



IUCN SSC guidelines on human-wildlife conflict and coexistence

First edition



INTERNATIONAL UNION FOR CONSERVATION OF NATURE



IUCN SSC
**Human-Wildlife
Conflict & Coexistence**
SPECIALIST GROUP

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Executive summary

Wildlife can pose a direct threat to the safety, livelihood and well-being of people. Retaliation against the species blamed often ensues, leading to conflict between groups of people about what should be done to resolve the situation. Human-wildlife conflicts also negatively affect communities whose support for, and benefit from, wider conservation goals is easily eroded by recurring negative interactions with species close to their lands, fields and homes. Effective and sustainable methods to mitigate and manage these situations are elusive or are often not implemented in a socially or economically sustainable way. Each situation is different, with its own history and unique complications, limiting the transferability of methods for reducing the impacts of species as well as people's behaviour.

Human-wildlife conflicts involve recurring interactions between people and wildlife yet are always underpinned by social conflicts between groups of people. The species involved may include a wide range of terrestrial and aquatic species – from large cats, bears, elephants, deer, primates, sharks, seals, crocodilians, snakes, rhinos and otters, to invertebrates and plants – and these can be of varying degrees of conservation concern. Typically, human-wildlife conflict cases involving threatened, iconic or well-known species attract the most attention, and in turn the highest volume of voices, opinions, arguments or media coverage. For example, although venomous snakes kill far more people each year in India than do Asian elephants, the latter inevitably tend to gather disproportionately more attention.

These Guidelines are not limited to any region or species or human groups, but rather try to focus on principles and processes that apply across situations. Important in understanding the nature of human-wildlife conflict are five key considerations:

1. Interventions that focus only on reducing damage are not transferable from one case to another.
2. Poorly informed human-wildlife conflict mitigation attempts can exacerbate the situation.
3. Context awareness and understanding of social and political backgrounds are crucial.
4. Conflict mitigation and damage reduction interventions must be designed and managed collaboratively.
5. Long-term solutions must incorporate landscape-scale ecological, economic and socio-political planning.

These Guidelines focus in particular on how to resolve or manage human-wildlife conflict, but with coexistence in mind. Coexistence is not simply the opposite, or absence, of conflict. At the most basic level, coexistence suggests that at some level a choice is being made by humans to share landscapes and natural resources with wildlife in sustainable ways. It follows, therefore, that in order to do so, coexistence generally also requires agreement – or at very least, cooperation – between different groups of people about the wildlife in question.

The Guidelines provide the crucial foundations and principles for good practice. They have been developed by an interdisciplinary team of experts from the IUCN SSC Human-Wildlife Conflict & Coexistence Specialist Group, with chapters compiled by 50 contributors and written for conservation practitioners, community leaders, decision makers, researchers, government officers and other interested parties.

These Guidelines are centred around foundational Principles of understanding and managing human-wildlife conflicts: (1) Do no harm, (2) Understand issues and context, (3) Work together, (4) Integrate science and policy and (5) Enable sustainable pathways. These are mirrored in a Good Practice Checklist, containing 10 key questions, which in turn are elaborated across 32 short chapters. We recommend the user to keep the Principles and the Good Practice Checklist as a reference, and consult chapters as needed and where relevant for given contexts and situations.

In summary, the sections cover the following:

1. Do no harm

First covered is the importance of identifying the level of conflict and reflecting on one's own role in the given human-wildlife conflict situation (Chapters 1 and 2). This needs to be followed by an assessment of whether any intervention is advisable based on the best-available information about physical and social contexts, while giving careful consideration to possible unintended consequences (Chapters 3 and 4).

2. Understand issues and context

In order to assist the reader in the assessment of a human-wildlife conflict situation, we provide three sections on how to assess the impacts of wildlife, the natural and ecological drivers of these, and how to consider the species' behaviour in this situation (Chapters 5, 6 and 7). This is followed by five chapters of guidance on how to consider the underlying social, cultural, historical and political contexts. This requires an understanding of attitudes, tolerance, and human behaviour, cultural influences, histories, livelihoods and well-being, and different forms of governance related to human-wildlife conflicts (Chapters 8, 9, 10, 11 and 12).

3. Work together

Collaboration and co-management are critical in every human-wildlife conflict and coexistence initiative. The next section brings into focus the importance of working with stakeholders and communities, the integration (where relevant) of traditional knowledge and how to achieve good planning and co-designed theory of change (Chapters 13, 14 and 15). Alongside this we recommend multi-disciplinary teams across sectors and use established cooperation approaches to support this. These next chapters explain how to develop multi-stakeholder dialogues, how to resolve conflicts between groups of people and how to work constructively with the media on these complex issues (Chapters 16, 17 and 18).

4. Integrate science and policy

Actions to address human-wildlife conflict should be based on evidence and sound science. This section first covers the essentials of social research and ecological research methods for human-wildlife conflict assessment and monitoring, and how to consider and plan at landscape scales (Chapters 19, 20 and 21). We then cover key aspects of governance and policy integration via chapters on the role of laws, policy instruments, and political ecology in human-wildlife conflict (Chapter 22, 23 and 24).

5. Enable sustainable pathways

This section looks at the main categories of intervention in human-wildlife conflict mitigation in terms of reducing or managing the impacts of wildlife on people or people's behaviours in human-wildlife conflict situations. This includes chapters explaining when (or when not) to consider certain approaches, including an overview of damage-prevention methods, animal capture and

translocation, lethal control and response teams (Chapters 25, 26, 27 and 28). Finally, we consider costs and cost-offsetting strategies, as well as exit strategies to avoid social, financial or technical dependence. These last chapters cover strategies for human behaviour change and guidance for economic incentive approaches, compensation and insurance, and how to evaluate overall progress and sustainability (Chapters 29, 30, 31 and 32).

Human-wildlife coexistence is achievable through context-appropriate and well-informed collaborations of actors arriving at a way forward that is acceptable to those most directly involved. Some human-wildlife conflicts involve situations where lives and livelihoods are at serious risk, requiring urgent attention that cannot wait for the outcomes of research or mediation dialogues. In emergency cases, there may be no other option than to implement imperfectly informed damage control measures as soon as possible. However, these can and should be swiftly followed by the development of long-term, collaborative and holistic plans for conflict management. For human-wildlife coexistence to be possible, continuous dialogue is needed. Because of this, human-wildlife conflict is a global challenge for biodiversity conservation, and also an opportunity, a vehicle and subject for focused cooperation and working together towards the vision of the UN Convention on Biological Diversity's Global Biodiversity Framework, in which 'humanity lives in harmony with nature and in which wildlife and other living species are protected'.



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About the IUCN SSC Human-Wildlife Conflict & Coexistence Specialist Group

The IUCN SSC Human-Wildlife Conflict & Coexistence Specialist Group (HWCCSG) is an interdisciplinary advisory group that aims to support professionals working on human-wildlife conflict. The HWCCSG (formerly the Human-Wildlife Conflict Task Force, HWCTF) was established in 2016 as an IUCN SSC Task Force with the aim of fostering links between policy, science and communities, and assimilating knowledge and capacity for human-wildlife conflict management. In 2022 it was granted full IUCN SSC Specialist Group status.

The HWCCSG's objectives to date have been to:






1. **act as an advisory body** on matters of human-wildlife conflict that can provide a platform for the exchange of best practice;
2. **facilitate interdisciplinary approaches** to human-wildlife conflict mitigation by encouraging the collaboration of experts from many different fields; and
3. **build capacity** by developing technical or framework guidance materials, training workshops and learning platforms.

Its ambition is that where animals pose a direct and recurring threat to the livelihoods or safety of people, efforts to manage the situation are pursued through well-informed, holistic and collaborative processes that take into account underlying social, cultural and economic contexts.

The HWCCSG endeavours to work towards the following outcomes:

- **Increase understanding** and awareness of the complexities of conflict and coexistence.
- **Facilitate more collaboration** between practitioners, policy makers, scientists and the community.
- **Catalyse more resources** and effort committed to good human-wildlife conflict management.
- **Encourage preventative mitigation** of emerging human-wildlife conflicts.
- **Integrate effective policies** for human-wildlife conflict and coexistence into major biodiversity and development agendas.

Key resources

- [IUCN Human-Wildlife Conflict & Coexistence Resource Library](#) 
- [IUCN SSC Position Statement on the Management of Human-Wildlife Conflict](#) 
- [IUCN SSC HWCTF Briefing Paper on What is Human-Wildlife Conflict?](#) 
- [IUCN SSC HWCTF Briefing Paper on Perspectives on Human-Wildlife Coexistence](#) 
- [IUCN Issues Brief](#) 

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ResearchGate	www.researchgate.net/project/IUCN-SSC-Human-Wildlife-Conflict-Coexistence-Specialist-Group

About these Guidelines

As human-wildlife conflicts become more frequent, serious and widespread worldwide, they are notoriously challenging to resolve, and many efforts to address these conflicts struggle to make progress. Challenges typically arise because:

- the unique cultural, political and economic contexts of each situation are poorly understood;
- the complicated relationships between the different groups of people involved are difficult to understand and address;
- each case is unique, and solutions are rarely transferable from one situation to another;
- effective methods of damage and retaliation control may be socially unacceptable and/or financially unsustainable; and
- decision-making processes are not inclusive or transparent.

These Guidelines provide an essential guide to understanding and resolving human-wildlife conflict. The Guidelines answer key questions such as:



How can we understand the complexities of human-wildlife conflict better?



What are the best approaches and solutions that benefit people and wildlife?



Who needs to be involved in achieving lasting coexistence?

The Guidelines aim to provide foundations and principles for good practice, with clear, practical guidance on how best to tackle conflicts and enable coexistence with wildlife. They have been developed for use by conservation practitioners, community leaders, decision makers, researchers, government officers and others. Focusing on approaches and tools for analysis and decision making, they are not limited to any particular species or region of the world.

The Guidelines have been developed as a comprehensive and practical resource, hopefully relevant to any human-wildlife conflict situation, irrespective of species or region, which can be used by any individual, organisation, community or government that is trying to manage human-wildlife conflict and achieve coexistence. The aim of these Guidelines is to improve the management of human-wildlife conflict globally, supporting efforts to be pursued through well-informed, holistic and collaborative processes that take into account underlying social, cultural and economic contexts.

How to use these Guidelines

The chapters are set out across five foundational *Principles* of understanding and managing human-wildlife conflict. It is not necessary to read the Guidelines from beginning to end; we suggest using the *Principles* and the *Good Practice Checklist* as an essential general guide, and consulting chapters according to interests and needs.



Introduction



Introduction

Alexandra Zimmermann, Simon Pooley, John Linnell, Jenny A. Glickman,
Silvio Marchini, Catherine Hill & Camilla Sandström

Human-wildlife conflict: a global conservation challenge

Wildlife can pose a direct threat to the safety, livelihoods and well-being of people. Retaliation against the species blamed often ensues, leading to conflict between groups of people about what should be done to resolve the situation. Although this is not a new phenomenon – people and wildlife have lived in proximity to each other for millennia – it is one that is becoming much more of a global concern for conservation and development interests alike.

These conflicts over wildlife, commonly called *human-wildlife conflict* involve many different terrestrial and aquatic species, ranging from large cats, bears, elephants, deer, primates, sharks, seals, crocodilians, snakes, rhinos, otters, to invertebrates and plants, and many more. Human-wildlife conflict also negatively affects communities, which need to support – and benefit from – the wider conservation goals. It poses serious challenges to governments and organisations trying to align wildlife conservation with sustainable development, among other pressures. Furthermore, where conservation ‘successes’ have resulted in wildlife population increases, or species have recovered and expanded their ranges, human-wildlife conflicts often follow.

Extensive efforts to understand and manage human-wildlife conflicts have revealed that these situations tend to be complex, dynamic and multi-layered. Effective and practical methods for preventing the impacts of wildlife on people and their livelihoods (such as livestock predation or crop raiding) are, in many cases, difficult to find. Furthermore, retaliatory or preventative persecution of wildlife by people is often complicated by past experience, fears, perceptions or wider underlying social tensions. Thus human-wildlife conflicts are usually about more than the apparent species-human interaction; they also involve several stakeholders set in specific contexts of environmental, social and economic change.

Efforts to manage human-wildlife conflict often do not sufficiently seek to understand and address the underlying social conflicts that shape these situations. Faced with urgent pressures to address the visible damage or threat, organisations and governments trying their best to alleviate the situation are often pressured into rushed physical interventions to control damage and retaliation. However, human-wildlife conflicts involve tensions among the underlying values of the parties involved, which

requires entirely different approaches for which there is often insufficient expertise. This, together with limited resources, means that human-wildlife conflicts are notoriously difficult to manage. Most human-wildlife relationships are complex and dynamic, and for many cases of human-wildlife conflict a perfectly harmonious state of coexistence may not be a realistic goal.

The management of human-wildlife conflict is best pursued through sustained, collaborative and process-driven efforts, with the technical support of interdisciplinary expertise, including Indigenous and/or community leaders, peacebuilding practitioners, animal behaviour specialists, geographers, social scientists, biologists, development economists and others, to develop more integrated and sustainable approaches to addressing this global challenge. Some human-wildlife conflicts involve situations where lives and livelihoods are at very serious risk, requiring urgent attention that cannot wait for the outcomes of research, dialogues and conflict mediation. As such, human-wildlife conflict presents not only a global challenge, but also an opportunity for biodiversity and communities – a crucial part of the UN Convention on Biological Diversity’s vision for the planet in which “humanity lives in harmony with nature and in which wildlife and other living species are protected.”

Defining human-wildlife conflict and coexistence

In trying to capture broadly the essence of what makes a situation a human-wildlife conflict, the IUCN SSC Human-Wildlife Conflict & Coexistence Specialist Group defines human-wildlife conflict as *‘struggles that emerge when the presence or behaviour of wildlife poses actual or perceived, direct and recurring threats to human interests or needs, leading to disagreements between groups of people and negative impacts on people and/or wildlife’* (IUCN SSC HWCTF, 2020).

At its core, human-wildlife conflict is about a direct or perceived interaction between wildlife and people, over which there is some clash or disagreement among the people involved. Human-wildlife conflicts typically contain elements of interaction, intention or recurrence, linked to underlying social tensions, and often involve species of concern to conservation.

Thus, situations such as crop raiding by elephants leading to poisoning of elephants by farmers, or livestock predation by lions causing local persecution of lions, or mass culling of birds or bats to prevent damage to orchards are fairly clear cases of human-wildlife conflict. There are, however, many other circumstances involving wildlife that may or may not be regarded as human-wildlife conflict, depending on viewpoints. Poaching, vehicle collisions, rare attacks and disease transmissions are scenarios in which the delineation of whether or not they constitute human-wildlife conflict is context dependent.

For example, poaching of wildlife is not necessarily a human-wildlife conflict if the animal has been killed only with the motivation to obtain meat, body parts or a trophy, for trade, recreation or cultural reasons. If, however, the animals poached had also been blamed for damage caused to livelihoods, then their killing may have been influenced by, and therefore incorporated, a degree of human-wildlife conflict to some extent.

Collisions between animals and aeroplanes, trains, cars, boats or other vehicles are considered by some as human-wildlife conflict, while others argue that if these are purely accidental, then this does

not constitute a conflict. Some cases of recurring collisions lead to clashes among groups of people, and thereby begin to take on characteristics of conflict. Where collisions are deliberate – for example, drivers striking wildlife on purpose out of superstition or aggression towards the species – this also leads to disagreements among people, and is more clearly a case of human-wildlife conflict. Similarly, incidences of predation on humans by, for example, carnivores or sharks may be considered rare, tragic events rather than conflict. However, when recurrence, resentment or retaliation against the species starts to emerge and tensions among stakeholders grow, this too can develop into human-wildlife conflict.

Along these lines it follows that zoonotic or other disease transmission from wildlife to humans or their livestock are also not clear cut in terms of whether they should be classed as human-wildlife conflicts. Again, context-specific characteristics and perceptions will guide whether or not it is useful to include these in the definition of human-wildlife conflict. For example, widespread killing of bats or monkeys arising out of fear of epidemic disease outbreaks certainly takes on characteristic elements of human-wildlife conflict.

The main characteristics of human-wildlife conflicts

The definition recognises that human-wildlife conflicts are diverse and complex, and typically marked by the following three characteristics, an understanding of which is key for effective management of human-wildlife conflict:

1. ———

Human-wildlife conflicts involve interactions between people and wildlife that are direct and recurring.

All human-wildlife conflicts result from some form of real or perceived damage or threat caused by wildlife. However, the degree to which the conflict is merely about the presence or behaviour of animals versus how much the human-wildlife conflict is actually a conflict between different groups of people about the wildlife, can vary greatly. Damage caused by wildlife can range from being negligible or even perceived, to economically devastating and life threatening. Whatever the severity, if people react negatively to this real or perceived damage, and especially if the situation becomes a recurring event, human-wildlife conflict usually ensues.

2. ———

Human-wildlife conflicts are almost always underpinned by social conflicts between people over the management of wildlife.

Typically, these involve one party reacting to the presence/impact of the species and another party asserting conservation interests on behalf of that species. Usually several groups are involved, each with different interests, values and needs. In some cases, people may use complaints about wildlife as a vehicle to express other grievances about issues unrelated to wildlife, such as clashes over identities, values, power differences or social justice, irrespective of the measurable impact of the species involved. In rare cases, the wildlife itself may also be considered to be party to the conflict, as has been observed in some incidences of elephants attacking people in retaliation for past confrontations.

3. ———

Human-wildlife conflicts tend to involve species of conservation concern that are negatively affecting human interests.

This is because, for situations involving IUCN Threatened Red Listed or otherwise protected species, killing the wildlife believed to be responsible is usually not an option for those wishing to protect that species. This often results in higher stakes and solutions of greater complexity. Without the option of being able to legally eliminate the species causing losses for people and communities, and presented with clashing perceived valuations of that species and options for its management, the result is a fuelling of the social conflicts that underlie human-wildlife conflicts.

Coexistence is the aim, but not the opposite, of human-wildlife conflict

The concept of ‘coexistence’ has emerged into the mainstream of conservation science as an increasingly significant framing for thinking about human-wildlife interactions. However, despite its potential to stimulate a systems change in thinking about human-wildlife interactions, at present the concept is still being defined, with diverse suggestions on how to operationalise it. Resolving some of these issues is important to interested researchers and practitioners working on the challenges associated with human-wildlife interactions, and is therefore also a core focus of the Specialist Group going forward.

Just as human-wildlife *conflict* is complex and context-specific, so is human-wildlife *coexistence*. At the most basic level, *coexistence* suggests that at some level and in some form a choice is being made by humans to share landscapes and natural resources with wildlife in sustainable ways. It follows that, in order to do so, coexistence generally also requires agreement – or at the very least, cooperation – between different groups of people about the wildlife in question.

Coexistence can be conceived of more loosely as a set of ideas (see below) that are useful for enabling diverse research disciplines, and non-researchers, to collaborate on mutual challenges relating to how best to facilitate sharing landscapes with wildlife, without requiring total agreement on a definition. The Specialist Group intends to support constructive discussions of coexistence, and as a basis for this, proposes seven broad characteristics of coexistence helpful for exploring its nature:

1. Coexistence is not simply the opposite (or absence) of conflict.

Coexistence is often discussed as a dynamic state, or process, rather than an endpoint on a continuum from conflict to coexistence. A state of coexistence, for example, does not imply that there is an absence of conflict or require an absence of negative interactions or impacts: it refers to how these are understood and managed. Indeed, a broad state of coexistence normally contains incidences of conflict within it, but these conflicts are managed and/or tolerated well.

2. Coexistence does not prioritise negative human-wildlife interactions.

Studying human-wildlife interactions and human-human interactions over wildlife holistically

requires consideration of both positive and neutral interactions and relations, in addition to the negative. Positive reframing and language can be very helpful in transforming conflicts, so long as communities' grievances are not dismissed in the process.

3. Coexistence emphasises human-wildlife interactions in multi-use landscapes.

Many kinds of wildlife, including abundant, uncharismatic and introduced species, have significant impacts on people's livelihoods, and attitudes toward conservation. A coexistence framing includes the interactions of all these kinds of wildlife with people in multi-use landscapes.

4. Coexistence must work at broad landscape scales, as well as resolving specific problems in particular places.

The aim is to transform conflict scenarios into durable, workable coexistence not just at local scales but also at the landscape level. This requires taking into consideration multiple species including those of less concern to conservationists, multiple stakeholders with diverse views on the costs and benefits of cohabiting with wildlife, patterns and processes occurring at broad spatial and temporal scales and which impact on local scenarios, a range of management solutions with varying applicability and effectiveness across different scenarios, and diverse capacity and resource constraints.

5. Coexistence is ecologically and socially complex and context specific.

Our current understanding highlights the high degree of complexity and local specificity of human-wildlife and human-human interactions. We are currently working on accumulating a significant body of knowledge from diverse settings.

6. Coexistence requires self-awareness from conservationists.

While desiring coexistence with wildlife is a goal for conservationists, this might not be the goal of all of those affected by wildlife; nor should contrasting views be regarded as inherently unacceptable. Taking such differences into account requires recognising one's own positionality and accepting other worldviews and the rights of local and Indigenous peoples.

7. Coexistence involves consideration of power, equity and justice.

Understanding, and intervening in, human-wildlife interactions and human-human relations requires consideration of historic legacies of conservation, and asymmetries in power and influence of actors in landscapes shared by humans and wildlife. Attempts to foster coexistence should consider which parties (human and non-human) are favoured by attempts to facilitate coexistence, and which parties may suffer. Ideally, they require the participation of all affected groups in transparent and democratic processes for framing and developing management aims, plans and procedures. Humans as well as wild animals should have agency and reasonable freedom to choose how to behave in shared landscapes.

Given the rich diversity of currently developing ideas on coexistence, it may be best mobilised as a more flexible concept to enable diverse research disciplines, as well as non-researchers, to collaborate on mutual challenges and learning. There is a need to accumulate case studies of where coexistence occurs in order to understand better what factors enable and sustain coexistence, and what can be learned from this.

Essential considerations for managing conflicts and coexistence

Human-wildlife conflicts are complex and defy easy analysis and resolution. Each human-wildlife conflict is different from the next, and what may work in one case may not be transferrable to another. Effective and sustainable practical methods to mitigate damage and minimise retaliation are often difficult to find and, even where they do exist, they are often not implemented in a socially and financially sustainable way. A seemingly straightforward issue of guarding a herd of cows or fencing a patch of crops can escalate into a deeply divided ongoing conflict about who is to blame, who should pay, who did what wrong in the past, to whom the wildlife belongs and who should be responsible for possible solutions. Given the different dimensions involved, there is a need for holistic, interdisciplinary approaches, which should consider carefully the following essential insights for human-wildlife conflict management:

1. Interventions that focus only on reducing damage are not transferable from one case to another.

Interventions such as fencing, deterrents and compensation schemes are often urgently needed, especially when there is pressure on agencies, governments and conservation organisations to deliver solutions. In cases where there is no particular underlying social conflict, such damage reduction measures can work well if practically effective and economically viable – however, such scenarios are relatively rare. For most human-wildlife conflicts, developing an intervention to reduce damage by wildlife is best pursued as a *process* rather than a direct transfer of a pre-defined method from one site to another. Each case of human-wildlife conflict has unique ecological, cultural, social, physical, economic and political characteristics, and each has different histories, attributes and opportunities.

2. Poorly informed human-wildlife conflict mitigation attempts can make the situation worse.

Attempts to manage conflicts rapidly and without consideration of underlying sociopolitical and biological elements can exacerbate pre-existing tensions and escalate human-wildlife conflicts into intractable conflicts in which parties become polarised. This can occur when a damage reduction method is copied from one context and transferred to another without following a process of engagement with stakeholders. The method may work only temporarily, expectations and hopes may be raised and then dashed, leading to misunderstandings about responsibilities and ownership of the solution, and increased divisions and mistrust between the groups involved. Similarly, a trial-and-error approach to human-wildlife conflicts is generally not recommended. While some experimentation with damage reduction measures may be needed, such trials should be evidence-based as far as possible, and must be carefully designed *together* with the affected parties, not imported ready-made by an external party.

3. Context awareness and understanding of social and political backgrounds are crucial.

Who are the various stakeholders and actors involved in the situation, and what are their relationships, histories and power differences? While there is usually at least one notable community or group most directly affected by the species blamed, most human-wildlife conflicts are multilateral, involving (to varying degrees) other stakeholders as well. Understanding the values, social norms, beliefs, culture, economics, interactions between stakeholders and other social and political factors is key for planning and implementing any human-wildlife conflict mitigation initiative. Because of the

complexity of contexts, questionnaire-based studies are best complemented with more in-depth approaches that provide additional understanding of the layers, histories and nuances of human-wildlife conflict cases. Such context assessments also benefit greatly from multi-expertise collaborations, involving for example social scientists, development specialists or conflict analysts to help understand the issues contributing to the human-wildlife conflict

4. Conflict mitigation and damage reduction interventions must be designed and managed collaboratively.

Key for the success and sustainability of any human-wildlife conflict project or initiative is the development of a collaborative way of working. To do so, officials or project staff need to build rapport with the affected communities and other involved parties, while remaining aware of their own positions. Often the process of jointly defining project goals and plans is useful as a vehicle for building such collaboration, trust and cooperation among the parties. Genuine collaboration can allow a balance of diverse goals, negotiation of acceptable trade-offs and allow communities to adjust their expectations about levels of impact or develop skills required to adapt to new situations in the future. In cases of deep-rooted (also known as identity-based) conflicts, in which stakeholders are so mistrustful of each other that collaborative working is not currently realistic, help from trained peace mediators may be needed for reconciliation work before or alongside efforts to address the human-wildlife conflict.

5. Long-term solutions need to incorporate landscape-scale ecological, economic and physical patterns.

Many human-wildlife conflicts involve species that range across highly fragmented habitats and/or well beyond protected areas into human-dominated landscapes. Mitigating damage by wildlife to promote tolerance by people, even when successful, may provide only a short-term solution. Once emergencies are brought under control, human-wildlife conflict initiatives must begin to consider how and where people and wildlife will be able to share the landscape in the long term, and what legal and development frameworks are needed to enable this. It is crucial for communities living near wildlife to be actively engaged in ideas and decisions, supporting, for example, biologists, ecologists and geographers in gaining an understanding of a given species' movement patterns, resource needs and behaviour. Many species have very advanced learning and behavioural capacities, an understanding of which can help the design of depredation interventions and movement options. Such landscape-scale planning also generates important sectoral collaborations, across, for example, agriculture, forestry, health, environment, transport, energy or defence agencies.

Finally, conflicts are not always negative, and words and language matter. Conflicts bring about change. As such, conflicts can be positive opportunities leading to dialogue, stimulating action and forcing a potentially bad situation to be resolved or improved. If addressed properly, human-wildlife conflicts force us to look at underlying tensions and inequalities and work together for improved well-being, development and conservation. Nevertheless, the term 'human-wildlife conflict' is not without implications and thus much debated in the conservation community. Some prefer to refer to these situations as 'conflicts over wildlife' or 'conservation conflicts', while others prefer to avoid the

word ‘conflict’ altogether and focus on ‘human-wildlife coexistence’ or ‘human-wildlife interactions’ rather than the ‘conflicting’ aspects of relationships between people and wildlife. Whichever the preferred and appropriate term for a given situation, it is important to consider context and sensitivity to the possible effects of words used. For example, calling a relatively mild situation a ‘conflict’ can escalate it unnecessarily; conversely, however, avoiding it altogether may leave communities feeling that their situation is not receiving sufficient attention. Different cultures, languages, communities and countries will use different words to describe these situations.

This introduction is a combined reprint from three briefing papers written by the IUCN SSC Human-Wildlife Conflict & Coexistence Specialist Group (available at www.hwctf.org/document-library):

IUCN (2020). *IUCN SSC Position Statement on the Management of Human-Wildlife Conflict*. IUCN Species Survival Commission (SSC) Human-Wildlife Conflict Task Force.

IUCN SSC HWCTF (2020). *What is human-wildlife conflict?* Briefing Paper by the IUCN SSC Human-Wildlife Conflict Task Force.

IUCN SSC HWCTF (2022). *Perspectives on human-wildlife coexistence*. Briefing Paper by the IUCN SSC Human-Wildlife Conflict Task Force.





Principles



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Principles



1

Do no harm



2

**Understand issues
and context**



3

Work together



4

**Integrate science
and policy**



5

**Enable sustainable
pathways**

1. Do no harm

- Follow the precautionary principle
 - Follow ethical guidance
 - Assess the risk of unintended consequences
 - Appreciate the uniqueness of each case
 - Consider history and environmental justice
 - Be mindful of your non-impartiality
-

2. Understand issues and context

- Know that all human-wildlife conflicts are complex and multi-layered
 - Do not rush into assumptions about causal links
 - Seek to understand social contexts and drivers
 - Seek to understand ecological and spatial drivers
 - Assess the political and governance context
-

3. Work together

- Identify and involve all relevant stakeholders
 - Co-develop a theory of change and action plan or strategy
 - Design and manage solutions collaboratively
 - Encourage and support community-led solutions
 - Transfer ownership of process and decisions
 - Work in multidisciplinary teams and across sectors
-

4. Integrate science and policy

- Study the human, societal and political perspective
 - Assess the physical, ecological and natural patterns
 - Avoid quick fixes; do not copy-paste solutions
 - Adapt to local governance, political and policy contexts
 - Create opportunities for training and capacity building
 - Create a collective learning loop: measure, evaluate and adapt
-

5. Enable sustainable pathways

- Minimise and redistribute costs burdens fairly
- Nurture societal and cultural values of wildlife
- Create sustainable economic benefits from wildlife
- Incorporate long-term ecological needs
- Develop and nurture ongoing dialogue and build relationships
- Anticipate and prevent emerging conflicts

Good practice checklist

10 guiding questions for turning the *Principles* into practice

This checklist, building on the foundational **Principles**, is considered from the perspective of parties seeking to support and manage the mitigation of human-wildlife conflicts and conflicts over wildlife, and facilitate progress towards coexistence. These parties include conservation organisations, government agencies, local organisations and grant-giving institutions.

-
- Has the level of conflict been identified?**
Principle: Do no harm
Chapters: 1) Levels of conflict over wildlife, 2) The role of the conservationist
-
- Have the ethics, consequences and roles of actors been considered?**
Principle: Do no harm
Chapters: 3) Interventions: to act or not to act? 4) Avoiding unintended consequences
-
- Have the natural, ecological and land-use factors been considered?**
Principle: Understand issues and context
Chapters: 5) Assessing the impacts of conflict, 6) Natural drivers of human-wildlife conflict, 7) Animal behaviour
-
- Have the underlying social, cultural, historical and political contexts been understood?**
Principle: Understand issues and context
Chapters: 8) Attitudes, tolerance and human behaviour, 9) Culture and wildlife, 10) How histories shape interactions, 11) Livelihoods, poverty and well-being, 12) Governing human-wildlife conflicts
-
- Has the project/intervention been planned together with stakeholders?**
Principle: Work together
Chapters: 13) Working with stakeholders and communities, 14) Traditional ecological knowledge, 15) Planning and theory of change

Is the initiative benefiting from multidisciplinary teams across sectors?

Principle: Work together

Chapters: 16) Dialogue: a process for conflict resolution, 17) Resolving conflicts between people, 18) Engaging with the media and social media

Are planning and actions based on evidence and sound science?

Principle: Integrate science and policy

Chapters: 19) Social science research, 20) Ecological research, 21) Planning across landscapes, 25) Animal capture and translocation, 26) Lethal control tools

Are relevant aspects of governance and policies incorporated?

Principle: Integrate science and policy

Chapters: 22) Political ecology of wildlife, 23) Law and human-wildlife conflict, 24) Policy instruments

Are interventions based on best available and jointly led knowledge?

Principle: Enable sustainable pathways

Chapters: 27) Preventing damage by wildlife, 28) Response teams

Is there an exit strategy from financial or technical dependence?

Principle: Enable sustainable pathways

Chapters: 29) Social marketing and behaviour change, 30) Economic incentives, 31) Compensation and insurance, 32) Evaluating interventions



List of chapters



1. Do no harm

- . Levels of conflict over wildlife
 - . The role of the conservationist
 - . Interventions: to act or not to act?
 - . Avoiding unintended consequences
-



2. Understand issues and context

- . Assessing the impacts of conflict
 - . Natural drivers of human-wildlife conflict
 - . Animal behaviour
 - . Attitudes, tolerance and human behaviour
 - . Culture and wildlife
 - . How histories shape interactions
 - . Livelihoods, poverty and well-being
 - . Governing human-wildlife conflicts
-



3. Work together

- . Working with stakeholders and communities
 - . Traditional ecological knowledge
 - . Planning and theory of change
 - . Dialogue: a process for conflict resolution
 - . Resolving conflicts between people
 - . Engaging with the media and social media
-



4. Integrate science and policy

- . Social science research
 - . Ecological research methods
 - . Planning across landscapes
 - . Political ecology of wildlife
 - . Law and human-wildlife conflict
 - . Policy instruments
 - . Animal capture and translocation
 - . Lethal control tools
-



5. Enable sustainable pathways

- . Preventing damage by wildlife
- . Response teams
- . Social marketing and behaviour change
- . Economic incentives
- . Compensation and insurance
- . Evaluating interventions

Case studies and further resources

There are several resources available to help support and complement the content of the *IUCN SSC guidelines on human-wildlife conflict and coexistence* in the form of human-wildlife conflict and coexistence case studies and the Human-Wildlife Conflict & Coexistence Library.

Case studies

In collaboration with the UN Food and Agriculture Organization (FAO), a set of case studies has been developed with the aim of covering the processes that various projects have undergone to understand, plan and address various aspects of a human-wildlife conflict situation, while highlighting the lessons learnt. The case studies are used to illustrate the chapters within these Guidelines with real-life examples. Their aim is not to highlight what has been done, but to show the processes followed in managing the different situations, which means they are applicable to a range of circumstances, irrespective of the species, region or stakeholders involved. The case studies cover topics such as: participatory approaches to understanding a human-wildlife conflict situation to inform future management; building communities' capacities to coexist with wildlife; developing and evaluating a deterrent intervention through stakeholder involvement; and developing a programme to deliver the benefits of living with wildlife.

The case studies can be found here: www.hwctf.org/case-studies

IUCN Human-Wildlife Conflict & Coexistence Library

The IUCN SSC Human-Wildlife Conflict & Coexistence Library is the largest, and continuously growing, open resource library of recommended literature, manuals and materials on human-wildlife conflict and coexistence. It contains thematically arranged sections, taxonomic focal sections, key articles, policy documents, videos and much more. Many of the chapters in these Guidelines have corresponding thematic sections within the Library, which provide further key reading if you would like to gain more in-depth knowledge of a topic. The key topics include engaging with stakeholders, conflict analysis and theory, social research methods, political ecology of conflicts, cultural dimensions, the role of the media, monitoring and evaluation, deterrents and repellents and many more.

The Library can be accessed here: www.hwctf.org/document-library



IUCN SSC GUIDELINES

PRINCIPLE 1 —

Do no harm



Levels of conflict over wildlife

Alexandra Zimmermann & Brian McQuinn

Human-wildlife conflicts are complex and vary greatly in terms of apparent ‘solvability’. Some are more protracted, entrenched and challenging to address than others. Some human-wildlife conflicts seem to be mainly about damage or loss obvious to any observer, while other situations seem to be entangled in historic grievances, polarised opinions between groups of people and ‘side-issues’ that seem unrelated to the conflict.

All human-wildlife conflicts involve disputes between people about wildlife. When wildlife and humans interact and there is no disagreement among people about this interaction, then there is essentially no human-wildlife conflict. It follows, then, that actions to change the interaction between wildlife and people – for example, by reducing damage caused to crops by species, or by reducing retaliatory killing of the species by humans – only resolves the conflict if all human parties involved agree that the problem is solved. If anyone involved in the conflict feels that the situation is not settled, then the conflict remains and will *usually continue to worsen* until the parties’ concerns are satisfied.

Underlying conflict dynamics can be identified using the Levels of Conflict framework (CICR, 2002; Madden & McQuinn, 2014; Zimmermann et al., 2020) (Figure 1), which describes three levels of conflict and provides guidance on the types of conflict reduction approach suitable for each. We argue that solving the wrong problem, i.e. misdiagnosing the level of conflict in a given human-wildlife conflict situation, or ignoring underlying issues, is not just inefficient, it is far more serious: it actively does harm.

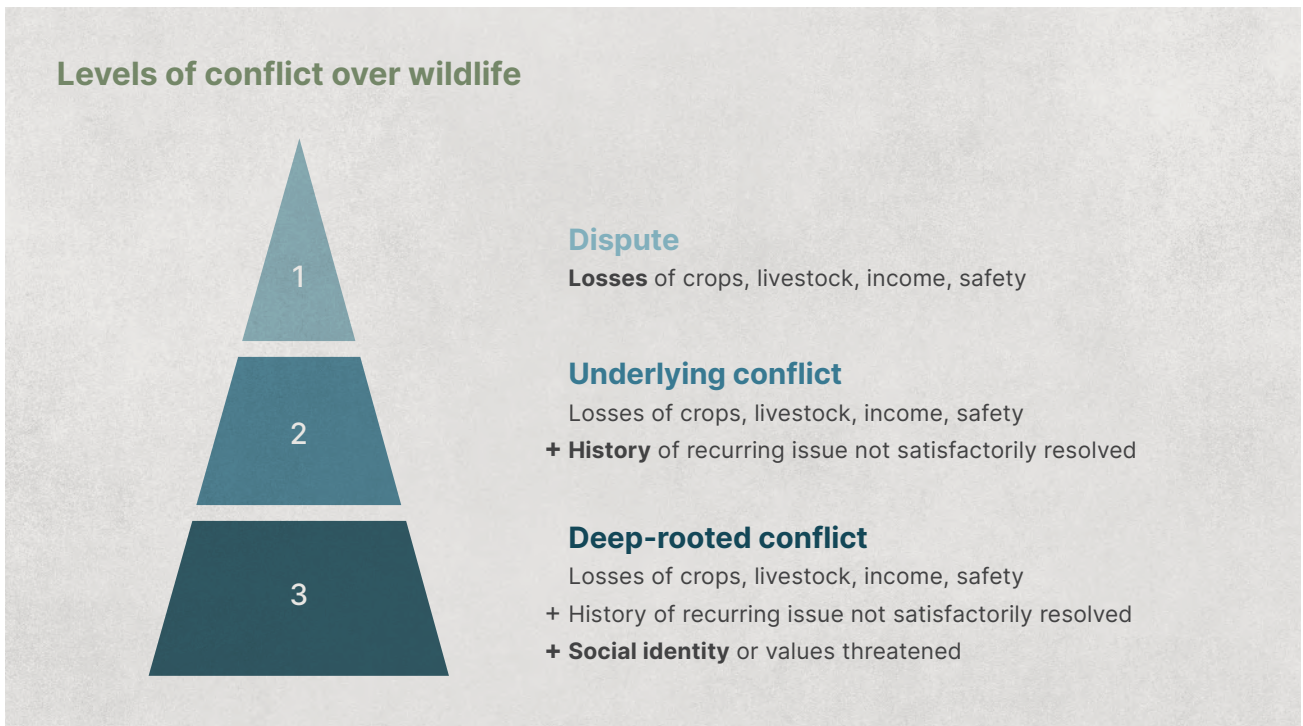


Figure 1. The levels of conflict over wildlife (Source: Zimmermann et al. (2020))

The three levels of conflict

Level 1

Disputes are the obvious and tangible issues being fought over by those involved, such as crop or livestock loss, reintroduction of a species, or access to a national park. The positions of those involved in the conflict are often clearly stated, creating the impression that these are the only issues at stake. For some conflicts, this is true, but all too often human-wildlife conflicts contain more layers than this. In these less intense situations, tensions are tempered by tolerance of, or appreciation for, the species involved. This makes Level 1 conflicts less complicated for conservationists to identify, quantify, address, and monitor (relative to Level 2 or 3 conflicts). Unfortunately, most conflicts have more going on under the surface than might be initially obvious.

Level 2

If Level 1 conflicts are not settled satisfactorily for all the parties involved, feelings of resentment and injustice can take root among some of them. Over time, these unresolved disputes and the feelings associated with them accumulate. Underlying (or Level 2) conflicts have a history of ineffective responses, which may also be perceived by certain stakeholders as being unfair or misleading, leading to greater animosity towards the species involved and those trying to address the problem. Those involved begin to develop an “us versus them” mentality towards others involved in the situation. From the perspective of those involved, disputes are an opportunity to redress past injustices. This is why the existence of underlying conflicts make future disputes more likely. It is also why settlements of disputes that do not address underlying conflicts are often only temporary fixes. A key feature of underlying conflict is a poisoning of the relationships among those party to the conflict. Crucially, this

history of unresolved issues and the animosity and complexity they create may not be immediately apparent to third parties.

Level 3

The most entrenched and complex human-wildlife conflicts are Level 3, also called deep-rooted or identity-based conflicts. This level of conflict arises from stakeholders' perception that a human-wildlife conflict threatens their values or identity. They occur when conflicts over conservation align with other intense socio-political divisions. Conservation becomes intertwined with these broader conflicts, making it more challenging for conservationists to identify the problem and help address the situation. A thorough and nuanced understanding of the situation - achieved through quantitative and qualitative assessments - is essential to ensure that those trying to resolve the conflict avoid causing harm to stakeholder groups or exacerbating the conflict.

Box 1

Examples of the three levels of conflict over wildlife

Level 1

The detrimental impact of damage by elephants in some communities in north-east India is significant for poor farmers, who can lose their entire livelihood to elephants in a single night. Despite this, some communities are willing to work with outside parties (e.g. government officials or conservation organisations) to find solutions because they have a strong, culturally grounded appreciation of elephants. Community-led interventions (e.g. fencing and deterrents) have largely resolved the human-elephant conflict situation in these areas (Davies et al., 2011; Wilson et al., 2013; Zimmermann et al., 2009), although continual work is needed to ensure that relations remain collaborative.

Level 2

The island nation of Mauritius is home to the endemic and endangered Mauritian fruit bat, which feeds on fruits in commercial orchards and residential gardens. Over time, tensions have escalated as damage to lychee and mango orchards, and the mess and noise from the presence of bats in people's back yards, have increased and, controversially, led to government-endorsed culling of bats. At the heart of this conflict is a history of disputes between stakeholder groups that were not properly addressed. Consequently, resolving this conflict requires a focus on a process of bringing together the parties to create longer-term and mutually agreed solutions (IUCN SSC, 2018; Milgroom & Spierenburg, 2008; A. Zimmermann, E. A. Macdonald, et al., 2020).

Level 3

Conflicts over the presence or introduction of wolves has led to some of the most intractable human-wildlife conflicts worldwide. People living in several regions with wolf populations in Europe and North America can hold extremely negative perceptions of the species, and may mistrust the government agencies responsible for wolf populations. It is not uncommon for certain groups of ranchers to express a strong hatred of wolves and

all they represent. The intensity of that feeling is often disproportionate to the level of risk, and can persist even when wolf depredation on sheep is reduced to a negligible level. The hostility persists because the human-wolf conflicts have evolved alongside, and are now embedded in, wider issues of social, political and cultural change in these regions. Relationships between stakeholders have deteriorated badly, and there are significant value differences over an animal that has come to symbolise the deep disconnect and discontent among those involved (Milgroom & Spierenburg, 2008; Skogen et al., 2008; Treves et al., 2013; Witter, 2013).

Identifying the level of conflict

Identifying the levels of conflict in a human-wildlife conflict situation requires a deeper analysis of the political, social and economic circumstances of the parties to the conflict. Ecological research methods provide a process for identifying the environmental and ecological factors at play (see Chapter 20, Ecological research). Additionally, quantitative and qualitative social research methods, such as surveys, focus groups and participant observation, can reveal crucial insights into perceptions, values, beliefs, needs and other influences on the situation (see Chapter 8, Attitudes, tolerance and human behaviour and Chapter 19, Social science research).

Most human-wildlife conflict assessments focus on the obvious disputes (e.g. what happened, which field was raided, how much was lost), and not the underlying causes for the tensions (e.g. how this has been handled in the past, who is blamed, other tensions that exist between those involved). As well intentioned as addressing the obvious problem is, this is often insufficient to uncover the underlying conflict dynamics. If a solution to the obvious issue fails to settle the problem, this is a clue that there are underlying issues driving the tension. Unless these issues are uncovered and addressed (at least partly), solutions targeting only the obvious manifestations of the problem are unlikely to settle the dispute. Worse, ignoring these issues tends to lead to short-lived solutions (however well-meaning) that can actually worsen the underlying conflicts. In most cases, individuals familiar with a situation are acutely aware of the underlying levels of conflict affecting the situation. There are some tell-tale signs and symptoms that provide clues about the different levels of conflict present in a human-wildlife conflict (Figure 2).



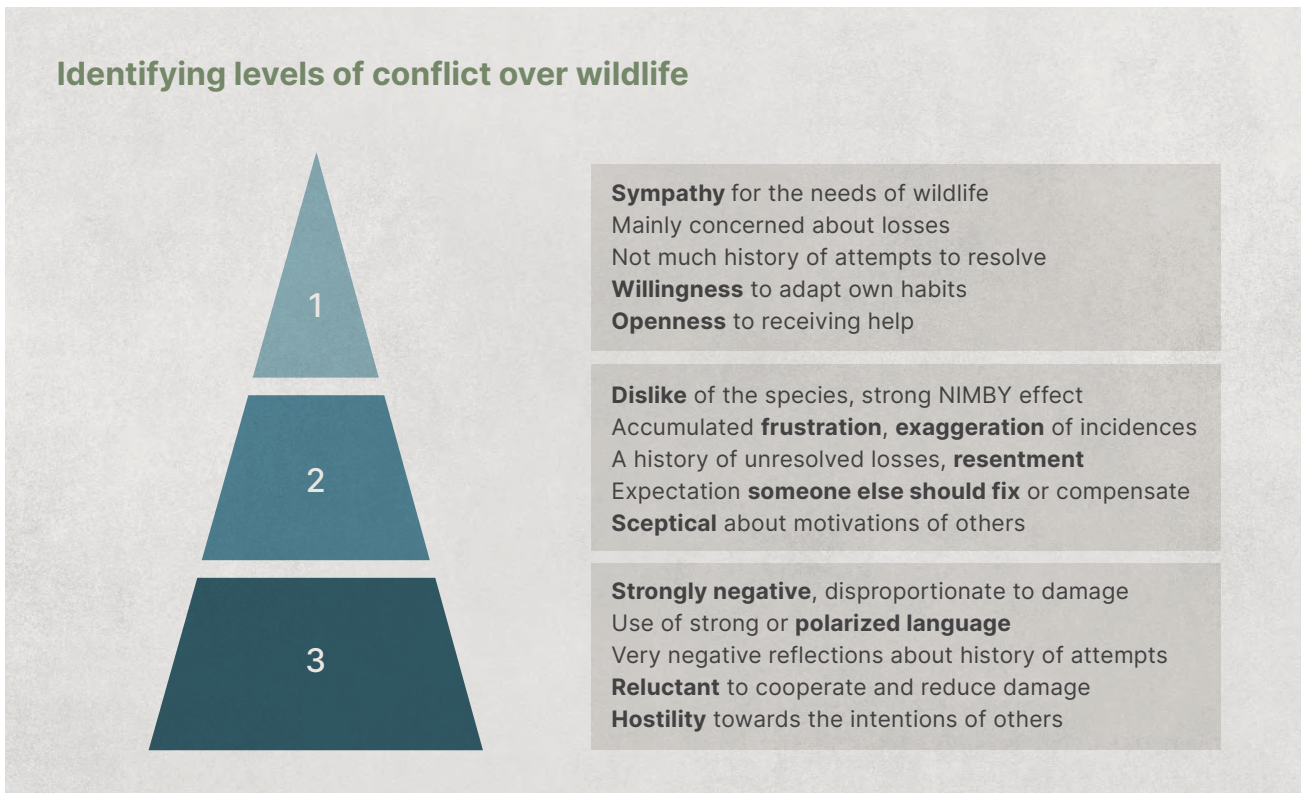


Figure 2. The symptoms of each level of conflict (Source: Zimmermann et al. (2020))

In a **Level 1** human-wildlife conflict, the parties affected by the wildlife express sympathy for the needs of wildlife (e.g. ‘they have lost their habitat and don’t have enough to eat’), and the problem centres on economic losses and security. There is usually little history of interventions to settle the issue, or perhaps those previous experiences were not perceived as negative (e.g. they did not cause disappointments or misunderstandings). There is a general willingness to adapt habits or invest in measures to solve the dispute (e.g. modify cropping routines or building fences), and an openness to receiving help in doing so.

In a **Level 2** conflict, the affected parties are much more likely to express a strong dislike of the species involved. There is also a very strong NIMBY (not in my back yard) effect and palpable frustration, which is expressed through exasperated tones of speech and by exaggerating the impact of incidences to amplify and draw attention to them. Individuals or organisations have usually tried to resolve the issue but these efforts have gone badly (e.g. ineffective or poorly managed, leading to misunderstandings and resentment that reinforce negative feelings). There is an expectation that someone should be ‘fixing’ or ‘paying for the damage’ (e.g. an NGO, government or company) and there is scepticism or mistrust of the motivations of others interested in working on the issue (e.g. ‘who sent you?’).

In a **Level 3** conflict, the language and behaviour of those affected are strongly negative, and disproportionate to the damage involved (e.g. highly dramatised). Parties use strong or polarised language, and descriptions of previous attempts to solve the issue are described as complete failures. In addition, the affected parties are reluctant or even refuse to cooperate with each other (e.g. conservationists) or with the authorities (e.g. government agencies) to try to reduce the impact, and there is hostility and scepticism or sarcasm about the intentions of others.

To facilitate diagnosis, we suggest five categories of information that can help analyse a particular human-wildlife conflict:

1. Perceptions about the species blamed in a conflict
2. Views of the human-wildlife conflict issues at stake
3. Assessments of previous attempts to address the conflict
4. Willingness of the parties to find a solution
5. Perceptions about those not directly party to the conflict

These lines of inquiry will help reveal the level of conflict present (Table 1), and can be incorporated into qualitative and quantitative research methods.

Table 1. Key areas of questioning and typical responses that help identify the level of conflict over wildlife

LEVEL OF CONFLICT	Responses to questions about the species	Responses to questions about the situation	Responses to questions about the history of attempts	Responses to questions about finding solutions	Responses to questions about others involved in the issue
Level 1: Dispute	Neutral or positive response to questions about the species. For example, empathy or understanding regarding the needs of wildlife.	Complaints about income loss or concerns about safety. Main concern is with tangible impacts or losses.	Few attempts to settle the dispute, or previous attempts were seen as helpful or perceived neutrally.	Willingness to adapt habits and cooperate with interventions. Openness to receiving help and cooperating with pilot solutions.	Others are perceived as genuine or trustworthy in their attempts to help.
Level 2: Underlying conflict	Dislike of the species involved. Strong NIMBY effect ('not in my back yard').	Accumulated frustration about the situation, seen as a major issue. Frequency and impact of losses usually exaggerated.	There is a history of unresolved disputes or resentment about the actions of third parties.	An expectation that someone else should solve this issue, or provide compensation.	Scepticism about the motivations of others and the prospect of a solution.
Level 3: Identity-based conflict	Strong negative emotions and responses that seem disproportionate to the damage caused by the situation. Vilification, exaggeration and transfer of blame.	Use of strong or polarising language. Perceived as very serious and/or a threat to a party's way of life.	Very negative reflections about the history of attempts to address the problem – perceived as unhelpful or even deceptive.	Unwilling or very reluctant to make modifications to help reduce damage.	Hostility towards the intentions of others, including sarcasm or blaming. Perception that their identity and values are not understood or valued.

