Tackling Human-wildlife Conflict: A prerequisite for linking conservation and poverty alleviation

A decision-makers guide to financial and institutional mechanisms

Photo: Johannes Refisch, Indonesia, 2012

By Evan Bowen-Jones

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Executive summary

The Great Apes represent a group of highly endangered species with high conservation value. They have potential for contributing to poverty alleviation due to the economic benefits they can generate. These can accrue directly e.g. through tourism, or indirectly through their habitat and the ecosystem services this provides. However, efforts to conserve apes and their habitat often result in negative impacts on local people's livelihoods: in some case local people are excluded from areas set aside for ape conservation, resulting in a loss of access to critical resources; in other cases apes and other species leave the conservation area and cause damage to people and property.

This so-called 'human-wildlife conflict' (HWC) needs to be addressed to ensure that local people do not unfairly bear the negative side-effects of conservation, becoming more opposed to it and further jeopardizing the survival of high conservation value (HCV) species. Although apes usually cause the minority of problems they – as large, threatening animals - can come to represent the broader dissatisfaction that local people can come to feel when conservation doesn't provide them with sufficient benefits. Successful resolution of HWC therefore requires multiple approaches to address the impacts of multiple species, even if apes are the primary conservation focus.

There are a number of different approaches that can be taken to reduce HWC. The most common involves **preventative measures** such as fencing, deterrents and scaring of the animals involved. These are well described in the literature and best practice guidance is available for many species causing HWC, including apes. **Reactive measures** – removing problem animals – are also common to many HWC resolution strategies. However, both preventative and reactive measures often only reduce HWC meaning that there is still a livelihood costs to apes, and other HWC species, that can sour local perceptions of conservation. We therefore focus on **financial mitigation measures** that can be used to offset these remaining costs, looking wider than the compensation that has typified this approach to-date and put many off financial options. We also examine what the institutional enabling environment needs to look like to make these measures work.

We conclude that a nested institutional approach – whereby successful local interventions inform policy which in turn supports local ways of tackling HWC; combined with more targeted delivery of greater benefits to the households most affected by HWC, could support the delivery of packages of preventative, reactive and financial measures. Combined, these measures could provide net positive livelihood benefits to those being impacted by HWC. This is more likely to ensure positive conservation results for apes. Single-sided or inadequate HWC responses are unlikely to generate net positive benefit, and can result in escalating human-human conflict.

We provide a non-technical decision-making model through which to evaluate the major options.

1. Introduction

Great ape ranges, particularly those in sub-Saharan Africa, coincide with some of the poorest countries of the world. Some, such as Rwanda, Uganda and Burundi have densely populated rural areas that surround high profile ape populations. Great apes are highly endangered and are of high conservation value due to their close genetic relationship with humans and their status as global flagship species for conservation. They are also of high economic value to poor countries due to the revenue that they can generate through tourism. However, the benefits they generate for poor people are often very limited, and often outweighed by the costs associated with their conservation. Even exceptional initiatives such as high-end community lodges linked to gorilla tracking that generate $300,000 in a year only amount to per capita benefits of $10/year (Sandbrook & Roe, 2010). Because they are so endangered, apes are often protected through strictly controlled and enforced conservation areas that can – intentionally or otherwise – have negative impacts on the livelihoods of the already poor local communities, through restrictions on resource access and so on. Furthermore, apes and other species often leave the conservation area and trespass onto surrounding farmland causing damage to crops, livestock, property and sometimes causing injury or death to local people. Human-wildlife conflict (HWC) has been highlighted as one of the key obstacles to linking conservation and poverty alleviation (PCLG 2010).[1]

This paper is intended to contribute to addressing this obstacle by providing decision-makers with a framework to evaluate the various options that are available to tackling HWC. Broad-based reviews of HWC resolution (e.g. Distefano 2005, Lamarque *et al* 2009) show that **preventative measures** comprising interventions including fencing; guarding; resettlement and integrated land-use planning have received quite a lot of attention. These kinds of approaches are, however, less effective for addressing ape-human conflict given the intelligence, adaptability and dexterity of the great apes (Hockings & Humle 2009, Lee & Priston 2005, Kalpers *et al* 2010). **Reactive measures**, comprising lethal removal or relocation of problem animals, which are used in some case are not appropriate for social, protected animals like apes (Dickman 2010, Lee & Priston 2005). This paper therefore focuses on **financial mitigation measures** that can complement other approaches – increasing benefits to those affected by HWC – as well as investigating the institutional contexts in which they can be most effective.

People living subsistence lifestyles are more likely to suffer animal damage due to the way they produce and store their food (Peterson *et al* 2010), but even within these communities vulnerability to human-wildlife conflict is distributed unequally, as is access to benefits from wildlife (Treves *et al* 2006). Consequently only delivering collective community-level benefits do little to increase tolerance of wildlife damage (Romanchet *et al* 2007). Wildlife crop damage sustained at household level can easily outweigh the benefits received from ape conservation, and thereby undermine it. At the same time, it is important for the wider community to receive generic benefits from living with wildlife, since one individual's behaviour (e.g. someone living locally and excluded from benefits) can undermine project success (Hazzah *et al* 2009).

This paper focuses on HWC resolution mechanisms that benefit both communities as a whole, and the households most affected by the conflict in question. This sort of balanced approach is emerging as the best method of implementing mechanisms such as Payment for Ecosystem Services (PES) – in terms of eliciting lasting impact in developing world contexts – Clements *et al* (2012).

Merely reducing HWC is unlikely to suffice in the long-term, as population pressure increases and habitat is further fragmented (although it might be a valid short term strategy where conflict levels are relatively low, or whilst working towards full resolution). For sustainable conservation equitable benefit distribution needs to occur at a level that outweighs all opportunity costs (Dickman *et al* 2011)

[1] In November 2010 a PCLG workshop was held in Masindi Uganda focusing on exploring the experience of ape conservation organizations in addressing poverty alleviation. Human Wildlife Conflict (HWC) was identified as a key obstacle to improving attitudes of local people to conservation initiatives, and that there was a need to address this.

– i.e. net positive livelihood benefits (NPLB) need to be generated. It is on this basis that we analyse the options for HWC resolution throughout this discussion paper.

There are few case studies of financial mechanisms that have been specifically designed to address ape-human conflict. The paper therefore draws on examples from other High Conservation Value (HCV) species that provide transferable lessons. On the basis of these lessons the paper suggests what an ideal enabling environment for successful HWC resolution might look like and proposes a framework to help decision-makers and practitioners decide which options might be best suited to HWC resolution in their particular context.

Defining Human Wildlife Conflict

The IUCN (World Conservation Union) defines HWC as occurring "when wildlife requirements encroach on those of human populations, with costs both to residents and wild animals" (IUCN, 2005). Similarly human-great ape conflict (HGAC) can be defined as 'any great ape – human interaction that results in negative effects on any human social, economic or cultural life, great ape social, economic or cultural life, or the conservation of great apes and their environment.' (Hockings and Humle 2009).

Peterson *et al* (2010) suggest that the term *conflict* is anthropomorphic since going by the everyday definition of 'conflict' it implies a level of deliberateness on the part of the animals concerned. It is also, one can argue, emotive and negative. There has always been HWC, and most societies have developed reasonably successful strategies to with it, problems arise when these are constrained (Treves *et al* 2006). However, with diminishing habitat and increasing human populations, local perception of HWC incidents and the way in which these are dealt with are critical in terms of conserving those species deemed important/ threatened (Madden 2004). Dickman *et al* (2011) point out that HWC is usually derived from groups of people holding different values e.g. local people versus protected area authorities, or protection of species that are highly valued at a global scale but have little or even negative value at a local scale. It is therefore, from nearly every perspective more of a human than a wildlife problem.

Either way, to address the multiple inter-connected issues contained within the umbrella term HWC one needs to define exactly what the problems involved are, otherwise it is going to be difficult to develop successful targeted solutions. Peterson *et al* 2010 carried out a comprehensive content analysis of the HWC literature and identified that 95% of reported "conflict" equates to *animal damage* to things humans value i.e. crops, livestock, property, safety. The remainder referred to *human-human conflict* stemming from decision on how to deal with animal damage – much of this occurring around protected areas.

