populations, is not always clear-cut: freely available medicinal products stimulate the market; wild-animal derivatives often attract a premium over farmed alternatives; there is no evidence that farmed animals can be produced or sold more cheaply than their wild counterparts[66,67].

LIVELIHOODS

Validation of the effectiveness of TM is sparse; much of its use is based on belief and tradition rather than evidence[38]. Wildlife-based products can carry zoonotic disease (e.g. SARS[68], Anthrax[63], avian influenza[69], Ebola[38]) and may cause allergic reactions. Despite this, in poor rural areas zootherapy might be the only available source of medicine[42]. Supplying animal products for TM can also be an important income source. About 40 percent of current conventional medicinal substances were originally extracted from living organisms – reducing biodiversity may reduce medicinal development in the future[38,70].

PICTURE © PAVEL SOROKIN

Reproductive collapse in the critically endangered saiga antelope is likely to have been caused by a catastrophic drop in the number of adult males in this harem-breeding ungulate, probably due to selective poaching for their horns.

MILLNER-GULLAND ET AL., 2003[71]

Potential solutions

Alternative medicine sources

Many animal-based pharmaceuticals have a number of readily available synthetic or herbal substitutes[11], usually better tested for their efficacy than traditional medicines. For example, cow bile can be used to produce a synthetic replacement for bear bile[72]. Education on alternatives should be combined with better healthcare provisions.

Increased awareness

It is imperative to increase public awareness of sustainable animal use, threatened species biodiversity conservation and animal welfare, as well as their short- and long-term economic benefits. Traditional medicine practitioners are a particularly important target group, as are children and adolescents, and villagers from border regions, who participate in transboundary transport and have limited access to conservation publicity events and education materials[73]. The increased awareness of TM-related zoonoses should be communicated more widely, and may be influential where users are resistant to concerns about species conservation and animal welfare.

Research

Policy should be based on data on the scale of wildlife exploitation for medicinal purposes, the sustainability of the trade and the impacts on wild animal populations. In addition, further studies of the efficacy of TM treatments and of useful synthetic alternatives to wildlife products are urgently needed.

Training of foresters and customs officers

Training should be delivered on species identification and animal handling. Officials should collaborate with staff from bordering countries, CITES officials and welfare and conservation organisations.

Managing confiscated animals

The handling of confiscated wildlife can pose problems for customs officers, sometimes resulting in haphazard releases without prior consultations with wildlife experts[73]. Such unprofessional releases have poor success and may damage local biodiversity. Professionals should assess each animal's health status and designate a proper release site. Sanctuaries should be built for animals unfit for release that are not euthanised.

Legislation and law enforcement

In some countries, fines and jail sentences are insufficient to deter poachers. NGOs, wildlife experts and government agencies should cooperate at an international level to produce statutes that are relevant to the current condition of the wildlife market, the status of wild populations and the numbers of illegally traded products. Enforcement is key.

www.animalsasia.org

PICTURE © ANIMALS ASIA

Case study

Animals Asia Foundation: ending bear farming

Founded in 1998, Animals Asia is devoted to the welfare of wild and domestic animals in Asia and the conservation of endangered species throughout Asia. The foundation's End Bear Farming campaign has seen unprecedented success in China and Vietnam, with Animals Asia having signed landmark agreements with the government of both countries to rescue a total of 700 bears from bile farms; about 250 rescued bears now live at Animals Asia sanctuaries and over the years a total of 350 bears have been rescued. The foundation compensations the farmers to ensure that no bears are slaughtered for their parts, and to help the farmers move into alternative employment.

Animals Asia works with conservation leaders in Beijing and forestry leaders in individual provinces to close the farms – to date, 20 of mainland China's 31 provinces are bear-farm free. The foundation also works to reduce the demand for bile in Asia by promoting affordable, effective and cruelty-free alternatives, and by showing the health risks associated with the consumption of farmed bear bile. In 2010, 33 drugstores in Chengdu joined the Animal Asia's Healing Without Harm campaign, destroying bear bile stock and displaying stickers declaring that their stores did not sell bear parts.