(Source: (Zimmermann et al., 2020))

Conclusion

Understanding the levels of conflict impacting a situation is crucial to designing sustainable solutions, by addressing the appropriate levels of human-wildlife conflict affecting a situation. To achieve this, practitioners can:

- **incorporate levels-of-conflict assessments in project planning;**
- **monitor conflict levels through quantitative and qualitative social research methods;**
- **select resolution strategies that are appropriate to the conflict level and that do no harm;**
- **seek the help of outside actors if the research and/or conflict resolution experience necessary to help the situation fall beyond the realm of their expertise.**





The role of the conservationist

Catherine Hill, Vidya Athreya, John D. C. Linnell, Brian McQuinn, Stephen Redpath, Juliette Young & Alexandra Zimmermann

Conservation actors and ‘positionality’

What makes people want to work in wildlife conservation? Some people may be motivated by a desire to promote sustainable practices, help farmers protect their crops from elephants and other megafauna, help fishing communities secure a livelihood in the face of competition with fish-eating marine mammals or perhaps help herders protect their livestock from carnivores. However, the primary, but not necessarily the only, motivation for many researchers, practitioners (government wildlife agencies and NGOs) and those working to influence conservation policy and practice (all henceforth referred to as conservation actors) is a strong commitment to biodiversity conservation. Not surprisingly, therefore, much of the current research on human-wildlife conflicts, and the management agendas directed at them, focus on the animals’ actions and people’s complaints about the animals, with the aim of changing the dynamics of the relationship between people and wildlife in order to facilitate biodiversity conservation (Hill, 2017a; Montana et al., 2020).

A key aspect that is often lacking in training for conservation science researchers and managers is that of ‘positionality’: an understanding of how an individual’s identity impacts and possibly prejudices their interpretation of the world, or how they might be seen by others (McLennan & Hill, 2013). However, examining and acknowledging individual and institutional positionalities, i.e. individual motivations, value and belief systems, priorities and agendas, is central to understanding the intentional or unintentional impacts conservation actors can have on any human-wildlife conflict situation. Such examination and acknowledgement can also help to: a) clarify when and why conservation actors and other stakeholders may disagree over their respective agendas and priorities; and b) explain why conservation actors are rarely able to act as ‘third-party, neutral’ facilitators in human-wildlife conflicts.

The stakeholders

Stakeholders in any conflict scenario are likely to be very diverse. For example, stakeholder groups in a typical rurally located human-wildlife conflict scenario could include some, or all, of the following: livestock herders, cultivators, local residents, Indigenous groups, hunters, wildlife guards, protected area managers, conservation NGO personnel and local dignitaries. However, the list of groups with a

possible interest in, or influence on, the outcome of any mitigation or management strategy can extend far beyond the spatial confines of the human-wildlife conflict, to include politicians and other policy makers, funders, rights-holders and citizens at both national and international levels (see Chapter 13, Working with stakeholders and communities).

Indeed, we need to think more broadly and acknowledge the fact that conservation actors are all interested parties in these human-wildlife conflicts, i.e. they are also stakeholders with their own priorities, perspectives and agendas, as a consequence of their positionality and the variety of roles they may play. For example, ‘calls to action’ for conservation scientists to link research findings directly with conservation action require researchers to straddle several roles, working as ‘impartial’ researchers gathering data about an human-wildlife conflict and as ‘partial’ conservationists working to implement a particular process or programme to address human-wildlife conflict.

A further confounding factor in this already complex situation is that other stakeholder groups may perceive or interpret the roles of conservation actors differently from those of conservationists themselves. This can create additional challenges as stakeholders struggle to understand each other’s perspectives, motivations and actions. This can be detrimental to effective communication and trust building among the groups concerned.

Furthermore, researchers, NGOs and wildlife management personnel working on human-wildlife conflicts need to nurture relationships with various interested parties, including local residents and government officials. They also need to reflect on how their presence is perceived and experienced by residents and state authorities, which if not carefully considered can trigger new or reinforce existing human-wildlife conflicts. This ‘social actor’ influence and the consequent need for reflexivity is well documented by qualitative social scientists (Cresswell & Miller, 2000; Hill, 2017a). This influence is seldom recognised or written about in the conservation science literature, but it has significant implications for conservation research and action (McLennan & Hill, 2013; Moon, Adams, et al., 2019).

Can conservation actors be ‘neutral’ or impartial in human-wildlife conflict?

Human-wildlife conflict mitigation requires clear goals – in other words, what outcome are we trying to achieve? For instance, are we simply striving to reduce the symptoms of a conflict, or encourage effective communication among actors involved in the conflict? And what does ‘success’ in doing so look like? This goal setting needs to be carried out collaboratively with all relevant stakeholders. In many cases conservation actors try to assume the role of ‘mediator’ in these discussions, but this can often be problematic given that conservation actors are also stakeholders in human-wildlife conflict, and therefore are not neutral actors in these scenarios (Redpath et al., 2013).

To be neutral means not taking sides in a conflict, i.e. not having a vested interest in any particular outcome; therefore, none of the stakeholders involved can be considered neutral. Alternatively, conservation actors might endeavour to behave impartially, treating all parties or stakeholders equally. While this might be possible in certain situations, there is an additional problem, because conservation actors are unlikely to be regarded as impartial by at least some of the stakeholder groups they interact with.

All conservation actors need to be aware that, even if they consider themselves neutral, objective observers: 1) they are stakeholders embedded in contested social settings, and therefore not truly neutral; and 2) even if they can behave impartially, this is not the way they are likely to be viewed by

the other protagonists involved, who will recognise them as advancing conservation interests. This has significant implications for trust building, transparency and conflict mitigation or conflict transformation processes, and needs to be thought through carefully during the process of developing appropriate strategies and procedures (see Chapter 17, Resolving conflicts between people). More specifically, it is important for conservation actors to be fully aware that they cannot take on mediation roles that require the services of a neutral outside party to enable an impartial mediation process, thereby encouraging multiple stakeholder buy-in to the process.

Conclusion

In most human-wildlife conflicts (and wider conservation conflicts), especially deep-rooted or sensitive cases, conservation actors need to:

- identify who the other stakeholder or interest groups are;
- be aware of how their own positionality influences their values, understanding, perceptions and priorities within any conflict scenario;
- be aware that as social actors they can, and do, inadvertently influence the ecological, conservation and social landscapes they work in;
- be clear about what their role is and how this might impact their goals, and try to be open and transparent about this;
- understand how they could be perceived by other parties involved in the conflict, and reflect on how other stakeholders might interpret their words and actions;
- be aware that as conservation actors they are unlikely to be considered neutral by other stakeholder groups, and that this can create barriers to trust building and effective mediation between stakeholders; and
- be prepared to bring in a neutral outside party when appropriate.





Interventions: to act or not to act?

Simon Hedges & Joshua M. Plotnik

The question of whether or not to act to address human-wildlife conflict needs to be considered by actor type – i.e. who is to intervene in the situation. The different actors might include, for example, conservation NGOs, development organisations, industry, government agencies, civil society organisations and local self-help groups.

Different actors will have different reasons for wanting to intervene in an human-wildlife conflict situation. These reasons might relate to species or area conservation, humanitarian or development issues, animal welfare, politics, business factors, or cultural or ceremonial considerations. While there may not be a conservation reason for intervening in a particular scenario involving humans and wildlife initially, when government agencies and/or non-conservation NGOs become involved, they may create one. Conservation organisations need to keep this in mind when deciding whether to act or at which stage to intervene (see Chapter 2, The role of the conservationist).

The conservation reason for acting to address human-wildlife conflict does not need to be expressed solely in terms of the wildlife species involved in the conflict. For example, acting to reduce the impact of human-wildlife conflict around a protected area can help reduce antagonism towards that protected area and thus help prevent such retaliatory acts as the deliberate setting of fires or destruction of ranger stations (Hedges, 2006; Hill et al., 2002).

The decision about whether to act should not be based just on the actual risk posed to people's livelihoods, health or life, but should also take into account people's perceptions of risk, including 'intrinsic fear and dread', such as that inspired by large carnivores and elephants (Dickman & Hazzah, 2016). Even if the actual physical damage or opportunity costs suffered by people as a result of human-wildlife conflict are relatively small, people's attitudes to the animals involved might be extremely negative, and so there are likely to be significant consequences if the human-wildlife conflict is left unaddressed.

Decisions about whether to act to address human-wildlife conflict should involve all appropriate stakeholders, including the people and groups affected by the conflict, such as farmers, livestock owners and other local community members (see Chapter 13, Working with stakeholders and communities and Chapter 15, Planning and theory of change).

When not to act

There are circumstances under which it may be inappropriate to act to address human-wildlife conflict, and where the decision to intervene or not should be carefully considered:

1. Illegal activity

One of the more frequent reasons for not acting is if the human-wildlife conflict is affecting areas of illegal agriculture or illegal livestock grazing inside a protected area, or if the human-wildlife conflict is the result of other illegal activities. Some conservation NGOs have adopted a policy of only working with communities to help reduce human-wildlife conflict through reduction of crop or livestock losses (or compensation for – or insurance against – such losses) in legally farmed/settled areas because, for example, helping reduce human-wildlife conflict for people illegally growing crops inside protected areas could encourage further loss of protected area land to illegal agriculture. In some cases, such encroachment may be supported by large agricultural companies or rich individuals, and the conservation NGOs do not want to facilitate or otherwise encourage their illegal activities inside protected areas. Indeed, doing so would put the NGOs in the position of breaking national laws. In such situations, it is preferable for conservation/human-wildlife conflict initiatives to work with communities to reduce illegal activities as a means to reducing human-wildlife conflict – for example, by developing alternative livelihoods and thus helping to reduce illegal resource collection within a protected area, potentially reducing the number of people attacked by dangerous animals. For non-conservation organisations, there may be a case for a different approach, but one should still be aware of the risks of facilitating or otherwise encouraging illegal activities.

2. Temporary situations

It may also be appropriate not to work to reduce or otherwise mitigate the impacts of human-wildlife conflict (e.g. by implementing crop protection measures) if removal of the wildlife causing the human-wildlife conflict is planned in the near future – for example, removal of ‘pocketed’ or ‘doomed’ wildlife populations, such as three male elephants trapped in a small forest block. In such a case, the removal of these animals is the human-wildlife conflict intervention, and thus no additional, short-term strategy development is warranted.

3. Deep-rooted conflicts

In many areas where spaces have been historically shared between potentially dangerous wildlife and humans, there might be underlying social or cultural relationships that are not viewed as conflict by the resident communities (see Chapter 10, How histories shape interactions). It is thus important to not act if we do not understand the underlying relationships. This could heighten the perception that conflict is instigated by researchers and conservationists who have not studied or understood the existing relationships between people and wildlife in that landscape (see Chapter 1, Levels of conflict over wildlife). It is also advisable to be cautious about intervening in situations of heightened political or social conflict, in which wildlife has become implicated as a proxy for other conflicts. Endangered species should be protected, but it would be best to participate in broader conflict transformation activities and attempt to establish legitimacy for conservation actions before intervening (see Chapter 17, Resolving conflicts between people).

When to act

The question of when to act is a multifaceted one. Consequently, several factors need to be considered, including the severity of the human-wildlife conflict situation, animal ecology and behaviour, the human dimensions, the type of action planned, the amount and quality of information available, and the extent and nature of stakeholder consultation and involvement (see Chapter 7, Animal behaviour, Chapter 8, Attitudes, tolerance and human behaviour and Chapter 13, Working with stakeholders and communities). In addition, an important principle to keep in mind is that preventing conflict is often more effective than trying to cure it; it is thus better to act early to prevent human-wildlife conflict starting or becoming serious.

When to act will depend to a large extent on the type(s) of action planned. For example, land use planning that takes into account the needs of wildlife to prevent human-wildlife conflict is by definition an action needed very early in the human-wildlife conflict management planning cycle (see Chapter 21, Planning across landscapes). In contrast, crop/livestock loss insurance schemes to mitigate the impact of human-wildlife conflict, for example, are more likely to be needed for already established human-wildlife conflict problems.

For chronic (long-established) human-wildlife conflict situations, the following considerations will tend to affect the timing of actions:

1. Act only when sufficient information is available:

- Collect information about the nature and extent of the situation, including the sociopolitical context and the various stakeholders' perspectives. (See also Chapter 8, Attitudes, tolerance and human behaviour, Chapter 10, How histories shape interactions, Chapter 12, Governing human-wildlife conflicts and Chapter 19, Social science research.)
- Gather information about the ecology and behaviour of the species involved. (See also Chapter 6, Natural drivers of human-wildlife conflict, Chapter 7, Animal behaviour and Chapter 20, Ecological research.)
- Ensure that there is information about the efficacy of any proposed technical interventions, as well as rates of adoption (and non-adoption) of the proposed interventions from other comparable sites. (See also Chapter 4, Avoiding unintended consequences, Chapter 15, Planning and theory of change and Chapter 27, Preventing damage by wildlife.)

2. Act only when there has been appropriate stakeholder involvement:

- It is essential that actions to prevent, reduce or otherwise mitigate human-wildlife conflict are only taken after these have been planned jointly with the stakeholder directly affected (e.g. farmers, local community) and other stakeholders involved (e.g. local business, conservation projects). The uptake and sustainability of human-wildlife conflict management measures is likely to be much greater if stakeholders are involved in the selection, design and implementation of those measures (Denninger Snyder & Rentsch, 2020; Gunaryadi et al., 2017). (See also Chapter 13, Working with stakeholders and communities and Chapter 16, Dialogue: a process for conflict resolution.)

3. Act only when the necessary permissions have been secured:

- For NGOs and universities, the requisite ethical approvals need to be in place for any work involving wildlife and human subjects. Relevant governmental permissions, for example to work in protected

areas, are also necessary prerequisites for groups or projects requiring such permissions.

- Where traditional or other local authorities are involved, and on communal or private land, permission must be sought, ethical consent acquired and, where relevant, the principles and practices of free, prior and informed consent (FPIC) should be followed.

Conclusion

It is necessary for all human-wildlife conflict reduction or mitigation interventions to have clear timelines and funding strategies, and for all stakeholders to be aware of these. Inadequately funded interventions may cause more problems than no interventions at all. Project managers (whether from government agencies, NGOs or other organisations) need to plan for contingencies, for long-term sustainability and for an exit strategy (Karidozo et al., 2016). Exit strategies, such as ‘the human-wildlife conflict reduction/mitigation project will run with external support for 5 years or until its methods have been fully adopted by the affected communities and the project is clearly sustainable, whichever is the shorter period’, need to be developed with, and agreed by, all stakeholders.





Avoiding unintended consequences

James Stevens, Simon Hedges & Juliette Young

When planning what action(s) to implement in the management of the human-wildlife conflict it is important to provide all reasonable efforts to prevent harmful outcomes and that all stakeholders are aware of, and accept, the risks involved (see Chapter 3, Interventions: to act or not to act?). Being aware of what these unintended outcomes may be during the planning stages allows stakeholders to not only identify these issues early in the implementation phase if they arise, but also to co-develop plans to address them. It is crucial to be aware of what the successful application of an action may look like, not only in the local context, but for stakeholders in the wider region.

This process of considering possible unintended outcomes needs to take place during the planning phase, before implementation of the action, and ideally during development of a theory of change (see Chapter 15, Planning and theory of change). For example, by clarifying the assumptions of an action in the theory of change, potential unintended consequences can be identified. However, not all unintended outcomes are predictable or negative; nor can all consequences ever be predicted fully.

This chapter highlights some unintended outcomes (both predictable and unpredictable) that can occur when implementing an action (Table 2), and provides guidance on how to avoid, reduce or plan for these outcomes to ensure successful management of the human-wildlife conflict situation in both the short and long term.

Table 2. Examples of unintended outcomes that may arise because of an action

Example action	Possible unintended outcome
Wire fence used to act as a barrier to property	Fence wire stolen and used for snares (Lindsey et al., 2012)
Virtual fencing and shock collars used to deter wildlife entering certain areas	Collared animal becomes trapped on the wrong side of the virtual fence, causing extensive damage
Beehive fence used to deter elephants	Wildlife (e.g. honey badger in Africa, sun bear in Sumatra) attracted to beehives and damages them, impacting efficacy and also creating safety concerns for people, at least in the bear example (Johnson (2019)Hedges, pers. comm.)
Barrier used to reduce access to property	Wildlife utilise the barrier to create a safe haven, which farmers cannot reach, and use that haven to stage additional foraging visits (e.g. baboons using fences in the Shimba Hills, Kenya)

Shark net used to block access to recreational areas	Non-target species become trapped in the net (Meeuwig & Ferreira, 2014)
Alert system to indicate presence of wildlife	A high number of alerts may indicate to stakeholders that wildlife has a greater presence in the area than perceived, resulting in calls for further action (Weise et al., 2019)
Supplementary feeding of wild animals to deter them foraging on human resources	Wildlife becomes reliant on and habituated to feeding, and loses fear of humans; the animals may acquire a taste for this food and target it further (Steyaert et al., 2014)
Adults guard fields during the night.	Children are required to guard field during the day, impacting their school attendance (Mackenzie & Ahabyona, 2012); adults unable to gain further employment during the day

(Source: Compiled by the chapter authors)

Displacement of the problem

Some actions are intended to reduce the severity and frequency of impacts caused by wildlife. Understandably, the desired outcome would be that impacts on the stakeholder group(s) involved are reduced and any human-wildlife conflict driven threats to wildlife and wildlife habitat are reduced or eliminated. However, if the wildlife in question is exhibiting the conflict-causing behaviour for reasons such as to ensure its survival, resource preference or ease (see Chapter 7, Animal behaviour), reducing the opportunities for carrying out this behaviour at a certain spatial location or time may result in the wildlife simply shifting to another location or time and repeating the behaviour there or then (Dickman, 2010). For example, while fencing may provide a solution to small-scale crop foraging by elephants, it may result in more severe foraging in other areas as the elephants are displaced (Osipova et al., 2018). Likewise, measures to reduce crop foraging during a previously established peak time may result in the animals switching to foraging earlier or later. Under some scenarios, the management decision may be to translocate the individual animal(s) to a new location. However, unless planned carefully, the animal(s) may cause impacts in the new location or return to the original location, causing conflict *en route* (Athreya et al., 2011; Bradley et al., 2005; Fernando et al., 2012) (see Chapter 25, Animal capture and translocation).

Reducing impacts in one location or during a certain time might appear successful. However, if the impacts are displaced to another location, the situation is clearly not successfully managed across the wider landscape. This imposes the impact onto other communities, and is likely to increase the severity of human-human conflict by creating or fostering animosity between stakeholders (Glikman et al., 2022b) (see Chapter 1, Levels of conflict over wildlife).

Risks to people

Some actions to reduce human-wildlife conflict may require people to get close to potentially dangerous wild animals. For example, providing farmers with tents or torches to help them guard crops or livestock may require farmers or herders to remain in their fields or with their livestock during the night to scare off the problem animal. This requirement for the farmer to actively repel the potentially dangerous animals (such as elephants and large carnivores) places them at greater risk of coming into contact, increasing the risk of injury or death for both parties (Barua, 2014). Such

dangerous interactions can also result in high levels of stress, with negative effects on mental health (Jadhav & Barua, 2012).

If an action results in people getting close to dangerous wild animals, understanding animal behaviour and how to behave in these situations is crucial to ensuring safety. Preparation of safety guidelines, informed by that understanding, should be a prerequisite. Additionally, actions to reduce human-wildlife conflict may entail other risks to people's health and safety – for example, night guarding increases the risk of exposure to insect-borne diseases (Barua et al., 2013). It is important for implementing stakeholders to be aware of such potential risks and to be supported in the mitigation of them.

Risks to animals

For any action taken to reduce impacts from wildlife, the welfare and survival of the animals causing damage need careful attention. Actions that aim to move one or more animals from one location to another (see Chapter 25, Animal capture and translocation) should ensure that the new location is suitable for the animals before any translocation takes place (IUCN SSC, 2013). It is crucial that there are sufficient resources available, that there is 'space' for additional individuals of that species and that potential for impacts at the new location are low (ideally non-existent) (Massei et al., 2010). Translocation may cause social disruption and potentially aggravate the severity of human-wildlife conflict due to the animals' disorientation and lack of familiarity with release areas (de la Torre et al., 2021) (for other unintended consequences, see Chapter 25, Animal capture and translocation). In many situations, these assessments are not carried out, often with negative effects on the individual(s) being translocated and resulting in little net benefit from the action.

Actions in which a domestic animal is used to deter a wild animal should be carefully assessed to ensure that the risk to the safety and welfare of people and both the domestic and wild animals is minimised. Herding dogs are often used to effectively deter predators from preying on livestock when grazing during the day and corralled at night. Under certain circumstances, guard animals have been found to harass the livestock they are supposed to protect (Marker et al., 2005). Likewise, some guard animals have come into contact with the wildlife they are trying to deter, resulting in injuries to, and sometimes deaths of, both the guard animals and the wildlife (Smith et al., 2020). When planning such actions, it is therefore vitally important to ensure that risks are minimised through the use of well-trained, suitable-for-the-task guarding animals.

Box 2

Unintended outcomes of compensation and insurance

Compensation or insurance schemes are sometimes used to mitigate impacts that have already occurred (see Chapter 31, Compensation and insurance). These schemes aim to reimburse people for crop or livestock losses or provide financial recompense for injuries to, or deaths of, family members. However, these schemes can reduce the

incentive for damage prevention by affected stakeholders, or encourage the deliberate establishment of activities in places where damage is likely to occur, and payment to only some victims (a frequent problem) may cause or exacerbate disputes between affected stakeholders or other social problems. Finally, both schemes can cause the so-called ‘moral hazard’ problem, whereby if they are successful at reducing the impact of human-wildlife conflict, this might encourage expansion of activities into other areas (Nyhus et al. (2003); Bulte and Rondeau (2005)).

Avoiding and managing unintended outcomes

Discussing unintended outcomes during the planning phase can help to reduce the chances of them occurring or to establish protocols and plans for when they occur. What might appear to be a straightforward action to one stakeholder may not be to another. Diverse perspectives are likely to highlight a variety of potential unintended outcomes.

Once an action has been decided, it is important as a group (all local, relevant, affected stakeholders) to identify what factors may influence the success of an action, and any problems that could arise during implementation. The group should then determine what can be done to reduce the chances of identified potential unintended outcomes occurring, and what actions might need to be taken if they do occur. The more aware and prepared stakeholders are, the easier it is to manage such a situation.

It will likely not be possible to identify all unintended outcomes; however, putting in place protocols to report these outcomes as they arise will allow stakeholders to come together and work on ways to reduce the problems in a timely manner. Responsibility for such tracking and reporting could be assigned to one of the stakeholders or local authorities involved.

With regard to reporting, it is important to have regular meetings to ensure that the action is working as planned, and to allow proper monitoring and evaluation to take place (see Chapter 32, Evaluating interventions). Lines of communication should be open for all stakeholders to report any issues, and for any parties facilitating the implementation of the action to be present and accessible.





IUCN SSC GUIDELINES

PRINCIPLE 2 —

Understand issues and context



Assessing the impacts of conflict

John D. C. Linnell, Gladman Thondhlana & Simon Hedges

Origins

Living in proximity to wildlife can have a variety of negative impacts on human livelihoods and well-being. The early development of the field of human-wildlife conflict was around the study and mitigation of these impacts. As such, human-wildlife conflict emerged as an area of investigation at the interface between wildlife management, pest control, human health, veterinary care and conservation biology, and has typically focused on different situations. There is a large, although under-realized, potential for experience transfer between these traditions, which is essential if a holistic approach to human-wildlife conflict management is to be adopted.

Types of impact

As the understanding of human-wildlife conflict has matured there has been considerable development in our understanding of the diversity of impacts involved. They can be split into four components: 1) direct impacts, 2) indirect impacts, 3) opportunity costs and 4) psychosocial impacts, all of which may appear in different types of conflict to a greater or lesser extent.

The most obvious aspects of human-wildlife conflict lie with the *direct impacts*, represented by such things as a dead sheep killed by a wolf, a storehouse knocked down by an elephant or a field of crops flattened by wild pigs (Table 3). These are very tangible; however, they only represent a portion of the impacts. In addition to these is a range of *indirect impacts*. For example, a dead head of livestock represents not only a loss of meat/milk/wool production, but also a loss of a potential breeding animal and a loss of social status or of food or economic security. The threat of conflict will often force changes to the ways activities are conducted – for example, the way livestock is herded or crops protected – which may carry significant extra costs in terms of time or materials.

Furthermore, there may be many *opportunity costs*, because some potential economic activities and lifestyle choices may not be allowed to develop in certain areas as a result of the risk of damage or the time spent guarding crops or livestock, thus constraining human activities.

Finally, there may be a range of *psychosocial impacts*, including a) negative experiences (fear, lack of sleep and stress); b) annoyance, resentment and frustration; and c) the mental effects of fear, damage, fatality, disruption of lifestyle or economic/food uncertainty. The relative sizes of the different impacts will vary enormously between contexts (e.g. variable spatial and temporal scales, socio-economic settings), but it is important to be aware of the potential for all to occur.

Table 3. Summary of some of the main types of direct impact that wildlife can have on humans

Type of impact	Species often involved	Example references
Damage to agricultural crops	Main focus: elephants, wild boar/wild pigs, birds, primates Others: large herbivores such as deer, antelope, peccaries, wild cattle	(Hill, 2000; Hill, 2018; Mackenzie & Ahabyona, 2012; Mayer & Brisbin, 2009)
Damage to commercial forests	Main focus: deer species (e.g. moose, red deer), elephants Others: rodents such as beavers and squirrels, brown bears	(Nyhus & Tilson, 2004; Reimoser & Putman, 2011; Seidensticker & Mundial, 1984)
Grazing competition on grasslands	Main focus: large herbivores, colonial rodents such as gophers	(Chaikina & Ruckstuhl, 2006; Harris et al., 2015; Prins, 2000)
Vehicle collisions	Main focus: large herbivores with terrestrial transport; birds with aeroplanes	(Groot Bruinderink & Hazebroek, 1996; Langbein et al., 2010)
Depredation on livestock	Main focus: medium and large predatory mammals such as wolves, wild dogs, large cats and bears Others: raptors, crocodilians	(Inskip & Zimmermann, 2009; Tamang & Baral, 2008; van Eeden, Crowther, et al., 2018; Wilkinson et al., 2020)
Killing and injury of dogs and other pets	Main focus: large predatory mammals such as wolves, puma and leopards	(Butler et al., 2014)
Destruction of beehives	Main focus: bears, armadillos	(Naves et al., 2018)
Competition with hunters for game or with fishermen for fish	Main focus: mammalian carnivores and raptors for game; seals, whales, otters and seabirds for fish	(Graham et al., 2005)
Property damage	Main focus: racoons, martens, bears, elephants on land; seals damaging fishing gear	(Dai et al., 2020; Gross et al., 2021)
Loss of human life through direct attacks	Main focus: sharks, hippos, elephants, large cats, brown and black bears, puma, wolves, crocodiles	(Linnell & Alleau, 2016; Loe & Röskaft, 2004; Quigley & Herrero, 2005)
Loss of human life through poisoning	Main focus: snakes, insects	Kasturiratne et al., 2008; Mohapatra et al., 2011)
Loss of human health or life through disease transfer	Main focus: bats, rodents, birds, insects, arthropods	(Salyer et al., 2017)
Disease transfer to livestock	Main focus: large herbivores, rodents, mustelids such as badgers, birds, insects, arthropods	(Ferroglia et al., 2011)

(Source: Compiled by the chapter authors)

Documentation and transparency

Documenting the extent of direct impacts can be far more complicated than it appears. For example, if a sheep is found dead it may be hard to determine if it was actually killed by a predator (and if so, which species) or if it died of disease or an accident and was subsequently scavenged by a predator. Determining cause of death typically requires a field autopsy by a skilled inspector, and can only be conducted on fresh carcasses. It is also a common situation that many livestock simply disappear, and assumptions are then made about the cause of that disappearance. Likewise, if crops are damaged it may be hard to determine the species responsible or even to quantify the exact amount of crop consumed. There can even be a large degree of uncertainty surrounding cases in which people lose their lives to predator attacks, snake bites or zoonotic diseases.

There are also many challenges when it comes to quantifying the real economic impact of damage. For example, just because a tree has been browsed by a deer, it does not mean the tree loses all capacity to grow and generate future value. Likewise, if livestock were so sick or weak that they would have died soon without being killed by predators, it would be inaccurate to attribute their total loss to the predators. Furthermore, crop production suffers losses from multiple sources, thus making it wrong to assume that just because a certain amount has been consumed by ungulates or monkeys, it would all have been available for human harvest later. In such cases it is important to separate additive and compensatory losses – where *additive losses* are genuine additional impacts imposed by wildlife and *compensatory losses* are those where wildlife may just be responsible for proximate effects, which mask underlying issues that would have happened anyway.

Indirect impacts are even harder to quantify. Issues such as competition between wild and domestic herbivores for grazing or between hunters and predators for game are typically impossible to determine without full-scale research projects. Less tangible indirect impacts, including opportunity costs and psychosocial impacts, are also typically impossible to quantify accurately, since they may be embedded in everyday livelihood activities. Even when some impacts can be quantified, it is difficult to evaluate the loss of long-term benefits, for example those associated with increases in quantity and quality of livestock herds or crops, insurance value and cultural functions.

A final consideration concerns the diversity of perceptions relating to impacts. There is rarely a direct relationship between documented levels of impact and local perceptions of the seriousness of these impacts. Many communities tolerate high impacts as being ‘normal’, whereas other communities regard even trivial impacts as being unacceptable. The extent to which these impacts, or the necessity of adapting to them, is viewed as being a source of conflict or simply a normal part of everyday life will depend very much on the continuity of exposure, the cultural and historical context, and the socio-economic situation of the people involved.

It is essential that robust methods are used when impacts are being quantified, and that documentation is recorded and made public in a transparent manner. For other impacts, it may just be enough to recognise and acknowledge their existence, and forego attempts to quantify them or attribute monetary values to them. Likewise, it is important to relate documentation of impacts to local perceptions of the acceptability or seriousness of these impacts.

Although challenging, making attempts to quantify, or at least assess, the level and range of impacts is important because contested knowledge over such issues can become a central element in the wider social conflicts that are so widespread in human-wildlife conflict. There are also many cases where levels of impact become deliberately misrepresented by stakeholders in both directions, and for various reasons.

Responses

By recognising the existence of multiple direct and indirect impacts of wildlife on people, it is often possible to adopt concrete technical interventions to reduce some of their effects or mitigate their impacts (see Chapter 27, Preventing damage by wildlife). For example, a range of technical interventions exist to protect livestock from predators, reduce vehicle collisions or promote human safety, and it is possible to adapt the selection of crops and trees being grown according to the wildlife species present in an area. It is also possible to develop a range of economic mechanisms to redistribute the costs and benefits between different groups or scales. Although payment of compensation for losses is widespread, it is especially problematic because of the challenges of accurate quantification described above, resulting in high transaction costs and the opportunity for fraud and conflict (see Chapter 31, Compensation and insurance). Payment for risk, in contrast, is emerging as an alternative approach. In light of the psychosocial impacts, it is imperative that interventions are designed to address costs that cannot be sufficiently addressed using financial measures. Interventions must also be aligned with local environmental, social, cultural and economic realities.

An essential element in long-term impact reduction is the need for cooperation between different sectors (see Chapter 13, Working with stakeholders and communities), typically the environmental sector that manages wildlife and other sectors such as agriculture, forestry, transport and human health. Although this mainstreaming represents a universal challenge in public administration, it is an essential prerequisite for addressing the very real potential impacts that wildlife can have for the human communities with which they share space.

Conclusion

Although the field of human-wildlife conflict has expanded to include a focus on a wide range of social and governance issues around the context and management of conflicts, it is important to remain aware that wildlife can have a wide diversity of very real impacts on human health, well-being, livelihoods and economic activities. These real impacts will often need to be quantified, or at least recognised, and addressed in parallel with attempts to manage wider social conflicts.





Natural drivers of human-wildlife conflict

Mayukh Chatterjee, James Stevens & Sugoto Roy

Interactions between wildlife and people, including human-wildlife conflict, are essentially a function of encounters. They occur when there is some kind of overlap in space and time – most typically, either a physical encounter or (often unwanted) a sharing of land, spaces or resources (e.g. crops, access to water, stored food). This human-wildlife interface – a spatiotemporal overlap between human and wildlife populations and wildlife habitats – is rarely static, and the higher the encounter rate or surface area of interface, the more likely interactions will occur, and in turn the higher the chances of these being problematic for either wildlife or people.

The increased human-wildlife interface is largely driven by two factors: first, the change in land use patterns that allows humans to spread into areas inhabited by wildlife (Messmer, 2009); and second, changes in the distribution patterns of wildlife species that them into closer contact with human societies (Baruch-Mordo et al., 2014). It must also be kept in mind that these two aspects can, and often do, also influence each other, while also being influenced by other ultimate drivers such as climate change, although the impacts of this are not yet well studied (Abrahms, 2021) (Figure 3).



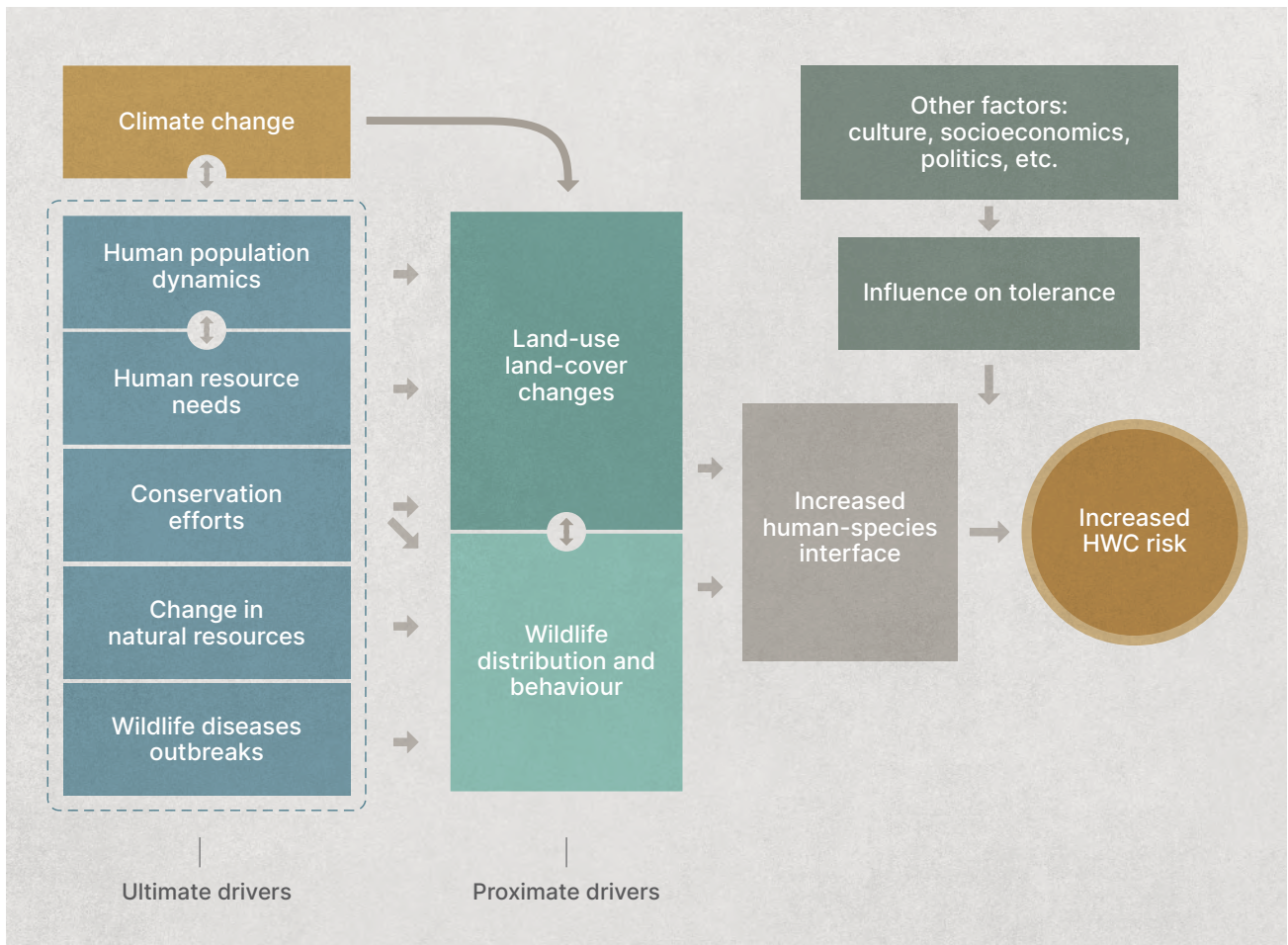


Figure 3. Schematic flowchart showing the impacts of various ultimate drivers on proximate drivers of land-use/land-cover change and wildlife distribution and behaviour, leading to an increased human-wildlife interface, which may drive changes in tolerance levels (which may be affected by other factors, such as culture or socio-economic situation), thereby increasing the risks for escalation of human-wildlife conflict. (Source: Compiled by the chapter authors)

Changes in land-use and land cover

Changes in land-use are exclusively human driven, while changes in land cover may occur due to a variety of reasons, primary of which is changes in human population distribution, and its need for various natural resources – especially land. The two are therefore heavily linked. In today’s rapidly developing world, diversion of habitats for human developmental projects are common, with dams, roads, mines and wind turbine farms all examples of this.

Agricultural expansion and habitat encroachment

One of the predominant land-use changes involves the expansion of agricultural lands (Schmitz et al., 2014). In several developing countries, slow yet steady encroachment into protected wildlife habitats remains a major issue, leading to habitat fragmentation and degradation, as well as increases in human-wildlife interactions. Additionally, sudden shifts in specific crop types can drive changes in land requirements (e.g. sugarcane or soya crops in northern India).

Human development and infrastructure

Developmental projects, including the industrialisation of agriculture and animal husbandry, and the expansion of solar farms and wind turbine farms, all require large-scale conversion of land, and in many places unprotected wildlife habitats are exploited for this ((Beckmann et al., 2012); (Walker et al., 2020). Dams and mines also lead to habitat degradation and fragmentation, often altering the ecosystem in profound ways. Linear infrastructure, such as railroads, highways and canals, also fragments habitats (Sánchez-Zapata et al., 2016).

Deforestation and afforestation

Deforestation is a common practice, either for developmental projects or simply for timber harvesting. Large-scale deforestation opens up habitats, imposing severe pressures on a variety of wildlife species (Supriatna et al., 2017; Voigt et al., 2022). A good example is the widescale deforestation of rainforests for palm plantations in Indonesia. Unplanned afforestation efforts can also alter the land-cover characteristics. In recent years, several initiatives to carry out plantation work in natural grassland patches (considering them to be barren) has driven adverse land-cover change (Iezzi et al., 2020).

Changes in wildlife species distributions and behaviour

The population distribution, ecology and behaviour of animals may also influence the interface between them and humans.

Recolonisation or range expansion

Recolonising wildlife species can lead directly to range shifts, bringing specific populations closer to humans (Chapron et al., 2014; Skogen et al., 2019) . Thus, when animal populations gradually move to new areas with human settlements and become residents, it can not only lead to more frequent interactions, but also to increased losses if the animals pose a potential threat to human lives or their property, including homes, livestock and crops. For instance, in many parts of the Asian elephant distribution range, increasing range extensions and shifts have been documented in recent years, invariably leading to interactions with human communities that may be unfamiliar with the species and how to coexist with them.

Changes in migration

Migration is a natural phenomenon undertaken by many species, ranging from birds to large mammals. When migration routes are disrupted, animals may adopt new routes of travel, which can bring them into closer contact with humans (Canney, 2019). Such changes in migratory patterns can also occur due to broader environmental changes as a result climate change. Furthermore, changes in migratory patterns, in which particular populations either stop migrating or migrate to altogether new regions, may give rise to increased interactions with resident human communities.

Dietary needs

Many species may have specific dietary requirements, which might lead them to explore larger areas in search of these particular resources, and thus bring them closer to human habitations. One example is that of leopards exploiting areas with high feral/domestic dog populations, as they are known to select prey with specific body sizes (Athreya et al., 2016). Such changes can be impacted by both human-induced and natural drivers.

Commensalism

Certain species are known to be highly adaptable and have been observed to show an affinity for areas inhabited by humans, primarily due to their ability to adapt to human environments. Species of macaque and wild pig provide good examples of commensalism. Such species, even without a specific driver, simply exploit the resources that human habitations provide, and adapt to such environments (Riley, 2019).

Habituation

Individuals or groups of certain species may get habituated to human presence (especially for the availability of high-calorie foods that human environments can provide), and may pose actual or perceived risks to humans as their presence increases. These interactions can increase the risk of conflict, as habituation may lead to the disruption of normal human activities, injuries or even loss of human lives. Even perceived threats from habituated animals can lead to conflict situations. A good example is the killing of the walrus 'Freya' by Norwegian authorities in 2022, based on perceived risks to human life due to the animal's extreme habituation to human presence.

Ultimate drivers

In addition to the proximate (immediate) natural drivers outlined above – changes in land use and land cover, as well as the distribution and behaviour of species – human-wildlife conflict and coexistence are also driven by ultimate (root cause) drivers.

While a growing human population implies a greater need for natural resources, inflated natural resource requirements can also occur irrespective of the human population size or density. Indeed, in many parts of the world high resource extraction is imposed by relatively low human population sizes. Either way, a high level of need for various natural resources, especially those that require modification of the landscape, drives dramatic land-use change in relatively short periods of time.

Migration of human populations to sparsely populated areas can also trigger an exponential increase in natural resource dependence and thus drive rapid land-use and land-cover changes. A good example is that of the Rohingya refugee crisis in Bangladesh. Mass human migration due to sociopolitical turmoil led to refugee settlements being established amid existing Asian elephant movement paths, driving the elephants to chart alternative courses through agricultural fields and human habitation (Islam et al., 2021).

Certain animal and habitat management measures can also trigger changes in land-cover characteristics. Examples include management practices involving habitat alteration (such as creation of grasslands or forests) or the introduction of species into new areas, which might change the

abundance and dominance structure of a habitat (e.g. due to overgrazing of a particular grass species by an introduced wild herbivore).

Similarly, reintroduction of certain species or changes in resource availability may also lead to changes in animal distribution and behaviour. For instance, the reintroduction of prey species can lead to range expansions by obligate predators of those herbivores, and thus bring them closer to humans (see Box 3 Cougar case study). Invasive species proliferation may also trigger changes in the habitat, as well as in the behaviour and distribution of other species.

Among the natural drivers, natural succession across various biotic elements itself may drive a change in land-cover and in animal distribution and behaviour (see Box 4 Botswana elephant case study). Overabundance of certain species may change the resource distribution, which may lead to changes in the distribution or behaviour of other species that can interact with humans. Furthermore, changes in climatic regimes may dramatically alter land-use change, thus impacting wildlife distribution and behaviour.

Disease outbreaks can affect wildlife population distributions, thereby impacting human-wildlife conflicts. For instance, lowered prey abundance due to a disease outbreak may drive predators to depend upon livestock outside the protected area boundaries. Carry-over of disease to human populations or their livestock can also result in conflicts (e.g. Masai excluding wildebeest from fawning grounds due to catarrhal fever transmission to livestock) (Woodroffe et al., 2005).

Climatic changes, which are also linked to human population, resource use and human migration, are also likely to influence human-wildlife conflict, although the patterns are not yet well-studied (Abrahms, 2021). It is likely, however, that climate change can affect human-wildlife conflict in three ways: species range changes; land-use and food production system changes; and increased unpredictability and unusual patterns in the behaviours or population dynamics of species, and in the needs and adaptations of human settlements and land use. These can all lead to changes in the location or frequency of human-wildlife encounters (Zimmermann & Stevens, 2021).

Box 3

The cougars of Boulder, Colorado, USA

Over two centuries, the cougar – like many other wildlife species – was heavily persecuted in North America, often through state-paid bounties for exterminating the big cat species (Torres et al., 1996). Boulder County, in Colorado, USA, beginning as a small mining town in the late 1850s, was no different in this regard, although by the mid-1960s it had acquired vast expanses of land owing to its rapid growth into a city, which also gave rise to a ‘nature-passionate’ populace.

The nature-loving people of Boulder drove the protection of vast tracts of natural lands, and allowed the recovery of numerous acquired farmlands and logged forest patches. This led many wildlife species that had previously been extensively hunted to recolonise, and even become habituated to the manicured gardens and open spaces that the city of Boulder now provided (Anderson et al., 2010).

By early 1980s, the mule deer population had expanded, leading to ever increasing collisions with vehicles on roads, and frequent sightings in residential backyards and public parks. With hunting of wildlife mostly banned (or severely restricted), by the late 1980s the cougar population had also rapidly recovered. But now with the prey species of choice frequenting human-inhabited lands, the cougars eventually followed them into Boulder City. Soon, this habituation led to increased instances of pet dogs and cats being killed by cougars inside residents' gardens. Then, in January 1991, the first well-documented case of a cougar killing and eating a human occurred near the city. Over the next decade, with more such incidents of humans being attacked by cougars, hunting of mule deer (its main prey) was again imposed, as a remedy to the audacious cougars who were now being sighted more openly, even in daylight hours (Halfpenny et al., 1991). Unfortunately, this had a counterintuitive effect. With the wild deer now fast disappearing, cougars began increasingly to rely on other sources of food, consequently increasing the number of attacks on humans, in addition to domestic dogs and cats (Baron, 2010). Today the Colorado Parks and Wildlife Department employs a combination of initiatives – such as using response teams to capture and relocate cougars, public awareness campaigns, use of deterrents and habitat management measures – to minimise interactions between humans and cougars in the state (Alldredge et al., 2019).

Box 4

How a changing river system led to increased human-elephant interactions

The Makgadikgadi Pans National Park is located in central northern Botswana. With limited surface water, the park relies on the flow of ephemeral rivers to support the system. The Boteti River, which flows out of the Okavango Delta, is the park's only permanent natural water source, running along the park's western boundary, with some sections within and others outside the park.

The flow of water in the Boteti River is sporadic, with the reliability of its flow influenced by the water dynamics in the Okavango Delta, which in turn are influenced by rainfall in the Angolan highlands and the Okavango Delta. In 1989, the Boteti River stopped flowing, restricting water availability within the park, likely due to tectonic movements deviating the Angolan floodwaters (Brooks, 2005).

For 20 years, the Boteti River was limited to a small number of natural waterholes, and artificially pumped waterholes designed to temporarily alleviate pressure on the wildlife. Then, in 2009, the Boteti started to flow again, becoming a permanent water source for the park. Following the return of the river, there was a subsequent expansion of elephant populations in the country's north, with an influx of primarily male elephants into their historical rangelands, utilising the river (Chase, 2011).

The park is surrounded by communal land on the western side, which is dominated by arable and cattle farming. With the elephants using the Boteti River, there was suddenly a spatial overlap with the communities, resulting in the region having one of the highest levels of negative human-wildlife interactions in Botswana (Brooks & Bradley, 2010; Stevens, 2018).

This case study highlights how land-cover changes (in this case, water accessibility) can influence wildlife distributions, leading to an increased human-species interface and ultimately human-wildlife conflict.

Conclusion

While addressing all ultimate and proximate drivers of human-wildlife conflicts may not be feasible for stakeholders trying to manage the situation, an understanding of the natural drivers can help policy makers, decision makers and managers mitigate human-wildlife conflicts.





Animal behaviour

*Joshua M. Plotnik, Robbie Ball, Matthew S. Rudolph, Simon Pooley,
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Why is animal behaviour important in human-wildlife conflict?

Animal behaviour describes the ways in which animals, including humans, interact with each other and the natural world around them. Some species have the capacity to adjust their behaviour to rapid, anthropogenic (human-driven) changes, and thus may cope better with unpredictability in their environments. Other species, on the other hand, may not, significantly impacting their survival. In addition, while some animals have coadapted to sharing landscapes with humans for millennia, the rate of transformation of such landscapes and the growing reach of human development is overtaking wild animals' capacity to avoid damaging interactions with people in many places.

The potential success of wildlife damage prevention measures can be significantly increased by taking the natural behaviour of animals into account, identifying ways in which some species have already adapted to the presence of humans and applying this knowledge elsewhere. It is also important to understand how individual differences in behaviour (animal and human personality) can vary the perception, presence and intensity of conflict from one landscape or conflict location to the next.



Animal decision making: negative impacts on human-dominated landscapes and ‘problem’ animals

It is likely that animals, when searching for food, optimise their foraging strategies in a way that maximises benefits while limiting loss of energy and time – ‘optimal foraging theory’ (Pyke, 1984). This is particularly relevant for understanding why some animals engage in ‘risky’ behaviour and forage in ways that maximise potential energy benefits, while at the same time increase the potential for negative interactions with humans. Indeed, even when substantial populations of a particular species live within or close to human-dominated landscapes, it is often only a select few individual animals that are of primary concern in human-wildlife conflicts (Mumby & Plotnik, 2018). These ‘problem animals’ often make food-motivated choices that may negatively impact their survival (Barrett et al., 2019).

For example, domesticated crops have been selected over millennia to have high nutritional value, and these cultivated plants are typically bred to possess lower levels of chemical defences than in the wild. High-yielding crops planted in pure stands offer greater nutritional value than wild forage, so an animal’s dietary requirements can be achieved more rapidly with less energy expended in finding food (Hill, 2018). Thus, for wild animals, rapid feeding on crops can be worth the risk associated with retaliation by farmers. Intelligent animals like elephants learn this easily, and therefore often target high-energy crops (e.g. cereals, rice, wheat, maize and sorghum) and wait until the crops are mature to do so. Many types of vegetable and fruit crop are also highly nutritious, especially if farmed intensively, and are targeted by herbivores like antelopes, deer, hippopotamus, elephants, primates and frugivorous birds and bats.

Similarly, domestic livestock species are relatively easy prey for wild carnivores; they are naturally tame and less fit than their wild counterparts, and avoid predators far less easily, especially when spatially confined. Being naturally very adaptable, wild carnivores that become problem animals on any of the world’s continents (e.g. foxes, coyotes, lynx, wolves, pumas, jaguars, leopards, cheetahs, hyenas, lions, tigers and crocodilians) have developed exceedingly clever hunting behaviour and practices for catching domestic livestock (and sometimes humans) (Treves & Karanth, 2003; Wilkinson et al., 2020).

In some cases, natural food sources have simply been overutilised or replaced by humans, leaving wild animals with little alternative but to feed on the crops or livestock. In addition, some domesticated animals and humans are preyed upon as part of ‘natural’ predation behaviour, and thus are not distinguished from typical wild prey.

Key behavioural considerations in human-wildlife conflict

To apply knowledge about animal behaviour to wildlife damage mitigation effectively, it is crucially important to consider how particular behaviours or capacities might impact the types and intensities of interaction that animals have with humans, including:

- **Cognition and behavioural flexibility:** how well and how quickly do animals adapt to changes in human behaviour, intervention or impacts on the environment? This flexibility may be expressed as innovative problem solving (i.e. an animal’s ability to overcome new obstacles or develop new ways

of navigating existing obstacles), and could allow animals to adapt quickly to changing mitigation methods or to novel food sources (Barrett et al., 2019; Benson-Amram & Holekamp, 2012).

- **Social behaviour:** does human behaviour negatively impact animal social groups in ways that either intensify conflict (e.g. separating young animals from adults or family groups could increase the frequency of aggressive behaviour) or are detrimental to reproductive behaviour and thus population stability? Prior experiences, particularly those involving humans, can have an impact on the social responses of wildlife towards humans, whereby repeated negative interactions can lead to undesirable or aggressive behaviours that are socially learned and transmitted.

Interestingly, these behaviours may vary by individual within a species, or even within a particular population. These individual differences in wildlife behaviour can often result in certain individuals being labelled as ‘problem’ animals (Barrett et al., 2019; Linnell et al., 1997). The number of individuals displaying behaviour resulting in negative impacts and human-wildlife conflict is often surprisingly small. Within a localised conflict, individual animals can often be recognised either via direct observation or the use of indirect methods, such as remote imaging (e.g. camera trapping) (Burton et al., 2015; Caravaggi et al., 2017).

But what causes some individual animals to take considerable ‘risk’ in engaging with people (e.g. targeting crops or livestock) and others to avoid them (e.g. remaining inside protected areas)? Many of these differences in behaviour within species are likely due to differences in personality. Research on personality traits that exist in humans and non-human animals alike, such as boldness, fear of novelty, innovation (problem solving), aggression and sociality, likely all play a role in whether certain individuals are more or less likely to take risks that result in human-wildlife conflict (Barrett et al., 2019; Goldenberg et al., 2017; Mumby & Plotnik, 2018).

Human-wildlife conflict scenarios linked to animal behaviour

Below are four examples of how animal behaviour in general can be relevant to human-wildlife conflict.