Causes of ape-human conflict

The causes of conflict are predominantly related to human activity in ape habitat – as summarized in Table 1. Habitat destruction and fragmentation is occurring at an increasing rate meaning that apes are coming into ever more contact with people – often poor people living subsistence lifestyles, but also the extractive and agricultural sectors. Human population growth is further exacerbating the level of HWC. Modeling suggests that by 2030 more than 90% of African great ape habitats and more than 99% of orangutan habitats will suffer moderate to high impact from human activities (Hockings and Humle 2009).

Table 1: Main causes of ape-human conflict *(taken from Hockings & Humle, 2009)*

		Consequences for great apes						
		Habitat						
Code	Activity in great ape habitat	Destruction	Fragmen-tation	Destruction of key natural resources*	Pollution of natural water sources	Behavioural disruption	Disease transmission risk	Killing or capture**
1	**Traditional practices**	**-/+**	**-/+**	**-/+**	**-/+**	**-/+**	**-/+**	**-/+**
1.1	Bushfires	+	+	-/+	–	+	–	-/+
1.2	Gathering of water from natural sources	–	–	–	-/+	-/+	-/+	–
1.3	Gathering of dead wood for coal or cooking	–	–	–	–	?	-/+	–
1.4	Harvesting of natural resources (e.g., food, medicine, honey, dye)	-/+	–	-/+	–	-/+	-/+	–
1.5	Snares	–	–	–	–	-/+	–	-/+
1.6	Hunting with guns	–	–	–	–	+	+	-/+
1.6.1	Great apes not targeted	–	–	–	–	+	+	–
1.6.2	Great apes targeted	–	–	–	–	+	+	+
2	**Agriculture**	**+**	**+**	**+**	**-/+**	**+**	**-/+**	**-/+**
2.1	Slash and burn	+	+	+	–	+	-/+	–
2.1.1	Snares: crop protection	–	–	–	–	-/+	N/A	-/+
2.2	Commercial	+	-/+	+	-/+	+	-/+	+
2.2.1	Eradication of forest	+	-/+	+	-	+	N/A	-/+
2.2.2	Influx of people	-/+	–	–	-/+	+	-/+	+
3	**Logging**	**+**	**+**	**-/+**	**-/+**	**+**	**+**	**-/+**
3.1	Small-scale	+	+	-/+	–	+	+	–
3.2	Commercial	+	+	+	-/+	+	+	-/+
3.2.1	'Total' deforestation	+	+	+	–	+	+	-/+
3.2.2	'Selective' deforestation	+	-/+	+	–	+	+	–
3.2.3	Road network	+	+	+	-/+	+	+	-/+
3.2.4	Influx of people	-/+	-/+	-/+	-/+	+	+	+
4	**Mining**	**+**	**+**	**-/+**	**+**	**+**	**+**	**-/+**
4.1	Small-scale	+	+	-/+	+	+	+	-/+
4.2	Industrial	+	+	+	+	+	+	-/+
4.2.1	Extraction	+	+	+	+	+	N/A	–
4.2.2	Erosion	+	+	+	+	+	N/A	–
4.2.3	Influx of people	-/+	-/+	-/+	-/+	+	+	-/+
5	**Tourism and Research**	**-/+**	**–**	**-/+**	**-/+**	**-/+**	**+**	**-/+**

* food and/or shelter (nesting/sleeping sites); ** for bushmeat, for the pet trade, or as pests; N/A = Not applicable; **?** = unknown since never assessed or formally reported; **–** = no risk; **+** = risk; **-/+** = depending on circumstances and context either none or risk present

Consequences of 'ape-human conflict' for humans

The main source of conflict between apes and humans is crop raiding. Hockings and Humle (2009) report that around some protected areas in Africa and Asia primates are considered to be responsible for 70% of crop raiding incidents and for 50% of the ensuing damage – although it is not clear how much of this is due to apes compared to other primates. Indeed evidence would suggest that apes are usually responsible for the minority of crop damage in areas they inhabit although raids can be relatively frequent (Hockings & Humle 2009) and cause significant perceived as well as actual losses (Lee & Priston 2005). Apes can also impact human safety and perceptions of safety (e.g. as cited in CARE 2003, wherein attacks by a problem mountain gorilla led to a school closure in a Bwindi community. However, human injuries and death caused by apes are relatively rare. Table 1 provides a summary of the main impacts of ape-human conflict on humans.

To-date there has been relatively little data on the scale of conflict involving apes and this has been assumed to be relatively low (Campbell-Smith *et al* 2011). Table 2 highlights how, in most cases, apes are not responsible for the majority of perceived animal damage where they are part of HWC. This damage tends to be caused by multiple other species that occupy the same area. The focusing of

HWC studies on charismatic megafauna may represent the pre-occupations of conservation biologists (Peterson *et al* 2010). Indeed, a nationwide survey of HWC in Gabon found that the number of local complaints about cane rats surpassed all other animal species (Lahm 1996). However, research into socio-economic factors that influence tolerance towards wildlife does highlight that large, social, potentially dangerous, protected species – like apes – elicit lower tolerance from local communities (Hoare 2001).

Table 2: Level of ape conflict from key literature

Species	Location	Type of HWC	Ranked importance &/ severity	Retaliatory killing of apes?	Data source	Reference
Gorilla (mountain sub-sp.)	Bwindi Impenetrable Forest, Uganda – one area of boundary in particular.	Crop raiding- particularly maize, & bananas	3 (after pigs & baboons); estimated 3% of crop lost per incident, raiding >twice a week.	Unknown	Household ranking of problem animals	Madden, 1998 in cited in CARE 2003
		Human injury	3 records pre-2000	Historic retaliation pre-park designation .		Macfie 2000
Chimpanzee	Tanzania (Arusha, Kilimanjaro, Tarangire, Lake Manyara, and Mikumi National Parks and the Selous Game Reserve)	Crop raiding	Primates (including chimpanzees – although several spp were involved – rated as the most problematic animals by 5.1.7%	Not recorded	Survey with over 1000 respondents	Newmark *et al* 1994, cited in Silero-Zubiri & Switzer 2011.
	Budongo Forest Reserve, Uganda	Crop raiding	3rd after bush-pigs & baboons, but above porcupines	Not recorded	Household questionnaires.	Tweheyo *et al* 2005
Sumatran orangutan	Gunung Leuster, Sumatra	Crop damage/ raiding	Unknown; orangutan being one of 13 vertebrates reported as damaging crops	Shooting reported but not quantified.	Semi-structured interviews	Marchal & Hill 2009

Consequences of 'ape-human conflict' for apes

Despite their relatively low level of impact on humans, the consequence for apes can be severe. Hockings and Humle (2009) report, from various sources, the establishment of primate eradication and control programmes. Although there are few reports of such a situation with regards to African apes, this certainly is a problem for orang-utans. Orangutans are threatened by loss and fragmentation of habitat throughout their range, something that has increased as commercial oil palm plantations have replaced forest over millions of hectares of Sumatra and Borneo. However, the secondary impacts of post-habitat-conversion agricultural conflict hadn't been recognised until recently. On Kalimantan Meijard *et al* (2011) estimated that 750-1800 Bornean orangutan were killed in 2010, 10% of these reportedly due to agricultural conflict (crop raiding of villagers gardens), whilst on Sumatra Marchal & Hill (2009) discovered that orangutan eating palm fruit (from both in large

plantations bordering forest fragments, and in small scale plantings surrounded by forest) has led to large number being killed illegally by both farmers and companies.

This could become an increasing problem in Africa if large areas of forest are turned over to oil palm, and other industrial crops, as seems likely in the near future.

2. Methods

A review of the global literature on financial mitigation was carried out in (months?) 2011. This was used to develop a framework for exploring financial mitigation measures in a series of HWC case studies. A call for case studies was issued via PCLG and three suitable case studies that focused on financial and institutional, mechanisms were identified. These were:

1) The Human Animal Conflict Self Insurance Scheme (HACSIS) in Namibia: case study compiled with Richard Diggle [currently WWF Namibia, formerly IRDNC where he was involved in the design of the scheme] with further inputs from Carol Murphy [an independent consultant based in Caprivi Region, Namibia].
2) The Chitwan National Park compensation scheme: case study compiled by Prabhu Budhathoki – former park warden of the Chitwan National Park, and Project Manager of the Park and People Project, a Nepalese government programme to reduce conflict in Chitwan and six other protected areas.
3) National and private compensation schemes in Kenya: case study compiled with Mordecai Ogada, who has been reviewing carnivore compensation in Kenya for the Panthera Foundation; and additional input from Leela Hazzah who completed her PhD in an area running a large compensation program.