PICTURE © ISTOCK

Animal-derived ornaments

Background

Wild-animal-derived decorations and ornaments are often high-value luxury products. They may be bought for decoration, fashion, as a part of traditional wear or for luck and prestige. Some ornaments form an integral part of a local tradition – for example, combs made from bekko (tortoiseshell) are part of the traditional Japanese wedding outfit – but others are merely a response to fashion demands. Trade in ornaments and decorations may be the principal reason for poaching a species, or it may go hand in hand with trade in bushmeat or traditional medicine. The trade principally targets large cats, mustelids and some ungulates for their fur; elephants and hippopotamuses for ivory; snakes and crocodilians for leather; and turtles for bekko.

WELFARE

Poachers may kill animals using steel-jaw traps, snares, poison, electrocution and firearms; tigers and leopards are mostly poisoned, but can also be caught in a leg-hold trap and then shot, clubbed or speared[37]. Orphaned elephant calves suffer traumas such as premature weaning and lack of socialisation, which later may be linked to increasing numbers of problem animals[74]. Turtles are usually harpooned, netted or seized when they emerge from the sea. Because of reptiles' slow blood-loss rate and resilient nerve tissue, injuries that kill mammals within minutes may take hours or days to kill turtles, probably inflicting great suffering[75].

CONSERVATION

Trade in animal-derived decorations is a key threat to the survival of tigers, snow leopards, Tibetan antelope, elephants, hawksbill turtles, and others, and in many cases has greatly contributed to their status as Critically Endangered[76]. In 1994–2006, 783 tiger skins were seized in India; this represented a significant proportion of the then estimated 5,000 remaining wild tigers[37]. Poaching affects whole ecosystems: many poached big cat species are top predators; elephants are essential for the germination and dispersal of a number of African tree species[77]; while hawksbill turtles help maintain healthy coral reefs[78].

LIVELIHOODS

While the use of certain animals is embedded in local culture and tradition, wildlife trade is extremely lucrative. In India a leg-hold trap to catch a tiger costs about US$4; the skin sells for US$540–1,500, while a trader in China can resell the same skin for up to US$16,000, with over 900 percent profit[37]. Around 30,000 people rely on the manufacture of shahtoosh (shawls from the down hair of Tibetan antelope) as their primary source of income[79] – poachers and artisans may have limited employment alternatives. Anti-poaching staff often risk their own lives during enforcement operations[80].

Between 1989 and 2002, the Elephant Trade Information System reported over 7,000 seizures of poached ivory, totalling up to 200 tonnes.

NEWMAN ET AL., 2004[80]

PICTURE © ISTOCK

Potential solutions

Increased awareness

It is crucial to increase public awareness of the trade's impact on endangered species. There is scope to relate the moral context of the philosophy or religion of local people, e.g. the wearing of skin-decorated costumes declined following a plea from the Dalai Lama in 2006[37]. WildAid (www.wildaid.org) campaigns in Asia reach up to 1 billion people per week with celebrity-driven consumer messaging. Western tourists should be informed of the regulations regarding wildlife-derived souvenirs.

Alternative employment

Craftsmen employed in ornament processing usually have transferrable skills and there can be scope for alternative employment, e.g. shahtoosh weavers could manufacture superior-quality pashmina shawls, advertised as cruelty-free products. It is widely hoped that ecotourism can offer local communities a more stable and long-term income than direct wildlife exploitation.

Legislation

PENALTIES AND LAW ENFORCEMENT

Penalties have to be sufficiently severe and enforceable to deter offenders; current fines make the trade in ivory or skins a very lucrative crime, e.g. in Singapore a smuggled ivory shipment worth around US$11 million was fined a mere US$3,000[80]. Even if the law already allows for harsh punishments, there is a pressing need for better enforcement, as the risk of capture and the ability to prosecute are a greater deterrent than increased fines. Due to large numbers of forgeries, customs officials and wildlife inspectors must be well trained to detect fraudulent licences and identify illegal products on the spot; recently developed molecular techniques such as 'fur fingerprints' allow quicker and easier identification[80].