Lions

Lion prides expel sub-adult males who then become ‘nomads’ without a territory. These individuals are prone to becoming involved in negative interactions for diverse reasons: they are young, inexperienced hunters; they have to roam areas outside of prime defended territories; and they survive either alone or in small ‘coalitions’ of two to three, and not in stable prides of experienced hunters (Stander, 1990). But this natural process takes place today in many sub-optimal home ranges modified by rural human settlements, where nomadic male lions frequently encounter and kill livestock. Retaliatory killing by humans then becomes disproportionate with this age class, which in turn affects the succession of males joining established prides of females later in life. Alternatively, if male pride leaders are unnaturally or too frequently removed by humans, female lions suffering the loss of male protection may leave their territory and engage in hunting easier prey, such as livestock.

Elephants

Studies on the crop-raiding behaviour of African and Asian elephants have documented and quantified far greater crop damage caused by male than by female elephants (Hoare, 1999). Mature

males are either solitary or live in small groups, and often take risks entering and raiding farmland. When regular crop-raiding male elephants ('habitual offenders') are destroyed or removed, they can be replaced by younger males. This may happen because dominant males were restricting the access of weaker rivals to the prime resource of food crops. Female elephants by contrast live in stable and cohesive social groups with calves, and may be more risk-averse due to the need for intense and long-term protection of their dependent offspring.

Crocodiles

Like most crocodiles, saltwater crocodiles are territorial, with stretches of rivers dominated by very large males (Grigg & Kirshner, 2015). These 'boss crocodiles' show considerable aggression towards other males in the breeding season. As younger males get bigger, they are forced to migrate, often downstream to the ocean, where they move along the coastline looking for rivers in which to establish their own territories, or upstream into fresher, smaller waterways. This can result in large crocodiles turning up in waterways (including lagoons, beaches, islands and headwaters of rivers) where they are not expected (Brien et al., 2017). When the large 'boss crocs' are shot, as is sometimes advocated by people worried about the danger posed by such large animals, this results in an influx of other males, and can result in a more dangerous situation.

Bears

Grizzly bear cubs living in Alberta, Canada, remain with their mothers until they are 2–3 years of age. During this period, cubs may acquire behaviours from their mother through social learning that could contribute to negative interactions with humans (Elfström et al., 2014). Morehouse et al. (2016) found that the offspring of female bears labelled 'problem bears' were more likely to be involved in conflict-related behaviours as well (a pattern not seen if fathers were 'problem bears'), while offspring from 'non-problem' mothers were not likely to be involved in such conflicts. These findings suggest that minimising opportunities for females to develop 'problem' behaviours, and thus limiting the spread of such behaviours within family groups, could reduce the impacts of human-bear conflict.

A step-by-step guide to considering animal behaviour in human-wildlife conflict mitigation strategy development

When trying to understand animal behaviours of relevance to a given human-wildlife conflict, it is useful to apply the following:

1. Consider the specific animal behaviour catalysing the situation.

What is the animal doing, *how* is their behaviour impacting conflict and *what* are humans doing that runs contrary to the animal's natural behaviour?

2. Consider the ecological factors influencing the behaviour.

What resources are limited or overlapping, and thus causing conflict? Is loss of habitat or land fragmentation contributing to the conflict? Is the problem at the level of individual animals or populations?

3. Determine whether the behaviour is dependent on resources that are critical to local human populations.

Then determine whether aspects of the behaviour or the resources would need to be changed in order to affect the conflict – for example, how separable are the animals from the resources? Are there alternatives available for either wildlife or human parties?

4. If possible, compare local conflict concerns with other human-wildlife conflict scenarios.

What are the similarities and differences between these conflict cases? What methods did they employ and what was their impact? Importantly:

- a) Determine if existing mitigation methods employed in other areas accounted for animal behaviour in some way, and whether enough similarities exist to pilot or implement these methods locally. It is important to recognise that if the problem is specific to the local population, methods that worked in one area may not apply in another.
- b) Consult with local community members in other areas, academic colleagues, HWCCSG members or NGOs knowledgeable about the wildlife species to see if knowledge of animal behaviour can be incorporated into existing mitigation strategies.

5. If no comparable conflict can be identified, consider how existing or novel mitigation strategies can take, even at a basic level, animal behaviour into consideration.

- a) Ask: does your strategy successfully account for the fact that many animals habituate to negative stimuli? If the animal does not experience any long-term impact of a deterrent strategy (e.g. lights, sounds, smells), they may quickly habituate to the deterrent, reducing its efficacy. Simple changes like alternating types of deterrent (e.g. changing light strobe frequencies, changing sound frequencies, increasing novelty of smells) may have significant impacts in terms of increasing the time it takes for an animal to habituate (or preventing habituation altogether). Habituation (and whether it is desirable or not) in a particular population is a hotly debated topic, and thus should be considered carefully when balancing the needs of local people and the wildlife.
- b) Ask: does your strategy account for natural predator-prey interactions, or natural stimuli that may be aversive to the animals? If a particular species has a natural predator they avoid, can something about this predator (smell, sound) be used as a natural deterrent?
- c) Ask: does your strategy provide alternative access to resources the animal needs? If this is the primary cause of the conflict, barriers to needed resources will not provide the same level of long-term efficacy as redirection to alternative resources. This can be very difficult in areas where resources are already limited, but this is important to consider, even at a small scale.

6. Decide on a plan that seeks to minimise loss to all parties involved (wildlife and humans), takes into account the existing intensity of the local conflict and considers unintended consequences.

- a) For humans, this means ensuring the livelihoods of local community members are protected. For wildlife, this means minimising the impact on the animals' natural behaviour and maximising their access to needed natural resources.
- b) Without careful tailoring of the mitigation strategy to individual behaviour or personality, long-term solutions to conflict can be elusive. It is important to impress upon affected people that in human-wildlife conflict one is usually only dealing with a small segment of any animal population by which they feel threatened.

- c) Killing not only removes an individual but can have a cascade of negative consequences in the larger population to which the animal belonged, particularly in terms of their behavioural ecology. Retaliatory killing by humans is by far the biggest mortality factor for much of the wildlife involved in human-wildlife conflict, and is especially damaging if the species' conservation status in the wild is declining.
- d) Translocations may merely displace a problem elsewhere, and should be considered with behaviour in mind. For example, moving a lion that has learned to raid livestock enclosures to another area will not change their behaviour, and if they are accepted into a new pride, pride mates may learn from them, perpetuating the problem. A more common concern is moving animals with strong homing instincts like leopards and crocodiles. As these animals often return to where they were caught, they may cause problems *en route*, including in places where these species are usually absent.

7. If you are knowledgeable about animal behaviour, or know others who are, present information about local species' behaviour to local communities, and recruit local teachers to implement modules about animal behaviour in science lessons. Local, traditional knowledge can often complement academic knowledge, and discussions about how best to interact with wildlife while taking the animals' natural behaviour into account can prevent negative interactions from occurring or help mitigate them when they are inevitable.

Table 4. Examples of how animal behaviour has been successfully applied to human-wildlife conflict mitigation

Human-wildlife conflict mitigation strategy	Animal	Animal behaviour	Results of mitigation strategy
Constructing barriers that discourage elephants from foraging on subsistence farmland	African elephant	Avoidance of aversive stimuli	Elephants were deterred from crossing fences that were coated with a mixture of crushed chilies and oil (Chang'a et al., 2016)
Visual deterrence from airports using drones to mimic predator-prey interactions	Canada goose	Sensory perception of associated predatory behaviour	Geese changed behaviour to avoid areas of potential aircraft congestion (Blackwell et al., 2012)
Acoustic deterrence used to prevent fish predation, using devices typically aimed at scaring seals ('seal scarers')	Harbour porpoise	Conditioning behaviour	Porpoises were scared away from foraging in aquaculture operations, although there were unknown effects on other marine life (Brandt et al., 2013)
Deterrence from food resources through combined sensory (visual, acoustic) system barriers	Coyote	Sensory perception and communication of risk/threat	Coyotes were prevented from approaching food resources most effectively when a 'frightening' light and sound were presented upon motion detection (Darrow & Shivik, 2009)
Protecting livestock through mediated interaction with domesticated guard dogs	Dogs living wild in Australia (e.g. feral domestic dogs and dingoes)	Predation (toward livestock) and shepherding behaviour	Guard dogs successfully prevented livestock attacks, although did not discourage wild dogs from foraging nearby (Allen et al., 2017)

(Source: Compiled by the chapter authors)



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Conclusion

Today, scientists have enough understanding of animal behaviour to provide substantial advice on human-wildlife conflict mitigation from the animal perspective. human-wildlife conflict can have serious effects on animals and populations, including increased stress levels, effects on resource use, reproduction and movement patterns, and, ultimately, local extinction. Fields including ethology, behavioural ecology, psychology, anthropology and human ethnography complement each other to help stakeholders understand how both the shared and differing needs of humans and wildlife can be addressed to work towards a model of long-term coexistence. Working together with local communities is key here; poor human-wildlife conflict management can sometimes lead to ‘positive feedback loops’ in which a misunderstanding about animal behaviour (like the aforementioned examples in lions and crocodiles) can perpetuate and increase the conflict. The importance of the need to consider animal behaviour in these situations can be difficult to explain to affected people in the hope of achieving sustainable human-wildlife conflict mitigation, but an effort to do just that is crucial.



Attitudes, tolerance and human behaviour

Silvio Marchini, Jenny A. Glikman, Michael Manfredo & Alexandra Zimmermann

Human thoughts, feelings and behaviours

The human dimension aspects of conflicts over wildlife are largely determined by the thoughts, feelings and, ultimately, behaviours of people (Manfredo & Dayer, 2004). Because all human-wildlife conflicts involve people, approaches that provide a better understanding of human behaviour – and facilitate behaviour change – are crucially important for helping manage such conflicts.

Efforts to mitigate human-wildlife conflict commonly include actions to try to influence or change the attitudes or behaviours of the people involved. Another extremely common approach for reducing human-wildlife conflict is to conduct education and awareness campaigns. These activities are well intentioned in attempting to change the human dimension of the human-wildlife conflict, but unfortunately are often ineffective for one very common reason – they are based on incorrect assumptions about cause-and-effect relationships of concepts within social psychology.

Common misconceptions

1) Information and tolerance: the assumption that *tolerance* of wildlife can be increased by improving people's *knowledge* about wildlife has rarely proven true, as people's tolerance of wildlife is determined by a number of factors, not just knowledge (Bruskotter and Wilson (2014). Thus, providing people with information will not necessarily influence their actions.

2) Attitudes and behaviour: measuring attitudes and aiming to change these in order to alter behaviour is also an incomplete link. Although attitudes do influence people's actions, there are characteristics about attitudes that make some of them very influential, but others only marginally impactful (e.g. strong versus weakly held attitudes). Focusing on attitudes alone neither provides a complete picture of the conflict, nor does it offer sufficiently holistic solutions for reducing it (Heberlein, 2012).

Less commonly studied are further aspects of the human dimensions of human-wildlife conflicts, such as values, beliefs, emotions and norms. In this chapter we disentangle these various terms and concepts to provide an introduction to the social psychology of human-wildlife conflict. Social psychology – the scientific study of the way in which people's thoughts, feelings and behaviours are

influenced by their actual and imagined interactions with the environment (Vaske & Manfredo, 2012) – has helped researchers and managers to understand, predict and influence tolerance and behaviour in a range of biodiversity conservation contexts, including human-wildlife conflict.

While this chapter is intended to provide an introductory overview of some key concepts, in order to design and conduct fully robust and reliable research it is very important that these components of any human-wildlife conflict assessment or project are carried out by a social scientist (Martin, 2020) (see Chapter 19, Social science research).

Key concepts from social psychology

Attitude

Attitude is defined as ‘an individual’s favourable or unfavourable evaluation of a person, object, concept or action’ (Ajzen & Fishbein, 2000). Attitude studies are useful predictors of human behaviour only when the attitude measured relates specifically to the behaviours of interest. For attitudes to predict behaviour, the attitude and behaviour must correspond on four levels of specificity: action, target, context and time. For example, attitudes about objects (such as sharks) will not necessarily predict behaviours (such as killing sharks). Instead, one would need to understand attitudes towards killing (action) sharks (target) that enter swimming zones (context) when people are present (time).

Belief

Beliefs are what people think are true about a person, object or action, which may or may not necessarily be objectively factual (Eagly & Chaiken, 1993; Vaske & Manfredo, 2012). Beliefs about wildlife are based on attributes associated with the species (Knox et al., 2019). Regardless of their accuracy, they can be major drivers of behaviour in an human-wildlife conflict context, hence the importance of assessing them. They can carry evaluative meaning – for example, an individual may believe that trophy hunting is right or wrong. However, beliefs do not need to be tied to evaluations. One might believe that lethal control is the most suitable intervention, for example, without attaching any particular evaluative meaning to that proposition.

Emotion

Emotions such as fear, anger, disgust, happiness and love are fundamental in understanding human-wildlife relationships (Jacobs & Vaske, 2019). They are a mixture of instinctive reactions, physiological responses and subjective interpretation of the associated feelings. Emotions are complex and not prone to easy measurement, but properly understanding them is a part of effective management of collaborative groups, conflict resolution and effective communication in the context of human-wildlife conflict. *Affect* and *feeling* are terms often used interchangeably with emotion in the human-wildlife conflict literature; however, the psychology literature usually makes a distinction between these concepts, with proposed definitions varying significantly across authors).

Knowledge

Knowledge refers to a theoretical or practical understanding of a subject. It can be implicit, as with practical skill or expertise, or explicit, as with the theoretical understanding of a subject (Oxford English Dictionary). Knowledge is closely related to belief: all knowledge is a belief, as people believe what they know, but not all belief is knowledge, as beliefs may or may not be accurate (Eagly &

Chaiken, 1993; Vaske & Manfredi, 2012). In human-wildlife conflict, an assessment of local knowledge about how to prevent wildlife damage, for example, may be relevant for managers and decision makers. However, while some studies show how greater knowledge about a species can positively influence attitudes towards it (Glikman et al., 2012), this is not often the case (Kahan et al., 2012).

Need and motivation

The concepts of need (i.e. pursuits that are essential for physical and mental well-being) and motivation (i.e. desired goals in life) have received considerable attention in some areas of conservation, most notably in the area of recreation and leisure (Decker et al., 2012). The concept has particular relevance in human-wildlife conflict simply because conflict arises when human needs, like security and subsistence, are threatened due to interactions with wildlife. Research has shown that as need structures change within a country due to modernisation, so too do their values (Inglehart, 1997), as do the population's desired relationships with, and tolerances towards, wildlife (Bruskotter et al., 2017). It stands to reason, however, that a crucial element of dealing with human-wildlife conflict is understanding the fundamental needs of those affected.

Norms

Norms are standards of behaviour that guide what people should or should not do (i.e. injunctive norms) or what most people are doing (i.e. descriptive norms) in given circumstances (Decker et al., 2012). Norms can help explain why people (either individually or collectively) behave in certain ways, as well as accept or support certain behaviours. The influence of norms on behaviour has been used to facilitate the design of persuasion campaigns intended to modify impact behaviour (Vaske & Whittaker, 2004). A concept interwoven with norms is social identity, which looks at a person's perception of self that is derived from being a member of a group (Marchini & Macdonald, 2012). Research would suggest that using normative appeals to change behaviours depends on the strength of a person's identity as a group member.

Perception

Perception is a widely used term in conservation to refer to 'the way an individual observes, understands, interprets and evaluates a referent object, action, experience, individual, policy or outcome' (Bennett et al., 2017). One specific type of perception has received increasing attention in the human-wildlife conflict literature: perception of benefit and cost/risk associated with wildlife. According to the hazard acceptance model (see below), perception of benefit and perception of cost/risk are the most direct determinants of tolerance to wildlife. Risk perception is understood as an intuitive judgement, not a technical assessment, of the threat an object or activity may pose, reflecting the degree to which individuals think or feel that they are, or may be, exposed to some hazard (Gore et al., 2006; Zajac et al., 2012).

Tolerance

In the human-wildlife conflict literature, tolerance has been defined as passive acceptance of a wildlife population (Bruskotter & Fulton, 2012). Human tolerance for wildlife will determine the distributions and densities of species, highlighting the need for understanding the psychological mechanisms that promote or inhibit tolerance. Tolerance can take both attitudinal forms (e.g. attitudes toward a species, judgements concerning the acceptability of a species) and behavioural forms (e.g. overt illegal killing, political protests) (Brenner & Metcalf, 2020; Bruskotter & Wilson, 2014). It has been used as a means of evaluating the effectiveness of policies or interventions designed to promote more positive attitudes (Slagle & Bruskotter, 2019).

Trust

Trust is an abstract and context-dependent concept, but a fundamental aspect of social relationships whereby people accept vulnerability based upon positive expectations of the intentions or behaviours of others (Young et al., 2016). It serves as a decision-making shortcut, where if someone trusts the managing agency, they will both believe the information being provided and act in accordance with relevant recommendations. In the context of wildlife conservation, hazard-acceptance theory (see below) would predict that greater trust in wildlife management agencies leads to lower perceived risks and higher perceived benefits associated with the species, which in turn leads to greater acceptance of the hazard (i.e. species or population) (Bruskotter & Wilson, 2014).

Value

A value is a broad, enduring goal that serves as a guiding principle in the life of a person or social group (Schwartz, 1992). Social justice and equality, power and achievement, and freedom are examples of values. Recent conceptualisation suggests that values are deeply embedded in culture, and integrated in verbal and nonverbal symbols, communication patterns, social institutions and the ways people structure and relate to their natural and social surroundings (Manfredo et al., 2017). As values are abstract concepts, Fulton et al. (1996) proposed the concept of wildlife value orientations (WVOs) to provide contextual meaning to those values (Teel & Manfredo, 2010). WVOs reflect broad cultural ideologies that play an important role in shaping individuals' wildlife-related behaviours and attitudes, particularly regarding issues relating to the treatment of wildlife (Manfredo et al., 2009). The two predominant WVOs are 'domination' (previously also labelled utilitarianism and materialism) and 'mutualism', and research shows that modernisation is creating a transition to more mutualism, and hence, a greater tolerance for human-wildlife conflict (Manfredo et al., 2020).

How to understand and predict tolerance and behaviour

From a conservation or human-wildlife conflict management perspective, it is important to understand that the above key concepts are interrelated, and that can help in understanding the context of the situation, and the reasons people might tolerate or behave in a certain way. As mentioned above, we cannot focus only on attitudes or knowledge alone, because tolerance for wildlife is determined by a number of factors and might not influence or change behaviour. To achieve conservation goals, it is also important to assess, measure and change the actual behaviour itself. It is only through their actions that people affect – directly (e.g. killing) and indirectly (e.g. voting and lobbying) – their interactions with wildlife.

Predicting the interplay of these factors is of particular interest to human-wildlife conflict social science researchers, and in the past decade the human-wildlife conflict literature has placed much emphasis on building theoretical predictive models. Tolerance to wildlife, for example, is directly caused by the balance between perceptions of cost and benefit. Both cost and benefit can be tangible (e.g. monetary loss, income) and intangible (e.g. fear, hatred, well-being). As for behaviour towards wildlife, attitudes and perceived social norms towards the behaviour have received particular attention as key immediate determinants.

The following are examples of conceptual frameworks used in human-wildlife conflict studies carried out by social scientists. These theories and models are intended to explain how some of the

psychological concepts above relate to each other and, ultimately, how they can be used to predict tolerance and behaviour toward wildlife (see Figure 4a–d).

Wildlife tolerance model

The wildlife tolerance model (Figure 4a) identifies key factors driving tolerance towards animals, with an emphasis on tangible and intangible benefits and costs. Kansky et al. (2016) proposed the model and tested it using a case study of urban baboons. 60% of tolerance towards baboons was explained by perceptions of costs and benefits. Intangible costs and benefits contributed equally to explaining tolerance, but tangible costs had no significant effect.

Hazard acceptance model

Hazard acceptance models are drawn from the literature on judgement and decision making under uncertainty, and were adapted for wildlife by Bruskotter and Wilson (2014) (Figure 4b). Tolerance (or acceptance) is directly affected by perceptions of risk and benefit associated with that species, and those perceptions of risk and benefit are, in turn, a function of perceived control over the hazard, trust in the management agency and affect (e.g. feeling, emotion) for the species. Zajac et al. (2012), for example, found that risk and benefit perceptions explained nearly 70% of the variability in the preferred population size of black bears in Ohio.

Cognitive hierarchy theory

The cognitive approach emphasises attitude and value theories (Fulton et al., 1996; Vaske & Donnelly, 1999). These theories propose that human thought is arranged into a hierarchy of cognitions. This approach explores values, values orientations (WVO), attitudes and norms in an effort to understand how these concepts influence behaviour. These elements build upon one another in what has been described as an inverted pyramid (Figure 4c). For example, Keener-Eck et al. (2020) found that attitudes towards timber rattlesnakes varied by WVO type, with pluralists exhibiting the most favourable attitudes and traditionalists exhibiting the most adverse attitudes towards the species.

Theory of planned behaviour

The theory of planned behaviour, or TPB (Icek Ajzen, 1991), proposes that human behaviours are governed not only by personal attitudes, but also by social pressures and perceived control over one's own behaviour (Figure 4d). According to the TPB, the most proximal determinant of a person's behaviour is their intention to engage in that behaviour. As an example, Perry et al. (2020) used the TPB to explore the social and psychological backdrop to livestock management practices in three different sites in Kenya. They found that norms, control beliefs and attitudes differed among sites, and these differences partially explained patterns associated with conflict (i.e. variation in livestock management behaviour).



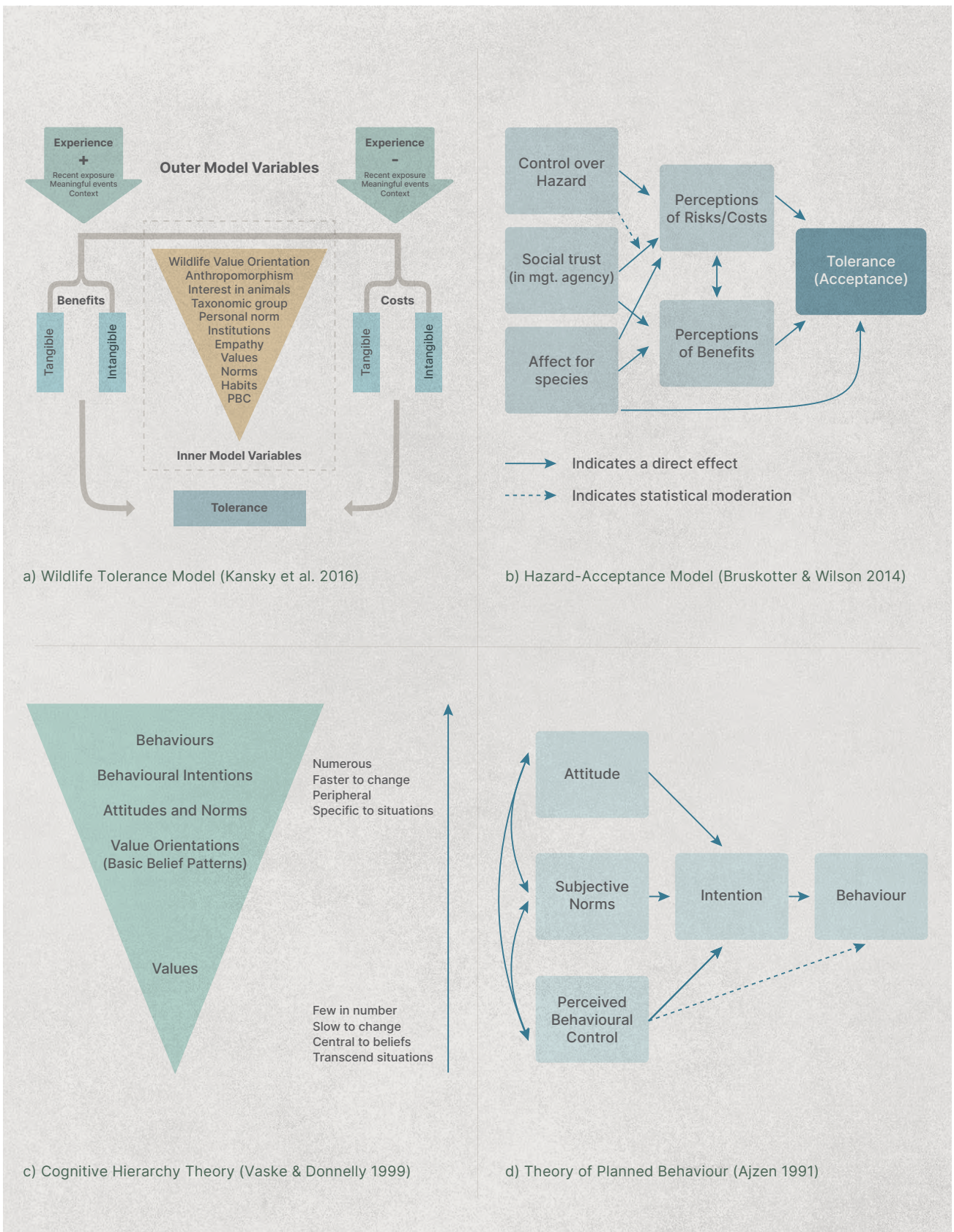


Figure 4 (a–d). Four key conceptual frameworks for understanding social psychology concepts relevant to human-wildlife conflict (Source: From Ajzen (1991); Bruskotter & Wilson, 2014; Kansky et al., 2016; Vaske & Donnelly, 1999)

Conclusion

Given so many different concepts and conceptual frameworks, which ones should be used? There are two fundamental ways to choose the right psychological concepts to be addressed in a particular human-wildlife conflict situation: deductive and inductive (see Chapter 19, Social science research). The deductive way has theory (e.g. the above models) as its starting point. For example, if the goal is to understand and increase tolerance, then the hazard acceptance model suggests that perceptions of risks/costs and perceptions of benefits should be assessed. The inductive way, conversely, starts from empirical observations. Exploratory, qualitative research on the causes of the behaviour of killing a predator, for instance, may reveal that fear is a relevant factor and therefore the one to be assessed and changed. Most socio-psychological research on human-wildlife conflict involves both inductive and deductive reasoning processes at some stage in the project.





Culture and wildlife

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Culture influences how people respond to or interact with wildlife, and how they respond to and manage conflicts. Culture is a set of principles, habits and symbols that are learnt and shared; it unites groups of people and influences their worldview and behaviour. Culture is also symbolic, whereby people have a shared understanding of symbolic meaning within their group or society. Culture may differ markedly within nations, regions and even local communities (Agrawal & Gibson, 1999) and can change over time. As outlined in Chapter 10 (How histories shape interactions), local cultures and environmental relationships are not static and do not exist in isolation; they are influenced by local and global developments, past and present, and this needs to be taken into consideration when examining or working with human-wildlife conflict.

Understanding culture enhances understanding of human-wildlife conflict

Neither biodiversity conservation nor human-wildlife conflict are solely about wildlife. Humans are central to both, so understanding human relationships with other species, landscapes and institutions is key to developing effective conservation initiatives and responses to human-wildlife conflict scenarios. The structure and role of these relationships, in turn, are grounded in people's knowledge and beliefs, and how these intersect with societal structures, rules and expectations. Consequently, the ways in which people understand or represent their relationships with wildlife, including human-wildlife conflict, reflect cultural concepts that may be very different from how others with different cultural backgrounds would interpret them. For example, the Trio people of southern Suriname have not traditionally viewed animals foraging on their crops as inherently problematic, but part of a reciprocal relationship, linked to ideas of animal personhood and hunting (Brightman, 2017). For observers 'looking in', wildlife foraging on crops could be interpreted as human-wildlife conflict; for the Trio, it is part of a reciprocal relationship with those animals.

People living alongside wildlife sometimes refer to those animals' behaviour using terms that suggest their actions are belligerent and intentional, while others might not (Dhee et al., 2019). The language of conflict may reflect the terminology they hear from wildlife officers, researchers, conservationists and the media (Hathaway et al., 2017) rather than necessarily reflecting the local understanding of

these interactions. In these circumstances, employing a conflict framework to examine human-wildlife relations is not always accurate or appropriate, and could perhaps result in new conflicts (Hill, 2017b).

Interdisciplinary work on human-wildlife interactions illustrates very clearly:

- why human-animal relationships cannot be understood solely in terms of physical interactions between people and animals, or how people exploit wildlife as a resource;
- that humans invest symbolic meaning in animals; and
- how the ways in which people perceive animals and understand the human-animal relationship shapes their interpretation and expectations of animals and those animals' behaviour.

Symbols and beliefs are often central to human-wildlife conflicts, which are as much about meanings as they are about resources or lack of awareness. To understand the symbolic nature of wildlife and local value or belief systems demands a familiarity with cultural constructs. Some of these factors are illustrated in the case study in Box 5.

Researchers working on human-wildlife conflicts increasingly find that species are persecuted, feared, venerated or protected for cultural and spiritual reasons. For example, the endangered aye-aye is, for various ethnic groups in Madagascar, a portent of sickness and death, and killed on sight if found in the vicinity of a village. Yet this fear of the aye-aye is not ubiquitous throughout the animal's range, with some groups treating the animal very differently, and even affording it funeral rites when a dead aye-aye is found (Randimbiharirinirina et al., 2021).

Box 5

Case study based on Sousa et al. (2017)

Cantanhez National Park lies in southwestern Guinea-Bissau. It comprises mangrove, forest, savannah and agricultural lands, and is home to people from several different ethnic groups and a variety of protected wildlife species, including the endangered chimpanzee. Various studies at this site suggest that human-chimpanzee interactions are notably more peaceful and less confrontational than are reported for many other sites where humans and chimpanzees are sympatric.

The results of a 13-month ethnographic study identify two main narratives used to describe local people's encounters with chimpanzees. One characterises 'bush chimpanzee' or 'clean chimpanzee' involved in attacks as a terrifying but fundamentally predictable animal, which only attacks on provocation. A second narrative focuses on chimpanzee attacks that are considered unprovoked. These events are identified as attacks by 'unclean' or shape-shifted chimpanzees, i.e. 'people who shape-shift into chimpanzees to commit crimes' (Sousa et al., 2017). Where 'unclean' events are invoked, they are symbolic of, and understood as, conflicts between relatives, and not necessarily events requiring responses from management authorities, researchers or other external agents.

Cultures of hunting and bravery may pose a threat to large carnivores, for example among ranchers in Brazil, or may arguably protect them, as among some Maasai in Kenya. The Lion Guardians program has built on traditional respect for lions to encourage Maasai guardianship of the species (Dolrenry et al., 2016; Hazzah et al., 2014). Many of the hunting cultures in south-eastern Europe have fostered sustainable harvest traditions around brown bears. However, cultures are dynamic and as social, economic and religious ideas and expectations change across the globe, so do people's relationships with wildlife, thereby changing their willingness and, sometimes, capacity to tolerate their wildlife neighbours.

Conflict studies point to the importance of taking cultural practices into account when tackling identity conflicts, which often underpin apparently unsolvable conflicts (see Chapter 1, Levels of conflict over wildlife). An example of identity conflict in human-wildlife conflict concerns conflicts over wolves in Norway (Skogen et al., 2017). Some rural Norwegians resent conservation measures that, in their view, have been informed by ignorance and a lack of respect for rural lifestyles shown by urban animal lovers. For rural residents wolves are symbolic of a decline in rural traditions and a lack of respect for rural lives. This is because they associate wolf presence with their reduced control over rural environments and rural production systems. In contrast, for some middle-class urbanites wolves are symbolic of 'authentic, wild nature' and signify a time before people managed the landscape. For both groups (rural and urban Norwegians) wolves are viewed as symbols of changing social and ecological conditions, which must be understood against the backdrop of rural-urban migration, globalisation and wider socio-economic threats to rural working-class identity. However, the discourse is complex, as many rural people also favour wolf conservation, underlining the challenge of situations in which there are multiple cultural identities.

Conservation conflicts can arise whenever stakeholder groups with different worldviews need to negotiate or agree on policies and practices concerning wildlife (Redpath et al., 2015). This can be particularly apparent where:

- worldviews through which human-wildlife interactions are conceptualised and governed do not coincide across the various stakeholders – for example, some hold relational rather than dualistic views of nature and culture;
- anthropocentric conceptual frameworks are employed (e.g. ecosystems services); and/or
- some local people identify with specific places or landscapes, but others do not, for example when newcomers immigrate into an area they have no prior relations with or cultural beliefs about.

It is important to note that improving livelihoods is not the same thing as improving well-being; the latter also includes a sense of purpose, autonomy, identity and social cohesion, many elements of which derive from the fulfilment of cultural values. Therefore, recognising the rights and responsibilities, as well as the diversity of identities, knowledge systems, values and institutions of local actors, and including them in transparent and accountable decision making, is as important as the distribution of benefits and mitigation of costs of living with wildlife, however those might be understood or experienced.

Resistance to engaging with cultures

Previously there has been resistance to engaging with the values of non-Western cultures within conservation science, but this is shifting. This resistance is partly because it can be difficult or uncomfortable for people to a) accept that there are multiple ways of conceptualising, understanding or relating to nature; and/or b) consider the ethics of trying to change the cultures of others. Indeed, conservationists need to reflect on their own values, knowledge systems and ways of understanding and valuing nature, that is, their own positionality and cultural relativism when working with human-wildlife conflicts (see Chapter 2, The role of the conservationist). More generally, there is clearly a need for many sectors of human society to adopt new behaviour and practices that, in effect, constitute a major cultural shift in production and consumption worldwide (see Chapter 22, Political ecology of wildlife).

There is also some scepticism surrounding the idea that Indigenous peoples and indigenous knowledge always provide superior practices and knowledge about the natural world or are relevant in a fast-changing world (see Chapter 14 Traditional ecological knowledge). Biodiversity can benefit from culturally mediated rules about natural resource extraction practices, taboos on killing certain 'magical' or 'totem' species, locally managed rules about extraction practices (where, when and which resources people can extract) or protection of sacred landscapes. However, other cultural practices and perspectives may be unsustainable or directly hostile to certain species groups. Therefore, it is not straightforward to include and engage with other ways of thinking about wildlife or how different human groups relate to particular species (see Chapter 17, Resolving conflicts between people); however, this does not mean it is not important to do so.

Exploring and engaging with other cultures – looking beyond one's own worldview

Cultures are dynamic and are contested, and negotiated between individuals, groups and social institutions over time. They develop in response to events, cycles and shifts in human and natural environments. This makes it hard to generalise as natural scientists are trained to do, and rather than devising generic 'best practices' requires context-specific research and action. Fortunately, there is a growing and dynamic body of research, and an emerging evidence base, regarding the value and challenges of incorporating culture into conservation work.

Identifying and incorporating cultural perspectives in human-wildlife conflict

Ethnography is a research approach used by various disciplines, including cultural geography and anthropology, to understand different peoples within their particular social and cultural contexts. Traditionally it requires lengthy periods of fieldwork to gather information about other people's lives through participating in their daily activities, listening, watching and asking questions. Participant observation is often combined with other means of gathering data, both qualitative and quantitative. However, it is the participation in the day-to-day activities of the focal group – from farming and food preparation to committee meetings etc. – that is fundamental to this kind of data collection. More

rapid approaches have developed in recent years to address some of the time challenges of traditional ethnography within modern business, health care and international development particularly (Issacs, 2013; Vindrola-Padros, 2021).

Ethnographic work, like other qualitative data-collection methods used in the social sciences (see Chapter 19 Social science research) involves identifying themes as they emerge from the data, rather than constraining investigations to pre-formulated hypotheses about what the important variables and causal links and relationships are. This exploratory research approach, while labour intensive and potentially time consuming, can generate much more finely nuanced understanding of different cultural perspectives, particularly with regards to human-wildlife relationships and conflicts about wildlife. Understanding cultural perspectives and narratives around human-wildlife conflict is key to strengthening governance processes (see Chapter 12, Governing human-wildlife conflicts) and effective routes to working with these conflicts.

Key questions

- How, and under what circumstances, have cultural meanings been applied to explain positive or negative human-wildlife interactions, and how have these developed or changed over time?
- How have cultural beliefs and practices influenced interpretations of the character, properties and behaviour of particular species, and interactions with them?
- What are the key differences and misunderstandings between the cultural frameworks of the human parties involved in human wildlife conflicts?
- How do cultural norms (of locals, and conservationists) operate to support or undermine human-wildlife coexistence?
- How is cultural or environmental change impacting on local peoples' relations with wildlife?
- To what degree do broader cultural shifts influence conservation strategies and efforts – for example, the shift in public opinion against trophy hunting and the likely impact on NGOs funded by revenues from such activities?



Conclusion

To reduce the risk of either exacerbating existing human-wildlife conflicts or provoking the development of new ones, it is crucial to be familiar with, and respectful of, local cultural perspectives and sensitivities. Accordingly, it is recommended that detailed background research on local cultural contexts is prioritised, including learning from, and collaborating with, a wide variety of local community members, ranging in gender, age and perspectives, from the initial stages of engagement and throughout any investigation or intervention. Alongside this, reading of relevant social science literature, and particularly that from anthropology, cultural geography and political ecology, will be helpful. Taking on a more pluralistic conceptualisation of biodiversity, where the sociocultural and the ecological are acknowledged to feed into each other (i.e. socionatural or biocultural), may help develop richer and more inclusive approaches to understanding human-wildlife interactions, and designing appropriate management responses and policy interventions.





How histories shape interactions

Simon Pooley, Catherine Hill & John Linnell

Why consider history?

Every conservation context and even the most straightforward dispute-level human-wildlife conflict has a history, in that interactions between wildlife and humans have occurred over time. For many conflicts, this is further complicated by a history of (perceived) failures of individuals or management authorities to address their causes, resulting in human-human conflicts over what should be done to mitigate these (see Chapter 1, Levels of conflict over wildlife). Similarly, communities might have long-standing grievances with the government or other groups on a range of other non-conservation issues that might exacerbate human-wildlife conflicts and hamper efforts to collaborate on finding socially acceptable solutions (see Chapter 12, Governing human-wildlife conflicts).

Without understanding such histories of interactions, it is not possible to properly address conflicts in the present, because past interactions between wildlife and humans, and between different human groups, shape how those involved will respond to new management actions. Perfectly rational and beneficial management interventions may fail because some stakeholders feel that past injustices (even those not related to conservation) must first be addressed. Histories of failed interventions, or bad relationships with conservation authorities, may lead locals to distrust project managers and refuse to participate in project implementation.

In addition to histories of interactions in specific conflict scenarios, it is important to consider broader historical influences on a given human-wildlife conflict, such as how:

- the dynamic nature of conservation goals and policies influences conceptions of conflict and coexistence – especially as wildlife conservation is drawn into the mainstream of global environmental and sustainable development policy (Conover, 2001);
- institutional and political histories, and the histories of the sciences that inform them, shape what conservation organisations prioritise and do in the present (Adams, 2004);
- the histories of key individuals, communities and other groups are likely to shape their attitudes to other actors and influence the success of interventions (Dowie, 2009).

For example, impacts of past conservation interventions, such as displacing locals from their lands, preventing access to natural resources, or criminalising traditional practices, have been shown to influence which proposed interventions will be supported or opposed by locals on the ground. Historical studies reveal how cultures and practices of resource management, and attitudes to conservation, are shaped by historical global processes and institutions (e.g. colonialism, development, ecotourism, conservation NGOs), as well as by conservation interventions in specific places, by particular individuals and organisations (Brockington, 2002; Dowie, 2009; Murphy, 2009; Randeria, 2007).

Hostility to conservation may originate in memories of tense encounters between locals and conservationists, rather than locals' indifference to their environment (Brockington, 2002). Wild animals may be killed not because they are disliked or feared, but because locals resent having been excluded from a protected area (Holmes, 2007) or dislike the social process behind the conservation agenda.

Environmental changes, such as droughts and changing river courses, alongside human interventions, including dam building, game farming or fencing protected areas, can shift local landscapes from situations where coexistence was feasible (IUCN SSC HWCTF, 2022) into situations of intense competition for space and resources between humans and wildlife, where conflicts proliferate (Fox, 2018; McGregor, 2005).

In short, human-wildlife conflict scenarios are seldom the simple outcome of current ecological and social circumstances. Past events shape current relationships and interactions. Therefore, studying the environmental histories (Grove & Damodaran, 2011) of areas experiencing human-wildlife conflict as part of the process of designing conservation interventions can improve the chances of successful implementation.

An introduction to historical research

History as a discipline focuses on the interpretation of past events and their causes. The past is only accessible indirectly and partially. Therefore, to answer particular historical questions, it is first necessary to select what kinds of sources are required. These must be located, critically analysed, compared and triangulated.

A study of a human-wildlife conflict situation could benefit from the location, evaluation and comparison of the following kinds of sources:

1. Archival (primary literary) sources – for example, historical management reports and policy documents, socio-economic and ecological statistical data, court records, diaries, newspapers, social media platforms and email records (since the early 2000s).
2. Non-textual sources – for example, material culture like artefacts and structures, as well as non-literary sources such as documentary films, maps, photographs, music and artworks.
3. Secondary sources: qualitative or quantitative studies from a range of disciplines – for example, anthropology, archaeology, climatology, geography, historical ecology, history, linguistics and population ecology – on relevant role players (humans and wildlife) and aspects of human-wildlife and human-human relations in an ecological context in the area of concern.

4. Oral histories: interviews with key informants about past events and interactions, particularly relating to perceptions and dimensions of conflict not recorded in written sources or studies.

Synthesising and interpreting such sources facilitates an understanding of historical contexts and the creation of coherent narratives with clear timelines, explaining broad changes in social and ecological systems over time. This enables informed interpretations of specific events (Claus & Marriott, 2012; Jordanova, 2000; Pooley, 2018). Naturally, the biases of the historical researcher, authors of secondary sources, and creators of primary and oral sources must be considered. The diverse perspectives on shared histories held by key role-players should also be carefully considered.

Box 6

Case study: the Philippine crocodile

In the early 2000s, the Philippine crocodile was critically endangered, with the received wisdom among conservationists and the Philippine government being that Filipinos revile and fear crocodiles, and preserving this small (< 3 m) crocodile in the wild was impossible. Negative cultural representations of crocodiles in mainstream Philippine media (as symbols of corruption and greed) were offered as evidence by policymakers (and no doubt influenced the general public).

Dutch and Filipino anthropologists and biologists working in areas where crocodiles persisted in the wild found that the situation is more complex, combining fear and reverence. There is a deep and enduring tradition of positive cultural beliefs about Philippine crocodiles. Misrepresentations of what ‘the locals think’ had sidelined Indigenous peoples’ views from conservation policy decisions, based on an ahistorical assessment of mass media and the perceptions of people who no longer coexist with crocodiles.

Highlighting historical cultural values and promoting pride in crocodiles has enabled the Mabuwaya Foundation to mobilise local support for conservation, enabling the (still tenuous) survival of the Philippine crocodile in the wild (Cureg et al., 2016; van der Ploeg et al., 2011) Van der Ploeg, pers. comm., 2021).

A schematic approach to investigating human-wildlife conflict histories

Historians are professionals requiring specialist training, with no single methodological approach. It is best to work with a trained historian on human-wildlife conflict histories, but as that is not always possible. This section provides a basic outline of how the history of such a conflict could be approached.

Basic questions to ask

1. How have the historical interactions among locals, conservationists and other stakeholders, and wildlife, shaped contemporary relations between them? Explore any potential or reported changes and how these changes may impact communities.
2. What are the historical cultural beliefs regarding the various species of interest/concern? Ask questions and listen for how and where wildlife species are referenced in oral histories. Gently explore the intersection between culture (Chapter 9, Culture and wildlife), history and wildlife values.
3. At what temporal scales have significant interactions occurred? These can be annual (events like natural disasters or confrontations), decadal (demographic changes or economic trends) or generational (establishment of protected areas and loss of access to resources).
4. What are the relevant spatial scales – for example, local (negative impacts), regional (migrations, policies) and international (foreign NGOs, international conventions)?

Steps towards understanding the history of a given human-wildlife conflict

1. *Identify the effects of human-wildlife conflicts and interactions in a particular place.* Begin with quantifiable incidents and impacts using available sources, and expand to include perceptions of impacts.
2. *Define the area of concern using characteristics showing strong continuities over space and time.* Parameters may include factors such as typical habitats and landscapes, with distinctive land tenure and natural resource use practices, and social, economic and governance structures. Fast variables include population growth, land clearing, political or economic shifts and environmental trends. Also important are decisive, one-off or random events that have altered pre-existing states or trends.
3. *Discover how all relevant, extant agencies, communities and individuals (human and non-human) have interacted over a relevant time period, with a view to discovering how this may influence their current interactions and relationships.* This should include histories of regional conservation policies and management interventions. Do this by collating and synthesising information from sources (see ‘Historical research’ above), and considering factors outlined in the ‘Key dimensions’ section below.
4. *Focus back in on the specific human-wildlife conflict.* Start with the recent empirical and perceived impacts and conflicts, and work backwards in time and outwards in space, to test and establish firm causal linkages (Walters & Vayda, 2020).
5. *Synthesise the evidence and interpretations of it into a narrative explaining what shapes the current workings of the system.* Think about the human-wildlife conflict history, both in terms of how the general historical context has shaped the particular present conflict (3), and also, contrariwise, to test causal links by tracing particular current events back to past events and broader contexts (4).

Key dimensions to consider for human-wildlife conflict histories

Nature of the impacts

What kinds and levels of impact have occurred? Beneath an apparent dispute over the direct impacts of crocodile attacks, may be underlying conflicts over land use (farming or recreation versus conservation), livestock losses and safety fears, and a history of unsatisfactory attempts to address these. Deeper still, conflicts may align with ethnic and political identities, or those associated with livelihoods like farming or fishing, associating human-wildlife conflict with broader social conflicts. These underlying dimensions have histories: addressing current disputes alone will not transform conflicts (Pooley, 2013; Zimmermann et al., 2020).

What are the actual causes of conflicts?

What external factors not directly related to conservation (independent variables) might be shaping what for conservationists are human-wildlife conflict scenarios? Economic hardship, political instability or drought may have driven immigration into areas of conservation importance, destabilising existing attitudes and approaches to living with wildlife. Equally, they may have driven locals to unsustainable resource exploitation. Here, conflicts impacting on wildlife may have little to do with conservation actions or local attitudes to conservation. Furthermore, conservation interventions, like building electric fences or encouraging alternative livelihoods, may have been repurposed to other ends (Evans & Adams, 2016). Parties to conflicts involving wildlife can mobilise public concern over harmful wildlife impacts for their own (unrelated) ends (Holmes, 2007; Pooley, 2013).

Individuals matter

Influential individuals shape decision making and the opinions of communities and organisations. They, and everyone touched by a human-wildlife interaction or conflict, have an autobiography of influences, memories, experiences, hopes and fears which shape their behaviour. Oral histories, with ethnography and other qualitative research methods, are useful for exploring these dimensions (see Chapter 19 Social science research). Individual life histories shape distinctive behaviour in wild animals too, especially in the case of social animals (see Chapter 7, Animal behaviour).

Cultures and traditions

Different communities interpret shared pasts in different ways, and understanding such multiple histories informs our understanding of their divergent visions for the future (van Dooren, 2019). Transforming conflicts requires that we understand these divergences. In some places, locals may retain traditions of coexisting with wildlife not recognised by outsiders, but influential in the present.

Cultures emerge from the interactions of humans with the natural and social worlds over time (see Chapter 9, Culture and wildlife), and they change over time (Marvin, 2012; Oommen, 2021; Pooley, 2016). In East Africa, for example, cultural beliefs encourage the tolerance of some dangerous predators such as lions. However, their replacement by evangelical Christian beliefs is resulting in growing intolerance (Dickman et al., 2014). In the UK, conflicts over gamebirds and raptors are intertwined with histories of land ownership, and cultural and economic justifications for favouring

grouse and killing birds of prey. Difficult histories of disputes between stakeholders make constructive dialogue challenging (Amar & Redpath, 2015). In East Timor, some crocodile attacks seen as a management problem by the authorities are not seen as problematic by locals, for cultural reasons – but a recent influx of crocodiles from elsewhere is resulting in some partial exceptions to this (Brackhane et al., 2019).

For local people, places and landscapes are repositories of personal and intergenerational memory and identity, and conservationists are advised to investigate the cultural significance given to particular places and their wildlife before intervening (Schama, 1996; Shetler, 2007). These associations have histories: they change, are disputed and may differ from those of conservationists (Cronon, 1995; Oommen, 2021; Pooley, 2014). Recovering and understanding such cultural histories, where written records are few, is challenging but possible (Shetler, 2007). Furthermore, the use of oral histories and conversations with local community members is valuable for understanding cultural histories.

Conservation culture

Cultures of conservation and environmentalism evolve over time (Adams, 2004; Anderson & Grove, 1987; Guha, 2014; Lewis, 2004). Consider the cultural histories of controversial activities like hunting and use of wildlife (MacKenzie, 1988; Ritvo, 1987; Somerville, 2016). Historical legacies of colonial interventions in Africa, complicated by the priorities of western supporters of conservation NGOs, still shape acrimonious debates over the ivory trade. For example, when Africans assert their right to exploit their wildlife sustainably, through ivory sales or trophy hunting, the colonial past and its legacies still influence the debates (Mkono, 2019). Historical investigations contribute an awareness of these long-running, dynamic factors influencing current conservation initiatives, debates and conflicts. They provide clues as to why some current conflicts appear to be more intense and intractable than the actual disputes in question would seem to justify.

Conclusion

Historical studies provide essential context for understanding human-wildlife conflict situations. If we are to understand and address underlying dimensions of human-wildlife conflict – including acknowledging past negative conservation interactions and recovering forgotten or neglected histories of local peoples and human-wildlife interactions – it is imperative that we learn their histories.

Recovering, acknowledging and learning from diverse histories of valuing, utilising and conserving nature will strengthen efforts to transform human-wildlife conflicts into coexistence in the future.



Livelihoods, poverty and well-being

Dilys Roe, Gladman Thondhlana, Catherine Hill & Sugoto Roy

Negative interactions with wildlife can have significant impacts on the livelihoods of local people, which can exacerbate poverty and undermine well-being (see Chapter 5, Assessing the impacts of conflict). The most obvious impacts are direct material costs, but there are also many indirect non-material costs, and both can cause poverty or exacerbate existing levels of poverty and undermine human well-being. It is important for practitioners to understand the linkages between livelihoods, poverty and human well-being to develop practical interventions for addressing human-wildlife conflict and related impacts. But what do these terms mean, and how are they connected to human-wildlife conflict?

Livelihoods and human-wildlife conflict

A livelihood is the means by which a person makes their living and achieves their desired goals – from meeting basic needs to more aspirational goals. A livelihood is sustainable when it can ‘cope with and recover from stresses and shocks’, such as social, economic and political instability, and ‘maintain or enhance its capabilities and assets’ without negatively impacting the ability of future generations to sustain their own livelihoods (Chambers & Conway, 1992).

The sustainable livelihoods framework (Carney, 1998) is a useful tool for thinking through the underlying causal factors driving livelihood decisions and outcomes. The framework describes how the choices people make about the livelihood options they pursue depend on a mix of their assets (what they have) and capabilities (what they can do with what they have). The assets (sometimes called ‘capital’) that an individual or household controls, claims and/or accesses are the basic building blocks that form the household’s ability to sustain a living. These are often divided into five key categories: 1) natural assets, such as land, trees and water resources; 2) financial assets, such as income, savings and pensions; 3) social assets, such as family and friend networks, support groups and political linkages; 4) human assets, such as the level of education or skills that an individual holds or their level of health and fitness; and 5) physical assets, such as housing, infrastructure and machinery.

Capabilities are what people can do or be with their assets – for example, their ability to use wildlife on their land, cultivate healthy crops for subsistence purposes and cash income generation, or rear

livestock or build a house or livestock shelter. Translating household assets into livelihood outcomes (such as more income or a better standard of living) is influenced by varied social, economic, contextual and policy factors, which can constrain the activities that people undertake for their livelihoods. It is also influenced by the ‘vulnerability context’ in which people live – for example, their exposure to extreme weather events or to economic shocks, such as a collapse in the global tourism industry. Figure 5 summarises the framework and the processes that influence the determination of livelihood choices and outcomes.