In addition to the case studies, PCLG national teams in Cameroon and Uganda conducted country-level reviews of HWC policy and practice. These were coordinated by: Antoine Eyebe, Dominique Endamana and Guy Patrice Dkamela in Cameroon and Robert Baganda and Panta Kasoma in Uganda. The Uganda report had not been finalized at the time of writing and is not included in this analysis. The case studies and Cameroon country review are summarized in Box 1.

Box 1 SUMMARY OF PCLG CASE STUDIES

The Human Animal Conflict Self Insurance Scheme (HACSIS), Namibia

In Namibia, conservancies are legally-recognized community-based organisations (CBOs) licensed to manage geographically-defined areas in order to benefit from wildlife through sustainable trophy hunting, meat harvesting, live game sales, and non- consumptive tourism. They are the main conservation management unit on communal land in Namibia. In 2003 five of them decided to establish the Human Animal Conflict Self Insurance Scheme (HACSIS) within their areas. The Namibian Government's policy at the time was not to compensate for wildlife damage. However, there was a perception that successful conservation was leading to increased HWC, so the Conservancies decided action was needed to rebalance the individual losses being suffered due to HWC versus the collective income being generated from tourism.

HACSIS's objectives were to: increase community tolerance towards problem causing animals; create an incentive for farmers to manage and protect their stock and crops better; encourage conservancies to put in place a management strategy to mitigate problems; and, promote equitable distribution of benefits so that individuals who suffer losses could receive wildlife income. It was considered that the most effective way to achieve these objectives was through an insurance type mode backed up by various other measures including removal of predators that caused repeated problems (sometimes offering said animals to trophy hunters and sharing resultant income); and application of intensified but sustainable 'conservation agriculture' to reduce field sizes, making them easier to protect, increasing yield, and maximising land for wildlife and tourism.

The Conservancies paid into the scheme and their contribution was matched by third party donations secured by Integrated Rural Development and Nature Conservation (IRDNC) - a national NGO that also provided the Conservancies with technical support. Payouts to conservancy members affected by HWC were made to cover: funeral expenses for the families of those people killed by wildlife; livestock deaths caused by high trophy value and protected species; and damage caused by elephants (whilst acknowledging that other species should be included in future).

The scheme relied on well-established local management structures to generate and distribute wildlife-derived income *equitably* (a requirement under Namibian law) and successfully channelled collective income to individual conservancy members who had incurred losses. It encouraged responsibility through strict claim conditions based on farmer vigilance. It also put the issue of HWC into proportion –the actual losses incurred and claims made being far less than anticipated.

In 2010 the Namibian government decided to convert HACSIS into a national scheme – the Human Self Reliance Scheme (HWSRS), whose final details are still being decided.

Chitwan National Park Compensation Scheme

Chitwan National Park in Nepal has been operating an *ad hoc* compensation scheme since the mid 1990s to compensate for human injuries and death, and livestock depredation. Since 2009 it has been expanded – under a national government scheme – to include crop damage. The scheme focuses on conflict with protected species such as elephant, tiger, rhino, leopard and bear but has also been paying modest compensation for damage caused by other animals.

Compensation payments are made from the Park's 'Buffer Zone Management Plan' (BZMP). This is financed through 50% of park revenues (from tourism and other income). The BZMP also pays for community development activities (giving priority to wildlife victims) and preventative measures such as fencing around the park; guarding stations in villages; and voluntary resettlement and alternative land-use. Problem animals are either moved to other protected areas (e.g. rhinos) or killed (e.g. man-eating tigers).

As per the Nepalese Wildlife Damage Relief Guidelines 2006 the main reason for the introduction of compensation was to 'reduce conflict between local communities and conservation agencies and to increase communities' support and ownership for conservation initiatives'. It benefits everyone affected around the park.

The park office deals with HWC based on a principle of "3 Rs" (relief, reduce and resolve) with compensation being seen as less important than the preventative measures, and as part of a package of measures that are regarded as equally important by the buffer zone residents. Compensation is based on the principle of partial payment of the losses, and fixed and maximum ceilings for claims.

Village-level 'Buffer Zone User Committees' and the park-level Committee have become to be seen as effective platforms for park-people dialogue over issues including compensation (as well as playing a role in peer-to-peer verification of claims). There has been a decrease in retaliatory killings of wildlife, and resentment towards the Park, and until 2009 the number of claims was reducing due to the success of preventative measures.

Since 2009 the new government policy's inclusion of crop damage and higher levels of payment on injury and death has resulted in an increased overall level and number of claims, and the government has been delaying payments. However, CNP seems to have the capacity to manage its own HWC and has sufficient income to sustain compensation even if central government support is withdrawn.

HWC Compensation in Kenya

The Kenya case study focuses on the combination of a National government compensation scheme for injury and death, plus ongoing private schemes on conservancies around protected areas in the Mara Triangle and the Amboseli-Tsavo region.

National government attempts to address HWC through monetary compensation were instigated after the (ongoing) ban on hunting that came into force in 1977. The statutory government compensation scheme was meant to cover crop damage as well as injury and death caused by wildlife. The crop damage element was suspended in 1989 because the system reportedly became unworkable with widespread cheating on claims, high administration costs and lack of disbursable funds. National compensation for injury and death is supposedly still in operation (although it isn't paid, and the amounts theoretically involved are inadequate). Private schemes on game ranches exist, seemingly, when there is sufficient profit motive – focussing on carnivores, particularly lions, which are seen as being of particularly high value for tourism.

Within an unclear national framework individual schemes – including the community-owned Mbirikani Group Ranch –may be having qualified local success (i.e. reducing killing of lions), but they also build expectation and resentment in the wider geographic regions in which they operate (where compensation isn't being paid). In some other unprotected regions of Kenya without monetary compensation schemes where holistic conservation programmes (encompassing livestock management, education and awareness initiatives) are in operation, lion populations actually appear to be more viable.

There is broad agreement that policy reform and a fundamentally different approach is required across the whole of Kenya to stem the severe ongoing national decline of carnivores like lions. Ideally this would enable broader benefits to be derived to communities living with wildlife; be based on clear, shared responsibilities; reward positive actions; and avoid undermining traditional herding systems by paying for avoidable livestock losses.

National review of HWC in Cameroon

This case study highlights an almost total absence of a national legal and policy framework to deal with HWC issues which has hampered effective resolution by both national and local agencies.

The general approach for resolving conflicts can be summarised as community attempts at prevention (e.g. through trapping pests, and eating them for bushmeat – all illegal) and government attempts at lethal removal (e.g. allowing hunts known as 'battues'). Although there isn't any form of formalised HWC compensation this is applied where high profile conflicts occur e.g. injury/ death or large-scale commercial crop losses, using a legal framework borrowed from compensation associated with development projects of national importance.

HWC in Cameroon occurs throughout both southern forest and northern savannah zones of Cameroon, and is anticipated to increase over the next decade due to incomplete land use planning and restriction of wildlife habitat due to the expansion of industrial plantations. Most is thought to involve crop damage, followed by loss of livestock, and finally human injury or death (although data is limited).

Enforcement and application of potential legal and regulatory provisions for HWC is very weak due to the lack of specific tools to deal with HWC. This has impacts on both people (e.g. delayed responses to issues affecting their livelihoods, and their feeling no option but to take the law into their own hands) and wildlife (e.g. reprisal killings on lions or elephants).

The situation is exacerbated by weak coordination and collaboration between the key ministries involved, and there seems to be a lack of political will to design a clear policy to resolve the situation due to the perceived magnitude of the problem, and the lack funding to do so.

Although none of the case studies are specific to apes they all provide lessons that can inform their conservation. This discussion paper draws on both the case studies and national reviews within the context of the global literature on HWC resolution to identify elements of financial mitigation schemes that have been successful, or problematic, and – wherever possible – to identify why.

3. FINANCIAL MITIGATION OPTIONS

Financial mitigation measures include compensation, insurance and incentive payments. There is a degree of overlap between each, and also some important caveats and clarifications to be made.