AVOIDING LOOPHOLES.

Legislation must be reviewed on a regular basis to avoid loopholes and ambiguities, e.g. in Thailand it is legal to possess and sell ivory from domesticated elephants, while countries such as China allow trade in ivory acquired before the ban[80]. Since verifying the origin of ivory can be difficult, these regulations may not be enough to discourage poaching.

A MULTI-AGENCY APPROACH

Task forces should be formed between governmental agencies, NGOs, tourist operators and others to facilitate collaboration on a local, regional and international scale.

Research

Population monitoring of quarry species is a prerequisite for analysing the impact of harvests on ecosystems. Consumer trends can also be monitored by systematic anonymous surveys, as is done for illicit drugs in the West.

Wildlife farming is a controversial option. Farmed products do not necessarily reduce demand for their wild counterparts; in fact, they may perpetuate market demand and fuel a high-end luxury market for goods of wild provenance. Since killing a wild animal is almost always cheaper than raising it to maturity, and since determining the origin is often impossible, many animal products will probably still come from the wild. Under unregulated circumstances, this is likely to be unsustainable.

Case study

Snow Leopard Conservancy

The Snow Leopard Conservancy (SLC), in partnership with The Mountain Institute and UNESCO, initiated the Traditional Village Homestay programme as alternative employment for shahtoosh workers in Hemis National Park in India. The goal is to encourage local communities to become guardians of healthy populations of snow leopards through income-generation schemes and minimising livestock depredation. Up until 2006, SLC-India had predator-proofed 22 corrals, serving 194 households and some 3,000 head of livestock, and protecting up to 20 snow leopards from herder retaliation in Zanskar, plus five in Nubra and 10 in Ladakh.

Training and support for cooperatives of village women in Ladakh allowed them to offer tourists traditional accommodation. In 2005 SLC-India developed three new Himalayan Homestay sites in the Sham region with 16 new hosts, encouraging environmentally friendly practices, e.g. good waste management, using natural gas and kerosene for cooking (rather than local firewood), and the sale of pressure-boiled, filtered water to minimise use of plastic mineral water bottles. In 2003 the programme was expanded to other areas and training was provided for local people to act as wildlife and cultural guides.

www.snowleopardconservancy.org/eco-tourism

PICTURE © WENDY LAMA/KARMA QUEST ECOTOURISM AND ADVENTURE TRAVEL X 2

PICTURE © ISTOCK

Entertainment animals

Background

Entertainment animals fall into two main categories: performance/show animals and pets. Globally, wild animals can be displayed as curia, take part in performances or serve as photographic props. Some animal exhibitors, e.g. snake charmers, rely on their menagerie for their main income, although for most exhibitors display animals are only a supplementary source of earnings. Pet animals bought for their aesthetic value, as a status symbol or as companions are popular among both local people in tropical regions and western hobbyists. In Indonesia, where songbird contests are a fashionable pastime, 60.2 percent of urban bird-keeping households are reported to own a wild-caught pet bird, resulting in more than 700,000 wild-caught songbirds being supplied to the market each year[81].