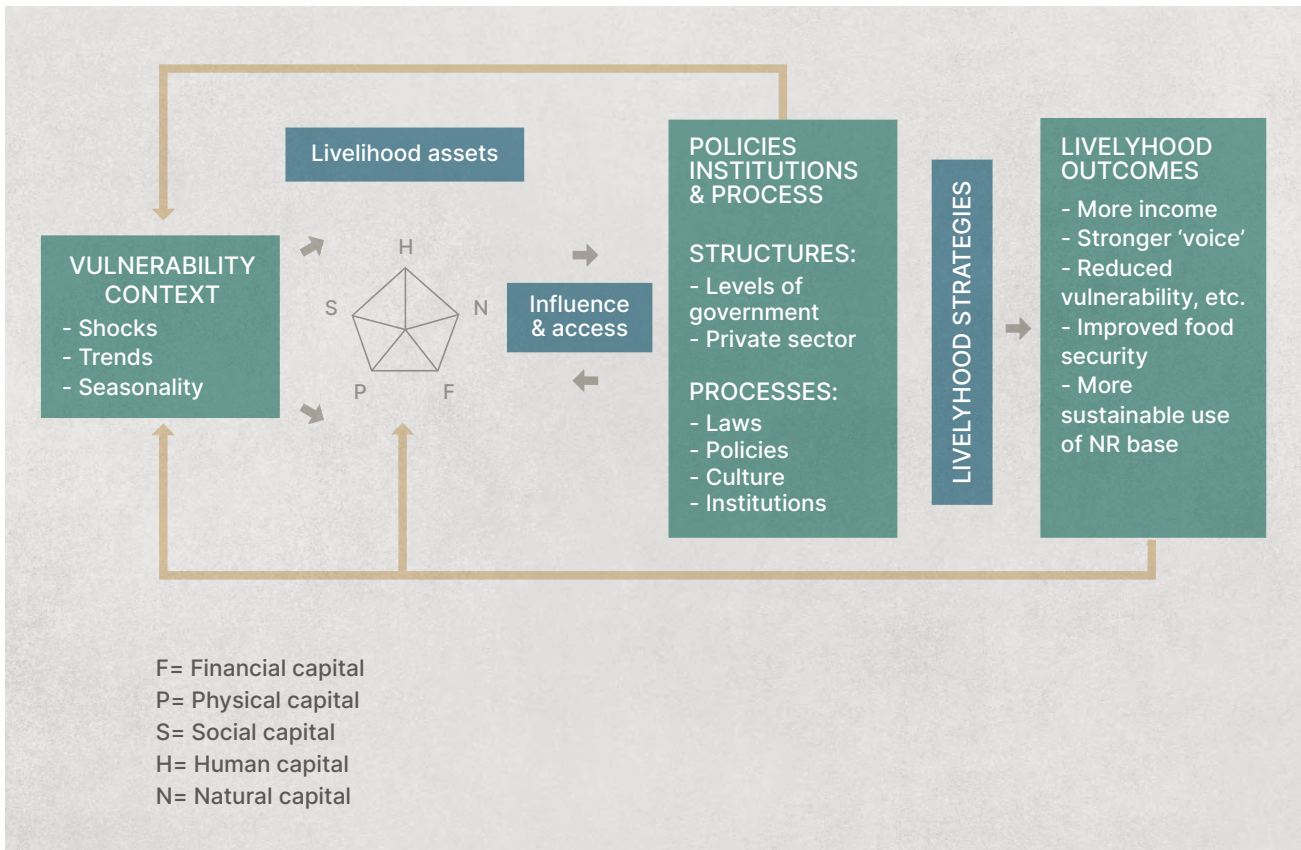


Figure 5. The sustainable livelihoods framework (Source: Carney (1998))

Human-wildlife conflict is often part of the vulnerability context of rural people, especially those living in close proximity to dangerous or destructive wildlife, either permanently or at particular times of the year (e.g. corresponding to migration patterns). The vulnerability context of people's livelihoods is itself often influenced by external factors beyond people's direct control, and is dependent on wider policies, institutions and processes. These affect the complex social, economic and political contexts within which people pursue their livelihood strategies. For example, in the context of human-wildlife conflict, policies, institutions and processes can affect who has rights to manage wildlife, what the rules are for dealing with problem animals, what the rules are for compensation and so on. Furthermore, bad governance of protected areas can result in livestock loss from predation or crop damage by elephants, which can constrain people's ability to sustain their livelihoods. The impacts of human-wildlife conflict on livelihoods can be measured using household surveys aimed at identifying people's livelihood sources, level of dependence and changes in livelihood contribution over time, which in turn provide essential information for action planning.

Poverty and human-wildlife conflict

Poverty is a term that means different things to different people. The simplest conception of poverty usually relates to some level of material wealth. For example, Target 1.1 of the Sustainable Development Goals (SDGs) defines extreme poverty as living on less than \$1.25/day (UN, 2022). However, poor people often do not define themselves in cash income terms – indeed, the concept of cash is completely meaningless for some Indigenous peoples and local communities (IPLCs) who live outside of the cash economy. In many cases, issues such as power and voice, opportunity and a healthy environment are valued more highly than money. It is now widely recognised that poverty is multidimensional. The United Nations Committee on Economic Social and Cultural Rights (2002) defines poverty as ‘a human condition characterised by the sustained or chronic deprivation of resources, capabilities, choices, security and power necessary for the enjoyment of an adequate standard of living and other civil, economic, political and social rights’. Put simply, poverty is a pronounced deprivation in well-being.

Human-wildlife conflict can have direct and indirect effects on local livelihoods. These effects can be much greater when it is the livelihoods of poor people that are under consideration. It is critical for those dealing with human-wildlife conflict to recognise that the asset base of poor households is generally more limited than that of non-poor households. This can reduce their livelihood options and their ability to cope with shocks. Therefore human-wildlife conflict can affect poorer people disproportionately because they already have lower resilience. For example, crop raiding or livestock loss may not affect well-off households in the same way they affect poor people because the former may have more assets or alternative income sources to fall back on. Thus, in seeking to address human-wildlife conflict, specific measures may be needed to prioritise the poorest people, recognising that the conflict may be a key factor in driving people into or exacerbating poverty.

Measuring the impact of human-wildlife conflict on poverty would thus mean first undertaking an assessment of who is and who is not poor in the affected area. Defining who is poor can be achieved in relation to a fixed poverty indicator – for example, a certain level of income. But in many rural communities – where often everyone is ‘poor’ by international standards – it is usually more appropriate to do this according to who is poor in relation to others in the community. So, for example, who has a tin roof and who does not, who has the most or least livestock. The indicators for defining who is and who is not poor will vary from context to context, but can often be locally defined simply by asking the community who is poor and who is not and finding out how they make that distinction – i.e. what indicators they use.

Measuring poverty in a multidimensional sense, for example by using the Multidimensional Poverty Index (MDPI) (OPHI, 2018), requires the use of monetary and non-monetary indicators, and involves gathering the opinions of local communities on their situation and establishing levels of deprivation or inequality in the distribution of services. This approach allows consideration of the subjective dimensions of poverty, including exclusion and inequality which can be combined with quantitative (monetary) indicators to provide a complete view of poverty.

Human well-being and human-wildlife conflict

Human well-being refers to the ability of people to live a life they value. The concept of well-being transcends meeting basic needs and includes other valued dimensions of life (see Box 7). Well-being is often a more useful concept to use in discussions with local people than poverty, not least because it is positive and focuses on what people can do rather than what they cannot. Many people do not like to be labelled as ‘poor’, finding it derogatory and demeaning. Figure 6 provides a framework for understanding human well-being, including indicators for measuring its different dimensions.

Box 7

Well-being

According to McGregor (2007) well-being arises from a combination of:

- what a person has – the assets and/or resources that a person can command, as per the sustainable livelihoods framework (i.e. *material well-being*)
- what a person can do or be with the resources that they have – for example, the power or influence they give them, the needs, goals and aspirations they are able to meet (*relational well-being*); and
- how a person feels about what they have and what they can do – the meaning and personal value that they give to the goals they achieve and the processes in which they engage (*subjective well-being*).



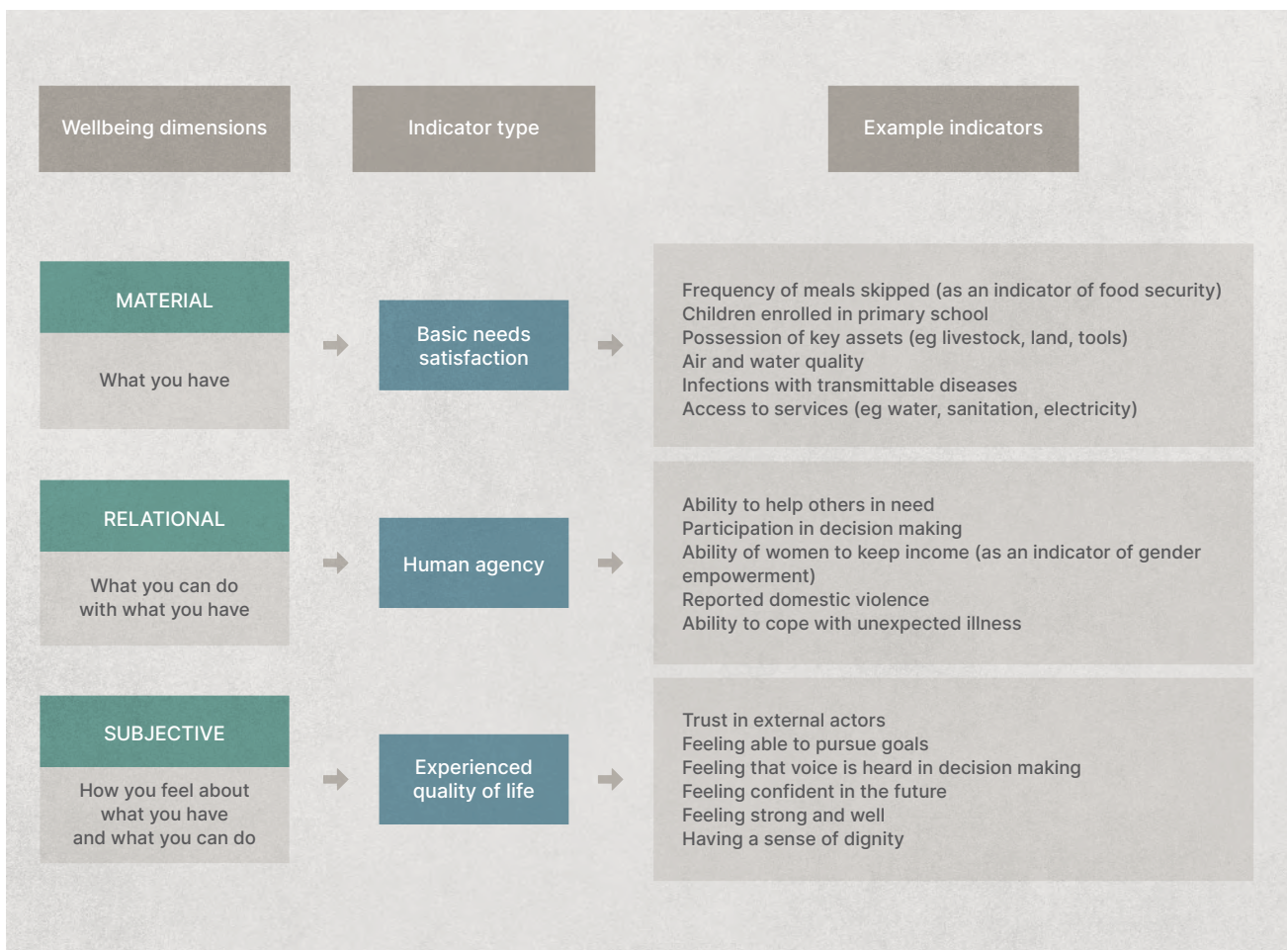


Figure 6. A framework for understanding well-being (Source: Woodhouse et al. (2016))

Measuring the impacts of human-wildlife conflict on human wellbeing requires the use of both quantitative and qualitative methods. Measuring the material dimensions of human wellbeing is generally straightforward. For example, the economic impacts of livestock predation or crop-raiding can be measured by estimating the goods and services lost from livestock and crop losses, and compensation schemes might be used to address such losses but reflect only the present worth. However, the relational and subjective impacts of human-wildlife conflict on human well-being can be difficult to measure, and may be best assessed through inductive qualitative research in affected communities (see Chapter 19, Social science research). For example, subjective scales can be used to express relational losses related to human-wildlife conflicts such as the long-term functions of livestock (e.g. savings, future value, genetic qualities and history of a livestock herd, the lost insurance role of livestock, trauma, esteem from livestock accumulation, and other more cultural functions).

The views of people affected by human-wildlife conflict can also be assessed using indicators such as trust, feeling that their voice is heard and feeling of a sense of dignity. Qualitative approaches can capture people's historical, political and cultural contexts, which can inform our understanding of narratives, stories and lived experiences related to the impacts of human-wildlife conflict on livelihoods, poverty and human well-being. These stories, feelings, experiences and narratives of local people can allow an in-depth understanding of human-wildlife conflict-livelihood linkages, which can be used to inform socially relevant solutions.

Conclusion

Human-wildlife conflict can impact local people in varied and complex ways. To understand these impacts it is critical to understand how people's livelihoods are constructed, what determines their livelihood options, and how human-wildlife conflict then affects these options. To ensure human wildlife conflict does not undermine human well-being (and to ensure effective mitigation when it does), as well as ensuring that it does not disproportionately affect the poorest members of the community, it is important to understand the links between livelihoods, poverty and well-being. Quite often these simply involve looking at the same problem from different angles. Initiatives to enhance, stabilise and diversify livelihoods, enhance well-being and prevent the exacerbation of poverty are likely to be a critical part of any human-wildlife conflict response. Furthermore, failing to understand these issues can lead to the failure of such responses.





Governing human-wildlife conflicts

Camilla Sandström & Elaine Lan Yin Hsiao

Why does governance matter?

Every day, at multiple societal levels, from global to local, decisions are made that have an impact upon interactions – positive or negative – between humans and wildlife (Emerson & Nabatchi, 2015; Graham et al., 2003). The term governance captures how those decisions are made, who has the power to make or influence them, and how, and with what means, they are implemented. Governance may contribute to or create human-wildlife conflicts, but it may also, through purposeful (re-) design, help resolve, manage or transform conflicts. It is thus critical for the design and implementation of effective human-wildlife conflict mitigation strategies to increase the knowledge of how human-wildlife interactions are governed in practice.

What is governance?

The aim of governance is to steer or guide individual behaviours or collective action in pursuance of public or private objectives. To be able to steer individual behaviour and collective action, three basic elements are needed: a) institutions (rules and norms); b) structures (i.e. formal, and informal bodies with governance capacity); and c) processes to realise the functions and performance of governance (Bennett & Satterfield, 2018; Lange et al., 2013). Furthermore, an important conceptual distinction needs to be made between governance and management: governance can be understood as the regulatory processes and mechanisms that influence how society coordinates in order to realise collective goals (Ostrom, 2005); management refers to resources, plans and actions that result from the functioning of governance (Decker et al., 2012).

Governance structures and processes can be controlled from the top by governments or from the bottom by local communities. The control can also be shared between the state and local communities in co-governance arrangements. Governance can thus be public, private or a mix thereof (Lange et al., 2013). Governance also occurs at multiple levels, from local to global (Figure 7). In particular at the local level, there may also exist formal governance structures in parallel with traditional systems of governance.

To be able to assess the governance of human-wildlife interactions it is necessary to take these multiple levels of governance into consideration and identify how human-wildlife conflict at the local level may be enabled or hindered by rules and regulations set at regional, national or even global levels, and vice versa (Ostrom, 2005). For example, when countries ratify multilateral environmental agreements aimed at protecting wildlife, these conventions need to be translated and embedded in existing political and administrative systems. This translation process can open up or close down the space for agency for managers and citizens at the local level to manage human-wildlife conflict (Sjölander-Lindqvist et al., 2020).

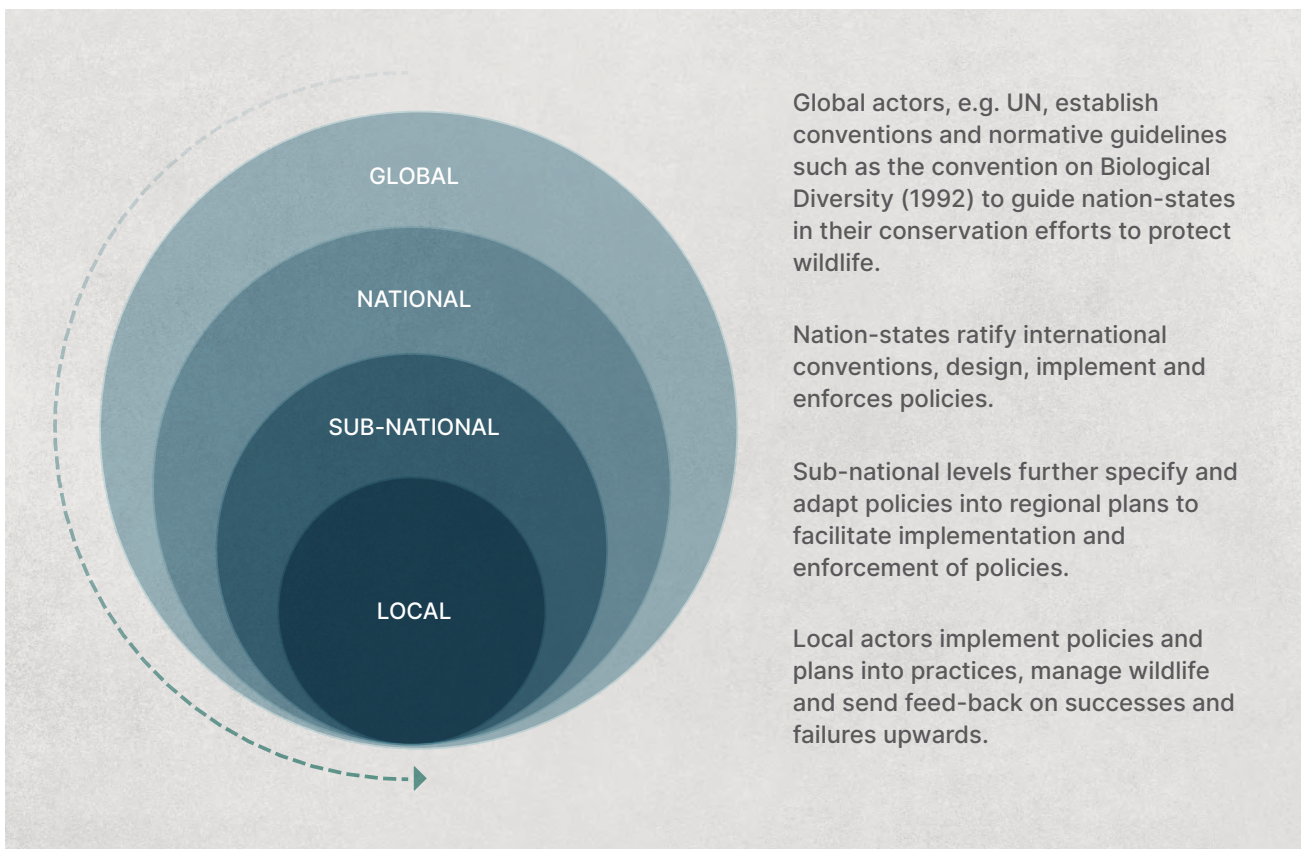


Figure 7. The emergence of multilevel policy in the governance of wildlife sets the frame for how conflicts at the local level can be managed. (Source: Compiled by the chapter authors)

Assessing the governance of human-wildlife conflicts

There are several reasons why assessing the governance of human-wildlife conflict is important. First, such an assessment can provide a health check, identifying the strengths and challenges of the current governance system, with the purpose to improve the quality of governance; this is often defined as the impartiality of institutions that exercise government authority (Rothstein & Teorell, 2008). Second, an assessment can provide a diagnosis, exploring the governance-related causes of existing human-wildlife conflict with the purpose to, for example, develop more effective governance processes or identify the policy tool that best addresses what is causing the conflict (Ostrom, 2005).

Third, an assessment can also facilitate monitoring of potential or existing human-wildlife conflict, and help collect data to establish a baseline for measuring changes over time.

One of the most common approaches to assessing governance is to provide a list of desirable elements of governance and assess the quality of these elements. The *Good governance* framework developed by the UN, which adheres to eight elements, is perhaps the most well-known approach to assessing the quality of governance (Figure 8). The UN framework makes it possible to break down the governance problems to identify which elements contribute to human-wildlife conflict, and thus help suggest solutions to the problem.

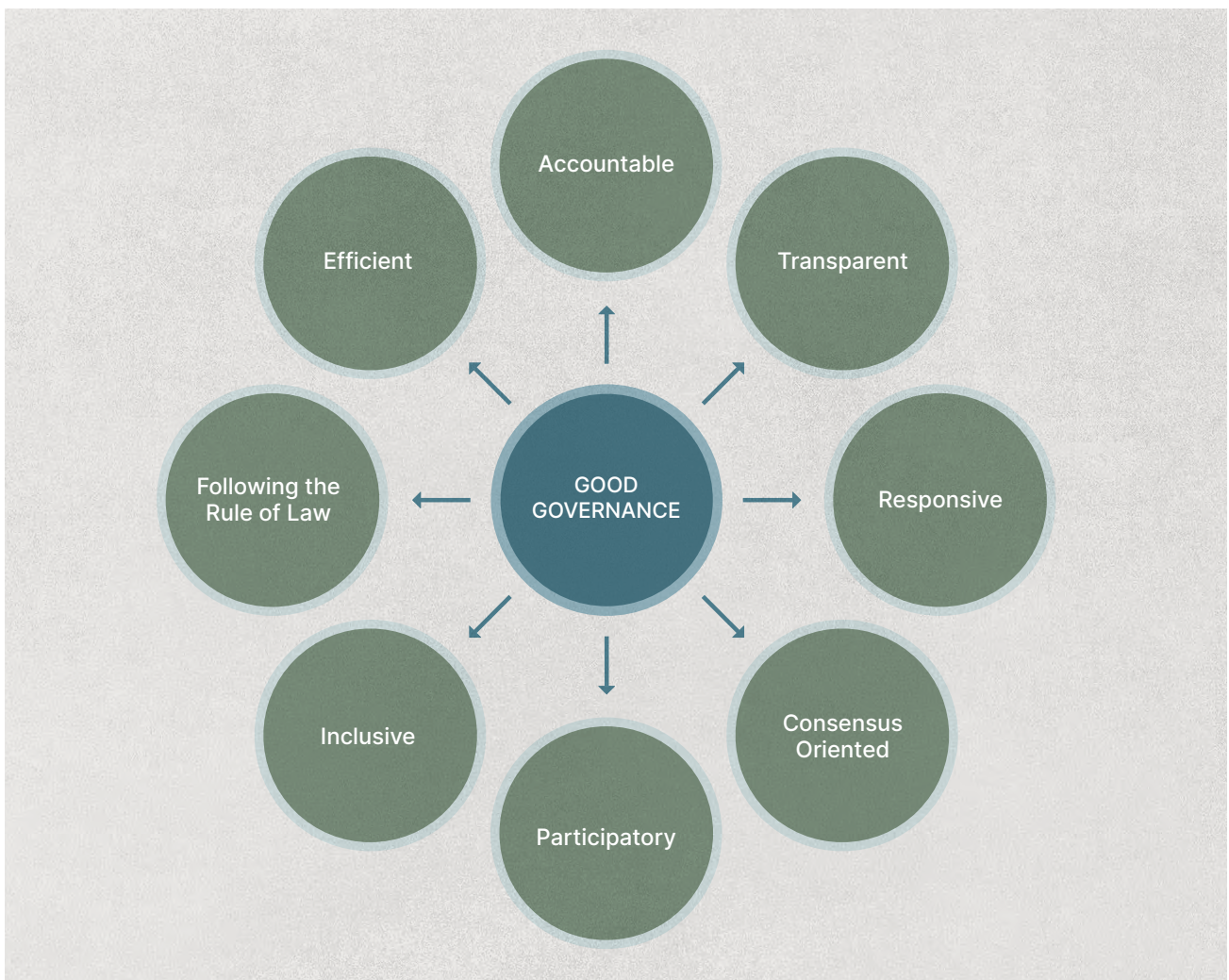


Figure 8. Elements of good governance. Common to many assessments of good governance are elements of stakeholder inclusion, transparency, equity, accountability and fairness (UNDP, 1997).

Another approach that has been instrumental in shaping the analysis of resource management and conservation, especially at the local level, is the social-ecological systems (SESs) framework developed by Nobel laureate Elinor Ostrom and colleagues (Ostrom, 2007). The framework identifies both ecological variables, such as wildlife and their habitats, and social variables, such as the users and the governance system, with an impact upon the patterns of interactions and outcomes in SESs. By identifying which variables are causing problems, it is also possible to suggest remedies.

A governance problem that causes human-wildlife conflict often means that any of the elements above are missing, unclear or not fully implemented. For example, if we identify participation as a problem that triggers human-wildlife conflict, the problem may be as simple as the lack of proper and inclusive mechanisms for participation. However, there may also be such complex forms of participation that only strong stakeholder groups have the capacity to master the system, which in turn leads to unequal opportunities for participation. If accountability is identified as a governance problem this is often related to a lack of accountability due to, for example, lack of engagement, lack of trust or lack of representation. However, the systems for ensuring accountability may be too complex, resulting in too much time and resources spent on overly bureaucratic processes.

Once a governance problem has been identified, and can be related to one or several elements, there is a need to identify solutions to the problem. These could include changing or adapting the rules and regulations causing the specific human-wildlife conflict, reviewing and adjusting the governance structures to strengthen the governance capacity, or altering the processes to better realise the functions and performance of the governance framing the human-wildlife conflict.

Box 8

Assessing the governance of large carnivore conservation in Sweden

When the Swedish parliament decided to adopt a new large carnivore policy in 2000, it was also decided to introduce elements of collaborative governance (regional large carnivore committees and, later, Wildlife Management Delegations), with the aim to legitimise the policy and to reduce human-wildlife conflict. Stakeholders and politicians were involved in the governance and, to some extent, management of large carnivores at the regional level. Despite the ambition to reduce conflicts, they have persisted, while the policy – including elements of collaborative governance – has gradually improved as a result of several governance assessments. A recent assessment shows that some of the identified governance problems have successfully been dealt with, while others remain to be handled (Environmental collaborative governance in large carnivore management: policy and institutional design, administrative leadership and stakeholders, <http://vrdemokrati.se/environmental-collaborative-governance-in-large-carnivore-management-policy-and-institutional-design-administrative-leadership-and-stakeholders>). Table 5 shows an example of how a framework for assessing governance problems may contribute to the identification both of problems and potential solutions to those problems. In this example, a framework based on five elements of governance – transparency, accountability, participation, integrity and capacity (TAPIC – (Greer et al., 2016) – is used to assess the collaborative governance of large carnivores in Sweden. Despite the changes made to increase transparency, representation and accountability, several problems associated with the governance of large carnivore conservation in Sweden can still be identified (Milgroom & Spierenburg, 2008; Sandström et al., 2018). This case illustrates how many of the issues for conflict concern the governance per se and not only the management of wildlife or the direct conflicts between humans and wildlife.

Table 5. An assessment of collaborative governance of large carnivore conservation in Sweden based on the TAPIC framework.

Governance attribute	Identified problem and potential remedy
Transparency ensures that decisions, and the reasons why they are made are clear and open.	Lack of transparency contributed to a lack of trust among the involved actors towards the governance system, but also between the involved actors, and thus an increased level of conflict Systematic efforts to better prepare decisions, in a more inclusive governance process, contributed to increasing transparency and thus also trust
Accountability means that actors must give an account of their actions, with consequences if the action and explanation are inadequate	Disagreements about whether the members of the large carnivore committees are primarily accountable upwards towards the government or downwards towards their organisations or the public contributes to uncertainty and conflicts The accountability mechanisms still need to be clarified
Participation means that affected actors have an opportunity to influence the governance process	Studies have shown that certain actors, especially environmental NGOs, have felt underrepresented in relation to other actors The government decided to increase the number of members from the under-represented organisations
Integrity means that processes of representation and decision making are clear and specified	Lack of clarity on allocation of roles and responsibilities, and on power, have increased existing conflicts It remains to clarify the roles, responsibilities and power balances of members of the committees
Capacity includes the ability to develop policy that is aligned with resources in pursuit of goals	Lack of capacity to include different sources of knowledge has increased conflicts There is a need to acknowledge different ways of knowing, such as indigenous and local knowledge in parallel with scientific knowledge, and thus build ways for understanding policy formation

(Source: Compiled by the chapter authors)



Conclusion

A governance assessment, with clearly defined elements, enables individuals or groups of actors to become aware of the governance problems associated with human-wildlife conflict, opening up possibilities to improve governance or otherwise deal with it. If there are several actors involved, as in the large carnivore example above, there is much value to making this assessment in a collaborative, participatory manner, to provide a basis for sharing information and perceptions that can later be of paramount value for effective implementation. Optimally, the actors may be able to arrive at a joint understanding of, and potentially identify common solutions to, human-wildlife conflict-related problems. A governance assessment can also reveal differences of opinion, pinpointing more precisely what the disagreements or the conflicts are about. To summarise, governance matters, and it can usually be improved to help ensure successful implementation of policies. By assessing governance and identifying governance problems it is possible to remedy them before they undermine related policies and the governance system itself, which could lead to increases in the level of human-wildlife conflict.





IUCN SSC GUIDELINES

PRINCIPLE 3 —

Work together



Working with stakeholders and communities

*Juliette C. Young, Jenny A. Glikman, Beatrice Frank, Simon Hedges,
Kate Hill & Rachel Hoffmann*

Over the last 30 years there has been increasing recognition of the importance of engaging stakeholders for achieving more sustainable, long-term and inclusive decision-making processes, including efforts to reduce or mitigate the negative impacts of conflicts. Here we refer to ‘stakeholders’ as people, groups or organisations with an interest in the situation or the issues surrounding it. This includes local communities directly involved in human-wildlife conflict situations, but also other groups, with the aim of sharing knowledge, discussing possible ways forward and taking joint action to address conflicts.

The need for, and importance of, this broader engagement is also reflected in international policy. The United Nations, for example, has propelled engagement at the most relevant level of decision making with regard to sustainable development, through Agenda 21. As a consequence, public engagement is now firmly rooted in public policy and a requirement under legislation such as the Aarhus Conventions and associated EU Directive. The need for engagement with local communities in the context of conservation is embedded in the 2020 Aichi biodiversity targets, and is widely thought to be critical to the long-term success of conservation efforts.

Certain questions need to be answered in order to carry out successful engagement with stakeholders and local communities. These include the what, who, when and how of engagement (Figure 9).





Figure 9. Engaging with stakeholders. (Source: Compiled by the chapter authors)

What is the purpose of engagement?

Engaging with stakeholders can have a number of different purposes, depending on what needs to be, or can be, achieved (Arnstein (1969); Beierle and Cayford (2002); Creighton (2005); Dovers et al. (2015); Durham et al. (2014); Frank (2017)). For example, the aims of the engagement process could be to:

- better understand problems and contextual opportunities by developing communication with stakeholders;
- generate innovative ideas;
- develop a common understanding and shared solutions between stakeholders;
- increase learning and trust between stakeholders;
- make decision making more collaborative, thereby increasing the legitimacy and credibility of decisions;
- foster more 'ownership' of solutions by the people most affected by, or having the most effect on, the issues and problems;
- help ensure the effectiveness and long-term sustainability of efforts to reduce or mitigate conflicts over wildlife.

Table 6 shows some of the different purposes behind engaging stakeholders (once framing and analysis are under way), and the tools that can be used to implement passive to active participation. Related to this, it is worth bearing in mind the conditions under which participation is likely to work (or not) and what it can achieve in different circumstances (for a useful illustration of circumstances regarding the nature and goal of stakeholder participation, see Hurlbert and Gupta (2015)). The key is to communicate early on in the process, and in a transparent way, the purpose of involving

stakeholders and communities to prevent unrealistic expectations. The purpose of involvement can change with time and might not be the same depending on who is involved.

Table 6. Different purposes of engagement (gathering information, discussion, engagement and partnership), with adapted tools for engagement

	Gather information	Discuss	Engage	Partner
Objective of engagement	To obtain feedback on analysis, alternatives and/or decisions	To work with others to ensure concerns and aspirations are understood and considered	To facilitate discussions and agreements between public parties in order to identify common ground for action and solutions	To create governance structures in order to delegate decision making and/or work directly with the public
Tools	Immersion Response form Survey Interview Open house Public meeting (e.g. town hall)	Immersion Focus group Panel	Immersion Online dialogue Advisory committee Facilitated workshop	Task force Delegate decision Ballots
Level of engagement	Low	Medium	High	Very high

(Adapted from: Frank (2017))

Who should be engaged?

The question of who should be engaged will depend on the purpose of engagement. In the context of human-wildlife conflicts, stakeholders will usually be those either directly or indirectly affected by the conflict, or who have some interest (stake) in it, whether they are local or not. Indirectly affected stakeholders may include:

- NGOs;
- funding agencies;
- representatives of other sectors affected by the conflict (e.g. farming, forestry, transport);
- businesses or organisations with commercial interests in the species involved in the conflict;
- the general public;
- representatives of different levels of government – local, regional, provincial, national and international (e.g. EU) government agencies
- other experts, including researchers and organisations responsible for conservation.

These individuals, groups and organisations often have different backgrounds, knowledge, levels of impact, influence, access and styles of communication, which are important to take into account. Not all individuals, groups and organisations will have the same role or desire to be involved, and not all of them will need to be involved for the whole public participation process. An initial task will be to explore the range of stakeholders involved, and who is relevant to be included in the engagement process. See Reed (2008) and Swapan (2016) for a typology of stakeholder analysis methods for natural resource management, and a community participation model for developing countries. Another key question is, who leads the process? This is discussed in more detail in Chapter 16, Dialogue: a process for conflict resolution.

When and how to engage

When to engage, and how frequently, will depend on the context, who is engaged, why they are being engaged and the resources available. In general, participants can be involved at different stages of the process. It is usually advisable to take time to understand the context and the people, and to build trust with stakeholders at the outset. Developing a project timeline can help in planning when to engage different stakeholders as well as the frequency and the duration of their engagement. There are several papers and toolboxes that can help with developing timelines and planning effective timing for engagement (e.g. Dovers et al. (2015); Durham et al. (2014); Reed (2008)).

There are important practical and ethical challenges of achieving effective engagement (Agrawal & Gibson, 1999; Chan et al., 2007; Waylen et al., 2010). If engagement is done badly, or is not tailored to the context or purpose of engagement, this can damage relationships and trust, and lead to serious injustice to local people and setbacks for conservation outcomes (see Chapter 1, Levels of conflict over wildlife) (Glikman et al., 2022a; A. Zimmermann, B.P. McQuinn, et al., 2020). This is why it is important to consider general principles of engagement rather than undertake a ‘one size fits all’ approach to engagement.

Box 9

The PARTNERS Principles

A helpful approach to devising principles of engagement has been developed by the Snow Leopard Trust (Mishra, 2016; Mishra et al., 2017), and builds on ideas developed in such diverse fields as applied ecology, community health, social psychology, rural development, negotiation theory and ethics. These *PARTNERS Principles* outline some of the elements that need to be considered when engaging with communities to effect conservation. The eight principles for effective community-based programmes are centred around: Presence, Aptness, Respect, Transparency, Negotiations, Empathy, Responsiveness and Strategic support. They have been developed, challenged and tested through 20 years of community engagement experience and, with contextual adaptations, are relevant for applied ecologists and conservation practitioners.



(Source: Mishra, 2016; Mishra et al., 2017)

Challenges in engaging with stakeholders

Engagement with stakeholders is not without its share of problems. Engagement as a term is highly complex and value laden, meaning different things to different people. The purposes for engagement are equally complex, ranging from legitimisation and manipulation to deliberative and inclusionary processes.

In practice, engagement is highly sensitive to the social, economic and political contexts in which it is applied. There is no ‘one size fits all’ approach to engagement, but rather each situation needs to be carefully assessed through extensive background research to determine what kind, with whom and how engagement should be pursued. There may also be a discrepancy between the type of

engagement one may aspire to, and the type of engagement resources will allow for. For example, engagement takes time: time to foster relationships and to build and maintain trust. Such resources, however, are not always available, with few funding systems allowing for in-depth and long-term community engagement. Whilst partnerships can be locally effective, there are challenges to scaling-up to larger areas. Finally, even when resources and well thought through plans are in place to ensure effective and ethical engagement, external factors, such as other stakeholders or the media, can affect relationships with stakeholders and impact on the trust being built between the researcher or practitioner and the local communities, for example.

Box 10

Case study: mitigation of human-elephant conflict around Way Kambas National Park, Indonesia (Gunaryadi et al., 2017)

Wildlife Conservation Society (WCS) staff worked with national park authorities and local communities to reduce human-elephant conflict (HEC) around Way Kambas National Park (WKNP), a well-known HEC 'hotspot'. To help ensure a genuine community-based approach and to encourage the adoption of sustainable (voluntary) HEC reduction methods following initial trials of different crop protection methods, WCS Indonesia Program's national staff helped initiate and foster self-reliance groups (Kelompok Swadaya Masyarakat, KSM) in the villages around WKNP.

The KSM approach was intended to inform the methods used during the trials and facilitate and promote self-help schemes, including the post-trial establishment of voluntary crop guarding rotas using the methods shown to be most successful during the trials. These self-reliance groups also provided opportunities for farmers to discuss HEC, and acted as forums for providing informal training in crop guarding and safe elephant driving techniques. The training emphasised the safety of people and elephants and other wildlife. Verbal rather than written consent was obtained from the villagers who participated in the trials; written consent was not obtained because many farmers were illiterate. The consent process was documented and monitored by the self-reliance groups.

The self-reliance groups were set-up at the start of Phase 1 (22 October 2005 to 5 April 2006), and villagers in the trial sites were also hired to act as crop guards because WCS wanted to be able to effectively compare different community-based crop-guarding schemes, and in the previous two years of work around WKNP had been unsuccessful in establishing community-based crop-guarding on a voluntary basis. However, because WCS and the national park authorities were primarily interested in promoting a sustainable approach to HEC mitigation around WKNP, crop guards were only paid in Phase 1 and WCS made clear its intention to pay for crop guards for one crop-raising season only.

Once the Phase 1 trials were complete, WCS concentrated on promoting self-reliance and voluntary guarding of crops by working with the self-reliance groups. The focus of

the project was shifted to: (1) explicitly treating the second phase of work (Phase 2, 17 January to 12th May 2007) as a demonstration period; and (2) holding a series of village meetings (organised by the self-reliance groups) around WKNP, which included visits for farmers to the Phase 1 and 2 trial sites during which they could see for themselves what worked and what did not, and talk freely with farmers.

In Phase 3 (3 July 2008 to 25 March 2009), following encouragement by the village self-reliance groups, including trips by villagers from around WKNP to the test sites used in Phases 1 and 2, 16 villages voluntarily adopted the methods used in the conventional sites in Phases 1 and 2. No crop guards were paid and no tools or supplies were provided. The 16 villages had all experienced high levels of HEC in the preceding years, accounting for > 97% of the 742 HEC incidents recorded for the entire park in 2006. During the 265-night period represented by Phase 3, there were 203 attempted raids by elephants, of which 150 (73.9%) were repelled successfully, with nine of the villages achieving success rates > 90%.

Lessons learnt: this case study shows that genuine participation of stakeholders (in this case Indonesian farmers) in both the development and execution of human-wildlife conflict mitigation projects helps ensure that performance measures are credible and, critically, increases the probability that successful innovations will be adopted. The case study also shows that a simple evidence-based approach can achieve very significant reductions in crop-raiding rates at the protected area scale rather than at just the village scale.





Traditional ecological knowledge

Vidya Athreya, Dhee, John D. C. Linnell, Sahil Nijawan & Juliette Young

Cumulative body of knowledge and beliefs

Traditional ecological knowledge (TEK) is defined as a ‘cumulative body of knowledge and beliefs, handed down through generations by cultural transmission, about the relationship of living beings (including human beings) with one another and with their environment. Furthermore, TEK is an attribute of societies with historical continuity in resource use practices; by and large these are non-industrial or less technologically advanced societies, many of them indigenous or tribal’ (Berkes, 1993). It plays an important part in a number of different fields, including the use and conservation of biodiversity, communal property management, medicine, food and even governance (see Chapter 12, Governing human-wildlife conflicts) (Martin et al. (2010). In fact, until a few centuries ago, people relied solely on TEK to manage their natural resources and ecosystems (Berkes et al., 2000; Martin et al., 2010). TEK is based on multiple aspects of experience and belief, including myths, stories and superstitions (Ban et al., 2018), but can be considered as important as scientific knowledge, especially when we are trying to achieve behavioural changes to mitigate human-wildlife conflict (see Chapter 29, Social marketing and behaviour change).

There are various forms of traditional knowledge (Phuthego & Chanda, 2004); however, what we most refer to in the context of human-wildlife conflict is the knowledge that local communities have in the form of practices and behaviour that are used for reducing the negative impacts of wild animals on their lives and property. For example, night-time corrals (bomas) have been traditionally used to mitigate livestock depredation by lions in Botswana, and livestock guarding dogs are a Eurasian-wide tradition. In addition to details of how practices are conducted, TEK also covers the mechanisms and cultural adaptations that are evident in the icons, taboos and deities that affect the perception of the communities and make them more resilient towards wildlife damages.

The value of TEK in human-wildlife conflicts

The roots of human-wildlife conflict often lie in social issues (see Chapter 1, Levels of conflict over wildlife). TEK, which is tied to social mechanisms, can help to deliver positive change related to human-wildlife conflict. Communities living in an area for a very long time often have a deep understanding about their locality (Ban et al., 2018), which has evolved through a trial-and-error form

of adaptive management, and has been transferred and put into practice across generations. An example of its manifestation is the creation and management of sacred groves by communities across the world (Govigli et al., 2015; Sheridan, 2009; Yuan et al., 2020). In the field of natural resource management there is evidence to show that local knowledge and skills can be very efficient and cost effective (Gadgil et al., 1993; Hartwig et al., 2009; Niamir-Fuller et al., 2012). As funding agencies, governments and NGOs are increasingly looking for long-term mitigation measures that can be used by local communities, exploring local methods based on TEK could be the best-accepted and most cost-effective approach in many contexts.

TEK and the mitigation of human-wildlife conflict

In the case of wildlife with which people have been interacting for thousands of years, there are numerous examples of mitigation measures that are used by local communities to coexist with wildlife (Weise et al., 2018). These include: building corrals for preventing livestock damage (Ocholla et al., 2013; Weise et al., 2018); traditional land-use management, leading to coexistence between people and elephants (Fernando et al., 2008); use of deterrents to chase away primates (Saraswat et al., 2015); increased vigilance; use of guard animals; and even killing the wildlife (Ocholla et al., 2013). There also could be cultural aspects of dealing with potentially dangerous wildlife, such as taboos, religious institutions, and relationships with the animals, that allow people to better cope with the presence of damage-causing wildlife (see Chapter 9, Culture and wildlife).

The process of integrating traditional knowledge

The perspective and understanding of the local communities towards wildlife and human-wildlife conflict can be very different from scientific knowledge in the way the knowledge is gathered, transmitted and used (Ban et al., 2018). However, although the nature of TEK is not rooted in the same knowledge system conservation scientists have experience in, it is extremely relevant to the local context. As such, scientific and traditional knowledge are potentially complementary (Berkes et al., 2000), resulting in a greater understanding of issues relating to human-wildlife conflict (Ainsworth et al., 2020) and a greater potential for the successful implementation of socially and culturally relevant mitigation actions (Ainsworth et al., 2020; Ban et al., 2018). Indeed, local communities will prioritise their knowledge systems over that of a scientific system especially when it is related to use of their resources. Therefore, a collaboration right from the beginning, between scientists and local communities, is crucial if mitigation of human-wildlife conflict is to be incorporated by those local communities.

Steps to integrate TEK in the development and implementation of human-wildlife conflict mitigation measures

Where relevant, any project that deals with human-wildlife conflict mitigation should initially document the traditional mitigation strategies in that locality, which could be assessed for efficacy and then modified if required through adaptive management. To do this, project staff should apply the following:

- Collaborate with the local community institutions (such as village bodies) prior to carrying out any work. Initially building trust and relationships is important, especially if the mitigation practices have to be accepted and implemented by the communities.
- Collaborate with specialists from other relevant disciplines (e.g. anthropology, social science, economics) so that other aspects of the TEK can be understood.
- Assess traditional methods used to reduce damages caused by different wildlife species.
- Assess how the efficacy of these methods is evaluated by the community (which may differ from 'scientific' approaches).
- Assess whether efficacy can be increased by improving the design/implementation, building on the knowledge and advice of conservationists, scientists and those with local experience.
- Discuss mitigation design/practices and the way forward with the village decision-making body or people most involved with or impacted by human-wildlife conflict in the area.

There is a range of methods applicable to the understanding, evaluation and integration of TEK. These methods will, however, be context dependent both in terms of the aim of the research and the setting in which such methodologies will be applied. For a broader perspective on some of the potential approaches and methods that might be applicable, see Chapter 19, Social science research.

Cautionary notes: TEK, global change and politics

Although TEK can offer key insights relevant to human-wildlife conflict, there is also a need to exercise caution concerning its practical utility with respect to the following issues.

Local people are not omniscient. There are things that are simply impossible to know from the perspective of traditional observations, but which science is uniquely placed to answer using the technological tools at its disposal. These include factors like animal movements and animal densities, which can often only be documented using tools like GPS technology, camera traps or genetic methods.

The problem of scale. TEK is implicitly localised at small scales, reflecting the areas of observation of humans or social groups. Many challenges in human-wildlife conflict require larger-scale planning and coordination that imply observing scales greater than TEK can embrace. There is also the possibility for transfer of knowledge between areas in which people have different experiences.

The problem of global change. While TEK has developed over time through observation, practice and story telling, the rapid pace of social change and socio-economic development is greatly reducing these forms of learning, such that fewer people now have the intimate knowledge of the environment that their ancestors may have had. In areas where wildlife populations are recovering, the older TEK that provided adaptations to the presence of these species may have been lost. The massive changes that we are seeing in the environment are also moving beyond the range of situations in which TEK has developed, rendering it less useful. Finally, some of the solutions to human-wildlife conflict that TEK has relied on, such as the mass extermination of conflict-causing species, may no longer be acceptable to modern societies, implying that novel solutions are needed.

The problem of politics. The struggle over whose knowledge counts has become central in many social conflicts associated with human-wildlife conflict, with the tension between TEK and scientific knowledge often instrumentalised for political objectives. This leads to the rise of fake news and conspiracy theories, as well as a highly structured alternative rhetoric concerning human-wildlife conflict that often deliberately magnifies tensions with scientific knowledge.



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Conclusion

Despite these potential problems, it is essential to always scope out and understand the existing TEK concerning human-wildlife conflict, and to explore the synergies, complementary aspects and conflicts between TEK and scientific knowledge in a structured and respectful manner. Engagement, dialogue and co-generation of new knowledge can all help to reduce the gap between knowledge forms, or at least help their coexistence.



Planning and theory of change

*Silvio Marchini, Jenny A. Glikman, Sugoto Roy, Simon Hedges
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Why we need a plan to turn conflict into coexistence

What is the change you are trying to make and how do you get there? When it comes down to complex issues such as human-wildlife conflicts, the answers to these questions are not always as simple as they may seem. An understanding of the ecological and social dimensions of human-wildlife conflict itself does not translate naturally into effective management actions. The bridge between what we know and what we do – between where we are standing today and where we want to reach – is planning.

There are many reasons why we need a plan. These include:

- to create a common language between all partners and to foster dialogue;
- to build relationships and create a sense of collaboration;
- to think about – and check – assumptions;
- to set directions and priorities;
- to simplify decision making and clarify roles;
- to develop an associated set of indicators to measure change;
- to anticipate and prevent unintended negative consequences;
- to communicate with and to engage the full range of stakeholders – those directly and indirectly affected.

In human-wildlife conflict and coexistence, planning is particularly important not only because the issues are getting more complex and concerns about them are increasing, but also because poorly handled human-wildlife conflict mitigation can make the situation worse, creating even deeper divides and undoing any benefits that have been seen to date.

Warning: 'poor planning is worse than no planning at all'. The higher the quality of thinking and the

level of acceptance, the better the plan. Plans based on wrong information and flawed assumptions, or with no buy-in by the stakeholders, will be useless at best.

What is planning?

Planning is the process of thinking about the activities required to achieve a desired goal. It is recommended that a *planning workshop* is held as part of the design phase of any intervention, in order to facilitate the planning process and improve stakeholder engagement. There are various types of planning. Plans differ in what they seek to achieve and what methods will be used to achieve them (Schwartz et al., 2018). Conservation planning, for instance, has two major fronts: species-focused and ecosystem- or area-based planning – for example, species conservation planning (IUCN SSC Species Conservation Planning Sub-Committee, 2017) and systematic conservation planning (Margules & Pressey, 2000), and different frameworks have been developed to support it, such as Open Standards for the Practice of Conservation (Núñez-Regueiro et al., 2020). Various types of planning differ also in their level and scope. While there is no universal agreement on the nature of plans, a typical taxonomy is as follows:

- **Strategic plans** provide the ‘big picture’ of what needs to be done, including a vision, goals and objectives. Strategic plans do not include execution details.
- **Tactical and operational plans** determine how strategic plans should be implemented by focusing on efficiency (cost, effort, resources). Tactical and operational plans help to operationalise strategic plans. Typically, tactical plans are more general or broader than operational plans.
- **Action plans** are detailed plans outlining the actions needed to reach one or more major goals (which can be further subdivided into a series of sub-goals). As such, they further operationalise strategic plans. Action plans typically have four major elements: 1) scope – what will be done and by whom; 2) intensity – how much will be done; 3) time horizon – when will it be done; and 4) resource allocation – what specific funds are available for the specific activities. The four elements are interconnected and therefore modifications to one result in the need to readjust the others.

The planning process is often depicted as an iterative and adaptive cycle (Figure 10). As such, a plan is conceived as a ‘living document’. In the early stages, a plan can be basic and simple, but it typically evolves over time as more information becomes known, more data become available, and gaps in knowledge are highlighted and filled. The planning cycle comprises of the following fundamental steps:

- **Situation assessment** – to understand the current problem and how it has arisen from the perspective of the different stakeholders affected. It is developed by addressing the following questions: Where are we? Why are we here? Who is/should be involved?
- **Decision making** – this involves establishing what the plan will aim to achieve; defining the agreed shared vision; developing overarching strategies, including short-term activities that must be completed to ensure that longer-term goals are met; and determining what needs to be done to achieve the desired results, including how results will be monitored and evaluated. The guiding questions are: Where do we want to get to? How do we get there?
- **Implementation** – this involves putting into practice the actions called for the plan. It is often

guided by detailed work plans, which help ensure that sufficient resources are available, appropriate partners are fully involved, and all those involved have the necessary capacity to implement the plan effectively.

- **Monitoring and evaluation (M&E)** – a process in which the data collected before, during and after implementation are analysed in order to measure change and, ultimately, success, usually at different levels (e.g. outputs, outcomes and impacts). The guiding questions are: Are we achieving what we aimed for, and have we achieved it? Have there been any unintended consequences? Essentially, what lessons have been learned? In this step, revisiting the situation assessment, decision-making and implementation steps should be considered, thus closing the adaptive management/planning cycle (see Chapter 32, Evaluating interventions).