Until recently, most effort has been concentrated upon *compensation* aimed at single, charismatic species (Hanney 2007 provides a comprehensive bibliography). Much of this analysis has been critical, and yet compensation is probably still the most commonly used financial mitigation method in use. More recently increasing attention has been paid to alternative financial mitigation options, namely: *insurance* (Morrison *et al* 2009, Jones & Barnes 2006) and, *direct payment* approaches (Ferarro and Simpson 2002, Ferarro & Kiss 2002, Morrison *et al* 2009 Milne & Neiesten 2009). The sections below compare these tools (as Dickman *et al* (2011) have lately done in the context of carnivore conservation) and evaluate how, and in which contexts, they can be used to best effect for multi-species HWC resolution in ape range states.

Compensation

The literature suggests that financial compensation is ineffective in reducing conflicts or increasing the level of tolerance amongst those suffering from HWC, and that successes may often be due to the social contexts involved rather than the mechanism *per se.* For example, Buddhist communities are comparatively tolerant of snow leopards that predate their stock (Selebatso *et al* 2008). It also suggests that governments can become trapped into compensation schemes indefinitely (Wagner *et al* 1997). Economic modeling suggests that applying compensation where there is an active agricultural frontier (i.e. many areas that contain apes and where people are actively opening up new habitat for crops and livestock) could even drive habitat loss. This is because compensation could act

as an agricultural subsidy, displacing activities like hunting that favor the retention of habitat and promoting agricultural expansion that destroys it (Rondeau & Bulte 2007). Finally, as Hockings & Humle (2010) note the major conceptual flaw in stand-alone compensation is that it doesn't address the root causes of conflict.

There are, therefore, significant potential drawbacks to post-event financial compensation for wildlife damage, which any decision-maker should consider very carefully. The majority of effective compensation schemes are government backed and being implemented in North America or Europe and are characterised by: quick, accurate verification and payment; sufficient, sustainable funds; site specificity – encouraging local ownership and appropriate design; and clear rules, guidelines and measures of success (Morrison *et al* 2007). These issues have led to this mitigation approach being made ruled out elsewhere, for example in Uganda where "the statute does not provide for compensation of wild animal damage because the costs may be prohibitive and farmers often over-exaggerate the magnitude of crop damage" (CARE 2003). It has also led to legal ambiguities in countries e.g. Kenya – where private schemes operate independently in small areas, and a lack of clarity as to whether other kinds of financial mitigation could be legal.

Nevertheless, the PCLG case studies suggest that compensation can work in certain circumstances, depending on the scale over which success is required and measured; the context in which it is applied, the income available compared to the level of the problem; and the level of devolution of decision making that has been allowed within the policy framework in operation (Box 2)

Box 2 EFFECTIVE COMPENSATION FOR HWC IN NEPAL AND KENYA?

In **Chitwan National Park (CNP), Nepal,** compensation is based on the principle of partial payment of the losses, and provisions of fixed and maximum ceilings for claims The amounts payable under the current compensation guidelines are as follows: Rs. 150 000 (c. UK$ 1800) for death; up to Rs. 50 000 (about US$600) for serious injury (loss of body parts, disability etc.); up to Rs. 5 000 (US$60) for minor injury; up to Rs. 10,000 (US$120) for loss of livestock; up to Rs. 5000 for destruction of fruit orchards or stored grains; and up to Rs4000 (US$48) for loss of a building.

The chances of fraudulent claims are minimised by claims being scrutinized by nine agencies including two Ministries and the Buffer Zone Committees – that include community members – and there being fixed maximum ceilings for claims. People are reportedly satisfied with the 50-70 per cent market value compensation of they get for crop losses, but not satisfied with that received for injury or death, although they seem more concerned with speed of payment (which can be slow due to the level of bureaucracy) and with the continued provision of wider support being provided to the families of the victims involved (the Park is currently using its BZMP to fund scholarships for the children of victims, above and beyond the national government scheme).

To date, almost all cases of human injury and death have been compensated, but most compensation for livestock and crop losses etc. are still being considered by the Ministry of Finance (with >80% - 166 out of 202 - of the wildlife damage cases registered by local people in 2010/2011 still not compensated). The CNP is now using its endowment fund to facilitate speedier cash flow for payouts in the face of government delays (at the initiative of the Park administration, and on the basis that this will be refunded by the Treasury). However, should government funds not be forthcoming in the future it is estimated that 15 per cent of Park income would be sufficient to compensate wildlife-induced damages and therefore the scheme could be financially sustainable without support.

The CNP scheme has successful reduced animosity towards the Park and to wildlife. It has also resulted in a diminishing number of compensation claims due to the apparent success of preventative countermeasures being taken in parallel to financial mitigation e.g. electric fencing that has been installed around the Park. If greater responsibility were devolved to the strong community-based buffer zone organizations engaged with CNP to manage the compensation schemes it could remain effective. Unfortunately greater centralization risks undermining CNPs recent success.

In Kenya, at Mbirikani Group Ranch a compensation scheme was developed in 2003 in an attempt to reduce the killing of lions that were predating local livestock. The Mbirikani Group Ranch's Predatory Compensation Fund (MPCF) is implemented in conjunction with a number of other measures including a 'Lion Guardians' programme (which employs community members to monitor lions and keep herders away from them; find stray livestock; and improve conservation awareness). Between 2001 and 2006 there was a reduction in the number of lions killed on Mbirikani Group Ranch at least in part as a result of the MPCF being in place (Maclennan *et al* 2009). Overall, therefore, the Ranch scheme can be regarded as a success in terms of its primary objective of reducing

lion killing albeit in a relatively small geographic area, although "this success has to be tempered with the knowledge that the current lion population is very low and that annual off-take from the Mbirikani lion population, often when they move onto neighboring properties, is still unsustainable" (ibid). Given that MPCF is now being expanded to cover two adjacent group ranches this might become less of an issue in future, but this remains to be seen.

The MPCF pays fixed compensation amounts for lion, leopard, jackal, cheetah, and hyena kills, however, penalties are imposed to encourage people to manage their livestock effectively. Hence, if no negligence is found the claimant receives the full value set by MPCF. If livestock are predated whilst straying their owners receive 50% of its MPCF value and if they are predated from a poorly constructed boma (defined as less than 4 feet high) then the claimant receives 30% of the valuation. If the claimant is thought to have deliberately tried to mislead MPCF a fine results, or the claim isn't awarded. Payouts are made every second month and an independent Advisory Committee arbitrates contentious cases and advises MPCF whether the claimants need to have their claims revised.

Despite the penalties, at September 2009, 55% of the total claims paid were for stray livestock. MPCF has therefore not been achieving its secondary objective of improving husbandry. Although a solution would be to stop paying stray claims this may not be feasible since ranch members have threatened to kill all carnivores should this measure be taken. An alternative approach has been suggested in terms of employing professional herders (Maclennan *et al* 2009), and it may be that this is effectively what the Lion Guardians are accomplishing (having apparently found and returned 4,800 stray livestock in 2010 alone).

The case study suggests that in the longer-term the compensation paid under the MPCF may neither be cost effective or sustainable, despite its apparent success in terms of its primary objectives, and its current expansion. This is particularly so since the ranch only contributes 20-30% of the funds for this scheme, while the rest is donor derived and cannot be considered secure.

The case studies demonstrate that compensation can be made to work in limited geographic areas in developing world scenarios, but also highlight the difficulty of any scheme claiming complete success. The Kenyan example highlights how short-term local success does not necessarily equate to long-term national success. Lions are still declining rapidly in Kenya as a whole despite the success of Mbirikani Ranch's package of measures including compensation. Meanwhile, part of Chitwan's local success is predicated on removal of problem animals i.e. tigers and rhinos that could affect the future viability of these HCV species.

Insurance

Another possible approach on the continuum from compensation is insurance, which – if established through collective inputs of those affected (whether as CBOs or individuals) – could overcome some of the problems of post-event compensation by engendering collective responsibility and reducing moral hazard – where people seek to engineer HWC. Insurance is currently a comparatively rare mitigation option compared to compensation (as affirmed by Morrison *et al* 2009). From an insurance industry perspective there are several potential *constraints* to the sort of self-help mutual/ micro insurance that would suit HWC resolution. These include: technical capacity; smaller groups being vulnerable to multiple claims/ chance events and thereby running out of pooled funds – covariant risk; local groups not having access to investment markets to generate sufficient interest to pay the claims involved; and, lack of political support (Morrison *et al* 2009). Nevertheless, the HACSIS scheme in Namibia managed to overcome a number of these constraints and also demonstrated some advantages over compensation – particularly its inherent ability to direct payouts to those most affected by HWC (including at household level)(Box 3).