WELFARE

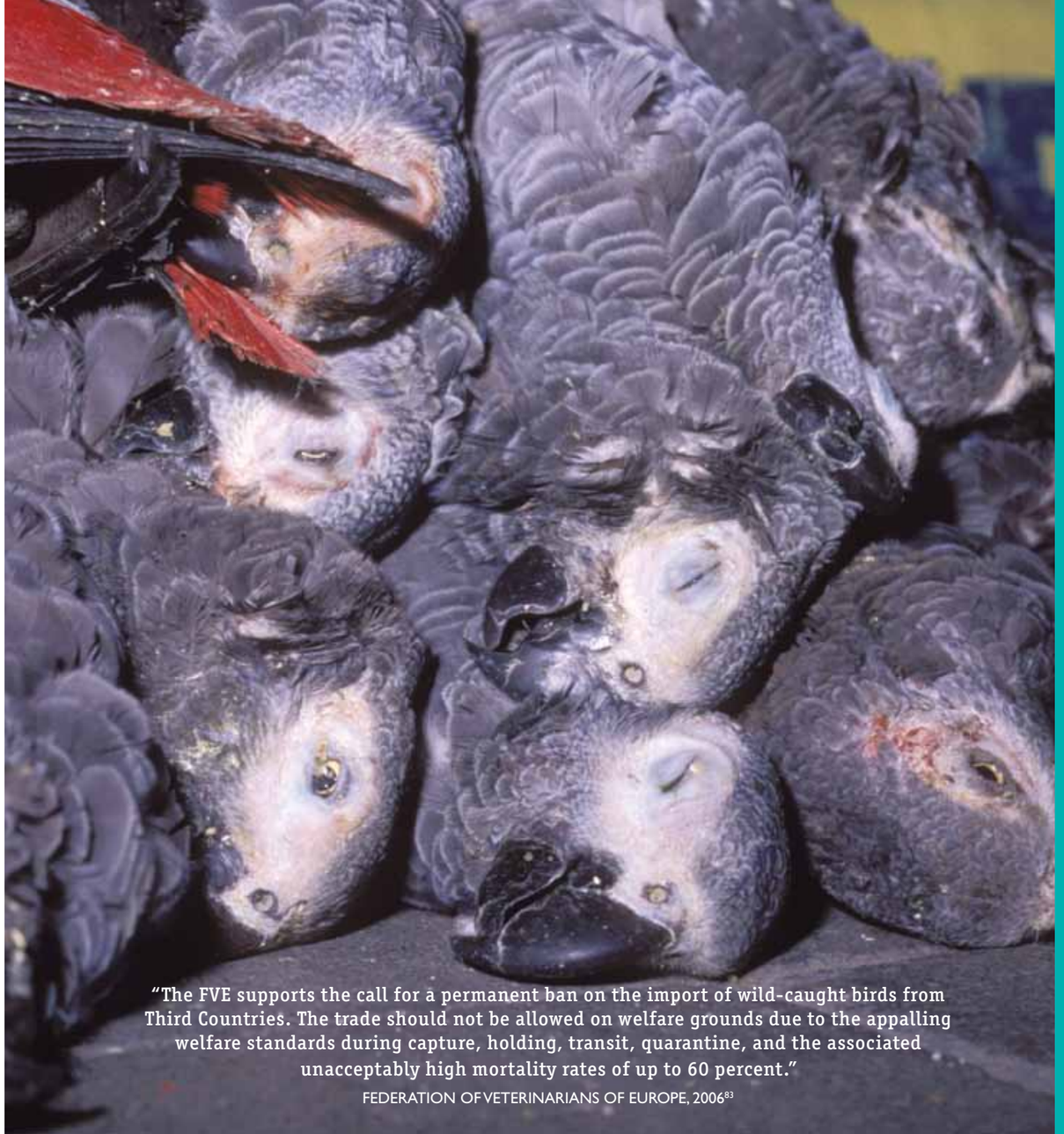
The animals' welfare may be severely violated from the moment of capture until death in captivity. Birds are caught using nets, snares and lime, with resultant injuries[82]. Transportation is often poor with no food, water or veterinary care, resulting in high mortality[83]. Animals kept for display and photography purposes are frequently housed in poor conditions with inadequate food. Primates and wild cats usually have their teeth and claws removed[82]. Performing animals may undergo cruel training regimes[32]. A lack of knowledge can lead to poor care of exotic pets.