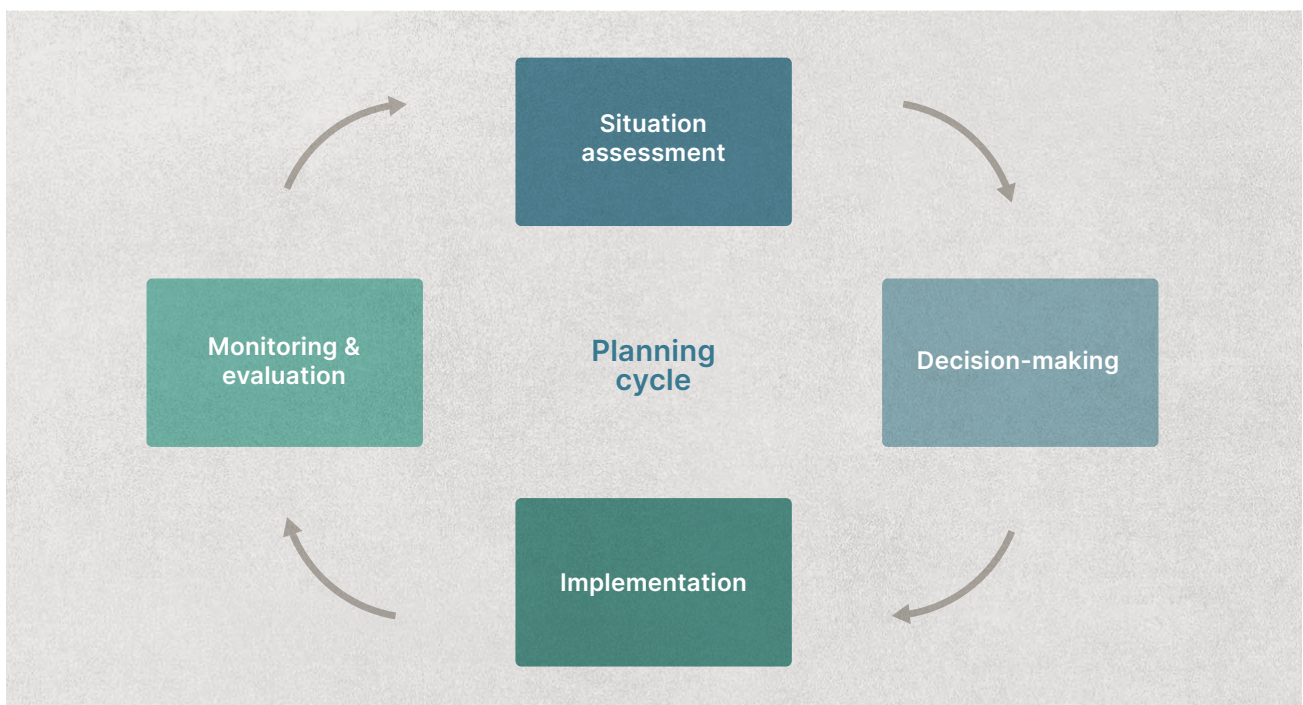


Figure 10. Planning cycle and its fundamental steps (Source: Marchini et al. (2019))

Throughout the planning cycle, *learning* and *communication* are essential tools for those responsible for the planning and implementation, to spread awareness of methods, successes and challenges by addressing the questions: What went well and according to plan? What went less well? (IUCN SSC Species Conservation Planning Sub-Committee, 2017). Learning and communication are relevant for project and organisation staff, and also, externally, for other planners, funders and donors. More broadly, they also apply to the conservation community, governments and civil society.

Theory of change for decision making and evaluation

As part of a stronger focus on making changes based on evidence, conservation has increasingly favoured the *theory of change* (ToC) approach as a framework for making decisions and for evaluating

whether the desired results have been achieved (Durant et al., 2022; Valters, 2015). A ToC is essentially a comprehensive description and illustration of how and why a desired change is expected to happen in a particular context (www.theoryofchange.org). The following are key elements of a ToC:

- **Inputs** – resources at the disposal of the project, including staff and budget.
- **Activities** – actions taken or work performed to convert inputs into outputs.
- **Outputs** – the results (the tangible goods or services) produced directly from the implementation of project activities (e.g. electric fences, information flyers, training workshops).
- **Outcomes** – changes in state (or effects) resulting from the delivery of outputs, during or soon after a project’s period (e.g. decreased livestock depredation, less fear of predators, improved conflict mitigation skills), including indirect changes.
- **Impacts** – broader changes that occur within the target system as a result of program outcomes (e.g. improved livelihoods for local people and increases in wildlife numbers). This will demonstrate how conflict management and mitigation can be part of a broader theory of change describing broader conservation goals.
- **Assumptions** – conditions that need to be in place to make the theory work. They explain the logic behind the overall project and behind the causal links in the theory (e.g. electric fences cause less livestock depredation, which leads to higher tolerance toward the predator, which leads to less persecution).

The most common representations of ToC are logic models, sometimes known as logframes (from logical framework), and results chains. *Logic models* are a general, yet systematic and visual way to present the perceived relationships among inputs, activities, outputs, outcomes and impacts (Margoluis et al., 2013) (Figure 11). Results chains are more specific and show direct assumed relationships among discrete actions, intermediate outcomes and the desired final impact. The number of levels and connecting arrows, including occasional feedback loops, must be adapted according to the complexity, scale and stage of the context/issue, and will ultimately reflect the capacity of the participants in the ToC workshop.



Figure 11. Generic logic model (Source: Margoluis et al. (2013))

A core component of ToCs, and one that should be explicitly addressed in the results chain, is a statement of the underpinning assumptions. Every step in the development of a ToC schematic has its inherent assumptions, risks and hypotheses relating to causative factors. These need to be explored in detail during the ToC workshop and perhaps through follow-up exercises on specific components using focus groups. Stakeholder input in developing a participatory ToC enables a better understanding of the underlying assumptions and questioning of the assumptions that are often side-lined, in the specific context where activities and interventions take place (Valters, 2015).

In addition to the outcome summarised in a logic model or results chain, developing a ToC is a process that gives project and programme teams the opportunity to think, discuss, learn from each other, collaborate and develop a sense of ownership of the process. It strengthens projects through more considered decision making and creates stronger teams as people are brought together. It also enables projects to identify knowledge or capacity gaps as they appear, and allows projects to evolve and become refined over time through adaptive management.

How to produce a plan in nine steps

Below is a summary of the recommended general steps to produce a plan using a ToC (Steps 4 to 7 cover the ToC). ToC and associated logframes work at multiple levels: at the level of individual sites and projects all the way through to programs looking at impacts across multiple sites and often multiple projects.

Step 1. Engage stakeholders

Connect with and engage the people who, directly or indirectly, affect or are affected by the problem you want to change. By engaging stakeholders you will obtain different perspectives, gain collective knowledge, and foster ownership and full participation (see Chapter 13, Working with stakeholders and communities). Developing a shared plan, irrespective of how basic, from the outset, enables different stakeholders to focus on the plan and not on each other. Stakeholder analyses can be used to identify the stakeholders before the project begins, and group them according to their levels of participation, interest and influence in the project, and to determine how best to involve and communicate to each of these stakeholder groups throughout the project's lifetime.

Step 2. Define the goal and scope

The final goal, or impact, should describe what changes you want to see with respect to the human-wildlife conflict problem, both from the wildlife and human sides of the interaction, and also *where* and *when* you expect these changes to happen. It should be realistic and succinct; you should not set more than a few final goals, and it is often best to have just one. A final goal should be relatively long-term, positively stated, and something that funders, commissioners or supporters would be interested in backing (e.g. improved livelihoods for local people and increases in wildlife numbers).

Step 3. Compile/collect evidence

Decisions should be rooted in a clear understanding of the issue you want to address. Evidence may be collated from both the academic and 'grey' literature, and from the expertise and experience of key stakeholders. If relevant evidence does not exist, you may need to collect it yourself, through ecological and/or social research (see Chapter 19, Social science research), as a first step in your theory of change development.

Step 4. Connect impact to outcomes to outputs to activities (yes, it goes backwards)

Once you have defined your impact, you need to work backwards through the steps or intermediate outcomes needed to achieve it. This is perhaps the most important part of the process: too often organisations jump from their activities to their final goals without thinking through the changes that need to happen in between, or the relationships between activities and outcomes. Intermediate outcomes must be clearly articulated within your ToC. The outcomes should be feasible, given the scale of your activities, link logically to your long-term goal(s), and they should ideally be supported by evidence. This is the opportunity to think through possible unintended outcomes and consequences (see Chapter 4, Avoiding unintended consequences).

Step 5. Make assumptions explicit and check them

For all assumptions, consider if there is existing evidence to support them. You might find this in academic literature, reports from your organisation or others, and in the expertise and experience of key stakeholders. The idea that losses (for example of livestock or crops) determine the extent of retaliation, and that attitudes and awareness determine behaviour, are common flawed assumptions in human-wildlife conflict mitigation initiatives.

Step 6. Define your strategy

Review the different pathways in the ToC against a set of criteria – for example, strategic objectives and priorities, complementarity with existing or planned projects, lessons learned from previous projects, preferences of key stakeholders, benefits to the target group, cost efficiency and technical feasibility, and environmental, social and economic impacts. Then select one or more pathways to form your strategy, including the interventions that your initiative will perform to create your desired change.

Step 7. Convert to a logical framework matrix

A *logical framework* – or logframe – matrix is a concise document that outlines the key features that lead to a project achieving its goal (Dickson et al., 2017). A logframe typically consists of a four-column by four- or five-row matrix (Figure 12). The assumption column informs some of the complexity the project needs to consider. If assumptions do not hold true, they represent a risk, and a risk analysis should be undertaken. The 'if-and-then' logic, using the first and last columns, reflects the sequence of steps that lead to the results being achieved. The logframe matrix represents a concise outline for monitoring and evaluating the project. It is recommended that you use the matrix as a foundation for a more comprehensive M&E plan (see Chapter 32, Evaluating interventions).

	Project summary	Indicator	Means of verification	Assumption
Impact	Increase tolerance of predators among participants by 20% within 4 years.	Tolerance score.	In-person interviews with ranchers.	N/A.
Long-term outcome	Reduce livestock losses to predators in participants' ranches by 40% within 2 years.	Livestock loss (e.g., number of head lost to predator).	Ranch records, from observations.	Reduced livestock losses to predators increases tolerance of predators among ranchers.
Short-term outcome	Improve husbandry practices score for participants by 50% within 1 year.	'Husbandry practices score' (designed for each specific context to account for key practices e.g., use of barriers and proper disposal of carcasses of domestic animals).	In-person interviews with ranchers and observation of practices during visit to ranches.	Improved husbandry practices reduce livestock losses to predators.
Output	40 ranchers who are intolerant to predators complete the training workshops.	Number of ranchers completing a training workshop.	Workshop attendance records.	Ranchers apply what they learned in the workshops.
Activity	Run 4 training workshops on good husbandry practices, each with capacity for 10 ranchers.	Number of workshops run.	Workshop records.	Ranchers who are intolerant to predators and whose current husbandry practices fail to prevent livestock losses to predators are willing to attend the workshops.

Then (arrow from Output to Impact)

If (arrow from Activity to Output)

And (arrow from Activity to the box on the right)

Figure 12. Hypothetical example of a logical framework matrix and its if-and-then logic (Source: Compiled by the chapter authors, adapted from: <http://www.tools4dev.org/resources/how-to-write-a-logical-framework-logframe/>)

Step 8. Establish timelines and plan resources

Define a timeframe for when activities and outputs are expected to happen. This should shape stakeholder expectations of what can be achieved by the interventions called for in the plan. It will also help you plan when to collect data. If you think through the work associated with the delivery of your outputs, this will help you to plan the resources you will need and to set a budget for the intervention.

Step 9. Produce a summary report

As you develop your ToC you will need to make it available in a useful format. Most people find a diagram – logic model or results chain – helpful. It is also helpful to write up a narrative version of the ToC as a more comprehensive description of the theory, because diagrams can be difficult to understand on their own. Within the report, for the purposes of sharing more broadly in conservation, it may be beneficial to include the assumptions that were made, and clearly state the intended and unintended consequences, and the lessons learned.



Dialogue: a process for conflict resolution

Brian McQuinn, Alexandra Zimmermann, James Stevens & Gladman Thondhlana

Dialogue among stakeholders involved in a human-wildlife conflict is a series of conversations and meetings between two or more people or groups involved in a conflict with the goal of finding a collaborative, long-term solution. Convening stakeholders for a dialogue can be a daunting task. It is natural for individuals and organisations to be reticent in convening for a dialogue, as it could result in negative exchanges among the parties. Nevertheless, across societies and throughout history, discussion among disputants is, and has always been, a foundation for constructive conflict resolution.

Exactly how these discussions – or dialogues – are initiated, who is involved, who steers and facilitates them, and how they handle impasses or especially tense topics, is far from simple. Most worryingly, a badly managed dialogue process can exacerbate tensions rather than calm them. Consequently, there is an onus on those convening any dialogue to ensure that they take all reasonable precautions to prevent harm. Unfortunately, there is no one-size-fits-all solution to designing or leading a stakeholder dialogue. Each process must account for the unique history of the conflict, what is at stake, the intensity of the tensions, the disputants involved, the goal of the dialogue and the power dynamics among those with decision-making authority and those without (to name just a few considerations). There are three features or principles of dialogues that make them distinct from other forms of group process: purpose, neutrality and goals.

Purpose (and power)

Dialogues differ dramatically from many other forms of stakeholder engagement. First, and perhaps most importantly, dialogue processes place decision-making power in the hands of those involved in the discussion. In other words, whoever convenes a stakeholder dialogue does not have any authority to make decisions on solutions to the conflict – that responsibility is placed in the hands of those involved in the discussion. This principle is crucial as parties are less wary of participating in a process where they retain decision-making control.

By contrast, consultation processes seek the input of those with a stake in a conflict but with the individuals or agencies convening the meeting explicitly (or sometimes implicitly) retaining the

authority to decide which solutions will be implemented. It is often participants' feelings related to their exclusion from decision making that drive the animosity and intense confrontation on display in consultation meetings. Stakeholders' opposition to the solutions resulting from consultations (as opposed to dialogues) are often not a reaction to the proposed solution, but a rejection of the exclusionary process that led to those outcomes (see Chapter 1, Levels of conflict over wildlife).

Neutrality

The second feature of dialogues is the emphasis on relationship building among the stakeholders involved. Many other forms of group interactions are primarily solution oriented – focused on fixing a particular problem. By contrast, dialogues strive to improve the relationship among those involved in a conflict. The purpose of this relationship building is to establish trust, which is essential not only in addressing the presenting problem but also in improving the relationships among those involved, so that future issues are resolved more easily.

Dialogue goals

The more intense or deep-rooted the conflict, the more time and care those convening a dialogue must take in preparing the ground. Completing a conflict analysis, including understanding the different levels of conflict driving a situation, is an essential first step in helping to ensure that the initiative does not exacerbate the conflict (see Chapter 17, Resolving conflicts between people). The analysis should include an understanding of the history of the situation (see Chapter 10, How histories shape interactions). The more intense or longstanding a conflict, or the less experienced those convening the discussion, the humbler the goals should be. There can be a variety of goals and benefits as a result of a dialogue process, for example:

- Reducing tension and allowing parties to be heard.
- Initiating or resuming direct in-person communication among the parties.
- Creating a common understanding of the situation and its consequences.
- Improving relationships and common ground among the parties.
- Confirming the desire by all parties to find a negotiated solution to the present situation.
- Identifying trust-building steps that parties can take to show good faith.
- Finding consensus on the initial steps and/or generating multiple solutions.
- Agreeing to establish ongoing conflict resolution mechanisms to prepare for future issues.

Who should be included?

Including more stakeholders in generating a solution to a conflict often leads to a more sustainable outcome; however, increasing the number of people involved in a dialogue also adds complexity to the process by increasing the viewpoints and interests involved in the negotiations. This added complexity increases the time and effort required to find solutions. However, it can be argued (and initial evidence suggests) that outcomes agreed to with this approach are more robust and sustainable.

The tendency is often to only include those with power. This approach increases the chances of negotiating a settlement, but those solutions are usually less sustainable as excluded organisations or communities eventually find ways of influencing the situation. Processes that exclude these groups also tend to stoke mistrust and deepen the conflict by hardening resistance to existing solutions, and reinforces mistrust of those leading these efforts. Thus, though the involvement of diverse actors might make the process slow, it can reduce the potential of conflict and, in turn, the time and resources needed for conflict resolution in the future.

Building trust in the process

Stakeholder negotiations are more likely to succeed if all parties involved in a dispute perceive the process to be impartial. If parties feel that a process is biased against them and their interests, they will not participate, creating the potential of spoilers (individuals or groups that try to derail the process). Moreover, if the participants do not trust the motives of those convening the dialogue (however measured or tentative), participants will enter discussions with a mindset that reduces the potential for making progress. Participants' trust is often linked to their perception that those convening respect them and their input. How that perception of respect is generated is one of the unique challenges facing anyone organising a dialogue.

Conservationists are not likely to be perceived as neutral by other stakeholders in a human-wildlife conflict situations (see Chapter 2, Role of the conservationist). As a result, a dialogue led by conservation organisations is likely to be seen as biased in favour of specific outcomes, reducing participants' trust in the initiative. However, conservationists can play an essential role in initiating, organising and supporting multi-stakeholder dialogues to address these problems. Two ways conservationists can help initiate a dialogue are: 1) to include representatives from various stakeholder groups in planning and leading the dialogue; and 2) arranging for a third party, trusted and approved by all actors, to facilitate the dialogue process.

Organising a stakeholder dialogue

The first step in convening a dialogue is distinguishing between the individuals convening and facilitating a dialogue and those organisations that helped initiate discussions about whether such a dialogue was necessary in the first place. Conservationists usually play a crucial role in identifying the need for some sort of conflict resolution process. But even at such an early stage, it is crucial that all parties support initiating a dialogue and are involved in the selection of a third party. These

discussions hold the potential to build trust in the process, and can serve as a confidence-building measure among the parties. At the same time, excluding parties from involvement in the selection of the third party can doom the process before it begins. As a consequence, conservationists often play a particularly crucial role by talking with all parties and forging an agreement that the present situation is undesirable for all, and that there is a need to seek third-party support to find a sustainable solution. Parties to the conflict are usually more open to such a process when it is emphasised that they do not relinquish decision-making authority by agreeing to participate in a dialogue.

What follows are the general steps and considerations in the preparation, planning and implementation of a dialogue process (Lederach, 2005):

1. Conflict analysis.

There are many tools and frameworks for better analyses of what is happening below the surface. Any method should include a detailed stakeholder mapping, which documents all those affected by a situation and how they desire to have a voice in its resolution. Conflict analysis should happen iteratively at different stages within the dialogue process, and need not be limited to the initial phases.

2. Initial commitment from the parties.

Before any dialogue process is convened, it is crucial to obtain a mandate from the affected stakeholders. At this stage, participants are only committing to explore the possibility of a process and the make-up of the facilitation team supporting the initiative. If all parties agree to initiate a dialogue, representatives of each party are identified, to provide ongoing input.

3. Selecting the third party.

There are numerous organisations and individuals with dialogue experience, but it is crucial that they possess some experience with conservation contexts. Human-wildlife conflicts have unique features that require substantial adaptation of existing dialogue approaches. The challenge, normally, is funding for this role and identifying individuals willing to support such a process. It is important that all parties accept the proposed individual(s). It is also possible, and in some cases advantageous, to have a team of individuals, drawn from suggestions made by different parties to the conflict. The larger team can bring different perspectives and strengths to designing a dialogue.

4. Selecting a dialogue advisory group.

Assembling a group that will be responsible for advising the third party can be a significant trust-building opportunity. It is often the first time the conflict parties have agreed to something in a while. The group is made up of representatives from a conflict's stakeholder groups. The advisory group becomes a microcosm of the conflict, becoming an invaluable source of information about the perspectives of the different sides and a good sounding board for potential proposals. Again, the more intense the conflict, the more cautiously and thoroughly the third party should undertake this step (see Chapter 1, Levels of conflict over wildlife and Chapter 17, Resolving conflicts between people).

5. Dialogue design and preparatory steps.

The likelihood of a dialogue's success is increased by a thorough and considered preparation phase. The advisory board is often crucial to organising these discussions between their constituency and the third-party neutral. If there is substantial anger, this phase might require numerous meetings to

fully account for parties' experience of the conflict. The preparatory discussions shape the design of the dialogue by determining, for example: a) the appropriate makeup of the individuals leading the dialogue; b) the size and sequencing of events (e.g. one large event or smaller events leading up to a larger dialogue); c) issues to be raised in the dialogue; d) efforts to reduce potential risks to the dialogue; e) mechanisms for follow-up (e.g. if a report is going to be produced, will there be notetakers); f) identification and selection of participants.

6. Convening a dialogue.

There are many considerations to hosting a dialogue, ranging from logistics and security to preparation of facilitators and the agenda (see Box 11, for example). Dialogues tend to begin with a plenary session involving all participants, but quickly shift the configurations to small working group. If there are multiple representatives from the same group, there is a tendency for them to participate as a group – sitting together, or moving to working groups together. Consequently, it is often advised that the smaller working groups have participants from all of the conflict parties).

7. Follow-up mechanisms.

An important outcome of a successful dialogue is agreement on the next steps and, preferably, long-term decision-making mechanisms for addressing existing and future problems. Coming to an agreement on the existing situation is important, but circumstances change, as do the parties to a conflict. Consequently, building long-term and sustainable solutions requires some kind of ongoing – and usually representative – decision-making or dialogue forum to help prevent future escalation. Inevitably, issues or incidents will arise. Thus, having forums to address these is crucial to diffusing tension quickly and, over time, building robust relationships between the different sides.

Box 11

Example of a multi-stakeholder dialogue agenda

The following agenda is not a complete list, but provides an example of an initial dialogue in a conflict with moderate intensity.

Step 1

Opening plenary session, which has the following goals:

- Introduce the organising team, which hopefully models cross-conflict cooperation and sets the tone for the day.
- Present the process undertaken before the event, which includes the commitment by all parties to initiate and eventually organise a dialogue.
- Review the goals, agenda and desired outcomes of the event.
- Introduce the facilitation team and their responsibilities throughout the day.

Step 2

Establish ground rules for the dialogue and other tone-setting exercises, which have the following goals:

- Identifies ground rules for how participants should interact with each other during the day (e.g. by asking participants to identify the behaviours that make them feel respected).
- Commitment by all participants to adhere to the ground rules (e.g. acceptance of ground rules) and permission for dialogue facilitators to intervene in discussions if they see anyone breaking the ground rules.
- Help establish clear expectations for how the group should interact and create a productive tone for the discussion.

Step 3

Future-oriented visioning exercise (in small working groups) with the following goals:

- Establish or reinforce common ground among participants.
- Help participants recognise that their differences are not as intense as they might believe.
- Find consensus on how the future might look (e.g. 'what does my community look like in 20 years').

Step 4

Identify options and values for addressing conflict, which has the following goals:

- Building on the previous session, groups brainstorm all the mechanisms, values and approaches that might help better address conflict in the future.
- The brainstorming may focus on questions like, 'How do we build a conflict-resolving community?'

Step 5

Reconvene a plenary to conclude the dialogue

- Individual groups report to the plenary on key ideas they have generated and the experience of working together as a group.
- Identify key themes that emerge from the small-group brainstorming.
- Establish working groups to advance those ideas and solicit volunteers.
- Agree to next steps and follow-up.



Resolving conflicts between people

Alexandra Zimmermann & Brian McQuinn

In these Guidelines and recent literature, human-wildlife conflict is explained as a conflict *between people about wildlife*. Tensions are triggered by a negative interaction with animals, which, for various reasons and to differing extents, fuels a disagreement among individuals or groups about what should be done to address the situation. In short, efforts to improve wildlife-human interactions *can only succeed* if the human-human conflict is also solved. Thus, human-wildlife conflict cannot be resolved without resolving the human-human element of conflict.

In 2020, building on previous work by CICR (2002) and Madden and McQuinn (2014), Zimmermann and McQuinn published the *levels of conflict over wildlife* conceptual model, which is described in detail in Chapter 1. In brief, the model explains why some human-wildlife conflicts are more difficult to resolve than others. The concept outlines that Level 1 conflicts are disputes over issues such as crop or livestock loss or concerns about safety, yet typically involve relatively high tolerance of the damage-inducing species. Level 2 conflicts, in addition to the visible impact of wildlife, are burdened by a history of unsatisfactory attempts to address these issues, creating underlying resentment, tensions and a sense of injustice. Level 3 conflicts are deep-rooted and become intertwined with the identities of the parties and community involved, and extend to broader tensions over social identities and clashing values and beliefs. Chapter 1 also explains the typical signs and symptoms of these levels in order to be able to identify them. Once identified, the next questions naturally follow:

- What approaches and methods are available for conservationist to address conflict?
- When can human-wildlife conflict be managed by conservationists?
- When is third-party mediation advisable?

Different levels of conflict require different responses

Many efforts to solve human-wildlife conflicts address the wrong level of conflict (Figure 13). For instance, in biodiversity conflicts, disputes over resources or tangible damage or impacts are so

prominent that they can draw attention away from the underlying social issues at the root of the conflict. As a result, attempts to settle these issues tend to address the more obvious manifestation of the problem (e.g. damage caused by wildlife), and are usually focused on technical and practical fixes. Unfortunately, this approach ignores the underlying social, political or cultural issues that fuel the tension and make matters worse (Suliman, 1999; A. Zimmermann, B.P. McQuinn, et al., 2020) (see Chapter 3, Interventions: to act or not to act? and Chapter 4, Avoiding unintended consequences).

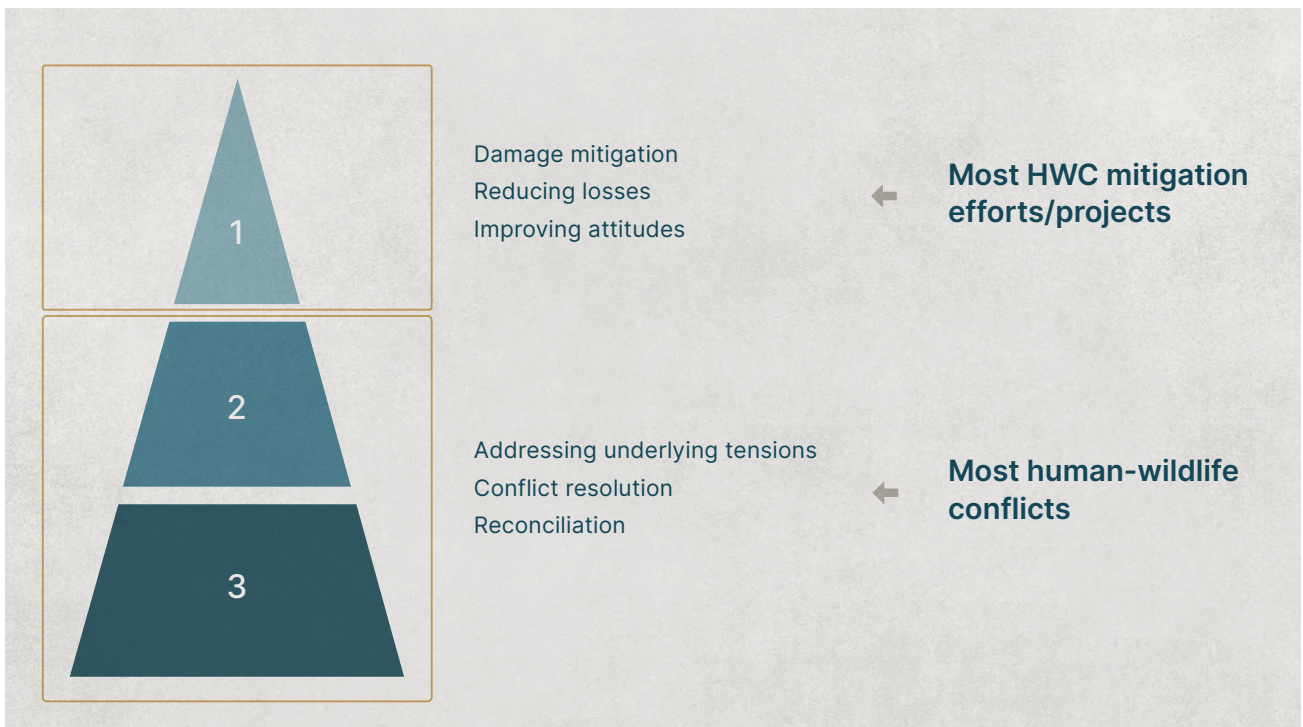


Figure 13. Many human-wildlife conflict interventions focus on the wrong level of conflict. (Adapted from: Zimmermann, 2022, MSc lectures, University of Oxford, with permission)

What approaches are suitable for the levels of conflict?

At Level 1, the aim is to negotiate *practical solutions* that are mutually acceptable and co-designed. Here the emphasis is on approaches that address one or more of the following:

- safeguarding income and security (e.g. barriers, alarms or husbandry improvements);
- reducing perceived risk and actual losses to levels acceptable to the people affected;
- increasing productivity or diversifying income sources to offset risk.

At Level 2, practical solutions need to be accompanied with efforts to repair and strengthen the *relationships* among the parties involved. Interventions that protect income and provide greater security may still play a role in addressing the conflict, but these efforts will need to be complimented with measures and stakeholder dialogues that:

- foster relationship-building communication and understanding that improve relationships among relevant stakeholder groups;
- practically or symbolically address past injustices or unresolved disputes, allowing parties to be heard and their experience validated;
- address relevant social norms and behaviours and discuss previously unresolved issues.

At Level 3, deep divisions or clashing identities need to be *reconciled*. This often includes dealing with seemingly unrelated issues, which are in fact the root drivers of the ongoing divisions and polarisation. Here, the conflict resolution process will seek to:

- refocus dialogue from the disputes to the identity needs of those involved, with an emphasis on rebalancing decision making and ownership, and acknowledging differences in power among the stakeholder groups;
- empower communities through joint decision-making and co-investing in solutions;
- treat stakeholders with dignity and respect – often perceived as lacking by some parties – including symbolic gestures that show respect and willingness to invest effort.

When is third-party outside help needed?

Human-wildlife conflicts are rarely resolved through legal systems or arbitration (a similar process in which a third party serves as a judge, listens to the parties and renders a binding solution (Moffitt & Bordone, 2012)) because, in most countries, existing legislation does not clearly outline how to address these situations or the rights of those involved. Alternative dispute resolution (ADR), a collective term for approaches to setting conflicts outside of courts, usually through the assistance of impartial ADR professionals, is also rarely used for human-wildlife conflicts. Instead, most attempts to resolve human-wildlife conflicts are carried out by conservation agencies, governments or other actors who have a stake or interest in the issue and are not seen by other affected parties as neutral or even as trustworthy.

Level 1 conflicts are the most easily addressed by conservation actors because they require the least amount of dialogue facilitation experience. Facilitation is the process of steering a group through meetings, discussions or planning sessions to help them achieve their joint goal (Hogan, 2005). In the last decade, many organisations have started to offer facilitation training tailored for conservationists. A skilled facilitator is able to handle tensions in the discussions and employ interest-based negotiation to avoid parties retracting into fixed positions and reaching an impasse.

Efforts to resolve Level 2 or Level 3 conflicts, however, should ideally not be led by conservation actors. This is because they themselves are a party to the conflict and are likely *regarded* by other stakeholders as partial and unable to detach from the situation sufficiently to acknowledge the views of other parties as valid. For example, a conservation actor may approach a dispute by setting conditions (taking positions) such as ‘culling of the species in question is not something we are willing to discuss’. If that group were then to lead a discussion about the situation and outcomes, other parties would assume (perhaps correctly) that the conservationist might lead the discussion to outcomes that avoid culling. Just the perception that this might happen can hamper the process. A professional impartial mediator, on the other hand, will allow the discussion of diverse views, even if some are unacceptable to others, in order to ensure that all the options are documented and their outcomes reviewed.

Such a mediator fulfils the role of a *third-party neutral* – someone who is not involved in the situation and has no interests in the outcome. In mediation, such an impartial third party tries to help the disputants come to a mutually acceptable agreement. Unlike an arbitrator, a mediator does not have decision-making power, but helps the parties themselves find a solution together. The mediator helps each side explore the interests that underlie their positions (Moffitt & Bordone, 2012). Mediation involves two essential components: a third person who is neutral and unbiased, and who helps facilitate the parties’ negotiations, but who does not have the authority to make decisions (Awada, 2014).

Issue, relationships and process

Mediators (or ‘third-party neutrals’) use a variety of methods and approaches, and there is also a range of sub-specialisms within the conflict-resolution field. One of these, *conflict transformation*, is outlined briefly below. There is, however, one fundamental concept and the basis of mediation approaches that is useful and informative to understand: all conflict resolution dialogues require attention given to three essential components – issue, relationships and process (Moffitt & Bordone, 2012; Ruppert et al., 2022).

By *issue* we mean the substance or topic of the dispute – the matter about which parties are arguing (e.g. who has the right to graze cattle on a particular piece of land, or who should be compensated for damage caused by wildlife). Mediators are also skilled at paying close attention to the second crucial component, the *relationships* among the parties involved. This includes relationships within groups on the same side of a conflict to determine, for instance, who has influence on a group’s thinking and what the different power dynamics between parties are. Finally, mediators carefully consider *process*, including the history of the process so far (e.g. understanding who has been involved or excluded from decisions, or who has authority) and seek to establish dialogue pathways that redress past imbalances in process inclusion.

These three components are part of every conflict and its resolution. They interact and overlap with each other, all are covered to some (but not necessarily an equal) extent, and they are often schematically depicted in the conflict resolution literature as a Venn diagram. Superimposing the *issue-relationships-process* components onto the levels-of-conflict diagram (Zimmermann et al., 2020b) (Figure 14) shows how this also reflects the levels concept – i.e. Level 1 deals more with the issues, while Levels 2 and 3 require particular time and effort focused on relationship building and quality of process – both of which are usually most effectively facilitated by a third-party neutral.

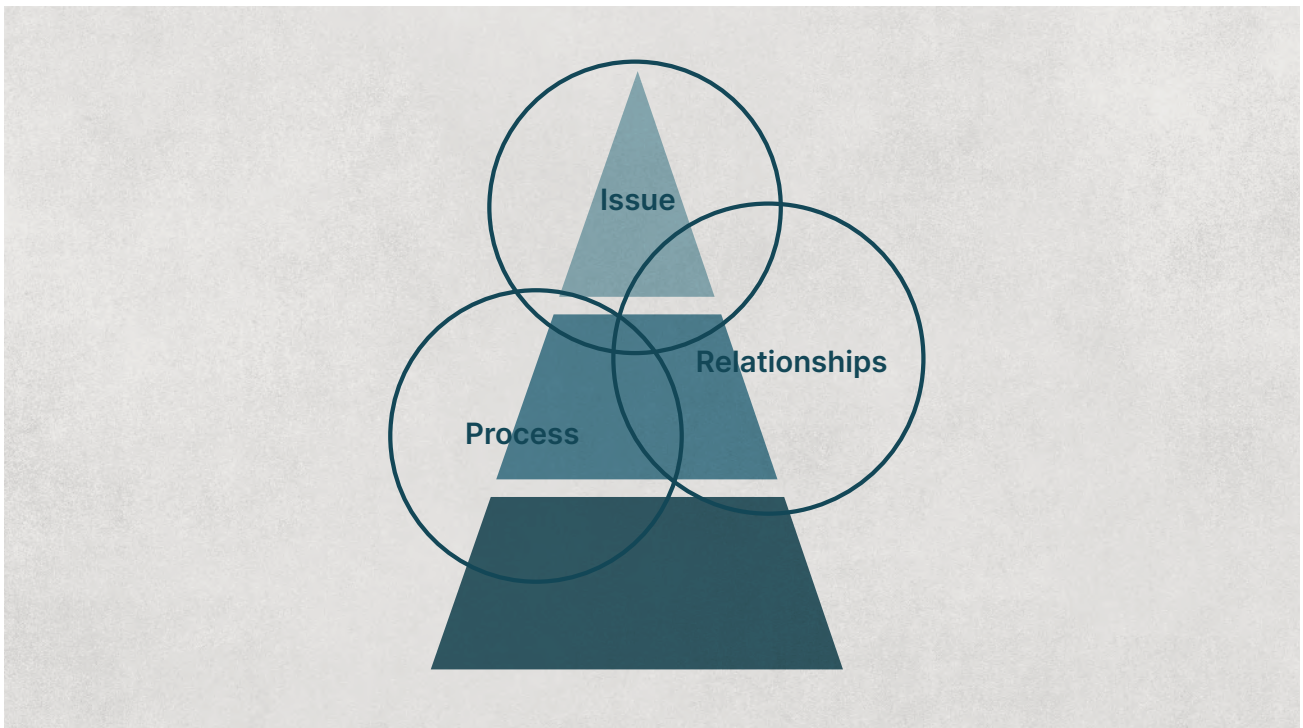


Figure 14. The three core components of conflict resolution. (Adapted from: Zimmermann & McQuinn (in prep), *Negotiating conflicts in conservation*, Oxford University Press, with permission)

In the case of deep-rooted or identity-based conflicts (Level 3) the challenge of resetting relationships, rebuilding cooperation and trust, or reconciling different worldviews is profound. Not only does this require professional support by mediators with a peacebuilding background, it also requires a lot of time – many years, typically. Setbacks are to be expected and progress slow, and the financial costs of such lengthy processes may be substantial. For this reason, it is important to intervene in conflicts early to help prevent them from becoming more entrenched (e.g. Level 2 or 3). Sadly, Level 3, intractable conflicts are persistent, destructive and resistant to resolution (Coleman et al., 2014). Parties involved are very divided and polarised, and hold extreme views of each other, inflamed by mistrust, suspicions and hostile language. In some cases, the parties hold not only opposing views about the issue in question (‘I perceive X to be this way’), but also entirely different realities of the same issue (‘X is this way – that is the only reality that exists’) and are unable and unwilling to see another party’s reality. Nevertheless, Level 3 human-wildlife conflicts are not hopeless; they can be reconciled, and they can provide an opportunity for partnership and learning between conservationists and conflict resolution specialists.

Conflict transformation

Conflict transformation is a distinct approach to addressing conflict that was advanced by John Paul Lederach (Lederach, 1996). It tries to achieve two seemingly opposing goals: settling a dispute in the short-term while also improving the underlying tensions fuelling the conflict. In other words, disputes are reframed as an opportunity to initiate a conflict resolution process that simultaneously addresses the immediate issues raised by parties, while also improving the broader social, political or economic dynamics fueling tension.

In this way, conflict transformation strives to capitalise on Level 1 disputes to engage parties in addressing underlying (Level 2 or 3) conflicts. Historically, conflict resolution has tended to focus on either negotiating the immediate problem or initiating long-term peacebuilding processes that address underlying conflicts. Conflict transformation tries to reconcile these divergent goals' timelines. Conflict transformation strives to address the shortcomings of both approaches: conflict management approaches tend to fixate on the immediate problem, ignoring the underlying conflicts; in contrast, peacebuilding efforts tend to address long-term change, which loses momentum as it often does not improve the immediate situation. For this reason, conflict transformation is a particularly suitable approach for human-wildlife conflicts because it strives to improve the immediate problem while simultaneously addressing the underlying conflicts.

Conclusion

Being able to identify the level of conflicts driving a situation is crucial to knowing what approaches are needed to address each, and whether it is appropriate to bring in external expertise to assist. Once these have been identified, conservationists and other potentially non-neutral parties in an human-wildlife conflict need to enlist the assistance of conflict-resolution specialists, such as mediators, to help untangle the situation. Even though this may often take more time and patience, this helps stakeholders towards a more positive and sustainable way forward.





Engaging with the media and social media

Virat Singh, Vidya Athreya, Chloe Inskip, Alexandra Zimmermann & Ranjeet Jadhav

Information provided by the media has the power to shape – either negatively or positively – public perceptions of, and opinions about, wildlife and human-wildlife conflict. Sensational and inflammatory reporting, for example, can do harm by increasing the public’s perception of the risk posed by wild animals, exacerbating conflicts and increasing public demand for immediate action. Such public pressure can lead to poorly planned or ill-informed conflict mitigation measures as a means of placating the public and diffusing a potentially volatile situation. While such measures may help calm conflicts in the short-term, they will rarely improve – and can further complicate – conflict in the long-term.

Conversely, sensitive, factual and balanced reporting by the media can enhance understanding of human-wildlife conflict situations and their complexities. This can help foster better relationships between stakeholder groups and garner local support for appropriate conflict responses, allowing for knowledge-based actions to be implemented and thus helping to mitigate human-wildlife conflict.

Given the broad reach of the media and the ability of wildlife-related news to attract a high reader- or viewership, the media have the potential to be powerful positive agents of change for human-wildlife conflict locally. It is important, therefore, for those involved in trying to reduce human-wildlife conflict to be able to engage effectively with the media and to understand the types of information that will help conflict reduction efforts.

Types of media and pathways of engagement

Typically, the media with which there may be engagement include two forms: **traditional media**, which include print media (newspapers, magazines, newsletters), broadcast media (television and radio) and digital media (online versions and sources of news, news portals, online articles and videos), and **social media**, which include blogs, social networking and social media platforms, such as Twitter, Facebook, WhatsApp, Instagram, LinkedIn, Reddit and Quora among others.

Usually conservationists connect with the media after a newsworthy incident occurs and the media seek information or guidance from an expert. Due to time restrictions, journalists may at times write about incidents without professional assistance, resulting in news articles or features that are not

well researched and can compound the problem. Conservationists may approach the media about their work and offer an article or news story in rare circumstances when projects are well resourced and have specialist media personnel on board.

Handling acute human-wildlife conflict media situations

In acute human-wildlife conflict incidences, there is heightened interest from the media in the issue. This is particularly the case when there has been a human injury or death, an animal has become trapped or is in an unusual location or situation, or a direct confrontation between animals and people has been captured on photo or video. Such incidences will always lead to some degree of news coverage, often by both traditional and journalist-led media and or public-led social media.

These situations occur and unfold rapidly, and from the conservationist point of view it is very important to ensure that the information and reporting do not escalate the situation, fuel hostile exchanges or lead to the spread of disinformation. The conservationist's objective here is to try to work with the media rapidly, to ensure objective and correct representation of the story, events and wider context. This is more easily achieved when a positive ongoing collaboration with contacts in the media is already established – guidance for which is provided in the next section below.

During an acute human-wildlife conflict media event, there may be an increased demand from the media for information about the situation due to a desire to provide 'real-time' reports on what is happening. If there is a lack of accurate information in these situations there is an increased risk of media stories becoming sensationalist and inflammatory. Thus, efforts should be taken to ensure that accurate information about the human-wildlife conflict reaches journalists, preferably as it unfolds (WhatsApp groups or similar can be a useful means of achieving this). Where applicable, it may also be useful at such times to repeat advice on how people in the conflict area can keep safe or protect their property.

When reporting on human-wildlife conflict, the information provided by the media can shape – either positively or negatively – public opinion of species and the people and organisations working to resolve the conflicts.

Very important also (for people working with human-wildlife conflicts who need to communicate with members of the media, but also to members of the media writing about human-wildlife conflicts) is careful consideration to the use of language in headlines. Table 7 provides examples and alternatives of sensationalist and objective headlines about human-wildlife conflict events.

Table 7. Examples of sensationalist and more objective news headlines concerning human-wildlife conflict situations

Sensationalist headline	Objective Headline
Man-eating leopard on the prowl – government orders shoot on sight	Government issues orders to shoot a problem leopard
Bloodthirsty tiger ordered to be shot on sight after five humans killed	Shoot-on-sight orders for a tiger believed to have killed five people

Rogue elephant kills 16 people	Elephant in 'heat' kills 16 people – most approached or provoked it
Giant killer slithering serpent is on the loose, sparking huge police hunt	Search begins for a 9 ft python on the loose after it escapes from a local house
Killer wolves posing risk for sheep farmers	Rise in wolf attacks worries sheep farmers
Families on guard against grave-robbing badgers	Bereaved seek solution to stop badgers from digging in graveyards
Rogue bear exterminated after rampage through Sapporo in Japan	Bear that injured four, shot dead in Sapporo, Japan

(Source: Compiled by the chapter authors)

Building productive and long-term engagement with the media

Conservation actors can begin by identifying all possible media platforms available in the area in which they are operating and, if appropriate, identifying individuals from these platforms with whom to communicate and create relationships. For some human-wildlife conflicts, broader public opinion may influence responses to, or policy towards, the conflict. In such cases, it may be vital to interact with regional or even national media. In some regions, media people often congregate under the auspices of a Press Club, which is an organisation for journalists and others who are engaged in news dissemination. Press Clubs and other organisations for journalists exist in the majority of cities globally – thus, connecting with these organisations may be beneficial.

It will also be beneficial to gain a basic understanding of the style of reporting used by each platform and, if relevant, their politics and 'house style' of narrative for wildlife and human-wildlife conflict-related news items.

Here are some key things to do when engaging with *print and broadcast media*:

- **Search and identify the media base in your area.** This can be as simple as identifying the main media platforms at your site, checking the names of the journalists who report on relevant topics and reaching out to them in order to build relationships. Be proactive – do not wait for a crisis to arise before this contact is made.
- **Create an early and consistent dialogue.** Regular communication, even during periods of relatively low levels of human-wildlife conflict, is important because it builds rapport and trust with members of the media and facilitates a greater understanding of human-wildlife conflicts, so that when/if a situation worsens reporters will be better equipped to present a balanced view. It also ensures that journalists are aware of who to contact should they wish to gain reliable information about a particular human-wildlife conflict.
- **Use different opportunities to engage with journalists.** This might include press releases, press conferences, informal discussions, events such as workshops or nature walks aimed specifically at

journalists. As above, communications experts or journalists with experience of reporting human-wildlife conflicts may be helpful contributors to these workshops or events. human-wildlife conflict-related press releases may be most effective when issued jointly by the parties working together to alleviate the conflict. The inclusion of experts' opinions (e.g. quotes from researchers) may also strengthen press releases.

- **Use social media.** Social media enable real-time sharing of information and are a powerful means of communicating with the media and the public, and as a means of staying abreast of other content related to human-wildlife conflict, wildlife and conservation that may be circulating. Where such information may intensify conflict situations or hinder responses to human-wildlife conflicts (e.g. fake news, inflammatory messages, inaccurate information), responses to these can be presented.
- **Remain as impartial as possible.** Avoid showing positive or negative bias towards any journalist or media house. Engage with all relevant parties and provide them with the same information, for example via a press release. Similarly, when organising a workshop for the media or a press conference, it is important for these events be inclusive rather than exclusive.
- **Understand the local media culture.** Journalists tend to work to strict deadlines. Furthermore, many journalists are overworked, underpaid and have high expectations placed upon them to know about a broad range of topics. Understanding and being sensitive to these challenges will help cultivate long-term and positive relationships with your media contacts.

Box 12

How Mumbai is learning to live with its leopards

In recent decades, leopards have adapted to life in human-dominated landscapes, and many cities in India, including Mumbai, are now home to leopard populations. Human-leopard conflict (HLC) has subsequently become an issue in these urban environments. In Mumbai, leopard attacks on humans increased significantly between 2001 and 2005, with people being injured or killed. Leopard sightings, which are also relatively common, were enough to spark fear and calls from the public for leopard removals. At this time, responses to HLC incidents typically involved trapping the 'problem' leopards and releasing them elsewhere. The media's reporting of such incidents served to increase Mumbaikars' fear of leopards and frustration with official responses to the problem.

In 2011, the Sanjay Gandhi National Park (SGNP) authorities embarked on a project to reduce HLC in Mumbai. This project brought together for the first time all key stakeholders (see Chapter 13, Working with stakeholders and communities) in Mumbai's HLC issue and, importantly, established links with Mumbai's media to improve reporting around the issue.

The project involved research into the behaviour and movement patterns of Mumbai's leopards, the formation of response teams (see Chapter 28, Response teams) and a

dedicated call centre to deal with incident reports and complaints, and campaigns to raise awareness of what to do and what not to do when one encounters a leopard. Regular workshops with representatives from the local media were conducted by the Forest Department, wildlife biologists and senior journalists to train journalists in sensitive and accurate reporting of HLC incidents and leopard sightings.

Media workshops continue as part of this ongoing initiative. Additionally, the Forest Department, local wildlife NGOs and wardens ensure that timely information about leopards, HLC incidents and responses to these is provided to the media. This information is provided via meetings, press releases and social media (WhatsApp, Facebook and Twitter). They also provide, where appropriate, images and video footage that can be used by journalists in their articles.

A media analysis of the print news headlines before and after the intervention of this project found a marked positive difference in the nature of reporting about Mumbai's HLC (Hathaway et al., 2017).

Providing information to the media: some guidance

- **Communicating with media using simple language.** When dealing with the press, it is critical that the language used is clear, simple and understandable. It is also critical to avoid provocative words or phrases that could cause panic or anxiety. All of the material presented should offer value and perspective to the reporting of journalists. Table 8 provides some simple criteria for people working to reduce human-wildlife conflict to follow when talking with media contacts to support them in writing clear, factual and engaging pieces.
- **Seek to dispel myths and misinformation.** Local people may hold inaccurate beliefs about animals, which are based, for example, on local myths or shaped by misinformation about a species. Informed and sensitively handled press communications can help to dispel such myths. However, due to the complex psychological and cultural processes that underpin people's beliefs, dispelling myths and misinformation is not always straightforward, and direct challenges to these beliefs may not be the most effective means of doing this (MacFarlane & Rocha, 2020). Instead, it is important that the information and messages conveyed to, and by, the media are framed in a manner appropriate for achieving change in beliefs (see MacFarlane and Rocha (2020) for examples and Chapter 8, Attitudes, tolerance and human behaviour).
- **Keep journalists and the public engaged.** Whenever possible, provide media contacts with interesting stories, summaries of new research initiatives or the results of such initiatives, or information about project developments or events. Importantly, such information should not become monotonous and repetitive over time. Instead, provide fresh, interesting information that

will help to maintain engagement. While this may not always be easy considering the workload of those trying to address human-wildlife conflict, the more regularly this can be done the better.

Table 8. Guidelines for communicating about human-wildlife conflict

	Avoid using/providing	Do use/provide
Language	<p>Complex language, jargon or technically detailed, incorrect, exaggerated or vague statements</p> <p>Example: Crocodilian attack peaks are significantly correlated with high humidity, temperatures and breeding peaks. Elevation of water levels leads to a lower density of crocodile distribution, with breeding peaks triggering escalation of testosterone levels, especially in male crocodiles. Furthermore, subtropical temperatures elevate activity levels in cold-blooded crocodiles. The interplay of these multiple variables results in increased incidences of attacks on humans.</p>	<p>Clear, concise language</p> <p>Example: Experts speculate that crocodile attacks on people peak during the rainy season because crocodiles may be more active at that time, due to the warmer temperatures, and also because when water levels are higher they are more widespread. Male crocodiles may also be more aggressive at this time of year because of increased testosterone levels associated with the breeding season, which coincides with the rainy season.</p>
	<p>Language that shows bias towards any party involved in the human-wildlife conflict</p> <p>Example: Protected by law, the badgers are allowed to run riot, despite pleas from residents for intervention before the animals start digging up bodies — or angry townsfolk take matters into their own hands.</p>	<p>Impartial language</p> <p>Example: Badgers protected under law have been reportedly digging in graveyards, leaving residents concerned about the desecration of graves of their loved ones.</p>
	<p>Inflammatory or emotionally charged words or phrases</p> <p>Example: infested with crocodiles</p>	<p>Unemotional language</p> <p>Example: inhabited by crocodiles</p>
Sentence structure	<p>Long, complex sentences</p> <p>Example: War and armed civil strife across the globe not only are a cause of widespread human suffering, but also exert a significant, yet poorly recognised, threat to thousands of mammalian and bird species, according to newly published scientific research in the journal, Conservation Letters.</p>	<p>Short, easy-to-follow sentences</p> <p>Example: War and armed conflicts pose a significant but under-recognised threat to thousands of mammal and bird species, according to a new study.</p>
Accuracy and context	<p>Report study or project findings or outcomes in a way that is vague and/or does not reflect their true context</p> <p>Example: Elephants damage 65% of farmers' fields in Botswana.</p>	<p>Report study or project findings or outcomes accurately, and provide appropriate context</p> <p>Example: A study in two villages in Botswana found that farmers believe elephants are responsible for up to 65% of crop losses.</p>

Discourse and standpoint	Discourses and metaphors that may alienate stakeholder groups and exacerbate conservation conflicts – for example, military metaphors (Larson, 2005; Veríssimo & Campbell, 2015) Example: Civilian guards deployed to protect innocent wildlife in fight against bloodthirsty hunters.	Simple, factual statements that accurately convey the situation Example: Volunteers try to reduce hunting pressure on endangered wildlife.
Terminology	Terminology that inaccurately represents a situation or stakeholder group(s) Example: Is it correct to refer to hunting (legal, with or without permits and quotas etc.) or poaching (illegal, uncontrolled) of wildlife and ‘hunters’ or ‘poachers’ in the given context?	The correct terminology for the situation or stakeholder group(s)
Imagery	Sensationalist imagery (photographs or video footage) of the species and people involved in the human-wildlife conflict	Neutral imagery (photographs or video footage) of the species and people involved in the human-wildlife conflict

(Source: Compiled by the chapter authors)

A note on social media, fake news and disinformation

Social media has been emerging as a major source for news gathering. Globally, social media networking platforms, such as Twitter, Instagram, Facebook and WhatsApp, have transformed into news providers, and the majority of the populace now shares as well as accepts this information without fact-checking or cross-examining it, which in turn results in the spread of fake news and disinformation. Given its potential to form public opinion on crucial issues related to wildlife conservation, social media can turn into a force that drives a wrong narrative, which will fuel divisions and polarise groups, thus contributing to the worsening of issues like human-wildlife conflict (see Chapter 1, Levels of conflict over wildlife). While monitoring the spread of false news needs devoted resources and time, individuals can play a limited but important role by flagging fake news and incorrect information whenever they come across it.