Box 3: COMMUNITY INSURANCE IN NAMIBIA

In Namibia the Human Animal Conflict Self Insurance Scheme (HACSIS) proved to be an effective financial mitigation approach to HWC. Its, success, may however have been be predicated to some extent on its unusual context i.e. one wherein the Conservancies (CBOs) involved in were mandated to distribute wildlife income equitably. Like some of the more successful compensation schemes it was designed to encourage better animal husbandry to reduce losses – and unlike many compensation schemes this was easier to instigate since much of the money has come from the communities (i.e. Conservancies) themselves. Therefore, full payment was tied to strict claim conditions being met e.g. kraaling at night, and guarding of fields during day.

The original objectives of the HACSIS were to: increase community tolerance towards wildlife causing damage; create an incentive for farmers to manage and protect their stock and crops better; encourage conservancies to put in place a management strategy to mitigate problems; and promote the equitable distribution of benefits so that individuals who suffer losses can benefit from wildlife income. Reports indicated that it achieved all of these objectives.

HACSIS was not a typical insurance scheme where premiums were paid in advance; but rather a performance-based payment whereby registered conservancy members had to take mutually-agreed proactive measures to protect themselves, their crops and their cattle. One of the main reasons that a commercial insurance company wasn't used was that communities only wanted to pay out after incidents had occurred rather than risk losing advance premiums. Payouts were donor funded in the first year (when it was being piloted) but as it matured the conservancies collectively paid 50% of claims using the revenue they generated from tourism ventures.

Payments were backed up by various other measures in addition to those already mentioned including removal of predators that caused repeated problems, sometimes by offering animals to trophy hunters and sharing resultant income; and the application of 'conservation agriculture' employing intensified but sustainable methods to reduce field sizes, making them easier to protect, whilst increasing yield and the land area available for wildlife and tourism.

The key elements to HACSIS's success seem to have been the fact that:

- It was developed by the Conservancies themselves (*with technical help from NGO partners*) and they agreed to match any third party financial contributions. The scheme addressed the problem of collective income from, and individual losses caused by, wildlife through its 'collective insurance approach'.
- Its management was locally based i.e. through the Conservancies.
- There were strict, self-enforced, claim conditions including limited payouts to valid claims and the scheme thereby encouraged greater farmer vigilance (e.g. kraaling at night, guarding fields during day).

The pooling of matched resources across several Conservancies, and its being tied to conditions that minimised incidents also reduced *covariant risk* – something that could be further reduced with the expansion of the scheme under HWSRS – the government scheme that has now replaced and subsumed HACSIS - to include a greater number of Conservancies. The potential problem of having *limited access to capital markets* was bypassed under HACSIS by 50% of the financing coming from self-generated sources i.e. wildlife income, and this could continue to do so if HWSRS is underwritten by funding from the Game Products Trust at national scale; whilst the issue of *political support and government backing* is obviously a lesser issue given that HACSIS is seen as a model that needs to be scaled up for national application, and its initial existence was predicated on enlightened policies of equitable, sustainable use and communal resource management.

Conservation incentive payments

Economic modeling approaches (Ferraro, 2001 and Bulte & Rondeau, 2007) suggest that direct payments can have the largest impact on individuals' conservation- related behavior. There are, however, few examples of such approaches for addressing HWC. The exceptions are the payment for live capture, rather than lethal removal of, cheetahs in South Africa (Morrison *et al* 2009) and payment for presence of various carnivore species in Mexico, Sweden and Nepal (Dickman *et al* 2011).

Milne and Niesten (2009) categorise 2 types of conservation incentive payment, which could theoretically be applied in addressing HWC:

1. Habitat or area based contracts – including communities as service providers, with leases or agreed management practices on communal land
2. Species-specific contracts, not area based (under which the both tiger and snow leopard HWC initiatives are listed as examples).

Within the category of habitat contracts an increasing suite of 'Payment for Ecosystem Service' (PES) tools are being developed and of potential interest. This is particularly since 'payment on delivery' i.e. for positive conservation results (as per Dickman *et al* 2011) is critical to these approaches, which are already being applied to habitats that contain HCV species. In fact payments for REDD+ (Reduced Emissions from Deforestation and Degradation) to prevent deforestation; or for watershed protection; or even future biodiversity credits, are all likely to be tied to the maintenance of HCV species. Currently if a project developer wants to achieve CCBA (Climate, Community & Biodiversity Alliance) certification they must ensure that any HCV species present are conserved (Pitman 2011). They can do this by selecting measures that counter anthropogenic threats – which could include

mitigating HWC – and the funding sources derived could lead to community payments over 30 years or more (depending on the project assurance period involved). The potential down-side is that set-up costs tend to be high, and delivery of benefits slow from this type of project, as well as the governance and land tenure requirements to make it work being high, as well as there being significant potential for negative livelihood impacts if the PES in question isn't well designed (Peskett 2008).

In contrast, the financing of species-specific contracts may be difficult unless specialist donor institutions are willing to commit to long-term interventions, or unless financing can be derived from direct income sources e.g. from tourism revenue or trophy hunting (although it is likely that such funds are already committed to other competing priorities). In addition, there are potential risks in external factors causing mortality in the target species concerned and the contractee(s) not getting payment through no fault of their own, as well as significant potential benefits in the payments are not independent of HWC events – thereby avoiding 'moral hazard' (Dickman *et al* 2011).

Finally, it seems that in the context of HWC resolution and delivering benefits to the households most affected, both area and species contracts would require tailoring/ combining with complimentary mechanisms such as insurance to enable delivery at both community-level (seemingly the most common contractual level to ensure compliance) and household level benefits to those most affected by HWC.

Bundled Coexistence Payments

In addition to the individual financial mitigation options discussed above there have been recent suggestions of hybrid funding models/ bundled payment systems to address HWC. One of these arose through examining financial options for improving the conservation of carnivores in human dominated landscapes (Dickman *et al* 2011). The suggestion is that multiple financing streams should be combined into one overall (Predator) Coexistence Payment (CP). Interpreting the authors' central tenant as being that more than one type of (financial) mitigation may be required in order to ensure net positive livelihood benefits (NPLB) of coexistence with species of high global but low (or negative) local value, then this would seem an applicable approach for other HCV species. However, from a more generic perspective, as well a financial sustainability one, it seems unlikely that CP schemes could be created wherever HCV species are present. On top of this, these conflicts often occur in countries where there are significant institutional challenges, and where additional bureaucratic layers are not what is needed to improve HWC responses.

Instead, one might look at achieving the same result by mainstreaming HWC mitigation into other payments and benefits to achieve the same result. Indeed, successful elements of multi-species HWC mitigation strategies discussed above seem to suggest the need for multifaceted resolution schemes that encompass combined prevention; livelihood benefits; problem animal removal; and financial mitigation options to achieve NPLB for those to living with the species in question.

Key lessons on financial mitigation

No stand-alone solution

The conclusion of both this study and other reviews is that financial mitigation only works as part of a wider suite of activities. The major failing of most schemes is that the cost of wildlife presence still usually outweighs the benefits (Dickman *et al* 2011; Kenya case study). Successful conservation outcomes are most likely when there is a clear net positive livelihood benefit through the application of multiple complimentary measures. In other words, financial mitigation should top up preventative actions, and livelihood benefits in the communities and households most affected by HWC. This issue is discussed further below.

Long-term financing

Successful financial compensation depends upon finding sustainable sources of finance i.e. paying out at an affordable but meaningful level for the foreseeable future; if this isn't taken into account not

only is project bankruptcy a significant risk but expectations of potential beneficiaries can be dashed and resentments given rise to that can lead to escalated animosity – potentially leading to human-human conflict, or withdrawal of support for conservation on the basis of a 'no pay, no care' ethic (Fisher 2012) –which may in itself be produced by any form of environmental payment.

Payouts tied to improved management

Linked to the above point ssuccessful financial mitigation schemes tend to ensure that payouts are tied to good husbandry/ crop protection. This helps to overcome the need to deal with underlying problems as well as treating the symptoms of HWC via financial mitigation. Wildlife damage is closely correlated to the effectiveness of livestock management (Muruthi 2005). Placing good husbandry conditionalities on payments can also help keep financial mitigation schemes affordable (Namibia case study, Nepal Case study).