CONSERVATION

In the case of some species listed on CITES Appendices I and II, as the rarity of the species increases, so does the demand for it. The pet trade is one of the most important factors in global declines of parrot species[84]. Mortality of captured animals can be as high as 50–90 percent, prompting a high turnover[83, 85]. Harvesting arboreal animals frequently involves cutting down trees and destroying nesting sites[86]. Escaped pets may become invasive species, while confiscated animals may be too ill to be released, even after extensive rehabilitation[87].

LIVELIHOODS

Governmental decrees forbidding the capture and use of wild animals directly affect the livelihoods of street performers and wildlife traders, e.g. an estimated 10,000 families are dependent on snake-charming in the Indian state of Orissa alone[88]. Profits gained from the trade in exotic pets mainly go to the middlemen, e.g. in Madagascar collectors earn about 30 US cents per radiated tortoise, while in Europe or the USA the species sells for about US$10,000[40]. Tourists buying exotic pets out of sympathy or curiosity are often unaware of the risks of zoonoses, and the legal status of the species.



PICTURE © JAN ROOTS/BIRD PROTECTION BELGIUM/RSPCA PHOTOLIBRARY

"The FVE supports the call for a permanent ban on the import of wild-caught birds from Third Countries. The trade should not be allowed on welfare grounds due to the appalling welfare standards during capture, holding, transit, quarantine, and the associated unacceptably high mortality rates of up to 60 percent."

FEDERATION OF VETERINARIANS OF EUROPE, 2006[83]

Potential solutions

Increased awareness

Awareness campaigns for local people and tourists should focus on endemic and endangered species threatened by trade. The public should be informed of the importance of biodiversity conservation and animal welfare and the impacts of taking wild animals from their natural habitat, as well as of legislation protecting wildlife and of penalties for illegal trade. Education could be conducted by NGOs, zoos and schools, through workshops, performances, and publications such as field guides, etc.

Providing alternative employment

Vocational training and alternative employment possibilities should be developed for people whose previous income came from wildlife trade and performances. Ecotourism can provide local communities with an income through indirect exploitation of wildlife.

Rehabilitation

Confiscated wildlife can be housed and rehabilitated at customised rescue centres. Ideally, healthy animals would be rehabilitated and released into the wild under careful monitoring. Animals that cannot be released can be cared for in designated sanctuaries or humanely euthanised.

Captive breeding

In principle, all pet animals should be captive-bred. Breeding facilities should be located in the country where animals will be bought so as to minimise stress during long-distance transportation. Facilities should be registered and all animals properly identified. Animals bred in captivity tend to make better pets because they are accustomed to being handled and show fewer health and behavioural problems than wild-caught individuals[83].

Research

Regular monitoring of wildlife markets is essential for identifying trends in the trade and its scale and species composition. Local NGOs and forestry department staff should be trained in survey methods and enforcement officers should take action when violations take place. All instances of illegal trade should be reported and documented for analysis; such data help predict future smuggling attempts. Wild populations should be monitored to assess their sustainability, and species-recovery plans should be implemented whenever possible.

Improved legal system and law enforcement

Customs officials must be able to identify protected species, even if they are transported in larger batches with other species. Training and resources such as identification keys are essential. Customs officials should collaborate between countries for better traceability of imports and to prevent smuggling through 'hub' countries with less stringent law enforcement and border control. Current penalty fines are too low to serve as an effective deterrent for smugglers

Case study

Wildlife SOS

Wildlife SOS is a non-profit organisation engaged in preserving Indian nature and wildlife. Its rescue centres rehabilitate sloth bears used in dancing performances. In 2002, 1,200 dancing bears were used in performance throughout the country. Through cooperation with government officials, Wildlife SOS has rescued many hundreds of bears and as of December 2009 believes there are no more dancing bears in India.