IUCN SSC GUIDELINES

PRINCIPLE 4 —

Integrate science and policy



Social science research

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Juliette Young & Catherine Hill*

Social science: what it is and why we need it

Engaging with the social, psychological, economic and political dimensions of wildlife management and conservation is essential for robust and effective actions and policies regarding human-wildlife conflicts. The term social science encompasses a large number of disciplines and sub-disciplines (Bennett et al., 2017). Psychology, anthropology, geography, sociology and political science are examples of the social sciences that have been used to understand the drivers of humans' feelings, values, worldviews, thoughts and actions in the context of human-wildlife conflict, from individual stakeholders' perspectives (e.g. attitudes) to landscape-level management and national-level policies (see Bennett et al. (2017) for an overview). Specifically, in the context of human-wildlife conflicts, understanding different interest groups' perspectives and their different value systems, beliefs, priorities and agendas is necessary to find out how to address challenges for improved actions for people and wildlife.

Social science research

Starting a social science research project begins by identifying the research question(s) or topics to be examined and the perspective used to address that question or topic (for an overview of the different ways of knowing and conceptualising the world within social sciences, see Moon and Blackman (2014) (Figure 15). Based on this, the researcher should undertake a review of what has already been done on the topic and identify the methodology that best fits the research.

A methodology differs from a method because it describes the rationale of why, what and how to address the research question(s) in terms of research design structure, sampling and methods. Methods, on the other hand, are ‘the tools of data collection and analysis’ (Moon, Blackman, et al., 2019).

Different methods apply to several disciplines of social sciences. Some disciplines have influenced one another with their expertise in a particular method. For example, nowadays, rigorous archival records research is not limited to history, advanced statistical analysis is used beyond economics, social network analysis software is extensively used outside sociology and participatory observation is taken seriously in disciplines other than ethnography. However, methods are tools that always need to be adapted and reflexively tailored to the purposes of a specific piece of research.

One kind of qualitative research involves an inductive methodology (i.e. starting from observation) in which the aim is to avoid preconceptions and understand things that cannot easily be accessed, such as the feelings, experiences and thought processes of stakeholders. Grounded theory, for example, aims to discover concepts and relationships from raw data, requiring long-term immersion in the field, where exposure to context generates questions. These are recorded, coded and organised into a theoretical explanatory scheme (Strauss & Corbin, 1998) (Figure 15).

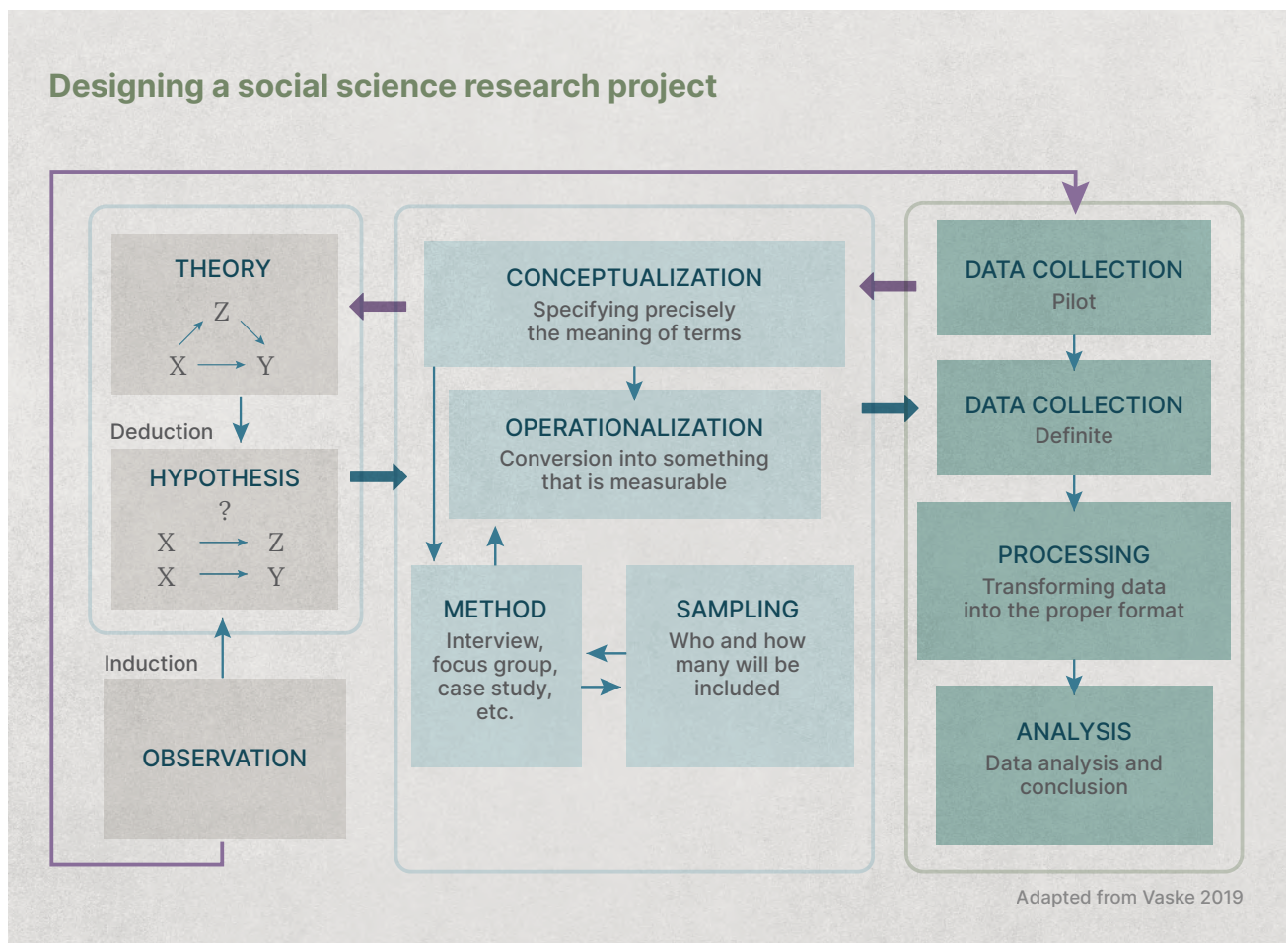


Figure 15. Flowchart of steps to design a social science research process. The purple line indicates the grounded theory process. (Adapted from: Vaske (2019) with permission)

Designing social science research

Collaborating with a social scientist, who has the training, experience and skills to conduct robust and reliable research, is certainly advisable, if not essential. Involving them from the outset of your research will help ensure the work is valuable (Martin, 2020), methods are adopted and the final analyses are carried out appropriately.

1. Decide on your research question(s)

Start from the big picture: what is it that you want to achieve with the research? Identify whether the research type will be exploratory (e.g. not much is known about the topic within the location/situation context, such as feelings toward okapi), descriptive (e.g. a case study, such as an example visitor experience at the zoo), comparative (comparing groups, or relations between them, such as case study 1 in Box 13) or explanatory (investigating causality between variables, such as case study 2). Then identify what you need to know to achieve your goal.

2. Review the literature and specify the meanings of the variables

In most cases, an extensive literature review is fundamental for gathering pertinent information. This will also guide the identification and definition of the topics to be converted into something measurable (i.e. operationalised).

3. Define the sampling strategy

This will be driven by the type of research question(s) and also by resources (e.g. time, money, personnel). Useful questions to consider are: What is the population of interest? What proportion can realistically be sampled? Are there important subgroups that might be under-represented? (St. John et al., 2014). Consider how you will collect the data (e.g. face to face/in person, online, by telephone, document analysis) because this will help determine your sampling strategy (Newing (2010). The following should be considered when deciding on sample size:

- **Qualitative.** Theoretical saturation is the stage in qualitative data collection when collecting more data produces little important new information or understanding relevant to your research questions.
- **Quantitative.** When the objective is generalisation the sample size depends on the size of the study population and on the chosen confidence level (e.g. 95%) and confidence interval, or margin of error (e.g. 2%). These can be calculated using Survey System: www.surveysystem.com/sscalc.htm
- **Both.** When the emphasis is explanatory, the sample size depends on the magnitude of the differences between samples (e.g. samples A and B are different) or the association between variables (e.g. variables X and Y are correlated). In those cases where the effect (difference between samples A and B or association between X and Y) is big, a small sample size might be enough to detect it. In most of the cases, an estimated sample can be based on what previous research studies on a similar topic have used; however, a definitive final sample size cannot be estimated in advance.

4. Consider the methods

Less structured methods generating qualitative data (e.g. unstructured or semi-structured interviews, focus groups, participant observation) seek to understand the nature and underlying characteristics of variability. More structured methods (e.g. structured interviews) attempt to reduce error variances by using standardised categories and applying these across a sample designed to be representative of a wide population (see Table 9 for some methods).

Table 9. Some of the more common research methods used (from qualitative to quantitative). (For more information on these methods, as well as others used in social science research)

Methods QUALITATIVE	What is involved	Methods MIXED	What is involved	Methods QUANTITATIVE	What is involved
Participant observation	Participating in the life of the study community and making systematic observations (Newing, 2010)	Q-methodology	Mixed-method approach to understand areas of agreement among different stakeholders	Structured interviews	Standardised questions within a questionnaire
Unstructured interviews	Face-to-face interviews in which researcher does not use a guide, but focuses on topics	Deliberative methods to build consensus or enact group think	For example, the Delphi technique, multi-criteria analysis or citizen jury	Content analysis	Systematic analysis of text, video or photos to discover common themes
Semi-structured interviews	Where an interview guide is used to direct questions around set topics			Methods to ask sensitive questions	For example, the unmatched count technique
Focus groups	Pre-arranged group interviews with 5–10 'similar' respondents to explore in-depth				

(Source: Compiled by the chapter authors)

5. Collect the data, but pilot first

Seeking ethical approval prior to beginning any research is an essential step. It is important to pilot the method to check its clarity, length and feasibility. Recording interviews is highly preferable, but participants need to give their consent to being recorded. It is important to ensure that an accurate record is made of what participants say rather than what you thought they said. Data collection for participant observation can involve taking photos/videos, recording conversations, writing memos and much more.

6. Analyse the data

The analytical approach used will depend on the research methodology implemented. Qualitative data, such as interview transcripts, field notes or recordings (video/audio/images) and text documents are non-numeric. Analysis is used to interpret the results (for further advice, see Newing (2010)). It is also possible to extract quantitative data from qualitative samples provided an appropriate sampling strategy was used during data collection. Quantitative data comprise numerical measures or frequency counts of target variables. There are dedicated software packages available to analyse findings. The most frequently used are NVivo, R packages and Atlas.Ti for qualitative data, and SPSS, R packages and Stata for quantitative data.

7. Share the findings

Outputs could include academic products (e.g. journal articles, reports and conference papers), along with wider communication materials, such as manuals or policy briefs, and media coverage (radio, TV, social media or blogs). It is good practice to present results back to research participants in order to obtain feedback and to advance the discussion toward further participatory approaches to finding solutions.

The ethics of social research

Researchers' ethical responsibilities include: choice of a question, study group and area; choice of funding; negotiating access, and fair exchanges or remuneration for participation; and interpretation and sharing of results, and safeguarding of data. Researchers must not harm the psychological, physical or social well-being of those they work with, and must respect their rights, interests, sensitivities and privacy.

The research design should be scrutinized and receive ethical clearance by an institutional review board. For interviews and participant observation it is essential to obtain informed consent (verbal or written) from each participant, ensuring they understand the purpose of the research, that participation is voluntary and they can withdraw from it at any time, that they have the option to remain anonymous, and finally how the data will be used and safely stored.

Researchers must protect participants from harmful effects of the research. Fair return must be made for assistance, and researchers should be aware of the intellectual property rights of participants in their countries, and communicate this to them.

Researchers should clarify in advance the roles, rights and obligations of the researcher, the employer, funder and/or sponsor, and be sure not to agree or imply acceptance of conditions contrary to their own ethics or commitments to participants. Finally, researchers' actions should not jeopardise the reputation of their discipline and thus of future research.

Box 13

Case study 1: Qualitative approach to understanding underlying drivers of conflict with carnivores in Namibia (Rust et al., 2016)

To understand underlying social factors, a qualitative approach was used to collect data on human-carnivore conflict in north-central Namibia's livestock farms. First, a literature review was conducted to determine what had already been discovered about the topic and where the research gaps lay. Next, the scope of the research was defined, which included the geographic areas of focus, the methodological approach, the themes on which to base the interview questions and the populations to target. A rapid stakeholder analysis was undertaken to determine which stakeholders needed to be interviewed, which helped ensure that all views were included in data collection. Ethical approval was obtained from the researcher's institution once the methodology had been developed.

An interview guide was created, informed by areas the researcher had found were gaps in the literature. This guide was piloted on a subset of the study population to determine wording clarity and conciseness, and then adapted accordingly. Once the interview guide was finalised, findings from the stakeholder analysis helped inform the purposeful sampling. The researcher contacted individuals to ask whether they would like to be interviewed and, if they agreed, arranged a time for the interview. Before the interview began, the researcher obtained free, prior informed consent (FPIC) and asked if the respondent agreed to have the interview recorded. If this was approved, the interview commenced using the questions from the interview guide, whilst asking additional follow-up questions if further clarification was needed.

The 67 interviews were transcribed into NVivo alongside memos recorded from 8 months of participant observation. These were analysed using a grounded-theory approach, searching for common themes emerging from the interviews, which were tagged in NVivo. Results were written up based on the themes that emerged and anonymised quotes were used to show both typical and atypical examples of a theme, and shared with participants.

Box 14

Case study 2: Quantitative approach to predicting the intention to kill jaguars in Amazonia and Pantanal, Brazil (Marchini & Macdonald, 2012)

To explore the relationships between ranchers' perceptions of jaguar impact on human livelihood and ranchers' jaguar killing behaviour, this study used the theory of planned behaviour (TPB – see Chapter 8, Attitudes, tolerance and human behaviour). The TPB proposes that human behaviours are determined not only by personal attitudes, but also by social pressures, perceived control over one's own behaviour and the intention to engage in that behaviour.

Qualitative, semi-structured interviews were used in the pilot study. By listening to people talk freely, researchers were able to identify relevant beliefs, perceptions and peculiarities of the local jargon, which were then used in the design of a close-ended questionnaire, and in adjusting the language for the ranchers in Amazonia and Pantanal. During the piloting process, open-ended questions were replaced incrementally by quantitative questions that would produce data suitable for inferential statistical analysis. Once the definite questionnaire was designed, a systematic sampling strategy was adopted to collect data: personal structured interviews were conducted at every third ranch along randomly selected roads. In total, 268 ranchers were interviewed.

The questionnaire contained all the elements needed to address the TPB. The answers to the questions that assessed *perceptions of jaguar impact* on livestock and on human safety were recorded on a six-point scale coded 0–5 (no impact to high impact). Respondents' *attitudes towards killing jaguars* were assessed by asking them to indicate their attitude towards killing the next jaguar that appeared on their properties, using five-point evaluative semantic differential scales. The attitude to jaguar killing scale ranged from –2 (most unfavourable) to 2 (most favourable). *Subjective norms, descriptive norms, group identification, perceived behavioural control and intention to kill* were recorded on a five-point scale ranging from 1 (minimum) to 5 (maximum). Two approaches were used to assess jaguar-killing behaviour: 1) respondents were asked if they had ever killed a jaguar and, if so, when they had last done this; and 2) respondents were asked to say which of their neighbours had killed jaguars within the previous 5 years.

Average scales were created to summarise each of the above variables. An analysis of the internal coherence of the scale was used to estimate scale reliability. General linear models (GLMs) were then applied to develop a predictive model of jaguar killing for each study area.



Ecological research

Mayukh Chatterjee, James Stevens & Sugoto Roy

Wildlife species are integral elements of the environment they live in, and therefore different environmental processes impacting their distribution, demography and behaviour may be responsible for driving human-wildlife conflicts. Diverse environmental changes, natural or human induced, can potentially impact and drive cascading processes, ultimately giving rise to human-wildlife conflicts in a particular landscape (see Chapter 6, Natural drivers of human-wildlife conflict). Understanding ecological drivers, and the various linkages and processes that ultimately shape human-wildlife conflicts, is therefore indispensable for this ecological research. Crucial to this is also an appropriate level of engagement and inclusion of local communities in the planning and implementation of research, allowing for clarity of aims, inputs and feedback.

Broadly, ecological research questions revolve around the following five areas of interest:

1. Identification of conflict hotspots and their environmental correlates.
2. Identification of species, groups and/or individuals engaged in conflict.
3. Demography and distribution of the species in question.
4. Resource utilisation by the species across time and space.
5. Species behaviour – adaptation and behavioural flexibility.

Aside from these broad areas of research interests, individual methods and techniques may also be used for immediate assessments to facilitate management of individual human-wildlife conflict situations and inform policy. For example, this may involve the collection of information on individual human-wildlife conflict cases, or the identification of the species or individuals involved in a surge of incidences in an area. In both cases, specific techniques and tools may be employed to collect vital data quickly, without needing to carry out more detailed research. Therefore, depending upon the need and the type of information required, different methods (either singly or in combination) can be used (Table 10).

Table 10. Quick reference matrix for type of method/technique to be employed for collecting different types of data to address different research/investigation needs

Time frame	Need	Type of information required	Technique/method	Pros	Cons
Short- to mid-term (for managing immediate conflict situations and getting preliminary understanding of human-wildlife conflict scenario)	Managing immediate conflict situations and ramifications	Detailed reports on incidents	Local interviews	Quick data	Can provide misleading information and may need additional validation
		Identity of species/groups/individuals involved and their movement patterns	Camera trapping, photographs	Non-invasive, and accurate information can be collected over long periods of time	Difficult to ID individuals without distinct markings; expensive equipment; risk of theft; limited by some weather conditions
			Genetic assessment	Accurate species and individual identification	Difficult to acquire uncontaminated samples; difficult to preserve samples; analysis takes time; expensive
			Spoor/sign tracking	Non-invasive and cost-effective	Observer biases in identification of signs; not appropriate for highly elusive species or in areas where tracking is difficult due to substrate
	Assessing spatial spread of conflicts and correlates	Past and current incident reports and locations	Opportunistic records	Cost-effective	Missing important cases, especially past cases
			Secondary data	Cost-effective and ready information	May have biases; erroneous location details
		Animal presence vis-à-vis environmental correlates and factors	Trail surveys	Cost-effective, and can be done quickly	Sampling bias
			Point or line transects	Systematic and allow for complex analyses	Sampling bias; observer biases; not fit for solitary or highly elusive species; cannot lay line transects in all terrain
Long-term (for developing long-term management strategies, management plans, etc.)	Species population trends	Number of individuals, recruitment and death rates	Camera trapping, photographs	Non-invasive and can collect data over long periods of time	For naturally marked species
			Point or line transects	Systematic and allow for complex analyses	Useful for group-living species only; difficult to lay lines in all terrains
			Acoustic devices	Non-invasive and passive	Only useful for species with distinct audible calls (vocalisations)
	Assessment of ecological factors driving animal distribution/movement and driving conflicts	Records of incidents over longer time periods	Opportunistic records/interviews	High-quality information on conflict cases	Acquired opportunistically – takes time, requires extensive travel
		Spatial data of animal presence/movement in landscape over period of time	Camera trapping	Non-invasive, and can be deployed for long periods of time	Expensive; does not work well for species without distinct natural markings; limited by some weather conditions
			Acoustic devices	Non-invasive, and can be deployed for long periods of time; passive devices – do not disturb animals	Works only for species with distinct calls; difficult to distinguish between individuals and hence interpret movement

			Unmanned vehicle surveys	Micro-scale real-time data can be recorded	Expensive; only useful for species living in open areas or in conjunction with radio transmitters
			Radio collaring/tagging	High-quality locational and movement data	Expensive; invasive – requires capture of the animal
		Habitat assessment	Transects/points	High-quality data	Difficult to carry out over very large landscapes and difficult terrain
		Unmanned vehicle surveys	High-quality macro- and micro-level data; can be carried out over large landscapes and difficult terrain	Expensive; requires piloting skills	

(Source: Compiled by the chapter authors)

Identifying conflict hotspots and environmental correlates

The identification of hotspots – smaller areas within the larger landscape where human-wildlife conflict incidences occur repeatedly – is very important and helpful in human-wildlife conflict management across a region. Once identified, it is then important to understand the geographical, ecological and societal factors that may give rise to such spatial clustering of human-wildlife conflicts.

To carry out research in this area, data must be collected on past and present incidents, which may be available in the form of local authority records, or can be studied via interviews with affected communities (see Chapter 13, Working with stakeholders and communities, Chapter 19, Social science research and Chapter 10, How histories shape interactions). Similar data, when collected across annual cycles, can help address questions regarding temporal clustering of conflicts and the underlying causes for such clustering.

Different ecological correlates can be assessed using different methods. Terrain type and linear distances from elements such as forests, waterbodies, human settlements etc. can be ascertained from maps or generated using geographical information systems (GIS). Surveys or technological tools such as drones may also be used to verify and map geophysical attributes of the area, while vegetation types and composition, for example, can be measured using standardised techniques such as vegetation transects and quadrats (Sutherland, 2006). Prey distributions and anthropogenic disturbances (thoroughfares, grazing etc.) can be assessed using sign surveys, transects, as well as systematic camera trapping (Karanth & Nichols, 2002; Rovero & Zimmermann, 2016). As with social research (which should be carried out by social scientists), these types of ecological research require specialists, who can form part of a wider interdisciplinary team.

Species, group(s) and individual identification

Identification of the species and the group(s) or individuals involved in incidences with people is often required in areas where several animals/groups exist that can cause similar impacts – for example, multiple predators can kill livestock or predate on fish. Identification is also important for management of individual animals, such as in specific removal or capture–relocation operations (see Chapter 25, Animal capture and translocation and Chapter 26, Lethal control tools).

Species identification may be carried out through opportunistic or systematic sign surveys, to identify different species' typical signs of presence. It may also be carried out using camera traps to capture images and/or videos of the animal involved, especially if the species is a highly elusive one. Genetic assessments may also be used, provided uncontaminated biological samples are easily available and accessible. In case the species in question is a highly vocal species, acoustic devices may also be used to capture sounds remotely in order to identify its presence.

Identification of an individual animal or a group of animals may be required to broadly ascertain the causality of an individual conflict situation at a proximate level – for example: is it a 'problem' animal, or a group of animals; is it of the major dispersing age and sex; was it a rehabilitated animal? Individual identification can be achieved through photographing individuals after tracking and obtaining visuals, camera trapping (for patterned animals) and genetic analyses.

Demography and distribution of the species in question

Demographic parameters (such as births, deaths and sex ratios) may need to be ascertained to understand if these might be promoting conflicts. For example, a sudden increase in births may lead to a higher number of individuals moving out of the bounds of the habitat in search for new territories or feeding areas, and therefore engaging in more interactions with humans or with humans that are not accustomed to coexisting with that particular species. Demographic parameters can be determined by direct observations and individual identifications (of visible species), or by extensive camera trapping, provided the species in focus is not highly elusive. Camera trapping using appropriate methodologies (Karanth & Nichols, 2002; O'Connell et al., 2010) can be also used to understand how the species is distributed in space. Recent technological developments also allow for use of acoustic devices to detect the presence of elusive species that are vocal.

Resource utilisation by the species

An understanding of how species utilise space and other resources, such as patches of food, is particularly important when the species typically move over large areas. For instance, if human-wildlife conflict in a region is highly seasonal and involves a long-ranging species, it may be useful to understand why the species uses the particular region during that time period (e.g. wildebeest fawning and interactions with Maasai on fawning grounds. Such use of resources may be investigated at multiple levels, including the use of natural elements, such as habitat types and food items. Diet is best analysed by collecting scat (animal faeces) samples and assessing their contents to identify the types of food consumed and relative volume of each.

Radio/satellite collars or tags can provide crucial information on space use over time by animals, which along with direct observations and scat analysis can provide deep insights into utilisation of habitat and food over space and time. Camera trapping of easily distinguishable species (with natural markings) or marked animals can also be an alternative to more expensive and invasive radio/satellite collars in understanding habitat utilisation. A more tedious and expensive method to assess the same is through genetic analysis from scat samples, using a capture–mark–recapture framework. Using intensive monitoring approaches, with individual identification of individuals over large areas and long time periods, also provides a wealth of insight into resource use and adaptation to human presence.

Species behaviour – adaptation and behavioural flexibility

Although time-consuming, gaining an understanding of animal behaviour is crucial to managing a situation (see Chapter 7, Animal behaviour). However, since most behavioural research requires copious observations, such research can rarely be carried out over short periods of time. Direct visual observation of animals causing damage can often be hard to achieve. However, camera traps can gather video footage of animals causing damage and even indirect signs such as spoor can be used to

help formulate why a behaviour might be occurring. Direct behavioural observations, where possible (e.g. with larger mammals), may be carried out using appropriate methodologies (Altmann (1974). When using tools such as camera traps, these may be deployed in a stratified manner in order to cover different habitat variables across which behaviours may be compared, or placed in locations (i.e. specific field or enclosure) where damage has been occurring repeatedly to understand a specific situation, or just opportunistically if the effort is exploratory in nature.

Box 15

Methods and tools for ecological and behavioural data collection

Direct observations

In-field observations by conservationists/researchers are invaluable, as they allow for recording of detailed information without relying on recalled data. Although it is rarely possible to witness every conflict situation, direct observations to record animal behaviour using an appropriate sampling framework (Altmann, 1974) to suit the species, terrain and other constraints, can be crucial in long-term ecological research to understand changes in animal behaviour and ecology that may be driving or impacted by prevalent human-wildlife conflict scenarios.

Sign or spoor surveys

Signs of animal presence, such as their scat, spoor (paw prints, pug marks etc.), hairs, feeding, or den sites, can provide crucial information about animal presence. These can therefore be used as proxies of animal distribution when systematic efforts to detect such signs are made using existing sampling frameworks. One key issue in estimating animal populations and distributions with spoor or other signs, is that of distinguishing between individual adult animals. Hence estimated population parameters are often crude, when compared with using other techniques that rely on individual identification. However, sign or spoor surveys are invaluable in being the most cost-effective methods for assessing species population, distribution and movement.

Transects

Transects are used for estimating animal abundance, and are especially useful for large landscapes and easily detectable species. This sampling strategy employs a spatial layout of straight lines, belts/strips or points to assess the presence and abundance of animals (and plants) (see Buckland et al. (2015). Transects can be sampled on foot or by using manned transport (such as cars, boats or aeroplanes) or unmanned vehicles (drones). Aerial vehicles (unmanned or manned) are particularly useful in relatively open habitats (such as savanna) that allow detection of animals from the air.

Camera traps

Camera traps are automated digital cameras that utilise a passive infrared beam to trigger the device when an animal crosses its field of detection. They are very useful for assessing the presence of elusive animals (difficult to detect using sign surveys), and are widely used for this purpose. When deployed in large numbers, using an appropriate sampling framework, they can aid in assessing the population of a particular species under a mark–recapture framework (Karanth & Nichols, 2002; Rovero & Zimmermann, 2016). This works best for species that have distinguishing natural markings to identify individuals, such as stripes of tigers or rosettes of jaguars. Besides this, camera trapping is also particularly useful during individual situations of conflict to identify the species and individuals of the species, and even capture behaviours.

Genetic analyses

Often animals leave behind biological materials at sites where they are present, in the form of scat, hair and saliva, which can provide genetic material for confirming the species and establishing the identity of the individual. This can help researchers gain insights into a conflict situation by identifying the animal/s responsible. For example, when an animal causes human deaths, it is extremely important to identify the individual animal responsible to avoid capture or elimination of another individual of the species in the area.

Radio or satellite collars/tags

This is a tool comprising a radio transmitter along with an onboard GPS device or a satellite transceiver, which mounted on an animal (e.g. using a collar or a backpack) (Millsbaugh & Marzluff, 2001). These have been developed specifically for aiding in research on animal movements. In conflict situations they can be extremely helpful in assessing movements of animals engaged in conflicts, as well as help in understanding the pattern of use of an area by an animal or a group of animals, which can aid in developing mitigation strategies. They are, however, limiting in terms of their higher costs and the massive efforts required to capture a free-ranging animal (especially for larger species) to fit it with the device.

Acoustic devices

These are recording devices that automatically record sounds from the surrounding vicinity. They can either be programmed to record within set thresholds of sound wavelengths and amplitudes, or can be passive devices that record all sounds. Irrespective of type, they are being increasingly used not only to detect elusive species that produce characteristic vocalisations (calls), but also to assess other habitat variables, such as human presence and signs of disturbance (e.g. tree felling).

Unmanned vehicles

Unmanned vehicles or drones are automated vehicles that allow researchers to investigate inaccessible areas, or sample vast landscapes. While such automated vehicles exist for land, water and air, unmanned aerial vehicles (UAV) in recent times have become extremely popular in wildlife research. Often rigged with high-resolution cameras, they not only allow researchers to sample species across vast landscapes using methods such as transect sampling, but can also be retrofitted with other devices, such as radio receivers to monitor radio-collared animals. In specific conflict situations they have also been successfully utilised to search for and detect individual animals responsible for conflict (e.g.

<https://www.dnaindia.com/india/report-tiger-that-killed-three-people-trapped-in-a-daring-operation-2251087>) and have the potential to record damage caused by wildlife.





Planning across landscapes

Anna Songhurst, James Stevens, Michael Manfredi & Graham McCulloch

Why do we need to plan?

A common factor attributed to causing many conflicts between humans and wildlife is land-use change (see Chapter 6, Natural drivers of human-wildlife conflict). When natural ecosystems are converted to agricultural land or human settlements, wildlife habitats can become reduced and fragmented, which leads to increased competition for space and resources, resulting in more frequent interactions between people and wildlife (Agetsuma, 2007; Linkie et al., 2003; Woodroffe et al., 2005). As existing habitat becomes progressively fragmented and human-wildlife interactions become more frequent, human-wildlife conflict can ultimately increase (Nyhus & Tilson, 2004). Indeed, conversion of habitat has been identified as the most important underlying driver of human-wildlife conflict, particularly crop damage by herbivores among rural crop lands (e.g. Songhurst and Coulson (2014); Pozo et al. (2017). Finding ways for people and wildlife to coexist in socio-ecological landscapes requires affording both people and wildlife access to critical resources and space (Songhurst et al., 2016). Spatial planning and appropriate land use zoning that considers shared space and critical resource needs is, therefore, imperative in any human-wildlife conflict management strategy, if landscapes of coexistence are to be successful (Woodroffe et al., 2005).

What is spatial and landscape planning in human-wildlife conflict management?

Spatial and land-use planning involves the identification of land uses or zones that consider people and wildlife in a way that minimises overlap and competition for space and resources between humans and wildlife, thus reducing the likelihood of negative interactions, property damage and injury or death for either party.

A particular approach that has been used by land use planners is zoning. This has been widely used in biodiversity conservation, with the creation of national parks, nature reserves and other protected areas (Linnell et al., 2005). Theoretically, though, large mammal populations are best conserved in landscapes where large protected areas are surrounded by buffer zones, connected to other areas of

critical resources by corridors and integrated into broader ecological landscapes (Nyhus & Tilson, 2004).

Land-use planning for coexistence landscapes, where conservation goes beyond the boundaries of protected areas, is critical for the conservation of wide-ranging mammals like elephants (Fernando, 2005; Hoare, 2000; Noss et al., 1996; Wikramanayake et al., 1998) and carnivores (Cushman et al., 2016; Treves et al., 2004; Woodroffe et al., 2005). As a result, correctly managed buffer zones and/or appropriately zoned multi-use, adaptive management areas around protected areas may be as important as wildlife reserves to the long-term viability of wide-ranging species (Noss et al., 1996). Such conservation strategies, however, require appropriate land-use zoning in these multi-use, socio-ecological landscapes, which considers the needs of both people and critical wildlife habitat and resource use (Fernando, 2005; Linnell et al., 2005).

How do we assist spatial planning to reduce human-wildlife conflict?

Appropriate zoning of socio-ecological landscapes requires a good understanding of how people and wildlife utilise space and resources. A greater understanding of the routes used to move between these critical resource use areas, as well as the risk-avoidance behaviours used by wildlife, can significantly improve the efficacy of land-use zoning to achieve landscapes of coexistence. For example, Treves et al. (2004) found that wolves appeared to prey on livestock where there were high proportions of pasture, but low proportions of crop land, coniferous forest, herbaceous wetlands and open water, helping to identify areas where human-wildlife conflict interventions could be targeted. Similarly, Fernando et al. (2005) and Pozo et al. (2017) found that land-use patterns, land conversion to agriculture and agricultural practices influenced the intensity of human-elephant conflict in Sri Lanka and Botswana, respectively. Fernando et al. (2005) found that a fragmented mosaic of small forest patches (protected areas) utilised by elephants, scattered throughout a human-dominated landscape of irrigated agriculture, exacerbated human-elephant conflict. However, adaptive management (common-use) areas, managed according to traditional agricultural practices, provided essential resources to elephants, and allowed coexistence of humans and elephants through temporal and spatial resource partitioning.

Songhurst et al. (2016) pioneered a strategy that involves identifying and ensuring appropriate protection of critical elephant pathways in land-use allocation systems in Botswana. Working with land authorities and using development-free buffer zones, combined with mitigation techniques along the interface with agricultural lands, human-wildlife conflict practitioners, with communities and other key stakeholders, can assist with the effective zoning of these critical wildlife corridors. This creates lower risk levels outside them to make agricultural areas easier to protect and reinforce human-wildlife interface boundaries that contribute to coexistence across shared landscapes.

At local scales, allocation of land for human use is typically determined by soil fertility, with the most fertile soils being dedicated to agriculture and livestock production, and the least fertile soils to non-agricultural uses (Happold, 1995; Martin & Taylor, 1983). Participatory resource mapping is therefore an essential component of land-use planning. A full understanding of how people choose land and utilise resources in an area experiencing human-wildlife conflict is essential to determining how land-use planning can be improved in the future to minimise conflicts and increase the likelihood of coexistence.

What data are required?

To ensure that any spatial planning results in the desired outcomes, significant data are required. Incomplete data may result in unintended outcomes, where a certain spatial element has not been incorporated into the planning process. For example, identifying habitats that would be suitable for wolves' ecological needs alone, may result in the presence of wolves in areas where they can survive but are heavily persecuted because the area overlaps with an area where there is low human tolerance or acceptance of wolves (Behr et al., 2017). Therefore, diverse data need to be gathered, including participatory resource mapping among local communities, and used to ensure long-term success. Data may include:

- geographical data – existing land uses (e.g. protected areas, settlements, existing fields, existing cattle posts, boreholes) or infrastructure (e.g. roads, railway lines, fences);
- environmental data – for example, human-wildlife conflict incidents, wildlife movement, soils, water sources, vegetation types, climate;
- social data – for example, settlement population numbers, acceptance of wildlife species;
- perceptions of, and needs for, land-use types from an array of stakeholders – community, government, researchers;
- land policy regulations;
- knowledge of wildlife risk avoidance behaviour.

Who do we need to work with?

Land-use planning is usually led by land management departments and planners. However, it is imperative that communities and all relevant local land allocation authorities and appropriate government offices are involved, including, for example, the ministries and departments responsible for land, wildlife, agriculture, tourism, water and transport (see Chapter 13, Working with stakeholders and communities). Participatory planning incorporating community knowledge, resource needs and desires is imperative to land-use planning processes, particularly in tribal land areas outside of protected areas (see Chapter 15, Planning and theory of change). Consideration for the needs of local communities and ownership of the planning outputs and land allocation processes is vital if the planning process is to be successful. Private-sector stakeholders with an interest in the land in question should also be involved.

Again, conservationists and human-wildlife conflict practitioners have a big role to play in terms of providing a greater understanding, backed by scientific evidence, of key wildlife resource-use areas, critical pathways or corridors used as conduits between these areas and what techniques or measures can be used to maximise risk-avoidance behaviour among different wildlife species. Land-use planning processes involving multi-sectoral co-design also provide an important opportunity for collaborations that are fundamental to addressing human-wildlife conflict (see Chapter 16, Dialogue: a process for conflict resolution).

What tools can we use?

A number of tools and processes can be used in land-use planning that play an important role when considering the needs of both wildlife and people for effective human-wildlife conflict management:

- Participatory mapping of human and wildlife space and resource use.
- Scientific data that provide evidence of wildlife resource use and key movement routes – for example, satellite collar tracking data, ground observations (e.g. camera traps) and indigenous knowledge.
- GIS-based spatial modelling that incorporates current, future and predicted land use patterns and overlap/conflict, while considering the resource needs of both people and wildlife – for example, the Land Use Conflict Identification Strategy (LUCIS).
- Connectivity modelling, which identifies and helps protect ecological connectivity among wildlife species populations within critical resource-use areas and across large landscapes.

What are the key considerations?

It is important to consider the following in land-use planning:

- The timeframe of the plan needs to be long term but realistic.
- Spatial plans will not always be able to predict future scenarios or unplanned events, so it is important that any plans and tools developed to assist planning are adaptable.
- A participatory approach is required, with involvement of all relevant stakeholders.

Contributions from human-wildlife conflict practitioners and scientists are important when advising appropriate land-use planning and sustainable land allocation systems that consider wildlife.

Spatial scale

Land-use and spatial planning are needed at various scales to address human-wildlife conflict. This involves micro- or local-level planning at the village or community level, national planning to address human-wildlife conflict within a specific country and regional-level spatial planning where wildlife exhibits transboundary movements (e.g. the Kavango Zambezi Transfrontier Conservation Area (KAZA TFCA) or the Y2Y Conservation Initiative, connecting Yellowstone National Park to Yukon). Different scales of spatial planning may use different tools, yet the data and stakeholders needed are similar, albeit also at the relevant scale (i.e. regional, cross-border planning requires data and stakeholders from all the countries involved).

Spatial scale and tolerance for wildlife

A phrase famously repeated by legislators in the USA is ‘all politics is local’. This certainly applies to human-wildlife conflict where, more often than not, the conflict is a struggle between local and external interests. For example, in the USA a frequent focal point of tension in decision making is balancing state versus local community interests. While the local communities absorb the consequences of decisions, the decision authority must represent the interests of all in the political jurisdiction, in this case the state. Political scientists refer to this as a mismatch of scale. This frequent phenomenon underscores the importance of assessing the spatial distribution of social acceptability of alternative management strategies. A survey funded by the US Fish and Wildlife Service agencies allowed development of a spatially explicit tool to assist assessment of scalar mismatch (Manfredo et al., 2021).

Figures 16–18 illustrate the application of these data on wolf management in the state of Washington. Figure 16 describes the two basic types of people identified by their wildlife values. Figure 17 shows, by county, the ratio of people with mutualist values to those with domination values, along with the distribution of wolf packs at the time of this study. Figure 18 clearly shows scalar mismatch with regard to the question that asked whether wolves should be lethally removed when they attack livestock. These data reveal a significant policy dilemma, with the heavily populated area of eastern Washington state being more supportive of wolves than the eastern parts of the state where the wolves exist. Studies have shown it is more beneficial for human-wildlife conflict and long-term sustainability to reintroduce species to lower habitat quality but higher human tolerance, than to areas with low human tolerance, but better habitat.

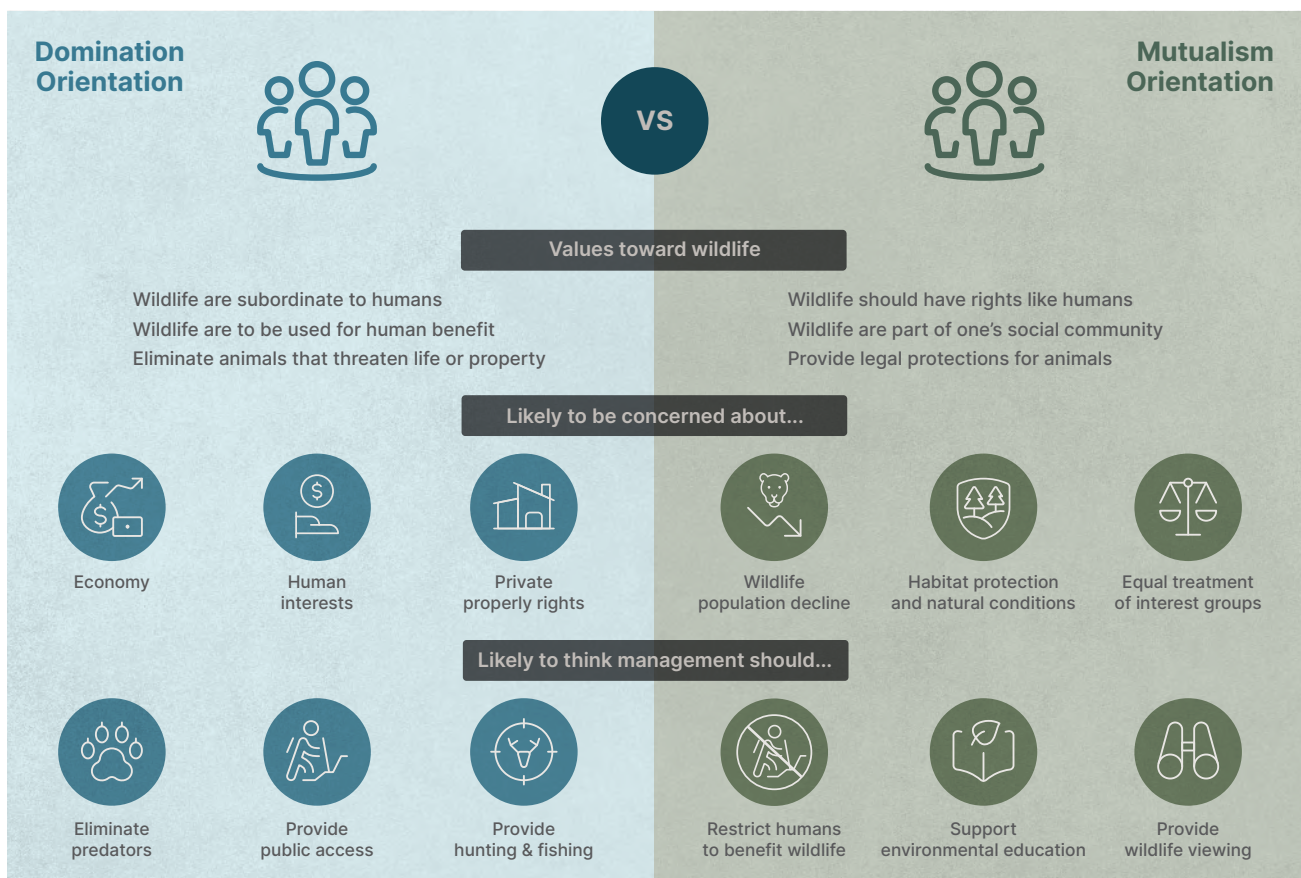


Figure 16. The profiles of different types of people who live in an area, based on their values. (Source: Manfredo et al., 2021, with permission)



Figure 17. The predominant values in an area overlaid with wolf distributions (black lines). Dark orange areas relate to a higher prevalence of domination values while dark purple areas to a higher prevalence of mutualism values (Adapted from: Manfredo et al., 2021, with permission)

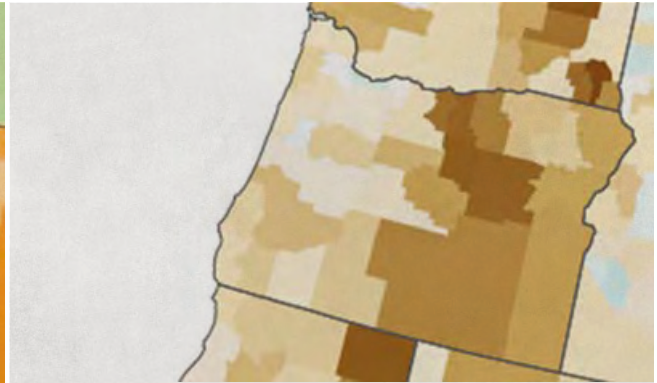


Figure 18. The scalar mismatch of responses to the statement 'Wolves that kill livestock should be lethally removed'. The dark brown areas show where respondents are far more likely to agree that wolves should be lethally removed than the state average. The blue areas are more likely to disagree, while the white areas are roughly equal to the overall response for the state. (Adapted from: Manfredo et al., 2021, with permission)

Spatial planning interventions

A broad range of interventions can be used once spatial planning has been conducted, to either demarcate land through zoning, establish multi-use areas or connect land. Each intervention should be chosen based on the data generated during the planning process rather than be presubscribed. Examples of the various interventions can be found in Table 11.

Table 11. Examples of spatial planning intervention

Intervention	Description
Multi-use areas	
Wildlife management areas	Protected areas set aside for the conservation of wildlife and for recreational activities involving wildlife
Buffer zones	Areas designated for environmental protection, where restricted human activities can take place
General landscapes	Areas where both humans and wildlife are present but there are no restrictions on activities
Zoning	
Protected areas	Terrestrial and marine areas that receive protection due to their recognised natural, ecological or cultural value
Agricultural areas	Areas already used for farming (arable and pastoral), or that could be brought back into cultivation

Urban areas	Towns, cities and metropolitan regions that are often dominated by humans
Connectivity	
Micro-corridors	Small corridors of natural habitat used by wildlife to move through human-dominated areas
Macro-corridors	Larger corridors of habitat used by wildlife for movement but also valuable for maintaining and increasing biodiversity in a region
Wildlife crossings	Interventions in habitat conservation, allowing connections or reconnections between habitats; they combat habitat fragmentation while notifying the public that wildlife is likely to be present in the vicinity and may cross
Bridges, viaducts, overpasses	Types of wildlife crossing mainly used by large or herd-type animals to avoid human threats (e.g. roads, railways)
Canopy bridges or walkways	Types of wildlife crossing typically used by arboreal species such as monkeys, sloths and squirrels to avoid or navigate through human-dominated areas
Flight paths	Types of wildlife crossing for flying animals, such as birds or bats, to avoid human threats (e.g. planes, pylons)
Tunnels or culverts	Types of wildlife crossing that allow small mammals, such as otters, hedgehogs and badgers, to pass under and avoid human threats (e.g. roads, railways)

(Source: Compiled by the chapter authors)



Conclusion

Human-wildlife conflict needs to be addressed using both short- and long-term approaches, which should begin with planning how people and wildlife can share a landscape. Interventions to address human-wildlife conflict can then be best placed to ensure that conservation efforts and development can be successful and compatible. Once human-wildlife conflict emergencies are brought under control and immediate needs have been addressed, appropriate spatial planning efforts should take place to ensure that human-wildlife conflict interventions are addressing long-term solutions and do not lead to unforeseen impacts on the environment, wildlife or people.





Political ecology of wildlife

Elaine Lan Yin Hsiao, Jared Margulies & Francis Massé

What is political ecology?

Political ecology is a methodological and theoretical approach to understanding how political, economic and social dynamics (referred to as power relations) shape interactions between people and environments (Blaikie & Brookfield, 1987; Neumann, 1992; Robbins, 2012). Political ecology pays particular attention to how inequalities in these power relations and in decision-making processes shape social and ecological outcomes that are unequal across different groups of people, species and environments. There is a wide diversity of approaches *within* political ecology, but, in general, political ecology research seeks to analyse foundational mechanisms responsible for socio-ecological outcomes, emphasising how matters of justice, power and violence intersect with social and environmental concerns (Forsyth, 2008).

One of the key insights of political ecology is an understanding that practices of environmental and natural resource management are inherently political endeavours tinged with power inequities, and produce uneven socio-political and environmental effects (Ranganathan, 2015). Conservation land/seascapes and protected areas, for example, are not natural or apolitical spatial arrangements. Conservation projects are human designed and often neglect (intentionally or otherwise) the socio-ecological or biocultural history of particular people and places. Conservation activities often produce socio-economic impacts across social groups without their consultation or consent, reflecting power imbalances. Such decisions can differentially affect people across lines of race, class, caste and gender, among other forms of identity or social difference. Such practices of conservation and biodiversity management may further aggravate inequalities, injustices or other social tensions. These include various types of human-wildlife conflict from crop destruction to livestock losses, that affect different social groups, such as men and women, in unequal ways.

What does political ecology offer to address human-wildlife conflict?

Political ecology studies of human-wildlife conflict can offer insight into the underlying drivers of why and how humans and wildlife come into conflict, and what conflict *signifies* to different affected actors (Table 12). As is now well evidenced, human-wildlife conflict is rarely a simple matter of direct conflict between humans and particular species, nor is it merely due to an increase in wildlife or human populations, or a result of spatial overlap between the two (Peterson et al., 2010). At its core, nearly all incidents of human-wildlife conflict involve conflict between different human stakeholder groups who value species differently (Fraser-Celin et al., 2018; A. Zimmermann, B.P. McQuinn, et al., 2020). Political ecology studies of human-wildlife conflict may also reveal additional, unexpected actors – even materials and objects – that play key roles in mediating interactions between people and wildlife that become obscured by the phrase human-wildlife conflict and common human-wildlife conflict narratives (Barua, 2014).

How human-wildlife conflict is framed and understood shapes the solutions that we put in place to respond to it. From the perspective of political ecology, understanding human-wildlife conflict requires, for example, an examination of how changes in the management of biodiversity for conservation may alter, for better or worse, interactions and power relations between different human communities (i.e. identity-based groups), especially the diverse group of actors engaged in conserving species, and wildlife (Fraser-Celin et al., 2018; Massé, 2016). Top-down environmental decisions can erode long-standing ways of coexistence with wildlife and adaptive management of human-wildlife conflict, resulting in increased human-wildlife conflict that can contribute to tensions between conservation efforts and local people (Margulies & Karanth, 2018; Massé, 2016; Milgroom & Spierenburg, 2008; Witter, 2013). Political ecologists often see technical interventions (e.g. barriers and compensation schemes) as short-term solutions that fail to address underlying causes and dynamics, and instead seek to offer solutions that can transform human-wildlife conflict in the long term.

Table 12. Examples of political ecology of human-wildlife conflict studies and thematic insights

Topic	Summary
Gender	People of different genders can experience, and be impacted by, human-wildlife conflict in different ways and at different intensities. For example, some research highlights instances in which women and girls are more exposed to direct and indirect costs associated with human-wildlife conflict in their daily interactions with potentially dangerous species (Doubleday & Adams; Khumalo & Yung, 2015; Ogra, 2008). human-wildlife conflict management strategies can also differentiate between gender-based groups.
Livelihood security	People's experiences with wildlife and whether the interactions they have with them are perceived as negative are often shaped by how conservation contributes to, or reduces, their health, livelihood security and safety (Barua, 2014; Jadhav & Barua, 2012) (see Chapter 11, Livelihoods, poverty and well-being).
Land rights and dispossession	Increased instances of human-wildlife conflict often occur because of dispossession and dislocation of people as a result of conservation initiatives to create people-free spaces for wildlife, driving further tension between conservation efforts and people (de Silva & Srinivasan, 2019; Goldman, 2009; Goldman, 2011; Margulies & Karanth, 2018; Massé, 2016; Milgroom & Spierenburg, 2008; Witter, 2013) (see Chapter 10, How histories shape interactions).