Fast and fair

To succeed financial mitigation of all forms needs to be perceived as fair, transparent and fast (in terms of verification and payment) – something that applies to statutory compensation too, and that seems to be the key to local success around Chitwan wherein the institutional set-up has (by default rather than design) ended up being quite devolved as far as those affected are concerned.

4. POLITICAL & INSTITUTIONAL STRUCTURES TO SUPPORT FINANCIAL MITIGATION

The benefits of a supportive political framework are clear from HACSIS. The authors of the Namibia case study state, "on a macro level it can be argued that the economic benefits associated with wildlife in Caprivi tend to outweigh the private economic costs in terms of crop and livestock losses. Thus the Namibian government policy of promoting a system of CBNRM where wildlife can pay for itself, and communities can internalise both the costs and benefits from wildlife appears to be economically sound". Contrastingly, the need for such reform is clear in Kenya where Hazzah *et al* (2009) summarise the problem for wildlife (outside protected areas) as being an expensive nuisance to those who lose crops, livestock, and occasionally human life. They state that this can only be reversed through national reforms that allow rural people to profit economically from ecotourism or other wildlife-based enterprises.

The above issues are symptomatic of the fact that successful resolution of HWC requires widely acknowledged global principles to be bought to bear in the unique contexts of a particular conflict (Madden 2004). Like any other multi-faceted conservation issues HWC resolution requires clear, joined-up policy thinking to ensure that regulatory frameworks are supportive of resolution strategies where wildlife damage occurs, and can ensure maximum possible benefits to the households affected i.e. as per the national operating requirements of Namibian conservancies.

Even where this type of system does exist it may do so more by luck than judgement. In Namibia one can argue that HACSIS was a success because it was supported by appropriate national policy. Paradoxically some of HACSIS' facets that made of it a local success are those that could now be lost as it is scaled up into a national level initiative due to its success (Box 4).

Box 4: SCALING UP FROM LOCAL SUCCESS

In Namibia the HACSIS insurance scheme belonged to the communal area conservancies that were then working with the NGO IRDNC (Integrated Rural Development and Nature Conservation). Its successor Human Wildlife Self Reliance Scheme (HWSRS) is now a national-level Namibian Government scheme incorporated in their Policy Document on HWC.

Scaling up to national scheme that is as successful as its local progenitor is going to be challenging. The fate of HACSIS within the new national framework is unclear, and the degree to which some of its key components are going to be retained isn't known.

HACSIS was piloted in two Caprivi and two Kunene Conservancies with whom IRDNC was already working plus a third Kunene conservancy operating on its own. All the areas selected initially had proven abilities in managing their staff and running their wildlife monitoring systems. HWSRS has now expanded to cover all communal lands in Namibia, some of which do not necessarily have these proven abilities and are not set up as Conservancies.

The funding strategy for HACSIS was to share responsibility for financing 50/50 between the conservancy and external partners, with payments going directly to people that incur the real costs. Both of these conditions may not be continued under HWSRS, and its current wording only suggests that conservancies that can afford to are expected to contribute their own funds. But such contributions are key to reducing the likelihood of false claims, and in addressing the constitutional requirement of equitable distribution of revenue earned from wildlife.

Although HACSIS ended in 2010, the government backed HWSRS should theoretically be in a strong position in terms of permanence. However, this may depend upon whether its access to national funding – such as the Game Products Trust Fund (GPTF) - is sufficient to counterbalance the probable loss of external partner financing it is likely to suffer as a 'government scheme'.

In addition, there is some concern that the expanded scheme could become a drain on conservancy finances given HWSRS's intent to include all residents rather than only registered conservancy members, and since the cattle values muted under it are substantially higher than they were under HACSIS. As a result total annual payments may have to be capped and/or Conservancies will need to increase their incomes (depending on how much funding is derived from GPTF and/or the Conservancies). Some are considering establishing livestock herds to replace animals lost to predators instead of making financial payments.

If sufficient external donors could be found to establish a Trust Fund this could also help sustain the conservancy element of HWSRS, as could increasing the income from wildlife products to assure the Conservancies' contributions. How sufficient financing can be secured for the non-conservancy element of HWSRS is less clear.

The Ministry of Environment & Tourism (MET) has emphasised that HWSRS is not a compensation scheme but will "offset" losses incurred by individuals. They assert that it builds on HACSIS, bringing the initiative into the national policy framework. However, without retaining and bolstering the critical HACSIS conditions of Conservancies matching external funding the risk is that HWSRS will become a national compensation scheme with all the risks inherent therein.

There is significant variation in the political frameworks for, and local experiences in tackling, HWC in sub-Saharan Africa ape range states. Namibia is an exceptional country in terms of its policy framework for communal conservancies and it may be that the lessons learned here are not applicable elsewhere in Africa. . It is however clear that a lack of a supportive national frameworks and clearly defined, simple roles and responsibilities can undermine any chances of local success. The Cameroon review of HWC policy and practice illustrated the disadvantages faced by countries lacking clear frameworks (Box 5).

Box 5: NATIONAL POLICY FRAMEWORKS FOR FINANCIAL MITIGATION OF HWC

In Cameroon the lack of a clear national legal framework for HWC management seems to have prevented local financial mitigation schemes from evolving. *Ad hoc* financial compensation of HWC victims occurs in high profile cases such as when a family was awarded $US2000 by a Minister after their child was maimed by a chimpanzee, but there is no formal provision for HWC compensation. Where compensation is applied it seems to be allowed under the auspices of statutory compensation designed for compensating agriculture affected by development/ infrastructure projects.

The situation is exacerbated by weak coordination and collaboration between the 10 Ministries theoretically involved. These are called upon through a "valuation commission" whose composition varies from one case to another. The Ministry of Territorial Administration and Decentralization (MINATD) leads and coordinates, and the commission is meant to assess wildlife damages and proceed with the compensation process.

In line with the government's decentralised approach representatives of the Ministries concerned address local level HWC, with support from the gendarmerie, local government officials, traditional authorities and NGOS. However, the lack of a national framework clarifying roles and responsibilities leads to a tendency for agencies avoiding taking responsibility; and there seems to be little political will to formulate a clear HWC policy due to the perceived magnitude of the issue and there being no clear financial provisions for its resolution.

There are, however, opportunities for better addressing HWC through improved policies in Cameroon including:

- including HWC more comprehensively within the Forest Code – which is currently being revised.

- maximizing the local income generation potential of existing protected areas (prior to carrying out the current planned extension of coverage to 30% of Cameroon's land area), e.g. through tourism/ REDD+
- establishment of Community Hunting Zones rather than stricter designations of protected area.
- working through the Commission of Central African Forest (COMIFAC) to harmonise policies and actions on HWC, particularly in transnational protected areas (that harbour populations of large landscape species like elephants and apes – ensuring compatible protection regimes)

In Kenya where localised success' of private compensation schemes for high value species like lion risks seem to be contributing to the warping of community perceptions about the value of wildlife, there is a clear need for a coherent national framework.

The socio-political problems of isolated attempts at implementing non-standardised compensation schemes without a broader regulatory framework suggest that one needs to be imposed otherwise the secondary consequences for conservation are likely to be severe i.e. increasing resentment and retaliatory killing (Huzzah *et al* 2009). The current national policy on HWC compensation is meant to compensate for injury and death; however, a sample of claims from Laikipia and Nyandarua Districts found that although one third were accepted none received actual payment (Obunde *et al* 2005).

Compensation is clearly not working in Kenya and commentators suggest that even if payments were made, compensation at the scale required is simply unaffordable (Ogada pers comm, Hazzah, *pers comm)* and made more awkward by the constantly changing value of livestock which gives rise to periodic discontent amongst livestock owners.

The Kenyan Government is currently preparing a new Wildlife Policy - the provisions it makes for HWC mitigation, and the degree to which policy is translated into practice remains to be seen.