The organisation's four rescue centres provide the bears with large enclosures, a nutritious diet and veterinary care. At the same time, Wildlife SOS helps ex-owners of the bears in Kalandar through its Tribal Rehabilitation Initiative. On surrendering the dancing bear, the owner signs an agreement stipulating that they will not use wild animals for earning money, and are then trained in alternative employment. So far, 300 Kalandars have signed up and are earning more money than they did working with dancing bears. Wildlife SOS also helps Kalandar families send their children to school and assists women in becoming second-wage earners for their family. The organisation is also active in the protection of other species, anti-poaching operations and awareness campaigns.

www.wildlifesos.org/rescue/bears/dancing-bears

PICTURE © WILDLIFE SOS

Recommendations

Problems of welfare, conservation and development all interweave to form a human-wildlife Gordian knot – and cutting it is by no means a straightforward task. Various recommendations foster both short- and long-term solutions to improve the current situation.

Short-term solutions

Short-term solutions usually entail small projects that chiefly engage NGOs and local communities. They can commence almost immediately and could bring direct and relatively quick results.

CONFLICT MITIGATION

Innovative methods reduce conflict either through decreasing contact with wildlife or managing the damage. Special attention should be given to non-lethal mitigation techniques, e.g. livestock-guarding dogs or deterrents against crop-raiding animals.

PROVIDING ALTERNATIVE EMPLOYMENT

In many cases, wildlife exploitation is the primary income source for a community, especially in areas with high unemployment. Offering alternative lifestyle opportunities and providing an economic incentive through a higher-income occupation may decrease the volume of wildlife trade. In terms of both sustainability and animal welfare, it is desirable that this employment should promote the switch from direct exploitation (consumptive or productive use) to indirect exploitation of wildlife (e.g. tourism, bird watching and photography).

BUILDING RESCUE CENTRES AND SANCTUARIES

Rehabilitation is a difficult process and often not properly monitored, but apart from rehabilitating confiscated and rescued wildlife, centres can offer education and employment to the local communities, as well as a facility for research.

Being able to observe wildlife more closely can give the public a different perspective on it, assuming that the husbandry conditions are good and the quality of the educational experience is high. However, in many cases humane euthanasia may be the best option for confiscated wildlife.

PICTURE © WILDLIFE SOS

Long-term solutions

Long-term solutions may take years to develop and often require the collaboration of governments, NGOs, schools, police and private entrepreneurs.

EDUCATION

Public awareness is crucial for the understanding and appreciation of wildlife. It can lead to attitude changes, a sustainable use of wildlife, and a higher conflict tolerance. Education campaigns should evoke respect and compassion towards animals and a higher awareness of the risks and gravity of zoonotic diseases, as well as teaching about the importance of, and threats to, biodiversity. Target groups include children, rural communities, people involved in the wildlife trade and tourists. Effective ambassadors are important, including people commanding respect and attention, and messages may be expressed in the contexts of teachings on the local philosophy and traditions.

IMPROVING LEGISLATION

Legislation should tackle loopholes in domestic law and inconsistencies in international law. Penalties for wildlife crimes must be effective deterrents and law enforcement needs to be improved. International collaboration is crucial, especially in the case of transboundary crime.

DEVELOPMENT OF SUBSTITUTES

If products derived from wildlife are to be made unavailable, it will often be necessary to provide competitive substitutes (especially for food and medicine).

RESEARCH

Research on population sizes of given species, their ecology and the sustainability of harvests can provide important scientific foundations for conservation policy. Exploring the extent to which perceived human-wildlife conflicts are real is essential to understanding and mitigating wildlife conservation problems and associated animal welfare issues. Techniques to measure welfare scientifically need to be developed.

CONCLUSION

We advocate an integrative approach: educating about conservation and animal welfare will debunk myth and superstition and encourage people to value nature, while both natural and social sciences provide the evidence to underpin policies that incentivise lifestyle change. Both short- and long-term solutions should be executed in parallel; both are important. The relevance of animal welfare to both conservation and development programmes can create a powerful trio of forces to benefit both wildlife and human wellbeing, fostering biodiversity and livelihoods.

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