(Source: Compiled by the chapter authors)

Political ecology in practice

As both a set of research tools and an analytical lens, political ecology is an inherently interdisciplinary field of practice, drawing on insights from a wide range of social and natural sciences (Robbins, 2012). Practising political ecology involves drawing on disciplines such as geography, anthropology, political economy, ecology and conservation biology, and employing diverse approaches and research methodologies, including in-depth interviews, social and ecological survey tools, participant observation (ethnography), media and content analysis, and geospatial and remote sensing tools.

Many studies involve mixed methods in their approach, relying on both quantitative and qualitative analyses, and often triangulate diverse kinds of data. At the core of this interdisciplinary approach is an effort to understand webs of relation and power (Rocheleau & Roth, 2007), or how social, political, economic or environmental changes influence social and ecological processes and outcomes (and vice versa). Hence, when examining human-wildlife conflict, political ecologists might start by examining changes in instances and patterns of human-wildlife conflict and trace how these are shaped by, or intersect with, changes in policy, practice, and socio-environmental dynamics. Other changes can include those in protected area status, rules governing natural resource use or the environment. In all cases, the primary concern is learning how different people who live through these changes experience them uniquely, and how this influences their interactions with wildlife.

Box 16

Increasing human-wildlife conflict in Mozambique's Limpopo National Park: more animals or changing rules and relations?

Mozambique's Limpopo NP was established in 2001 and joined the Great Limpopo Transfrontier Park in 2002. Conventional rationales for subsequent increases in human-wildlife conflict blamed the growing numbers of wild animals in the park. Digging deeper into how the establishment of a protected area changed the ways in which wildlife and people interacted, a political-ecological analysis revealed that the majority of human-wildlife conflict incidents and the intensification of their impacts were more a result of changes in the rules that governed how people were able to manage their coexistence with wild animals and the extent to which the State was willing to intervene to prevent human-wildlife conflict and protect people in areas recently classified as 'wilderness' or wildlife zones.

These rules include restrictions on how people can defend their fields and livestock from (increasing numbers of) wildlife, such as enforcing curtailments on killing wildlife to prevent crop and livestock losses, and the restriction of people and land/resource use to limited areas, all of which hinder the ability to protect oneself, crops or livestock from wildlife. These rules are the result of centralised political decisions that give preference to strict conservation (i.e. IUCN Category I and II protected areas). Repeating claims that human-wildlife conflict results predominantly (or only) from increases in wildlife numbers obscures this important reality. Understanding and acknowledging these dynamics can help foster more effective and sustainable approaches to mitigating and transforming human-wildlife conflict (Massé, 2016; Milgroom & Spierenburg, 2008; Witter, 2013).

Box 17

Political ecology in practice: Bandipur National Park and the generation of human-wildlife conflict

Bandipur NP in Karnataka, India, has one of the largest populations of tigers and leopards in the world. Indian Forest Department officials have expressed concerns that cultural tolerance for living with animals, including these large carnivores, is declining across villages that surround Bandipur, leading to negative interactions with wildlife. This narrative suggests that as local communities move away from traditional farming practices and values, their respect for wildlife has declined.

Applying a political ecology approach, an integration of qualitative interviews with demographic and economic data revealed a different explanation for the perceived increase in what the Forest Department and conservationists framed as 'human-wildlife conflict'. As a result of changes in the regional fertiliser economy and park management excluding cattle from grazing inside Bandipur, local livelihood strategies shifted from an economy reliant on raising cattle for dung fertiliser (grazed in Bandipur) to raising high-cost and high-maintenance dairy cattle. This shift meant that incidents of carnivore predation on cattle began occurring closer to people's homes and in agricultural fields, rather than in the forest. The shift in cattle breeds also meant that the economic losses incurred by local farmers increased substantially when a cow was injured or killed because of inherent differences between dung and dairy economies, which government compensation schemes did not adequately address.

In summary, narratives about increasing 'human-wildlife conflict', perceived as resulting from declines in cultural tolerance, masked foundational and structural changes in the livelihood strategies of farmers and labourers in response to Bandipur NP management, and regional economic change. These findings also showed how class and caste differences, affecting access to capital and land, left some sectors of the population more vulnerable to income loss resulting from conservation management than others (Madhusudan, 2005; Margulies & Karanth, 2018).



Conclusion

Political ecology offers important insights into understanding foundational causes of human-wildlife conflict and the implications of different conservation interventions in specific contexts. Its analyses often reveal how incidents of human-wildlife conflict are symptomatic of broader forms of structural inequality, violence and dispossession, reflecting deeper social conflicts; and how ‘band-aid’ technical approaches addressing human-wildlife conflict fail to transform more foundational problems that underlie or exacerbate perceived negative interactions between humans and wildlife species. Attention to diverse forms of social difference and power relations through rigorous social research is crucial for understanding who experiences human-wildlife conflict, how and why they do so, and how interventions might be better tailored to particular social groups’ needs or desires. How we frame and understand human-wildlife conflict and its drivers shapes the solutions put in place to address them, and whether they will foster lasting change in improving human-wildlife interactions.





Law and human-wildlife conflict

Arie Trouwborst, John Linnell & Camilla Sandström

In many human-wildlife conflict situations (and broader conservation conflicts), law plays a role – sometimes a conspicuous one, sometimes more in the background. When addressing such a conflict, it is important to be aware of this role, and to gain a basic understanding of the way(s) in which applicable laws affect the conflict and its potential resolution.

Law

Law consists of binding rules regulating human behaviour. The principal source of law is legislation, created, implemented and enforced by governments and other public entities at international, national and subnational levels, and interpreted and applied by courts. Distinctive branches of law are administrative, criminal, private and international law. Customary law is a separate source and category of law, and ranges from international customary law to customary rights at the local level. The binding nature of laws sets them apart from other, non-binding instruments in the broader domain. For example, at the international level, binding law is found in treaties (which can also be titled conventions, agreements or protocols) (Stroud et al., 2021), whereas non-binding commitments can be found in political declarations, strategies, plans, resolutions, recommendations, guidelines, memoranda of understanding and codes of conduct. Such non-binding commitments can also be important in practice, and they can inform the interpretation and application of associated binding obligations.

Laws can and do change, but typically do so only slowly. This is especially true for international legislation, which takes precedence over (more changeable) national laws in the legal hierarchy (Stroud et al., 2021; Trouwborst et al., 2017). It can be frustrating when legislation is not adjusted in a timely manner to societal or ecological changes, for instance relating to changes in population status of protected species. Conversely, the relatively rigid nature of laws provides for predictability and, importantly, for limits that do not easily yield to human interests at odds with wildlife conservation (Chapron et al., 2017; Trouwborst et al., 2017).

The influence of law on human-wildlife conflicts

Law can influence human-wildlife conflicts in numerous ways. Moreover, many fields of law can be relevant, ranging from biodiversity conservation, animal welfare and human rights law to legislation on land use, investment and trade. In some conflict situations, the role of law is direct and conspicuous, for instance when legislation confers strict protection on certain animal species, or grants people access to land inhabited by wildlife. In other situations, the role of law is more indirect and in the background, although not necessarily less influential. Examples are rules on access to information, participation in decision making and access to justice. Likewise, basic legal norms on ownership of land and of wildlife can play decisive roles (e.g. Snijders (2015)). Clearly, the degree to which the applicable law subjects wildlife to private ownership, community-based management or public trusteeship, or even grants it rights of its own (Chapron et al., 2019), will affect the scope for human-wildlife conflicts, the types of conflict likely to arise and the way they are likely to play out (e.g. Campbell et al. (2002); Blackmore and Trouwborst (2018)).

Law and the resolution of human-wildlife conflicts

Not only can law be a significant factor in the prevention of, versus the creation and development of, human-wildlife conflicts, but it can also exercise a distinct influence on their resolution. To illustrate, law tends to delimit the options available for addressing particular conflicts. This is the case, for example, where the legal protection of damage-causing animals stipulates that they can only be killed, captured or chased off after a permit to do so has been granted by the authorities involved – whereby the granting of such permits, in turn, typically hinges upon meeting certain conditions, for instance concerning the absence of alternatives. Some human-wildlife conflicts may lead to court cases. Whereas courts can provide for the final and binding settlement of legal disputes, this does not in all cases signify the resolution of the underlying conservation conflict (see Chapter 1, Levels of conflict over wildlife and Chapter 17, Resolving conflicts between people). Indeed, only rarely are all parties in a court case happy with its outcome.

Combining safeguards for people and wildlife

From a legal point of view, the competing interests of multiple humans and diverse wildlife in human-wildlife conflict situations tend to correspond with certain minimum safeguards recorded and anchored in law. For instance, international and national law require that certain basic human rights be respected at all times, with ‘human dignity’ as an inviolable minimum standard. Legal safeguards of the interests of wildlife are generally less impressive. Many national and international legal instruments set out obligations to conserve and restore wildlife, but often in qualified terms, and compliance with these obligations is often inadequate (e.g. Chapron et al. (2017); Trouwborst et al. (2017); Stroud et al. (2021)).

It is difficult to discern a standard representing the counterpart of ‘human dignity’ for wildlife. Candidates are the ‘intrinsic value’ of biodiversity (Fosci & West, 2016), as recognised in the preamble of the 1992 Convention on Biological Diversity, and the concepts of ‘favourable conservation status’ and ‘ecological integrity’ (Somsen & Trouwborst, 2021). All of these standards would seem to require securing the long-term viability of species and ecosystems, but do not preclude their sustainable use (Cretois et al., 2019; Somsen & Trouwborst, 2021). Similar considerations apply to the ‘rights’ of certain animals or ecosystems, which are increasingly recognised by national courts and legislators around the globe (e.g. Chapron et al. (2019)).

Many human-wildlife conflicts are essentially concerned with the way the various competing interests of the people and wildlife involved, as expressed in the aforementioned and other normative standards, ought to be weighed, combined and balanced against each other. It is instructive to consider the nature of conservation legislation of the European Union (EU) in this regard, which combines a general obligation of result to maintain or restore a 'favourable conservation status' of species and habitat types – a non-negotiable minimum standard – with flexibility regarding the means to achieve this.

The chief legal instrument, the 1992 Habitats Directive, requires EU member states to warrant the legal protection of vulnerable areas and species, but allows them to make exceptions for a variety of reasons, including socio-economic interests, provided that the overall conservation status of the habitats and species involved remains unaffected. Notwithstanding an imperfect compliance and enforcement record, many consider EU nature conservation law to be exemplary in the way it combines wildlife conservation with the accommodation of human interests (Born et al., 2015). Inevitably, however, where exactly to draw the line in individual instances has already been the focus of countless (legal) disputes, and in many cases the fact that the flexibility enabled by the Habitats Directive is not limitless predictably leaves some stakeholders unhappy. Indeed, the existence of international laws and their constraints have frequently been identified as important factors in conflicts at local levels, with questions raised about their rigidity and legitimacy (e.g. Keulartz and Leistra (2008).

Understanding, applying and changing the law

Whether the law, overall, promotes conflict or sustainable coexistence of people and wildlife will very much depend on the circumstances of each case (Baruch-Mordo et al., 2011; Cretois et al., 2019; Hamman et al., 2016; Madden, 2008; Redpath et al., 2017; Trouwborst, 2015). In essence, in each case, the key question is to what degree the applicable law hampers, enables, promotes or even requires whatever appears necessary to create a situation where the interests of people and of wildlife conservation coincide as well as possible.

In each concrete situation, it is helpful in this regard to address the following questions, which are separate but related:

1. On the basis of the best information available, what approach or approaches appear to be optimal or at least viable in order to meet conservation goals while minimising human-wildlife conflict?
2. What is the applicable law of relevance for these approaches?
3. To what degree does this applicable law require, enable, discourage and/or obstruct the identified approaches?
4. What steps or adjustments with regard to the applicable law are needed to achieve the best possible outcome?

Among other things, answering questions 2–4 requires: a) identifying all relevant legal instruments, rules and obligations; b) examining the latter's scope and proper interpretation; and c) determining their implications for the concrete set of facts at hand, which may or may not entail active engagement with applicable legislation (Hamman et al., 2016; Madden, 2008; Trouwborst, 2015).



Conclusion

It would appear that in many instances it may be impossible to successfully address an human-wildlife conflict without at least a basic awareness and understanding of – and in some cases engagement with – the applicable law. It is especially important to be aware of legal constraints when entering into conflict mitigation exercises or stakeholder negotiation processes, so that care is taken to ensure that any new actions are compatible with applicable legal frameworks.





Policy instruments

Camilla Sandström & Amy Dickman

Introduction

To handle or resolve human-wildlife conflicts there is a need for wildlife policies that include appropriate, effective policy instruments to steer and guide actors involved in the conflict. A broad variety of policy and planning instruments can be used to handle human-wildlife conflict. Those instruments are often classified into three categories: 1) regulations ('sticks'), 2) economic incentives ('carrots') or disincentives and (c) information ('sermons') (Vedung, 1998). The regulative instruments (the 'sticks') can be seen as the backbone of the policy mix, while the economic and informative instruments may complement laws with the aim to induce a change of behaviour. Lately, a fourth set of policy instruments has been identified, focusing on rights-based instruments and customary norms and institutions of Indigenous peoples and local communities (Table 13).

Wildlife policies often include a policy mix, involving an overarching policy strategy – for example, to conserve threatened species – and associated instruments, i.e. a combination of policy instruments to influence species conservation. The policy may be determined and specified at the local, regional, national and international level within the same policy mix, and include objectives and plans that specify the main proposed way towards achieving the objectives at multiple levels (Ring & Schröter-Schlaack, 2011; Rogge & Reichardt, 2016). Policies as well as the policy instruments are regularly evaluated to explore their effectiveness, their perception by stakeholders and their potential for including relevant actors in wildlife decision making.

While policy instruments are often only associated with public authorities, a broader understanding of policy instruments also includes other relevant decision makers, such as businesses, NGOs, Indigenous peoples and local communities that undertake activities relevant to human-wildlife conflict. Existing policy arrangements have developed over time and include a mix of policy instruments, which is not always cohesive but can be counter-productive, making it difficult to achieve stated objectives. Hence, to be able to handle a human-wildlife conflict it is important carry out a thorough policy assessment by: 1) identifying existing policies and policy instruments and the ways these are shaping the conflict; and 2) suggesting improvements or redesign of a policy.

Four categories of policy instrument

Legal and regulatory instruments

Regulatory instruments are legal, enforceable, ‘command and control’ type instruments designed to reach desired, prescribed conservation objectives. They are often formulated to prohibit or control undesirable actions, such as the illegal killing of animals, for example through negative sanctions and penalties. In the search for solutions to human-wildlife conflict, it is important to identify and assess the performance of existing laws, regulations and norms framing human-wildlife conflict. Legal frameworks may on the one hand open avenues of action, but on the other hand impose severe restrictions to potential reconciliation policies due to legal rigidity and thus lack of flexibility to test different solutions to handle conflicts. It is likely to be important to balance legal rigidity and flexibility in the design and implementation of regulatory instruments, to provide some room for manoeuvre in order to promote innovation and address unforeseen implications (Madden, 2008).

As a response to the critique towards too rigid legal frameworks, it has become more common to use framework laws in combination with decentralisation of power and adaptive governance and management, to continuously improve environmental performance through learning by doing (Redpath et al., 2013). For example, in Scandinavia, the power to manage large carnivore populations is devolved to the regional authorities when the populations have reached favourable conservation status. As a consequence, the regional authorities have, within the framework legislation, a certain room for manoeuvre to manage the human-wildlife conflict.

Economic and financial instruments

Economic and financial instruments are meant to change the behaviour of individuals (e.g. producers and consumers) and public actors (e.g. regional and local governments) towards desired policy objectives. Economic instruments are used to correct for policy and/or market failure, while financial instruments are often funded through state budgets (e.g. development aid). The instruments include a wide range of approaches, such as taxes, tax reliefs, fees and allowances, but also, for example, biodiversity offsets. The instruments can also be designed to develop new markets by introducing tradable land development rights, a zoning technique used to protect land or habitats with conservation value by redirecting development from one area to another.

Other economic instruments represent voluntary or conditional incentive schemes, such as payments for ecosystem services or conservation incentive payments. Examples of this are covered in Chapter 30, Economic incentives, and could include payments for the presence of wildlife on community or private land. Such mechanisms have worked for incentivising lynx and wolverine conservation in Sweden (Zabel et al., 2014), and have also been trialled in Africa to incentivise local coexistence with species such as lions.

Social and cultural instruments

Social and cultural instruments include those linking social and ecosystem aspects together in the management of natural and cultural assets, such as Biosphere reserves, World Heritage sites, Peace Parks, and Indigenous and local community conserved areas. Social instruments are also designed to raise awareness through environmental communication and information-related instruments, such as eco-labelling and biodiversity registers (e.g. IUCN Red List), but also voluntary agreements, corporate social responsibility, and social license to operate – that is, social permission or the level of acceptance or approval by local communities and stakeholders of organisations and their operations and collaborative governance.

Lion Guardians, a conservation organisation, is based on the use of social and cultural instruments to find and enact long-term solutions for people and lions to coexist. The organisation was founded in 2006 in the Amboseli-Tsavo ecosystem of Kenya, and draws its strength from using Indigenous culture and local traditional knowledge to conserve wildlife. The foundation of the organisation is the idea that the Maasai people – those who share the landscape with lions – are in the best position to protect them (Dolrenry et al., 2016; Hazzah et al., 2014). Lion Guardians, which is a private initiative, has started to have successes also in the public sector, since international conventions, such as the UN Convention on Biological Diversity, recognise the need to include local and traditional knowledge in the management of natural resources.

Rights-based instruments and customary norms

International and national human rights instruments have increasingly been recognised as important tools in conservation efforts. It has been found that the strengthening of collective rights, customary norms and institutions of Indigenous peoples and local communities may contribute to promoting adaptive governance with the focus on equitable and fair management of natural resources, including interactions with wildlife (Ring et al., 2018). People, often Indigenous people, who live in high-biodiversity areas often belong to the most vulnerable groups in a given country. Their livelihoods often depend directly on ecosystem services and access to land and natural resources, which is why it is important to – in conservation policies – respect and promote human rights within conservation programmes, protect the vulnerable and design governance systems that secure these rights (Springer et al., 2011). Table 13 lists examples of these four categories of policy instrument.

Table 13. Categories of policy instrument

Legal and regulatory instruments	Economic and financial instruments	Social and information-based instruments	Rights-based instruments and customary norms
<ul style="list-style-type: none"> • Legislation • Standards • Environmental quality objectives • Planning • Technology requirements • Impact regulations • Supervision/monitoring • Treaties and conventions 	<ul style="list-style-type: none"> • Taxes • Tax reliefs • Charges • Fees • Allowances • Offsets • Emissions trading • Subsidies • Compensation payments • Incentive payments 	<ul style="list-style-type: none"> • Information • Pollutant release and transfer registers • Biodiversity registers • Eco-labelling • Certification • Education/training • Corporate social responsibility • Voluntary agreements 	<ul style="list-style-type: none"> • International and national human rights instruments • Strengthening of collective rights • Customary norms and institutions of Indigenous people and local communities • Equitable and fair management of natural resources

(Adapted from: Ring et al. (2018); see also de Boon et al. (2020))

Assessing the effectiveness of policy mixes

Human-wildlife conflict can be reinforced by poorly designed policies and policy mixes. In a situation characterised by human-wildlife conflict, it is thus necessary to assess all the policy instruments in place, both independently and interdependently, to understand what roles policy instruments play in the conflict. The context of the conflict is central to this understanding. Studies have, for example, shown that any formal policy instrument can only be effective if it is supported by informal norms. In other words, enforcement rules have to fit the social and cultural context to be effective, and

instruments have to be accepted and in concordance with people's worldviews, to avoid opportunistic behaviour, corruption and fraud (Ring & Schröter-Schlaack, 2011). Furthermore, an insufficient understanding of the role of policy mixes, due to an overly narrow scope of the aforementioned assessment of policy instruments, may result in fragmentary and oversimplified policy recommendations on how to handle human-wildlife conflict.

An assessment of large carnivore policy mixes in Norway, Sweden, Finland, the Netherlands, Germany (specifically Saxony and Bavaria) and Spain (specifically Castilla y León) showed that all the countries have developed similar policy strategies. These were based on dual objectives to attain or maintain a viable population of large carnivores while at the same time maintain traditional (pasture-based) livestock husbandry with a minimum level of conflict. To achieve the dual objectives the countries have developed a similar set of instruments, although the applications vary.

The backbone of the instrument mix in these countries is some form of ex-post compensation, often coupled with requirements for preventive measures (e.g. Frank and Eklund (2017). Other instruments include culling/lethal control of problem-causing animals (Pellikka & Hiedanpää, 2017; Sjölander-Lindqvist, 2015), and license or quota hunting (Cinque (2015); (Mykrä et al., 2017). However, hunting is only allowed when the large carnivore population has reached favorable conservation status, as a measure to prevent illegal hunting or increase the acceptance of the large carnivores.

Although the applied instruments do not explicitly conflict with each other they are often not set up to reinforce one another and frequently focus on achieving one of the policy objectives while not directly addressing the other objective. Hence the instruments may in the best case reduce or compensate for the direct human-wildlife conflict impacts, but rarely reduce the underlying conflicts that often underpin human-wildlife conflicts (see Chapter 1, Levels of conflict over wildlife, Chapter 10, How histories shape interactions).

The assessment therefore concluded that the consistency of the instrument mixes in all the countries could be enhanced by establishing a stronger connection between the various instruments, preferably addressing both objectives at the same time. The assessment further identified the need to create a more comprehensive policy mix to be able to address several objectives at the same time.

Conclusion

To be able to handle human-wildlife conflict it is important to understand how policy-making processes can influence the level and path of conflicts. However, these processes are generally understudied, often focusing on how individual policy instruments influence human-wildlife conflict and not the interaction between policy processes and policy instruments. More research, with more detailed understanding of various policy effects and feedback mechanisms, would help enable the shaping of more holistic and comprehensive mixes for more effectively addressing human-wildlife conflict.



Animal capture and translocation

Richard Hoare, John D. C. Linnell & Vidya Athreya

What is translocation and why consider it?

Translocation in the human-wildlife conflict context refers to the capture of a 'problem animal' from a conflict site and moving it alive to a new location where it is believed the animal is less likely to engage in the behaviour that is bringing it into conflict with people.

As killing wildlife is either illegal or unpopular with large sections of modern societies, translocation may appear to provide an inviting opportunity to reduce conflicts without killing wild animals. Wild animal translocation is, therefore, often supported by people affected by human-wildlife conflict, members of the general public, government authorities and NGOs concerned with animal welfare. Donors are often willing to fund these exercises.

Modern veterinary techniques to immobilise and transport a wide range of species have become very advanced, and trained and qualified people can now do this relatively routinely and safely. These operations are well publicised in the media and so wild animal translocation can appear to offer a straightforward solution for resolving localised problems of human-wildlife conflict, both to those directly affected and to interested observers.

However, while translocation may appear to be one of the best modern solutions to human-wildlife conflict, there is much evidence to suggest that, for a number of species, as a mitigation measure it is far from a panacea. Critical evaluation has revealed a disappointing success rate in the translocation of a range of wild species, as well as a displacement of the 'problem' to other areas and other communities instead of a solving of the issue.

Using translocation options in human-wildlife conflict

The animal translocation process involves four phases: 1) capture, 2) transportation, 3) release, 4) post-release monitoring. Capture involves either free-range chemical immobilisation with drugs, or physical capture in a trap and subsequent tranquilisation. Transport is usually by road or occasionally in boats, but even aircraft have been successfully used, especially for longer journeys. The release

procedure can be of two kinds. In a 'hard release' the animal is simply set free immediately into a new location deemed to be suitable. Most non-territorial and social herbivores, for example, can often be hard released successfully in herds. To promote settling and reduce homing behaviour, 'soft releases' can be employed, which involve confining animals for a specified period to induce adaptation to the new area. In this case captive facilities for housing and feeding must be provided. In reality, costs play a large role in the choice of soft or hard release, meaning that soft release is often chosen only for valuable individuals (e.g. predators, rhinoceros).

The advantages and considerations of translocation in human-wildlife conflict

Not all of the points below will be applicable to every translocation exercise, but they represent the range of experiences that have been documented.

Advantages

- Killing of individual animals in situ or capture and removal for euthanasia is avoided.
- A relatively easy intervention to raise funds and material donations for (which may also contribute towards conservation efforts for the species).
- May be combined with reintroduction translocations if the problem animal is an endangered species.
- May allow concurrent research opportunities via the capture, tagging or sampling of study animals.

Considerations in the planning stage

- National and international legislation and regulations governing the capture and movement of animals can prevent or slow down approval for translocation.
- Capture, transport and release come at a high cost in terms of both money and expertise.
- The planning process must evaluate the social impact of the translocation of potentially dangerous animals and reoffenders on communities at the release site.
- Translocation must involve a comprehensive evaluation of whether any alternative options are available.

Considerations about the original human-wildlife conflict problem

- Correctly identifying the culprit animals for live capture can sometimes be difficult.
- Achieving success with live capture can sometimes be very time consuming, difficult and expensive. When live-capturing wild animals, the risk of both animal mortality and risks to attendant humans need to be managed.
- Removal of problem animals of certain species may risk creating a vacant territory or home range,

which can then be occupied by another individual that may also become a problem and/or has been shown to disrupt social hierarchies, leading to increased depredation/human-wildlife conflict-prone behaviours.

- Relying upon animal translocation can risk leading to simpler and more sustainable, pro-active, in situ human-wildlife conflict mitigation measures being ignored and can lead to local communities/government officials relying on translocation as a tool instead of examining and addressing the deeper human-wildlife conflict issues.

Considerations during transportation

- There can be significant animal welfare concerns in transit, which even the closest supportive veterinary care cannot always satisfactorily address. The most common cause is unforeseen logistical problems during road transport. Access to skilled veterinarians and the necessary immobilisation or stress-reducing drugs is often very limited.

Considerations at the release site

- ‘Soft release’ programmes can be very costly and labour intensive, and sites in which to implement them may be limited.
- The animal may be unable to survive due to competition or hostility from resident animals in its new range. Translocation creates intruders, which conspecifics of highly territorial or aggressive species will often try to kill or drive away.
- Translocated individuals from social species may have difficulty integrating into populations of conspecifics at the release site because the intervention can cause social disruption in the existing population. Natural behavioural ecology and thus possibly even fecundity of a population can be at risk of being compromised.
- Translocated individuals may have a low chance of survival given their lack of knowledge of the new area – inability to find food, water etc.
- It is impossible to be certain that the original problem will not be exported with the animal, especially with ‘habitual offenders’. This will cause huge setbacks for acceptance of the procedure among people newly affected by human-wildlife conflict at the release site, and may lead to ill will towards conservation efforts if not handled appropriately by including local community members from both the capture site and the release site in the decision and efforts *before* translocation occurs.
- If the problem animal does survive the immediate post-release period, it may return to its former range – called ‘homing back to range’. In some species this can take place over distances of many hundreds of kilometres.
- The overall cost of translocation must include the essential follow-up monitoring at the release site for a considerable period, without which the exercise is pointless. A retrospective process of evaluating success can take years and the successes and failures should be shared broadly so that other areas and projects/governments can make better-informed decisions around translocation.
- At the destination, population establishment in the shorter term must be distinguished from population persistence in the longer term. Local adaptation or integration can be complicated by

factors present in the new range, which were not anticipated or known at the time of the translocation exercise.

Animal translocation to mitigate human-wildlife conflict must not be confused with translocation intended for the re-establishment of a new population in a new range – sometimes called ‘reintroduction’ or ‘restocking’ – or for the genetic reinforcement of an isolated population, which is often quite successful (Soorae, 2021). The Eurasian lynx, for example, is a species that has benefited from such interventions. The term *mitigation translocation* (Bradley et al., 2020) is also different and refers to translocating individuals to ensure their survival from anthropogenic threats – for example, by being relocated away from development projects.

Box 18

Examples of translocations

In a review of problem **lions** over a 4-year period in Botswana, Morapedi et al. (2021) monitored the movements, survival and fates of 13 problem individuals captured and translocated from livestock farming areas into national parks. These translocations (at a mean distance of 156 km from capture site) all ended in failure, with a mean survival period of 275 days. This period is very short in terms of the natural lifespan of a wild lion (8–16 years). Six of the lions reoffended and were translocated a second time, with farmers killing four of those reoffenders. Individual translocated wild lions seldom get settled into the complex natural social structures of prides, which directly affects their survival. Similarly poor results have been obtained with many translocated lions in other African countries, but unfortunately most of these cases were not fully reported on or published.

Leopards are solitary with a wide dietary tolerance and so are adaptable to multiple habitat types, but translocation distance needs to be of the order of hundreds of kilometres. In India the success of translocating leopards away from village areas seemed to achieve little conflict reduction and in fact appeared to lead to increased conflicts at both capture and release sites, possibly due to social disruption and stress (Athreya et al., 2011). There was moderate success reported from South Africa in translocating leopards, but the host of variables used in evaluating success is very complex indeed (Power et al., 2021).

Hyaenas translocated individually in Africa show ‘site infidelity’ and have a high chance of returning to their former range, while **African wild dog** packs seldom remain anywhere near their chosen release site (Gusset et al., 2009).

Pumas translocated in the Americas are said to only establish new territories if there is sufficient vacant space available to them upon release. Pumas also show a strong tendency to ‘home back to range’ (<https://www.panthera.org/initiative/puma-program>).

There have been some successes with **tigers**, but many more failures. Translocations in

Asia have been recorded at the release site as variously: suffering high mortality from resident animals; disrupting breeding in the new population; or still killing livestock after translocation (Goodrich, 2010).

Translocation of 11 problem **cheetahs** in Botswana at a cost of US\$7330 per animal was completely unsuccessful in every case (Boast et al., 2016). In a long-term review of reintroduction of cheetahs, van der Meer et al. (2021) analysed the fate of a population in Zimbabwe whose founders were translocated for being livestock raiders more than 25 years previously. The population was not viable from around year 12, and local extirpation was the end result. This was due to unforeseen factors at the release site. Thus, the conclusion of detailed, published studies is that conflict mitigation methods should focus on coexistence between predators and humans and not on translocation (Fonturbel & Simonetti, 2011; Linnell et al., 1997; Nuwer, 2021). Most large social herbivores that show flexibility in home range or territories, for example deer, buffalo, bison, zebra, wild ass and hippopotamus, can often be hard released successfully in established herds (Soorae, 2021).

Translocating elephants can be done, even in numbers, but of course costs large sums of money (Dublin & Niskanen, 2003). A classic study in Sri Lanka, where 16 problem **Asian elephant** bulls were individually translocated (Fernando et al., 2012), demonstrated almost total failure, with a combination of homing, intensification of problem activity, aggression and increased elephant mortality. The conclusion was that such translocation defeats both conflict mitigation and elephant conservation goals. In the case of **African elephants**, female herds tend to settle in new locations but some bulls explore their new range until they locate human settlements and then resume crop raiding (Pinter-Wollman, 2009). Therefore, with elephants that are 'habitual offenders', translocation merely moves the problem with the animal.



Conclusion

Given the above considerations and the relatively poor success rate of problem animal translocation, the better course of action for the majority of human-wildlife conflict scenarios is to address human-wildlife conflict in situ, with actions identified through stakeholder consultation and participatory processes, and that are suited to the level and characteristics of conflict in that situation (Chapter 1, Levels of conflict over wildlife, Chapter 27, Preventing damage by wildlife, Chapter 15, Planning and theory of change; see also (Glikman et al., 2022a). Decision processes should take into careful consideration the points raised here and must be driven by evidence and practicality, not pressure from financial sources, especially those that claim to prioritise individual animal welfare over all other considerations. The only situation in which translocation should be considered as a standard approach is where the species or population is highly endangered, so that every individual matters.

Additionally, ‘quick-fix’ problem-animal translocations, often favoured by wildlife authorities, can rapidly become counter-productive. Authorities often find it more convenient to translocate problem animals rapidly, rather than engage with affected communities and persevere with negotiations involving the complexities of human-wildlife conflict (see Chapter 13, Working with stakeholders and communities and Chapter 17, Resolving conflicts between people). When *removal of the culprit* is relied on, other human-wildlife conflict mitigation measures to protect the target may be reduced or ignored, while the absence of one individual problem animal can leave the option wide open for it to be replaced by a subsequent one. If that results in the same problem occurring in not one, but now two places – both the source and destination of the translocation – then negotiation with affected communities and authorities about alternative or subsequent human-wildlife conflict mitigation proposals can become far more difficult (see Chapter 1, Levels of conflict over wildlife).





Lethal control tools

Sugoto Roy, James Stevens, Amy Dickman, Simon Pooley, Richard Hoare, Simon Hedges, John D. C. Linnell, Virat Singh & Piero Genovesi

Rationale

This chapter provides guidance and information on the use of lethal control of problem individuals as a negative impact response measure for situations in which species are protected. It does not relate to animals killed as part of trophy or subsistence hunting; nor does it aim to provide information on culling overabundant pest species as an ongoing measure for managing conflicts to below pre-agreed thresholds, although some of the arguments in these circumstances are still pertinent in the broader spectrum of human-wildlife conflicts (however, see Box 19). The lethal control of individual animals should only be considered as a last resort (particularly in the case of endangered species), with specific reference to the situation in which it is relevant as a management option. It should be noted that this is one of several different options for conflict mitigation, with others presented in other chapters as part of these Guidelines.

Why use lethal control

Lethal control may be considered in the following situations:

- Negative impacts created by an individual animal or small group of individuals (e.g. crop-foraging) have been severe and ongoing, and alternative actions to prevent the impacts, focusing on, for example, preventative barriers or hazing, have not worked (see Chapter 27, Preventing damage by wildlife).
- The species, and in particular the individual within the species, is known to be dangerous to life or property, meaning that it cannot be captured and relocated, and there is little interest in maintaining the individual in captivity indefinitely. Lethal control is often used in situations where human injury or fatality might have a high risk of occurring or has already occurred.
- A significant conflict has arisen between locals and conservation authorities over perceived threats to lives or livelihoods by the wild animal(s). The decision to use lethal control in such circumstances must be carefully weighed, considering the precedent that killing problem animal(s) may create.

- Alternative techniques for mitigating and preventing negative impacts may be beyond the financial and technical capabilities of those affected by the situation. For example, farmers in a remote location may not have the resources or experience to enact predator-proofing – especially where these are not proven to work or need continuous maintenance. Lethal control may therefore be the only option to reduce the negative impacts.
- Actions to prevent negative impacts have resulted in the impacts being displaced to another location. For example, erecting a predator-proof fence may move the problem to a neighbouring farm rearing livestock. If it is not possible to prevent damage fully, lethal control might be required.
- The individual animal in question may have adapted to overcome the damage-preventing actions or become behaviourally reliant on the resource presented (such as livestock). This behaviour may be exacerbated if the individual is injured and unable to provide for itself through normal means. Where no other options present themselves, lethal control may be required.

To reiterate, although lethal control may be required in these situations, it should only be used as a last resort once all other possibilities have been considered, or if the risks to human or animal welfare become too high.

The advantages and disadvantages of lethal control

The advantages

Lethal control often has conservation benefits. Firstly, it can often alleviate conflict situations quickly. By removing problem individuals, the immediate source of the conflict (at least in the eyes of those affected in local communities) is removed. This can help provide a temporary stopgap until a more permanent or sustainable solution is found for the species in question. While providing a solution can take the pressure off responsible authorities when focusing on better solutions, it can also temporarily improve relationships between different stakeholders because it looks like something is being done at first glance.

Lethal control of problem individuals within a population can also exert a positive conservation influence. By targeting identified problem individuals, it is less likely that members of the local community, especially those affected by the outcomes of the conflict (particularly if such outcomes include livestock loss or loss of human life/injury) take it upon themselves to kill other individual animals in the population.

The disadvantages

Lethal control also comes with several disadvantages. Some of which are outlined below:

- Once lethal control operations are undertaken, there is a danger that they will become the go-to mechanism for dealing with all conflicts with this particular species at the expense of other solutions. If this is not the case, local communities may take it upon themselves to undertake their own forms of lethal control. If undertaken by unqualified, poorly equipped members of the public, this is more likely to lead to further conflict:

- Nontarget individuals may be killed. This is particularly problematic because many conflict species are also of high conservation value, and indiscriminate killing may remove large numbers of individuals from the local population.
 - Animals may be injured during poorly executed culling operations and become dangerous if they are approached. If they escape during culling attempts, they may modify their behaviour to evade future capture or management attempts.
 - Nontarget species may also be affected through indiscriminate, non-specific trapping/killing methods (such as snares or poisons), leading to broader conservation losses.
- Lethal control of individuals may make it more acceptable for other stakeholders to take it into their own hands to kill wildlife, which could lead to unregulated, illegal and increasingly unenforceable wildlife trade.
 - Lethal control may expose organisations involved in conservation and law enforcement to unmanageable levels of media attention via animal-rights-driven organisations. Although this is not a bad situation, it requires a lot of time and attention to ensure that the media are informed appropriately.
 - Removal of problem individuals through lethal or other means may not solve the problem because other individuals from the population may fill vacant territories and take on the patterns of impacts. In the case of crocodiles, for example, removing dominant males can result in an influx of competitive, aggressive males, potentially making the situation more dangerous. Lethal control can also cause social upheaval within populations of the problem animal. For example, removing adult elephants can result in bad behaviour from young males in the absence of adults (Slotow et al., 2000).

Misconceptions of lethal control

Affected people and those authorising lethal control sometimes believe or hope that this approach has a deterrent effect on future potential problem individuals that witness the lethal control – by ‘teaching’ other individuals in the population to avoid certain areas. This belief is false, as shown by a case study on African elephants (Figure 19).

Although the concept of problem individuals who have adopted the pattern of frequent aberrant behaviour has been described for several species, it is still debatable how widespread this is among species involved in problematic behaviour. Therefore, the use of lethal control should be carefully considered, especially when problematic individuals are unlikely to be causing the impacts alone, but as part of a wider behaviour in the population. Efforts to prevent impacts, in this case, may be more efficient than lethal control.

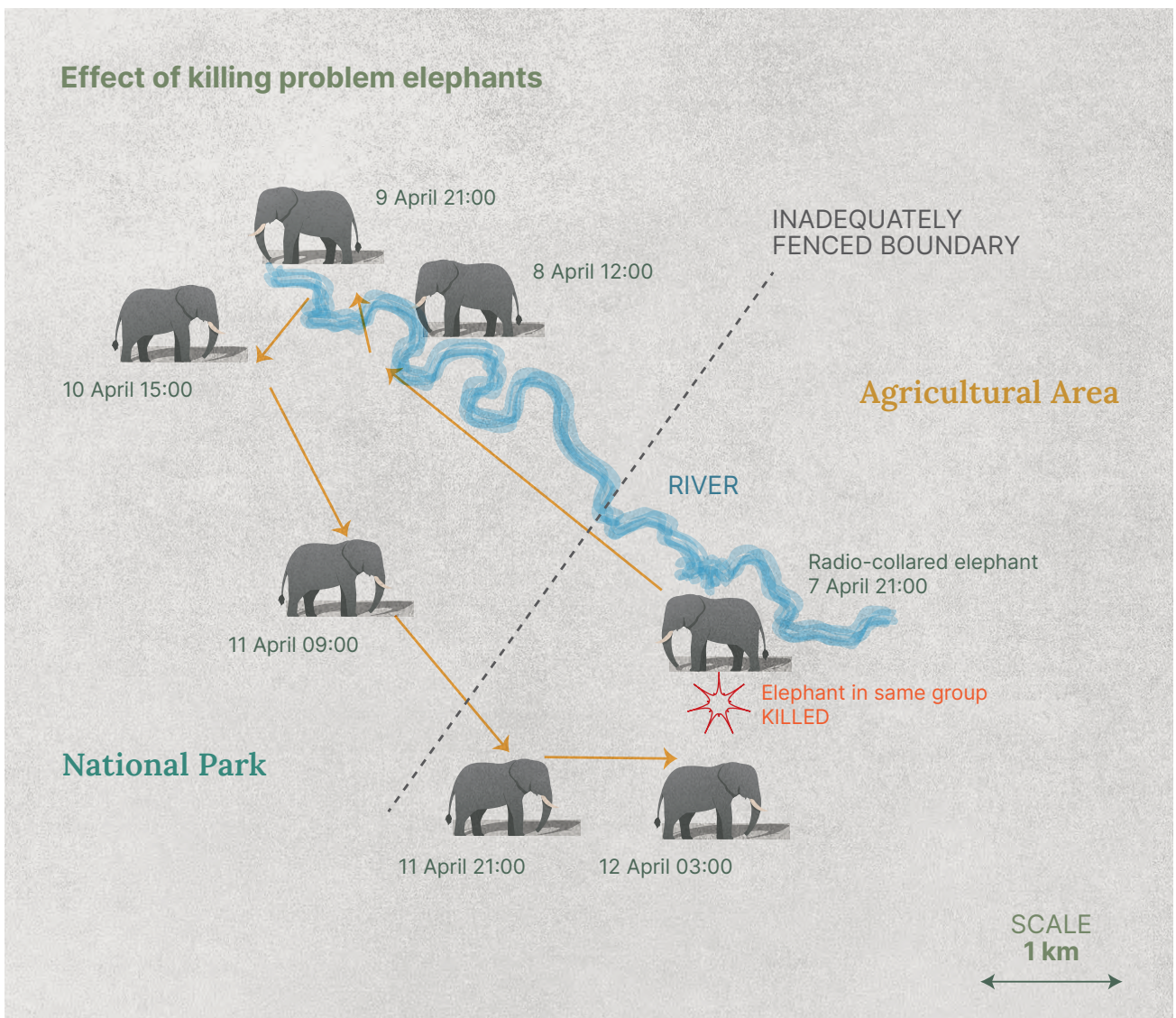


Figure 19. Movements of a radio-collared male elephant tracked by a researcher in Zimbabwe. One of the elephant's group mates was shot dead in the farming area on the night of 7 April. The animal initially returned to the sanctuary of the adjacent national park, but four nights later was crop-raiding again in the farming area very close to where the shooting of its companion took place. Decades of control shooting in many areas have had no deterrent effect on problem behaviour in African elephants. (Source: Hoare 2001)

When to use lethal options

Lethal control is often the last resort. Decisions are often associated with hierarchical and stepwise processes to ensure that specific criteria are met, and thresholds are reached before they are made. This is because species in conflicts are often large-bodied (usually predatory), with small populations and media interest. Lethally removing animals results in changes to local population structures and receives media attention. An example relating to bear conflict management in Italy is given in Figure 20).



Figure 20. The increasing degree of dangerousness criteria necessary to cull problem bears in Italy. Only at levels Q–V is lethal control contemplated, after considering, respectively, capture with the possibility of release or a life in permanent captive facilities. Where the danger level ranges from A–P, hazing and aversive behavioural conditioning are attempted before lethal control is considered (see also Chapter 25, Animal capture and translocation). (Adapted from: (Anon, 2010) with permission)

How to use lethal control

There are several different lethal control tools and techniques available. These vary in their application and can be active (techniques that actively target an individual), for example using trained marksmen, through to passive techniques (where equipment or other materials are left in the environment and target animals approach), such as poisoning or trapping. The technique used will be appropriate to the situation, species, underlying safety concerns (for example, is the conflict in a highly human dominated landscape, or are there nontargets at risk) and the underlying legislation of the country or state applying it.

In most cases where lethal control techniques are applied, there are associated paper trails, signoff from responsible agencies, and levels of accountability and record keeping. Most cases are overseen by government-appointed vets to ensure humaneness and welfare standards. In many countries these data are fed into guidelines and policy to maintain or maximise welfare standards.

Animal welfare

Animal welfare standards must be maintained and adhered to, with operatives being trained in technical competency, efficacy and humane standards. Most countries have predetermined animal welfare standards for lethal management of vertebrates; failing this, there are several international standards too, such as those developed by the World Organisation for Animal Health and the European Union (European Community, 1997; OIE (World Organisation for Animal Health), 2015). These ensure a swift death within a fixed timeframe and provide guidance in specific situations, such as where the targeted individual may have dependent young.

Responsibilities

Practitioners undertaking lethal control must be skilled, qualified and have appropriate backup. Lethal control is only one of the components of a long chain of events, including field surveying, reconnaissance and liaison with local communities (see Chapter 28, Response teams)

The roles and responsibilities of different team members need to be clearly identified. Those undertaking lethal control may also be subject to threats and accusations from the general public and organisations relating to animal rights. Precautions need to be undertaken to provide adequate and appropriate levels of anonymity.

Media relations are also a component of lethal control. All team members need to be adequately briefed to ensure that any information made public is coordinated (see Chapter 18, Engaging with the media and social media).

Box 19

Lethal control and public perception through the media

Any animal that is killed or 'controlled', even if it is a problem individual, is bound to cause a huge emotional outpouring and polarisation of views, especially as the news spreads across the internet quickly, through numerous channels, and often in subjective or biased ways. In most cases:

- facts are neither presented in a timely manner, nor widely for a larger audience
- facts are twisted due to public sentiments, and are never clarified by experts, organisations or the government.

Case study

A tigress officially called T1 and then nicknamed Avni from the Maharashtra state of India was suspected of killing 13 people since 2016 and was finally shot dead by a hunter called in by the government in November 2018. The tigress had two 10-month-old cubs when

she was shot. There were protests and candle-lit march vigils across India, and there was even global pressure to investigate her death.

Two years after the death of the tigress the Supreme Court of India had sought an answer to whether the slain tigress was indeed a man-eater. In this case, the public anger was directed more towards the fact that she was killed by a civilian, Ashgar Ali Khan, the son of the well-known hunter Nawab Shafath Ali Khan (who had a reputation for being a trophy hunter), and the fact that the Forest Department kept a lot of facts hidden from the media.

Lethal control, public opinion and the media – principles for good practice

1. Communicate with the local media via a detailed, simplified and humanely written media release or a small press conference, giving reasons and explanations. Ideally this should be before an animal is killed.
2. Use social media to put out facts relating to the case and the efforts in ensuring that attempts are being made to capture rather than kill.
3. Experts, researchers and government officials should speak with journalists they know and in advance, explaining the situation (off or on record).
4. Once the animal has been killed, it is best to avoid its images being circulated in public.
5. No images of people posing with the carcass of the ‘problem animal’ should be shared – this would create more negative perceptions on social media as well as in the traditional media.

Box 20

Case study: Hunting as a tool in integrated wildlife management

The recreational hunting of wildlife is widespread across most of North America and Eurasia. In most countries, this constitutes a highly regulated activity in which hunters are trained, quotas are set based on monitoring data and management agencies supervise the entire system. The motivations for hunting are diverse, and many usually operate simultaneously, leading to the concept of multifunctional hunting (Fischer et al., 2013). For example, in northern Europe, moose hunting provides: 1) economic benefits for landowners through the sale of hunting licenses; 2) meat for local consumption and sale; 3) trophies; 4) recreational opportunities; 5) opportunities for social activities within rural communities; and 6) a link to culturally important heritage activities.

In addition to these social and economic benefits, moose hunting is also an essential tool in managing the conflicts that moose are associated with. These include collisions with cars and trains, and damage to crops and forest plantations. The extent of these impacts is related to moose density, so adaptive hunting is the primary tool used to regulate

population sizes at a level that brings benefits while keeping costs at levels that are viewed as acceptable. In effect, the hunting of large herbivores is a form of integrated conflict management that uses hunter harvest to increase values and decrease costs and conflicts, and thus achieve a sustainable coexistence (Kaltenborn & Linnell, 2022; Linnell et al., 2020).

The same approach is also applied to large carnivores in the same region. However, recreational hunting of large carnivores is much more controversial with the public than hunting large herbivores.

Overall, the use of recreational hunting within a wildlife management/sustainable use framework has both allowed and fostered the recovery of large mammals across Europe and North America over the last century (Chapron et al., 2014; Linnell et al., 2020), facilitating their integration into the wider landscape beyond protected areas. This represents a model for human-wildlife interactions that seeks to balance costs, conflicts and benefits sustainably.





IUCN SSC GUIDELINES

PRINCIPLE 5 —

Enable sustainable pathways



Preventing damage by wildlife

James Stevens & Simon Hedges

Many types of action have been implemented by people around the world to prevent damage from wildlife (Conover, 2001; Nyhus, 2016). This chapter discusses actions and interventions to prevent damage; however, before focusing on preventing damage by wildlife, it is crucial to ensure that a comprehensive understanding of the conflict situation has been achieved. As explained in Chapter 1 (Levels of conflict over wildlife), many human-wildlife conflicts are about deeper issues beyond just the matter of damage caused by wildlife, and need to be approached accordingly.

In many human-wildlife conflict situations there is an urgency to intervene to address damage by wildlife. However, the efficacy of such actions are usually not tested (Hedges & Gunaryadi, 2010; van Eeden, Crowther, et al., 2018) or, when tested, the methods for assessment vary widely, making comparisons less straightforward. Conducting a participatory stakeholder engagement process (Chapter 13, Working with stakeholders and communities) to determine what action (if any) to take, and adopting a theory-of-change-based approach to planning (Chapter 15, Planning and theory of change), substantially increases the chance of the above concerns being addressed and therefore the likelihood that any actions taken will be successful.

Damage prevention interventions can take many forms, and identifying suitable ones requires extensive discussions with affected stakeholders to ensure acceptability, co-design and co-ownership, and sharing of responsibilities. Too often, an intervention that has worked in one human-wildlife conflict situation is applied to another, similar situation but is found to be unsuccessful. This is not because the action itself is not effective but might be because it will only work in particular cultural, physical or social contexts. It is essential that those hoping to mitigate the effects of human-wildlife conflict follow appropriate processes for understanding, planning and adapting for local contexts. By following these processes, the identification and selection of appropriate interventions will emerge from the participatory planning, and these are more likely to be effective when taking into account the full context of the human-wildlife conflict situation being addressed, embedded within the broader existing global human-wildlife conflict actions, successes and failures.

This chapter provides a brief discussion of the different ways of preventing damage by wildlife to crops, livestock and other property, and – to a lesser extent – preventing injuries to, or the death of, people. The interventions discussed in the next section have differing levels of efficacy, ethical considerations, feasibility, perceived functionality and, therefore, differing levels of success between contexts and regions, and depending on the species involved in the conflict (Allen et al., 2019; Gunaryadi et al., 2017; Hsiao et al., 2013; Weise et al., 2018; Zarco-Gonzalez & Monroy-Vilchis, 2014).

While this chapter will focus on actions and interventions that can be implemented to reduce damage at the local or site scale, some can and have been implemented on a wider, landscape scale. Some can be implemented to prevent damage by multiple species, while others are highly species specific.

Physical barriers

A commonly used technique to stop wildlife accessing and damaging property, and impacting human safety, is to construct a physical barrier where the structure alone makes it difficult for animals to cross into an area, thus spatially separating wildlife from people and property. Barriers can take many different shapes or forms, including fences, nets, trenches, moats, walls, buildings and exclusion cages, and may be produced using various materials, both synthetic and natural. While the presence of physical barriers alone may be enough to spatially separate wildlife and people, barriers can be supplemented with additional features to enhance the exclusion effect. For example, a fence can be electrified, resulting in a shock if wildlife touches it, thus adding a deterrent effect to the exclusionary one.

Guarding

The use of people or domestic animals to guard crops or livestock against wildlife has been applied for centuries. Guarding can be used to detect the presence of wildlife and deter it from accessing and damaging property or causing people harm. People guard property not only in static situations, such as community-based crop guarding, but also when herding livestock (van Eeden, Eklund, et al., 2018). Domestic animals have been used primarily to guard livestock from predation, although they have been used in other situations, such as crop guarding. Livestock-guarding dogs have most often been used for this task (Linnell & Lescureux, 2015), with other domestic animals, such as donkeys and llamas, being used under certain circumstances (Andelt, 2004). By integrating dogs into livestock herds from a very early age, the dogs become part of the herd and their ingrained behaviour to detect and deter threats means that predation can be reduced. This integration also prevents the dogs from chasing or killing the livestock themselves because they associate the livestock with their own pack.