Key institutional and policy lessons from case studies:

Single, clearly mandated, lead national agency:

There should be one lead agency at national level that is fully mandated to deal with all aspects of HWC as well as all related aspects of internal national, and external international, policy. This agency should be in a position to:

- secure and manage its own funds in relation to HWC as required to perform its statutory functions;
- ensure the maximum realistic level of devolution of management possible in terms of balancing institutional capacity requirements for management and governance with speed of delivery;
- create a clear strategic framework for HWC resolution in-line with the national context and informed by a logical decision-making process;
- lead on integrating HWC management with other departments e.g. those charged with agricultural or timber concession licences/ protected area management/ land-use planning;
- ensure that direct sufficient income from wildlife use/ ecosystem services/ nature tourism is maximised and made available to support the targeting of benefits to households most affected by HWC;
- ensure that national policies are supportive of the most technically feasible and socially appropriate options for HWC resolution e.g. that traditional preventative measures are upheld wherever possible, and that there are no legal obstacles to exploring financial mitigation (such as community self-insurance/ conservation incentive payments – even if compensation is avoided) where the context suggests that such measures might be required;
- administer and implement a standard, transparent and suitably rapid set of measures to deal with problem animals and statutory compensation for human injury and death;
- help to identify potential *human-human* conflicts that occur due to HWC at an early stage, and arbitrate in those that do occur.

True decentralised implementation

Local delivery of HWC resolution should be as decentralized as possible so that there are as few steps between the national agency and the level at which conflicts need to be mitigated. This is more efficient both in terms of money and time. Bureaucratic, slow processes tend to accrue frustration amongst those affected by HWC and waiting for assistance; they also provide opportunities for corruption and make the whole system less attractive for external donor funding.

Local delivery institutions could be a mix of the devolved national agency/ protected area administrations/ CBOs or NGOs depending on the context in question. Ultimately these agencies should go beyond delivering benefits to the communities affected by HWC and design mechanisms by which the households most affected by wildlife damage receive the maximum benefits (and be flexible enough to cope with the fact that this will change over time). Locally set HWC objectives should, wherever possible focus on ensuring net positive livelihood benefits to those living with wildlife.

The local implementing agencies concerned should be able to:

- provide both technical assistance (to improve preventative measures) and mange benefit flows;
- ensure monitoring of the resolution initiatives being attempted in order to finesse the strategies concerned (including economic aspects to ensure that net positive livelihood gains are eventually delivered);
- supply information to the central agency mentioned above in order to help inform national policy and ensure that this is supportive to their efforts).

Supportive national and international policies

Ideally, higher-level policies would be designed collectively by national HWC lead agencies to be explicitly supportive of pragmatic HWC resolution (balancing conservation and livelihood needs e.g. allowing for sustainable commercial wildlife use) whilst ensuring common approaches in neighbouring states e.g. those that share transboundary PAs or migrating wildlife. However, in reality conventions such as CITES limit the use of products from high-profile (HCV) species such as elephant, and hinder potential local revenue generation, as well as traditional reactive measures to conflict. It is against this backdrop and within these constraints that national and local HWC resolution needs to be made as responsive and beneficial to those affected as possible.

5. DISCUSSION – which strategies are best for tackling HWC?

Mainstreaming HWC policy

There is clearly a need to deliver net positive livelihood benefits (NPLB) to those affected by HWC. From an economic perspective this would mean ensuring that HWC is considered as a cost that can be exacerbated through poor decisions, and minimised by good decisions e.g. via land-use/ protected area planning, or game hunting policies. It would also involve ensuring that decision-makers recognise the potential synergies between well-designed resolution for HWC and improving local land tenure, increasing local income from wildlife through existing finance e.g. tourism revenue, and trying to engineer multiple wins from novel national income streams e.g. tying incentive payments for HCV species into emerging payment schemes such as REDD. The need for joined-up thinking is clear from the case studies commissioned for this study (Box 6).

Box 6: THE NEED FOR MAINSTREAMING

In Namibia, to be a success the Human Wildlife Self Reliance Scheme (HWSRS) will have to facilitate better collaboration and understanding between key ministries i.e. such as the Ministry of Environment and Tourism (MET) and the Ministry of Lands and Resettlement so that they view wildlife as a legitimate land use that can contribute to rural development (thereby reducing the likelihood that their policies will continue to exacerbate HWC).

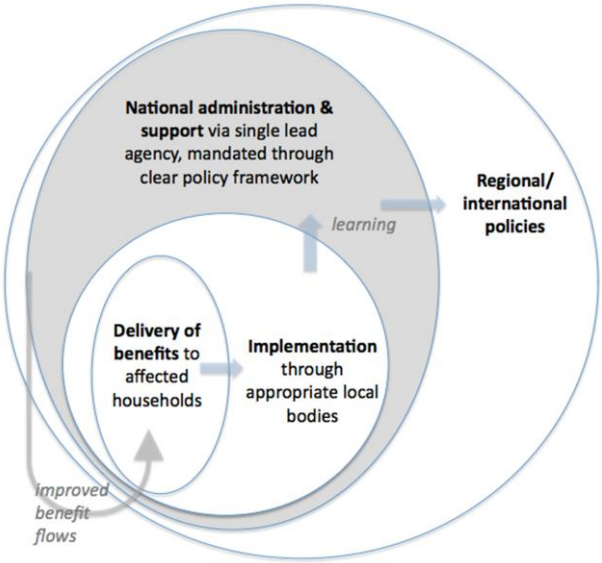
In Cameroon, a lack of clear legal frameworks, ineffective land-use planning, and poor PA management are significant issues in exacerbating HWC. Individual projects funded by external donors have tried to address specific example around Cameroonian PAs e.g. Waza National Park where lion-livestock conflicts have been addressed by discouraging livestock rearing inside or close to the park, whilst in nearby Bénoué National Park small-scale agriculture has also been restricted. However, these are token efforts in comparison to what is required more broadly.

However, in reality indirectly linked policies are often not supportive of HWC resolution and do require reform. One example is where national policies try to ban the use of appropriate technologies like snares for catching rodents around agricultural areas – exacerbating HWC, and removing the potential for local people to recoup some of their lost revenue for example by selling bushmeat from common species (Rondeau and Bulte 2007). Policy reform would potentially help to address bushmeat issues more broadly and derive greater income from wildlife, thereby reducing HWC (Bowen-Jones *et al* 2003). Currently, politicised non-sustainable use arguments prevent this from occurring (or even being trialled) in much the same way policy reform to allow economic wildlife use in Kenya that could prevent retributive killing HWC species also seems unlikely despite the clear arguments in its favour (Hazzah *et al* 2009).

This approach therefore goes beyond Muruthi (2005)'s observed need to integrate human-wildlife conflict management into wider conservation objectives, and instead looks at indirectly linked policies from the perspective of enabling efficient, and more broadly beneficial HWC resolution. All natural resource policies could be reviewed in terms of minimizing knock-on effects that exacerbate existing HWC whilst looking for opportunities for win-win solutions to decrease future HWC and save money therein.

Development of separate HWC policies/ institutional units/ species plans or decision-making/ financing tools risk further isolating the issue when it needs to be sewn into all of the other policies impacting communities in areas where wildlife is a potential livelihood issue. As Clements *et al* (2011) observe, PES programmes – which, as previously discussed share important similarities with both insurance and incentive payments discussed above – are best viewed as a tool in a broader process of strengthening institutions for conservation of biodiversity. Mainstreaming HWC into broader policy thinking is likely to be more effective, cheaper over the long term, and more sustainable in terms of

Figure 1: Model of an idealised, nested approach to multi-species Human Wildlife Conflict resolution



requiring less new institutional infrastructure. It could also help stop wildlife-damage issues from being perceived as the exclusive ambit of wildlife departments – and thereby remove the potential for exclusive blame for incidents being placed on them.

Figure 1 presents a model for a nested policy and institutional system that takes the best elements of the Namibian framework and avoids the demonstrably problematic elements of scenarios such as the one seen in Cameroon. Arrows indicate how learning from HWC resolution at local level would ideally inform higher levels of policy.

In this model institutional arrangements enable the best possible resolution strategies to be adopted, and ensure that national, and ultimately international policies stem from the most appropriate ways to help communities manage perceived conflicts. Unfortunately, as Sandbrook and Roe (2010) note, and as experience from Cameroon illustrates, governments around the world tend to adopt the rhetoric but not the practice of decentralisation and local empowerment.

Simplified decision-tree to select tools for HWC resolution

Our analysis of the available financial mitigation tools suggests that all are both complex and potentially problematic. However, it is clear that compensation schemes are by far the most awkward to establish in terms of avoiding moral hazard and unintended perverse incentives. For example, in Kenya compensation is regarded as easier money than taking livestock to market, and is undermining Maasai traditions of effective stock protection (Ogada *pers. comm.* in PCLG Kenya case study). More generally compensation does not seem to improve attitudes towards conservation (Nyus *et al* 2003) or feelings of ownership towards it.

Meanwhile, community insurance schemes have the potential to engage those affected by HWC in taking responsibility for managing their own wildlife resources/ land involved – although this requirement is likely to limit this approach to a small number of unusual contexts unless wider policy reform occurs. An example of this might be if hunting reserves in Cameroon were to be established under genuine principles of collective management and maximising returns to local people.

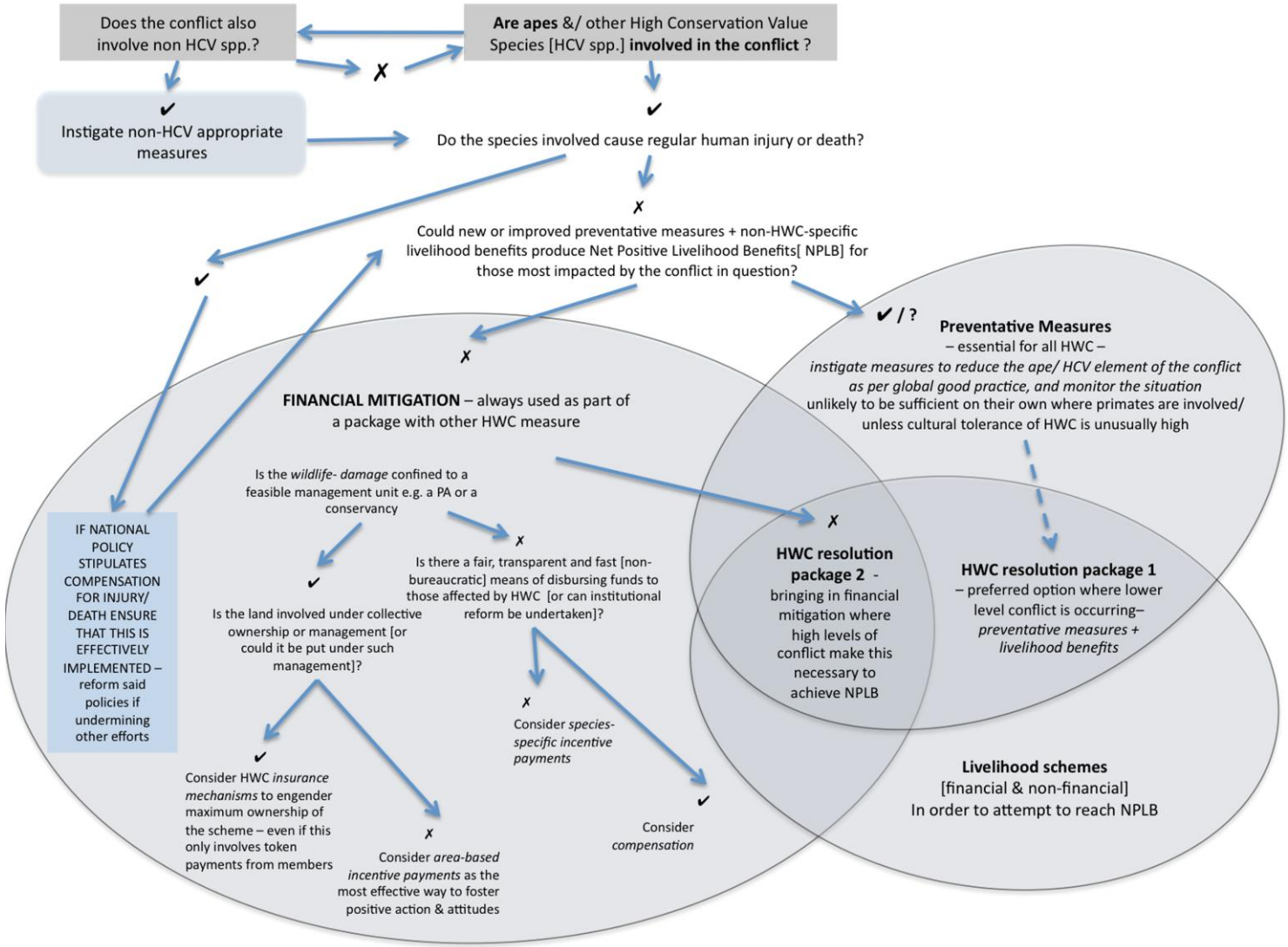
In contrast, in areas where PES or species-specific contracts are a possibility i.e. where sufficient money is available and national policy frameworks allow local payment to those living with wildlife, incentive payments should be high up amongst options for reducing HWC with high conservation value (HCV) species. Such payments represent incentives for positive engagement without the moral hazards of compensation.

More generally, all of the above require sustainable financing and are most likely to be effective when tied to improving preventative measures to minimise HWC, as well (often) as complimenting other financial and non-financial livelihood schemes.

Figure 2 overleaf tries to condense these lessons learnt to give policy-makers an overview of when financial mechanisms are appropriate, within the context of the best combinations of approaches (herein termed 'resolution packages') that might be best suited to different contexts.

This model works on the basis that financial mitigation is not always appropriate or advisable. In particular, it is suggested that common species of no high conservation value should not be the focus of financial mitigation strategies since any such scheme is likely to be financially unsustainable. However, conflict caused by non-HCV species still needs to be dealt with as part of any resolution strategy to avoid resentment arising, and the possible unfair blaming of HCV species present. To address these issues in an effectively might require policy reforms to allow use of traditional preventative measures, sustainable off-take, or the retention of income from wildlife products, etc. as per HCV species resolution. It might also require the supplementary technical assistance to improve preventative measures already being taken.

FIGURE 2: WHEN ARE FINANCIAL MECHANISMS APPROPRIATE? A simplified decision tree



Furthermore we have not gone into detail on preventative measures although we regard these as an essential component of any HWC resolution strategy. There are a plethora of studies and guidelines detailing deterrent methods for key HCV species that cause livestock or crop damage including guarding, fencing, olfactory and acoustic deterrents, alternative cropping and land-use etc. (as reviewed in the African context by FAO 2010, and for the Abertine Rift by Hill *et al* (2002). In Uganda, work has been done on physical prevention of crop losses to apes (Kalpers *et al* 2010), and the IUCN has produced guidelines for dealing with human-ape conflict (Hockings & Humle 2009) as different specialist groups have done for other species such as elephants and lions.

As can be seen in Figure 2, and as discussed, the financial mechanisms that form the focus of this paper are suitable to some contexts but not others. Indeed, due to their cost and problems of sustainability strategies that do not involve financial mitigation should be seen as the preferred option for lower level conflicts i.e. where retaliatory killing of wildlife isn't a significant conservation issue, or where human livelihoods are not locally perceived as being significantly impacted by wildlife. Where higher-level HWC is prevalent – including where human or HCV species deaths are occurring, or frequent wildlife damage risks sparking *human-human conflict* – then financial mitigation options should be considered.

It should also be emphasised that whichever mechanism is deemed to be the most appropriate the following basic principles apply to all interventions:

1. design solutions in collaboration with people being impacted by the HWC (Treves *et al* 2006).
2. set specific objectives (Hoare 2001, Hockings & Humle 2011);
3. base decisions on the best available data, or collect this as the project progresses (Dickman 2010, Treves *et al* 2006, Bruch-Mordo *et al* 2009, Hockings & Humle 2011);
4. ensure that impact monitoring and adaptive management are sewn into all strategies – which should be viewed as dynamic processes, and involve revisiting original decision-making logic to reassess if this is still valid depending on what is or isn't working (Hockings & Humle 2011).

Lack of co-management approaches to designing HWC interventions often underlies project failure (Treves *et al* 2006), and surprisingly few interventions are based upon sound sociological data that identifies root causes of conflict, or are formulated using a full combination of relevant information i.e. ecological, historical, sociological and economic data (Dickman 2010).

If the initial planning and decision-making is sound, an adaptive – results based – implementation approach is adopted, and policies at national level are reformed on the basis outlined in our nested model we believe that HWC can be better dealt with to the benefit of both the poor and HCV species such as apes. But, this will require deriving real benefits at the scale required to those living with wildlife. Token percentages of tourism revenue will not suffice and will allow resentment to undermine otherwise good conservation work.

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