Early-warning systems

Early-warning systems aim to ensure that people at risk of damage are made aware of the presence of wildlife as soon as possible. In some cases, this still requires an active guard – such as a lookout person – to detect the wildlife, with information regarding its presence distributed efficiently via various communication methods, such as loudhailers and sirens (Engelbrecht et al., 2017). More automatic systems have traditionally included tripwires that activate alarms (sirens, bells or even tin cans filled with stones) to indicate the approach of wildlife, thus allowing farmers to take appropriate actions, such as driving wildlife away from crops (Gunaryadi et al., 2017).

As technology has advanced, these detection processes have become more automated in various ways, ranging from radio/GPS-collared wildlife setting off alarms when crossing defined virtual boundaries (Weise et al., 2019), to strategically situated remote cameras that can detect and identify certain species of concern (ZSL, 2021). While early-warning systems can reduce the opportunity costs

associated with labour-intensive guarding (i.e. local people can sleep or engage in other pursuits, including work), technology is not a panacea and often has its limitations.

Deterrents and aversion

Some interventions can be used to deter wildlife from a given area by stimulating one or more of an animal's senses in a negative way, with the aim of making the animal leave the area. Some may be associated with a potential threat, producing a painful or uncomfortable stimulus, whereas others may simulate a potential threat, which is perceived to be real. These interventions can be acoustic, chemical, visual or tactile.

Acoustic deterrents emit sounds to scare the animal, and include sirens, firecrackers, beating drums and simulations of predator calls; some acoustic stimuli are simply uncomfortable to the animal and cause it to leave the area (Götz & Janik, 2013). Chemical deterrents can provoke a reaction to an odour or taste. These deterrents can be applied around or on the property to prevent damage, or discharged as an active deterrent in reaction to the presence of wildlife (Herrero & Higgins, 1998; Osborn, 2002). Capsicum, a compound of chilli peppers, has been used in several contexts. Visual wildlife deterrents come in various forms, including brightly coloured material (e.g. fladry), scarecrows placed to mimic humans, or even bright light systems (Adams et al., 2020; Ohrens et al., 2019).

Aversive conditioning involves the use of a deterrent that the animal learns to associate with a negative experience. This includes the use of beehive fences to deter African elephants, which have a natural aversion towards bees and learn not to enter areas with such fences (King et al., 2009). Conditioned taste aversion is a type of aversive conditioning that involves applying certain substances to crops or livestock, which may cause unpleasant effects (such as illness) when consumed by the wildlife. The wildlife then associates discomfort with the crop or livestock, and therefore avoids future consumption (Baker et al., 2008).

Box 21

Examples of damage-prevention approaches

Case study 1 – beehive fences

In Kenya, beehive fences have been used successfully to deter elephants from entering farmers' fields (King et al., 2009). However, when trialled in Botswana, maintaining active beehives was difficult due to a lack of the vegetation that is required to give bees enough resources to maintain strong and healthy hives. The region where the beehives were used also lacked natural bee colonies and therefore opportunities for the hives to be naturally colonised were limited (J. Stevens, pers. comm.).

Mixed results have been observed in Thailand, with one study showing limited defensive reactions of beehives when disturbed (Dror et al., 2020) and another showing that a pilot fence had caused some elephants to be deterred when approaching it (van de Water et al., 2020). This example highlights how the same intervention concept used in different contexts (and on different continents with distinct yet similar species) may have differing results.

Case study 2 – crop guarding

Around Way Kambas National Park (WKNP) in Sumatra, Indonesia, community-based crop-guarding methods involving low-tech approaches and a simple early-warning system have been successful at reducing previously high levels of human–elephant conflict (HEC; Gunaryadi et al. (2017). However, the same methods, when field-tested on the Nakai Plateau in Lao PDR, did not work effectively because there were low levels of participation by village crop guards, high levels of equipment theft and misuse and low levels of patrolling of field boundaries.

Various reasons appear to account for these differences in the method’s effectiveness: 1) the relatively low levels of HEC on the Nakai Plateau; 2) the sporadic and highly clumped spatial nature of HEC; and 3) the farmers’ understanding of points 1 and 2, which led them to perceive, correctly, that the risk to their crops was low. Consequently, the farmers likely decided that guarding their crops every night was too much effort relative to the low risk of crop depredation by elephants. In addition, the socio-economic differences between the Lao and Sumatran farmers, and their farming systems, i.e. scattered individualistic slash-and-burn dry rice fields in the Nakai area and a cooperative irrigated rice field system with well-established formal village-level coordination committees around WKNP, probably meant that the Sumatran farmers were naturally more inclined to participate in a cooperative community-based crop-guarding system (McWilliam et al., 2010).

This example shows the importance of recognising that just because an human–wildlife conflict mitigation method worked well in one place, this does not necessarily mean it will work well somewhere else. It also illustrates how understanding the various issues behind the human-wildlife conflict (see Chapter 9, Culture and wildlife, Chapter 10, How histories shape interactions and Chapter 19, Social science research) can improve the adaptability and appropriateness of the proposed action to a local context. This will not only improve its effectiveness, but will also guide the initial decision as to whether to implement the proposed action at all – potentially saving conservation efforts and resources for another area or species.

Limitations

All wildlife damage interventions have various advantages and disadvantages. One of the biggest issues with many interventions, particularly deterrents, is that wildlife can become habituated to them. This is particularly the case where interventions simulate a threat but do not themselves constitute an actual threat. In other words, ‘empty threats’ are often swiftly perceived as such by wildlife and then ignored. For example, scarecrows are a visual deterrent used to mimic humans; however, if the animal perceives there to be no threat from the scarecrow, it may no longer be deterred. This often depends on the species involved and their cognitive abilities (see Chapter 7, Animal behaviour).

Interventions that create some level of real threat or discomfort are likely to be more effective, although their use raises ethical concerns. If the motivation for the animals' problematic behaviour (e.g. obtaining high-quality food) outweighs the potential threat or discomfort, reducing or preventing the behaviour may not be possible (Mumby & Plotnik, 2018) (see Chapter 7, Animal behaviour).

Wildlife adapting to peoples' actions is also problematic, particularly for those species with significant cognitive abilities (Barrett et al., 2019). Interventions that may initially prove successful can quickly become ineffective if wildlife are able to adapt to them. For example, both African and Asian elephants have been observed to outwit electric fences consistently, either by breaking the fences with their tusks (Mutinda et al., 2014) or finding other ways to topple or damage fence parts by finding weaknesses in their setups.

Conclusion

Striking a balance between the various approaches will typically be needed to ensure optimal damage prevention. When identifying, selecting and implementing an action, it is essential to ensure that:

- underlying or deep-rooted conflicts are not present, have been addressed or are being addressed in parallel (see Chapter 1, Levels of conflict over wildlife);
- the intervention has been planned by the affected stakeholders, in consultation with other relevant stakeholders (see Chapter 13, Working with stakeholders and communities);
- the behaviour of the species in question (see Chapter 7, Animal behaviour) as well as the humans in the region (see Chapter 9, Culture and wildlife, and Chapter 19, Social science research) are considered in both the design and implementation of the action, especially if the action fails and must be adjusted according to human and non-human animal needs;
- the intervention is known to be functionally effective, ethically and culturally appropriate (see Chapter 9, Culture and wildlife), feasible and perceived as effective (see Chapter 32, Evaluating interventions), or in experimental situations, the relevant stakeholders are aware of the limitations;
- any potential unintended outcomes of implementing an intervention have been identified and a plan has been developed to mitigate these (see Chapter 4, Avoiding unintended consequences, and Chapter 15, Planning and theory of change).



Response teams

*Sugoto Roy, Mayukh Chatterjee, Chloe Inskip, Rachel Hoffmann,
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The management of human-wildlife conflicts involving certain species will require, and benefit from, an effective means of responding quickly to individual conflict incidents, especially where such incidents occur frequently or have the potential to result in severe losses and conflict. The nature of these incidents will vary, but are likely to involve two or more of the following characteristics:

- A species that has the capacity to seriously injure or kill people or large livestock, or to significantly damage people's property (e.g. large felid species, bears, elephants).
- A species that will enter, or approach very close to, human settlements.
- A community in which people will try to kill an animal when it enters a human settlement or agricultural land.
- A location that has a history of any of the aforementioned escalated incidents occurring.
- The tendency for large crowds of people to form – often quickly – when an animal enters human settlements or agricultural land.

Timely, effective, locally acceptable responses to such incidents can reduce the impacts of conflict on people and wildlife, and help to prevent conflict incidents from escalating (Anthony et al., 2010). In more complex and deep-rooted conflict scenarios, effective and inclusive rapid responses to incidents may only be possible once fraught relationships between stakeholders have been addressed (see Chapter 1, Levels of conflict over wildlife and Chapter 17, Resolving conflicts between people).

One robust mechanism for responding to such conflict incidents, implemented in several places worldwide, has been the constitution and mobilisation of response teams. Although their efficacy remains to be documented over the long run, they have been found to be fruitful in effectively ameliorating conflict situations on the ground (Goodrich et al., 2010; Sharma et al., 2021).

What is a response team?

In a number of countries, organisations and governments have established response teams to manage conflict incidents, usually at the local, administrative or village level. For example, the Wildlife Trust of India (WTI) has developed such a mechanism to address situations in Uttar Pradesh, India, where large carnivores, especially tigers and leopards, move into human-dominated landscapes, leading to injury to, and in some cases the death of, people and animals (Box 22). Similarly, in Trento, Italy, a team has been established to respond to incidents in which bears present a threat to human safety or property (Anon, 2010) (Box 23).

Response teams vary in their characteristics, but typically tend to be one of the following:

- **Community response teams (CRTs)** are established at the local level with communities that experience conflict incidents. These teams typically comprise volunteers who have received training in how to respond quickly, safely and effectively when a wild animal enters their village or farmland. They may also be trained in crowd management and dispute resolution techniques.
- **Emergency response teams (ERTs)** are established at the administrative (e.g. forest department) or organisational (e.g. NGO) level, and are composed of skilled personnel with varied expertise and access to specialised equipment. Team members may include wildlife biologists, wildlife veterinarians, individuals experienced in social engagement with local communities or forest department officials. Individuals skilled in crowd control and management, such as police personnel, disaster relief forces and/or armed forces personnel, may also be required. ERTs may act in isolation or can be employed in combination with CRTs.

Depending upon the expanse of the landscape in which conflicts occur, a combination of several teams may have to be instituted across an area. Response teams may bear different names in different locations. Table 14 provides examples of commonly used names for the two types of response team.

Table 14. Commonly used names for response teams

Type of response team	Alternative names used in various parts of the world
Community response team (CRT)	Primary response team (e.g. Box 22) Village response team (VRT) Village vigilance volunteers (V3) Community game scouts Conflict response team
Emergency response team (ERT)	Rapid response team (e.g. Box 23) Quick response team (QRT) Rapid response unit (RRU) Rapid response squad (RRS) Mobile response units

(Source: Compiled by the chapter authors)

Community response teams (CRTs)

Local communities are invariably at the forefront of human-wildlife conflicts, bearing major losses that can arise as a result of the conflict and typically being responsible for retaliation against the animal(s) involved. It can be hugely beneficial, therefore, if the first level of response is developed within the affected communities.

The formation of CRTs:

- empowers and mobilises communities to respond swiftly to local conflict incidents in a way that protects both people and wildlife;
- creates a locally accessible, knowledgeable support group for community members to reach out to when they face an human-wildlife conflict incident;
- helps to develop greater rapport between communities and other local stakeholders.

How to develop a CRT

CRTs typically comprise community members. They can either be constituted by the communities themselves or, where communities are unable to develop such teams, government agencies, NGOs or conservation practitioners concerned with human-wildlife conflict management can facilitate their development, in close collaboration with affected communities. Failure to integrate community groups into the response mechanism can lead to communities becoming further alienated from the issue and may reinforce notions that the animal responsible for conflict is not part of the landscape, 'belongs' only to people concerned about the animal and/or conservation, and therefore should be removed. In situations where CRTs are to function alongside ERTs, representatives from the other organisations or institutions to be involved in the response effort should also be consulted during the development process.

For conservation practitioners, park managers, NGOs etc., who are aiding communities to develop CRTs, the following key points should be considered:

- **The prevalent level of conflict** – to identify whether measures to improve relations between key stakeholders are necessary before a viable response team network can be formed
- **The conflict landscape and the number of teams required** – for example, the area over which the conflict occurs, the amount of conflict (perceived and actual) occurring in a specific time period, the terrain and the number of affected communities.
- **The nature of incidents, the measures required to respond to them, and the risks associated with these responses** – the actions and equipment necessary to minimise these risks can then also be identified.
- **The range of roles and skills needed** – for example, patrolling community boundaries, crowd control, imparting awareness and education, delivering first-aid care, creating safe passage for animals out of a village, and support with and verification of compensation claims. Open dialogue with community members will provide insight into the possibility of roles they can (and are willing)

to take on, and help to build trust to encourage engagement.

- **How to identify and engage appropriate individuals within the community** in a culturally sensitive and inclusive manner.
- **The equipment needed by the team** – for example, mobile phones, flashlights, cameras, GPS units, safety gear, loud speakers, nets or ropes, uniforms, a public announcement system and first-aid kits. Determine who within the team will need what equipment, and consider how such equipment will be funded and maintained.
- **Financial compensation for CRT.** Most CRTs are generally composed of volunteers, although when the role is adopted full time, salaries for team members will be necessary.
- **Communication mechanisms.** Identify the means by which incidents can be reported to the team and how the team members can communicate with one another, with ERTs (if established) or relevant external agencies, such as forest department teams, police personnel or disaster relief force personnel.

Once the members of a CRT have been identified, it will be necessary to apply the following:

- **Provide team members with general information on relevant topics.** This helps to prevent misinformation while improving the understanding and identification of the species involved from signs of their presence; the basic behaviour and ecology of the species of concern; the importance of conserving this species and its habitat; why conflict with the species arises (e.g. specific human behaviours, human-induced landscape changes, changing perceptions and tolerance, economic drivers, and elevated levels of fear during conflict periods).
- **Assess team members' interests and competencies.** Take time to observe the functioning of each team member and their interests and aptitude for a role before assignment of specific activities.
- **Begin by assigning simpler tasks** to build trust and confidence within the team – for example, by verifying information on reported conflicts, recording conflict information and timely relaying of information to relevant authorities and agencies.
- **Provide initial comprehensive training** on relevant topics and skills and then continue to provide regular refresher training sessions (e.g. at least twice a year), including practical sessions with mock exercises (where possible).

Emergency response teams (ERTs)

In some situations (e.g. see Box 23) it may be necessary to only have an ERT. However, there may be other scenarios where these highly skilled and well-equipped teams can provide crucial back up for CRTs, such as during particularly challenging, lengthy or volatile conflict incidents (e.g. see Box 22) (Barlow et al., 2010). It is important to gauge how many teams will be necessary to effectively scale up the response to cover the area where the human-wildlife conflict is occurring.

How to develop an ERT

ERTs should be developed collaboratively with appropriate representatives from the institutions and organisations whose staff will become part of these teams. Representatives from affected communities should also be consulted during the development process to ensure a democratic process in which their voices are heard and their needs are respected.

Other factors to consider are:

- **Barriers to setting up administrative-level response teams.** In many countries the government departments responsible for the management and protection of wildlife species are tasked with the role of managing conflict situations. However, the remoteness of certain landscapes – added to the lack of personnel, resources, skills and capacity, knowledge and infrastructure – or simply a lack of a clear longer-term strategy, often inhibits a response being affected. Any such limitations and challenges of relevance to the development of an ERT will need to be identified and addressed if ERTs are to be viable.
- **Types of skills and expertise needed in a team capable of responding to the given incident type(s).** Many of the necessary tasks will likely require highly specialised training in the fields of wildlife science, wildlife veterinary science or social sciences. Therefore, ERTs with a broader range of expertise will function more effectively. Other government department personnel, such as police or disaster relief forces, may also be engaged where their requirement is found to be crucial.
- **The equipment needed by the team.** This may be highly specialised or expensive equipment (e.g. to tranquilise or transport an animal). How and by whom such equipment will be funded needs to be considered (as well as any maintenance and accessibility/use requirements).
- **The role of each team member.** The roles of the ERT personnel when responding to conflict incidents must be clearly communicated and carefully managed.
- **Additional training requirements.** Where team members are required to multitask – for example, managing the local people experiencing the conflict(s); tracking wild animals over a vast expanse of land of multiple land-use types; capturing and relocating the animal responsible; monitoring wild animals post release – additional training may be required for some. How and by whom will this be delivered?
- **Approaches for building and maintaining positive relationships** between ERTs and CRTs and/or the broader community if community support is to be sustainable over time.

It is important to note that to reduce conflict over the longer term, haphazard capture and relocations of animals involved in conflict incidents should be avoided (see Chapter 25, Animal capture and translocation). Attempts to amicably resolve a situation by allowing animals to leave the location on their own, by keeping people and crowds at bay or by systematically driving the concerned animal/s away from the site of conflict (Chapter 27, Preventing damage by wildlife) are the key objectives, and capture of animals must be undertaken only as a last resort (see Chapter 25, Animal capture and translocation and Chapter 27, Preventing damage by wildlife).

Box 22

Case study: response teams in Uttar Pradesh, India

In the state of Uttar Pradesh, India, the Wildlife Trust of India (WTI) has established response teams to deal with conflict incidents involving tigers or leopards. They have set up CRTs called primary response teams (PRTs), along with supporting rapid response teams (RRTs) comprising wildlife veterinarians, wildlife biologists and social workers (akin to an ERT). The teams were created over a 5-year period (2012–2017) and have since been evolving as the PRTs have taken on more formal tasks. Since 2017, this structure has led to an increasing number of conflicts between humans and tigers, and between humans and leopards, being resolved amicably, minimising losses and chances of retaliation.

The PRTs

The PRTs comprise voluntary community representatives who are carefully selected from the local population that regularly faces conflicts with wild animals. A key strategy employed in their selection is to recruit people who have a strong voice and a respected position in the community.

These teams are the first line of defence in conflict situations, and also provide support to families affected by conflict. PRTs are periodically trained in the skills required to take on a variety of roles, which include:

- crowd management;
- village patrols;
- collection of information on conflicts;
- swift relay of information to the forest department and RRT (see below);
- providing first aid to victims following attacks by wild animals;
- conducting systematic drives to encourage an animal back into the forest;
- supporting local people in filing of compensation/relief claims for losses incurred due to conflicts;
- coordinating awareness-raising activities – for example, about what to do in conflict situations and about how to adapt behaviours to reduce the likelihood of being attacked by an animal.

Each PRT acts within a rough radius of 5 km and may therefore serve multiple villages.

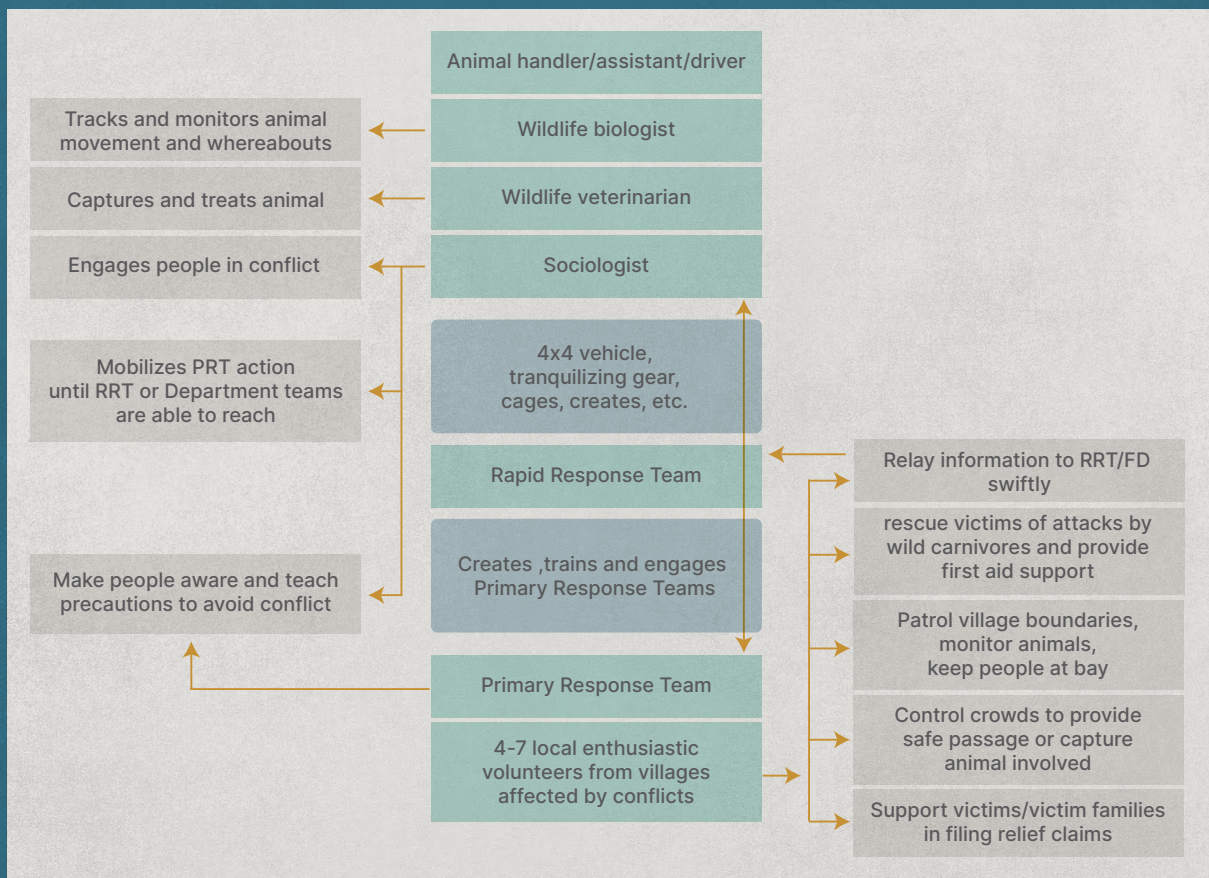
The RRTs

In Uttar Pradesh, each RRT attends every reported conflict situation in the target landscape as quickly as possible and remains posted at the location until the immediate

situation has been resolved. The RRTs are run by the WTI and typically comprise a wildlife biologist, a veterinarian and a social worker or a sociologist, and use a wide range of equipment required to address the more severe or drawn-out conflict incidents that the PRTs may not be able to resolve on their own.

A clear division of roles within each team ensures smooth execution of any operation aimed at mitigating conflicts. The wildlife biologist monitors animals in the conflict, delivering critical information on area of usage, movement paths, age and sex of the animal involved, and may try to understand which factors led to the conflict situation. The sociologist works towards pacifying aggrieved community members, managing crowds, taking crucial information generated by the biologist back to people, and building a rapport and dialogue with people in general. The veterinarian steps in when there is a requirement for physical capture of an animal involved, but only as a last resort.

In the WTI model, the RRT also acts as a bridge between the local people and the forest departments, helping to maintain a healthy rapport between stakeholders in areas where conflicts are frequent. They may also liaise with forest departments, other authority bodies such as the police (in the event that mob groups develop) and the local press to ensure that any information disseminated is factually correct.



Operational flow for the WTI model of RRTs and PRTs

Box 23

Case study: rapid response team to address problem bears in Trento, Italian central Alps

Between 1999 and 2002, 10 brown bears were translocated from Slovenia to the autonomous province of Trento as part of a population recovery programme in the Italian central Alps. A feasibility study carried out (prior to the translocation) highlighted the risks the bears could pose to human safety, and identified key measures to be taken by the authorities to address these risks. A telephone survey of local residents (also carried out before the translocation) showed that a commitment by the authorities to compensate all damage caused by bears, and to establish a permanent emergency team to respond to bear conflict incidents, increased positive opinions about the project from 73% to 80%.

The ERT, which is contactable at any time, is made up of specifically trained staff from the Forest Service of the province of Trento and a veterinarian. In situations where bears enter into a protected area or move outside the province of Trento, park rangers or staff from other administrations are also incorporated into the team. The team has been trained in bear biology as well as in the use of traps, rubber bullets and other aversion techniques. The staff are also trained to shoot dangerous individuals in extreme cases. A free toll telephone number can be used by the public to report bear presence, to request information about bears or assistance with a bear-related problem, or to communicate emergency situations related to large carnivores in the region – for example, roadside incidents involving bears, the presence of bears near or inside human settlements, attempts at predation against domestic livestock or attacks on humans. The number is also connected to the general national Italian emergency number (112). In the event of calls relating to damage to beekeeping, agriculture or livestock, the coordinator of the emergency team can activate one of the 53 agents of the Trento Forest Service trained in the detection and verification of bear damage, to facilitate associated compensation claims.

Additionally, a bear dog team has been created by the Trento authorities, comprising six specialist staff and six Jämthund and Laika bear dogs trained to find bear tracks following roadside incidents or incidents of aggression towards humans, or to carry out aversion actions to establish negative conditioning in harmful or confident bears.

Several additional measures have been applied to address the risks of bear attacks, including a permanent public campaign to inform people about how to behave when encountering bears and the use of deterrents such as bear-proof garbage cans in areas with the highest densities of bears.



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Conclusion

The rapid mobilisation of teams of people to respond to conflict incidents demonstrates how a participatory approach offers numerous benefits to enable the threat of human-wildlife conflict to be tackled effectively. Engaging communities and relevant stakeholders provides local knowledge and wisdom which, when combined with the technical expertise of experts, creates a more unified body for integrated action and improves the chances of a successful outcome. The wider benefits of these collaborative interventions should also be considered in terms of the longer-term value to local communities. There will be opportunities to acquire a range of diverse skills, ranging from detailed planning and financial and budget management, to community mobilisation and enhanced knowledge of conflict management.





Social marketing and behaviour change

*Diogo Verissimo, Silvio Marchini, Jenny A. Glikman, Meredith Gore,
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Historically, conservationists have focused on financial and technical solutions to human-wildlife conflicts (Redpath et al., 2013). It has become clear that although these are important to generate a context where change is possible, more attention to human behaviour is needed to achieve longer-term human-wildlife coexistence (Verissimo & Campbell, 2015). Interventions targeting human behaviour have been largely focused on measures such as regulation and education. Regulation in this context refers to the system of rules made by a government or other authority, usually backed by penalties and enforcement mechanisms, which describes the way people should behave, while education is concerned with the provision of information about a topic. However, the degree of influence of these interventions depends on the priority audience being motivated (i.e. the individual believes change is in their best interest) and/or able to change (i.e. overcome social pressure, inertia and social norms) (Figure 21) (Smith et al., 2020b).

As explained in Chapter 8, Attitudes, tolerance and human behaviour, the degree to which people alter their behaviour is influenced by various factors, but is not directly shaped by knowledge and awareness alone. In short, simply informing people about what they can/should do differently, often does little to actually change actions. How, then, can behaviour change be encouraged and influenced?



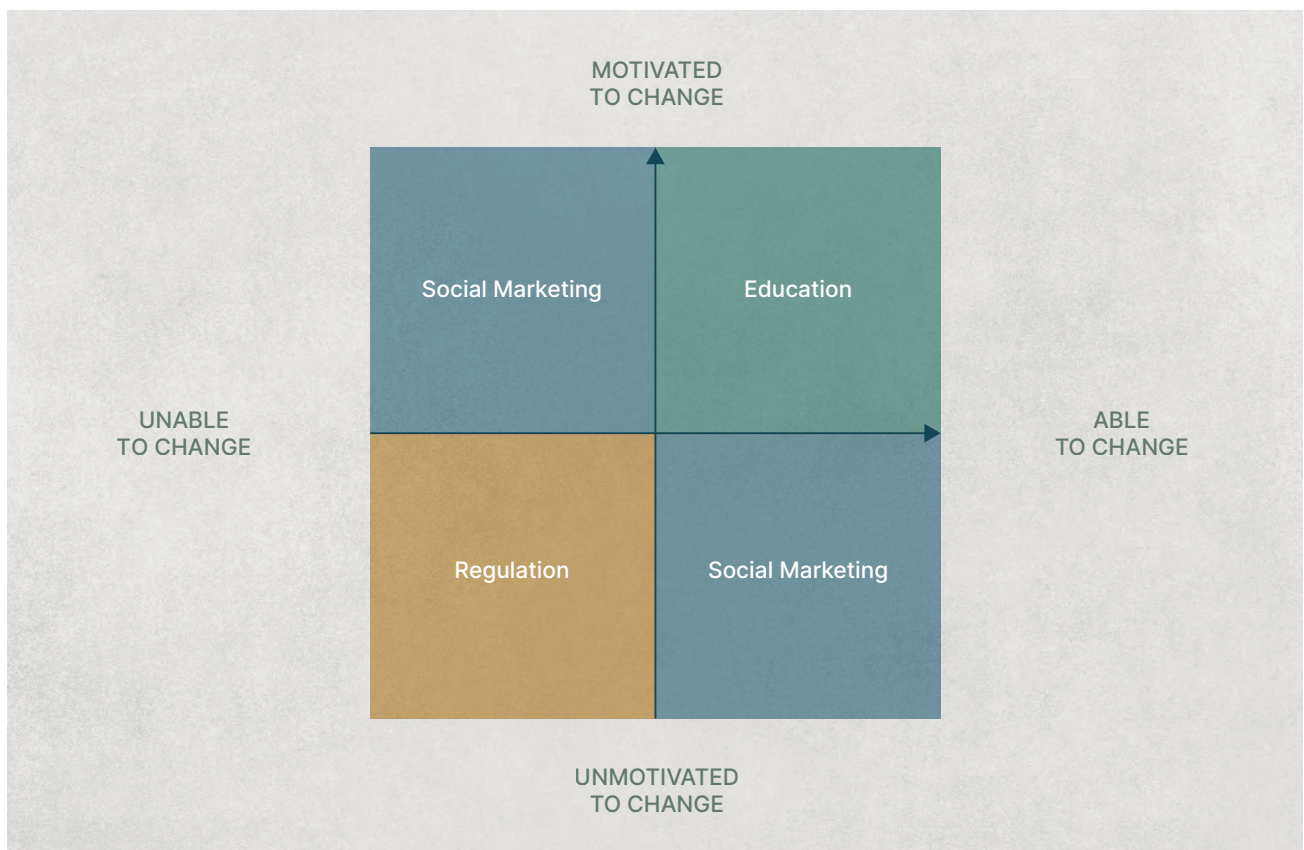


Figure 21. Types of behaviour change interventions suited to different contexts, defined by the motivation and ability to change of the priority audience that is to be influenced. (Source: Compiled by the chapter authors)

What is social marketing?

Social marketing seeks to develop and leverage marketing concepts and approaches in order to influence behaviour that benefits individuals and communities for the greater social good (Gordon & French, 2015). It integrates research, behavioural theory and audience insights to inform the delivery of interventions that take into account audience characteristics, as well as competing efforts (Smith et al., 2020b) (Figure 22). Social marketing interventions are most commonly defined by the following features.

Audience segmentation

Social marketing seeks to avoid a ‘one-size-fits-all’ approach. Instead, people are clustered into audience segments based not only on demographics but also on their shared values, attitudes, social norms and behaviours. The most relevant audience group is selected, based on clear criteria, such as size, accessibility or readiness to change, and the campaign is tailored according to these characteristics.

Citizen orientation

Interventions are designed around the orientation – the lifestyles, livelihoods and behaviours – of the priority audience groups. To achieve this, both quantitative and qualitative research methods may be used, as well as secondary data sources, to understand these groups. Furthermore, messages and

materials are pre-tested with the priority audience before implementation, to ensure they are appropriate for that group.

Interventions as exchanges

Social marketing interventions are seen as exchanges, where the perceived and actual benefits of adopting and maintaining a new behaviour need to outweigh the perceived and actual costs of maintaining a past behaviour. To be meaningful the exchange should be framed from the point of view of the target audience, using the insights collected through the audience research. This exchange will have to consider both emotional and rational factors underlying perceived and actual benefits. Furthermore, exchanges will likely need to include complementary actions to remove or mitigate technical, financial or technological barriers to change, such as lack of capacity in equipment and financial means to adopt a new behaviour.

Clear behavioural goals

Interventions have behaviour change as the primary goal, not just changes in knowledge, attitudes or behavioural intentions. In the context of biodiversity conservation, these behaviours should have a clear link to reducing threats to biodiversity.

Measure impact and share knowledge

Social marketing interventions go beyond measuring outputs, such as the number of materials produced or people engaged, to measuring impact, usually in the form of specific, measurable and time-bound behavioural goals. The learning insights derived from this impact evaluation should then be made available to the broader social marketing community.

Social marketing mix

Social marketing uses all elements of the marketing mix – product, price, place and promotion albeit to different degrees. The product can range from physical products (e.g. predator-proof fences) to services (e.g. training on livestock management) and intangible ideas (e.g. pride in a species or landscape). Price refers to the cost the priority audience must incur to obtain the product. This cost may be monetary, but it can also come in other forms, such as time, effort or risk of embarrassment and social exclusion. Place refers to how the priority audience accesses the product. Convenience is a major factor influencing their decision making, and lack of convenient facilities can be an important barrier to adopting or sustaining behaviours. Promotion focuses on determining the communication channels (e.g. radio, newspaper, social media) that will best reach the priority audiences for easy adoption of the products, as well as the nature of the message to be communicated, and how its impact will be evaluated.

Understand the competition

It is important to account for other interventions or stakeholders (see Chapter 13, Working with stakeholders and communities) working on the behaviour to be influenced or that can compete for the priority audience's time and attention. Furthermore, it is crucial to understand the cultural or social norms (see Chapter 9, Culture and wildlife and Chapter 19, Social science research) that may compete with the behavioural change being proposed.

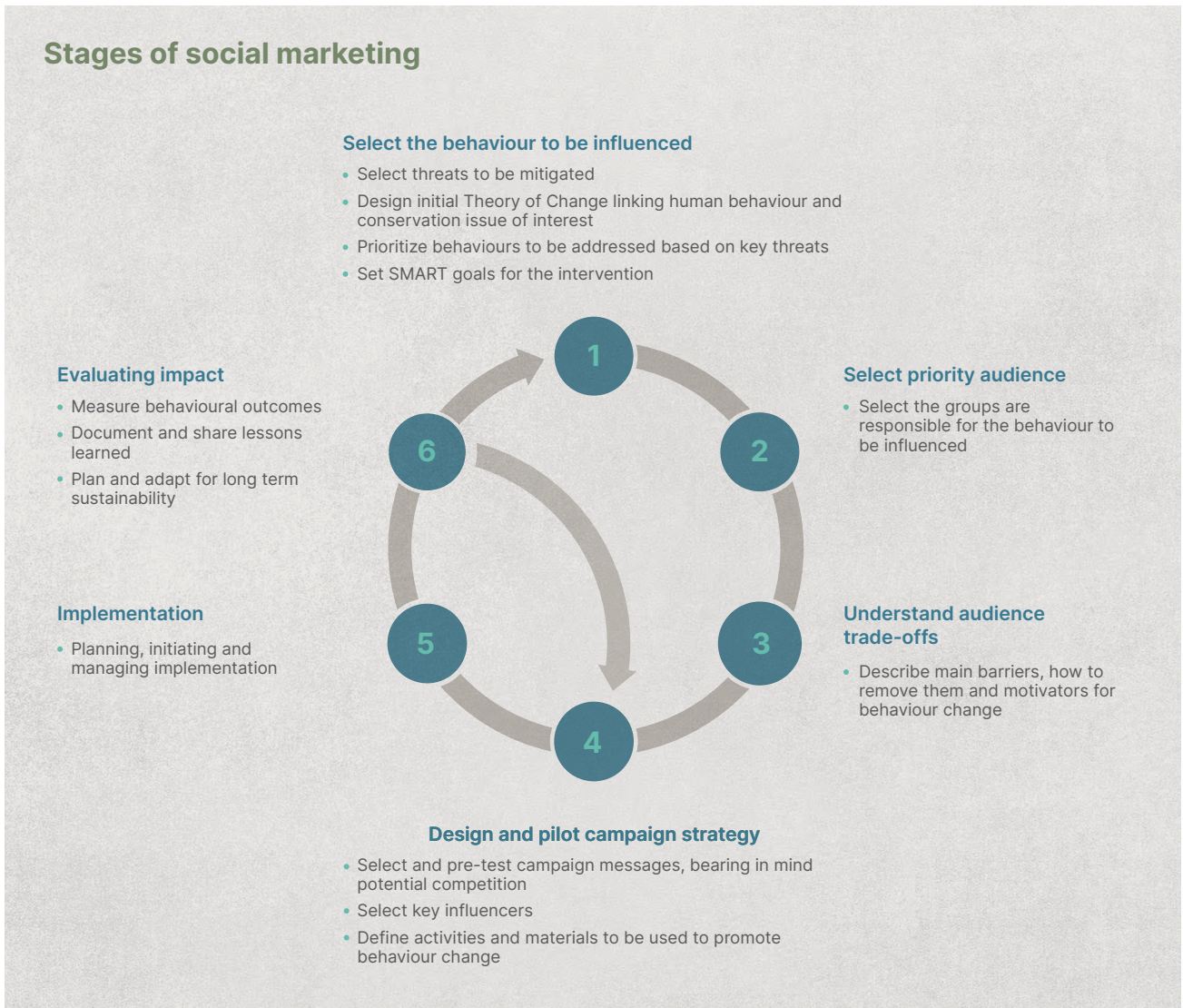


Figure 22. Different stages of the social marketing implementation cycle. (Source: Compiled by the chapter authors)

Box 24

Using social marketing for human-wildlife coexistence

Over the last decade, Nepal seen a rise in incidences of human-wildlife conflict, a consequence of increases in both wildlife and human populations. Tigers are among the species responsible for important losses in human lives and livestock every year. These losses must be mitigated to ensure that biodiversity conservation strategies have local support. The Living with Tigers project, a collaboration of Chester Zoo (UK) and Green Governance Nepal, was established with the aim to promote coexistence between tigers and local populations in four communities located in the buffer zones of two protected areas in Nepal – Bardia and Chitwan National Parks (<https://www.chesterzoo.org/news/living-with-tigers-project>).

Select the behaviour to be influenced

A review of the literature together with a round of local stakeholder consultation highlighted the differences between the two focus areas of the project. In Bardia, conflict with tigers was restricted to livestock predation but in Chitwan there was a history of tiger attacks on community members, and this was the biggest concern. As such, the project focused on reducing livestock predation in Bardia and reducing the risk of attacks on community members in Chitwan.

Select priority groups

In Bardia, the project focused chiefly on households with livestock, which at the start of the project constituted about 85% of the households in the two target communities. In Chitwan, the focus was placed on those households whose members regularly go to the forest to collect natural resources, particularly fuel wood, which accounted for 99% of households in the project communities. Because of the large relative sizes, and the large absolute sizes of the communities being targeted, it was decided to treat the entire communities as the target audiences.

Understand audience trade-offs

In Bardia, key barriers were linked to livestock management, and in particular the need to limit free roaming livestock and to protect livestock at night when tigers and leopards are most active. The project messaging emphasised the need to not let livestock roam in the National Park and of using robust livestock pens for guarding livestock at night. In Chitwan, the key barriers were linked with the need to resort to National Park and community forests for fuelwood and livestock fodder. The campaign placed emphasis on the opportunity cost that regular trips for natural resources represent in terms of time and how more recent and affordable energy sources, such as commercially available propane gas or biogas (produced through the breakdown of organic matter), could free up time for other tasks.

Design and pilot the campaign strategy

The design of the campaign strategy and messaging was informed by a workshop that involved local stakeholders as well as project staff and project partners. The project had a social marketing strategy that included community events, such as community meetings and street theatre performances, and a mass media component, focused on a radio drama transmitted by a regional community radio. This was supported by a technical component, which included capacity building around livestock management and a financial component that subsidised predator-proof livestock pens and biogas installation.

Implementation

All implementation was carried out by project staff who were resident in the communities where the project was being implemented. To deal with heterogeneity in risk between households in the same community, regular consultations with the local

Bufferzone Forest Committees were carried out to understand which specific households would most benefit from a given component of the project. This was particularly important in terms of the technical and capacity-building aspects of the project, as those could only target a limited number of people and households.

Evaluating behavioural impacts

The project used a research experimental design with four project communities and four comparison communities, divided equally between the two parks and matched according to key variables, such as frequency of livestock depredation and human attacks. In Chitwan, the project communities saw a greater decrease in the number of hours spent in park and community forests than the comparison ones. There was also a greater decrease in perceived conflict with tigers and leopards in the project communities than in the comparison communities. In Bardia, while decreases in livestock predation were similar in the project and comparison communities, the perceived conflict with tigers and leopards decreased much more steeply in communities that benefited from the project.

Using social marketing ethically

Ethical principles must be respected in the design and implementation of interventions, not only for moral reasons but also to avoid backlash against the interventions being promoted that may worsen the threats that need to be alleviated (Verissimo et al., 2019). Below are some basic principles to be observed:

- **Promote only evidence-based solutions to address a problem.** Social marketers are responsible for the consequences of their interventions. There should be clear evidence that the proposed solution will realistically benefit the individual and society (see Chapter 32, Evaluating interventions). Overstating the benefits can lead to a breach of trust and a backlash that can eliminate any benefits the intervention generates.
- **Ensure key local stakeholders support the intervention being proposed.** It is vital to ensure that local civil society and government are supportive of the social marketing intervention being developed. Furthermore, these stakeholders should, whenever possible, be involved in the design of the social marketing interventions (see Chapter 13, Working with stakeholders and communities).
- **Respect an individual's right to choose whether to adopt a behaviour, unless it harms or endangers others.** Social marketing is non-coercive, emphasising the importance of the right to choose, except when maintaining the past behaviour would be against the law or risk harming the individual themselves or other members of society. For this reason, interventions should resort to messages that shame or coerce individuals only in exceptional circumstances.
- **Ensure culturally sensitive interventions.** Interventions should respect the local cultural and social context to avoid alienating and antagonising the target audience (see Chapter 9, Culture and

wildlife). This applies to both research and to campaign messaging and implementation. As stated above, this can be ensured by partnering with local stakeholders.

- Engage with already existing positive behaviours. Interventions should avoid introducing new practices when there are traditionally solutions that have been shown to address the same issue (see Chapter 14, Traditional ecological knowledge).
- Work towards sustainable change. When interventions focus on major social change, such as changes in main occupations or lifestyles, social marketing interventions should ensure that the alternatives proposed are economically, technically and socially sustainable in the long term.





Economic incentives

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Improving the cost/benefit ratio of wildlife presence is an important part of reducing conflict and improving coexistence, and financial mechanisms are frequently used to try to achieve this. Chapter 31 provides a brief overview of financial mechanisms and reviews two of the most common approaches, compensation and insurance. Here, we examine other financial approaches that can be used to help reduce conflict and encourage coexistence.

Revenue-sharing and employment

Revenue-sharing and income from conservation services (e.g. through employment) are probably the most common financial mechanisms to encourage coexistence, especially in and around protected areas. Local people can often receive employment as guides, rangers, wildlife officers or hospitality staff. In some cases, whole regions rely on industries in place to support wildlife conservation services. Revenue may be generated in many ways, such as through photographic tourism, trophy hunting, philanthropy or other activities, and can be significant. In 2019, visitors spent \$21 billion in US National Parks, supporting over 340,000 jobs and generating an overall economic impact of \$41 billion (NPS, 2020), while in 2016 it was estimated that hunters generated over \$200 million across seven sub-Saharan African countries. This revenue can be important, both at a national and local level, especially in poorer areas. However, it can have limited reach, often being concentrated in locations where accommodation is available (Goodwin, 2002) rather than positively impacting more remote communities, which may be those suffering more costs from wildlife presence (Walpole & Goodwin, 2000).

It is also important to note that protected areas in particular can impose significant social and economic costs on local people, so the revenue is not cost-free (Brockington et al., 2006). Nevertheless, sharing revenue generated from wildlife can be an important tool for improving coexistence: in Uganda, revenue-sharing from three National Parks was associated with marked improvements in local attitudes towards conservation (Archabald & Naughton-Treves, 2001). However, while revenue sharing may positively influence views towards a protected area, government entity or NGO, it may not translate into more positive attitudes towards wildlife itself. A related concern is that communities are not homogenous entities, and so while some people may benefit or develop more positive attitudes to wildlife, others may receive no benefits or remain hostile.

Conservancies and other community wildlife areas

Under these approaches, instead of external agencies providing revenue to local stakeholders (as in the section above), the stakeholders themselves (sometimes in joint venture partnerships with other organisations and/or investors) set aside and/or manage land for wildlife, generate revenue for community development, or provide other services valued by the community, such as increased security or emergency response teams.

One example is Zimbabwe's CAMPFIRE (Communal Areas Management Programme for Indigenous Resources) model, where the CAMPFIRE Association works with local communities to help them better manage their land, and realise financial benefits from effective resource stewardship (mainly by selling safaris to both photographic tourists and foreign sport hunters). The Association aims to help people manage and profit from conserving healthy wildlife populations, enabling sustainable community development through the presence of wildlife. Over the first 12 years of the CAMPFIRE model (1989–2001), it generated over US\$20 million for participating communities, 89% of which came from sport hunting (Frost & Bond, 2008). This led to substantial community development, and some reported positive impacts on wildlife populations, although there are limited data on this (Frost & Bond, 2008). However, there was marked variability in revenue generation: 12 of the 37 districts that could market wildlife produced 97% of all CAMPFIRE revenues (Frost & Bond, 2008). The CAMPFIRE model has been strongly affected by political upheaval in Zimbabwe and changes in international restrictions on trophy (or safari) hunting (particularly those placed by the US Fish and Wildlife Service on lion and elephant imports), highlighting that financial mechanisms are often particularly subject to external impacts.

Collective land management and revenue sharing has seemed beneficial in Kenya, where 'group ranches' manage their wildlife together. Between 1977 and 1994, wildlife numbers in Kenya dropped by 29–65% in areas where most of the revenue went to the tourism industry and the government, but group ranches had stable wildlife numbers over the same period (Norton-Griffiths, 1998). However, later studies failed to find similar results, revealing marked declines in Kenya's wildlife populations, regardless of land-use type (Western et al., 2009). Communal conservancies in Namibia, where most wildlife revenue from photographic and/or trophy hunting is retained internally, have also been successful, with increasing populations of lions and other wildlife, as well as substantial revenue being generated for local people (Naidoo et al., 2016). However, these approaches depend on the area being suitable for phototourism and/or trophy hunting.

Another option is the 'conservation easement' approach, where local communities form legal agreements with other stakeholders who manage land for conservation. This has been done in Tarangire, Tanzania, where a consortium of tourism companies pays local villagers an annual lease fee to maintain plains as livestock pasture rather than converting it to settlement or farming, thereby integrating wildlife conservation concerns with local land-use planning. In India, grazing-free reserves have been established between NGOs and communities to improve snow leopard prey populations, thereby reducing snow leopard reliance on livestock. To compensate for the lost grazing areas, the NGOs provide financial assistance to the local councils, which can be used for development work, with community guards appointed to monitor the reserve. However, land may have greater economic return under an alternative land use, such as farming, and communities may be restricted in land-use options and activities within these models, leading to additional opportunity costs (Gibson & Marks, 1995)

The advantages of conservancies and other community wildlife area approaches include not being heavily reliant upon external funding, increasing community empowerment, and providing direct benefits from wildlife presence, which may be sufficient to outweigh costs.

Conservation products

This approach involves developing products, often certified and premium-priced, from a land-use with conservation practices aimed at benefiting biodiversity as well as local people. Examples include ‘jaguar-friendly’ coffee, where coffee farmers receive a premium if they agree to farm in ways that help protect jaguars, including implementing conflict reduction measures (Koprowski et al., 2019), ‘Snow Leopard Enterprises’, where people can sell handicrafts internationally once they have signed a conservation contract to reduce poaching, thereby increasing tolerance for snow leopards and reducing retaliatory killing (Alexander et al., 2022), and ‘elephant-friendly tea’ from Assam, where farmers produce tea while also using non-lethal approaches to minimise human-elephant conflict.

This approach has multiple community benefits, including empowerment and provision of skills training for local people, but may have opportunity costs. Yields may be lower under ‘conservation-friendly’ forms of farming, so if more land is required to be converted to farmland to provide the same returns, then there is a risk of unintended negative consequences. Moreover, it may be unclear how firm the linkage is between these kinds of products and conservation actions (particularly efforts to improve the cost/benefit ratio of wildlife presence), how well the benefits are distributed equitably according to those who suffer most costs as a result of wildlife presence, as well as how much these schemes directly improve the intended conservation impact, such as increasing in the focus species population. This is particularly the case for approaches that are not under an internationally accredited system.

Conservation performance payments

‘Performance payments’ for conserving wildlife have been used very successfully in Europe for species such as lynx and wolverines (Zabel & Engel, 2010; Zabel & Holm-Müller, 2008). The usual concept is that payments are made in return for clear conservation commitments (such as maintaining agreed land-use zones, damage prevention actions or not snaring or poisoning wildlife in retaliation to costs). In Sweden, a performance-payment strategy is implemented to maintain stable populations of wolverines, lynx and wolves. These carnivores are found in the same area where the Indigenous Sami herders herd reindeer, which are preyed. Performance payments are made to Sami cooperatives based on the number of carnivore reproductions on the grazing lands, incentivising livestock predation and reducing retaliatory or preventive killing.

Performance payments have been used successfully for land-use planning and promoting wildlife-friendly landscapes around communities inside one relatively small (580 km²) concession inside Mozambique’s Niassa National Reserve. Here, approximately 2,200 people receive community funds for keeping to agreed conservation contracts, from sightings of key species and through bed night levies, and receive penalties for actions such as killing lions or setting snares. In Tanzania, a ‘community camera-trapping’ initiative has been developed in which villagers monitor their wildlife using camera-traps, and generate points for each wild animal photographed. The points are

translated into community benefits, focused on local priorities such as healthcare and education, while amplifying cultural value to species that previously would have only caused impacts. These kinds of payment make a clear, direct link between wildlife presence, conservation behaviour and benefit, and have proved effective at reducing risks to wildlife and managing land-use (C. Begg, pers. comm.). However, unlike business-based models, they usually require continued external investment in some form, usually philanthropy unless some or all of the revenue is directed into enterprises that then pay back into the fund.

There is also a risk of exacerbating local sensitivity to environmental fluctuations: for example, during a drought, not only would livestock numbers decline, but wildlife numbers and therefore payments may as well, multiplying the negative impacts on local people. However, the funds can be valuable in strengthening community resilience and therefore reducing the impact of such events. To avoid unintended consequences (see Chapter 4, Avoiding unintended consequences), such as increasing local vulnerability in times of drought, indicators of successful conservation need to be chosen with care, such as a reduction in the number of wildlife killing events (as long as they can be detected), rather than merely changes in wildlife numbers. It is hard to provide sufficient community benefits to outweigh the individual or household costs (or potential risks) of wildlife presence but, nevertheless, this remains a promising approach, which deserves further attention.

Landscape-level business models

Performance payments to local communities can be made more financially sustainable by linking them to markets for ecosystem services (MES) that are valued internationally, such as carbon sequestration offsets and water mitigation banks. One example is Lion Carbon, a BioCarbon Partners/Lion Landscapes initiative in Luangwa Valley, Zambia, where 30-year agreements are signed with local communities. The communities commit to forest and wildlife conservation targets, and receive revenue from the sale of verified forest carbon offsets through an avoided deforestation mechanism known as REDD+ (Reducing Emissions from Deforestation and Degradation). Communities receive funds for avoided carbon dioxide emissions, and use those for projects that benefit both the community and the environment.

Markets for ecosystem services are still relatively unstable, but increasing recognition of their financial and conservation value is a growing business opportunity for some sectors. If properly linked to local conservation commitments, MES represents a direct and sustainable mechanism for transferring the international value of wildlife to those who bear the costs of living with them. They can also improve local governance and promote good management of the wider landscape, rather than focusing on just a few species. Business models such as these can provide financial sustainability to conservation activities, giving them the capacity to scale up over large areas, which is badly needed for conservation approaches.

Another emerging business approach (which could be used in collaboration with many of the approaches above) involves impact investments, ‘payment-by-results’ or ‘development impact bonds’. These are contracts between investors and the public sector, where the investor agrees to pay for improved social (and, increasingly, conservation) outcomes, which then result in public-sector savings. The investor provides up-front funding and if the project delivers the outcomes laid out in a contract, then the ‘service provider’ (e.g. a conservation organisation) would be paid, and the investor receives back their initial investment as well as a small return.

This provides a mechanism for private investors to finance public projects, and as the returns on the investment are dependent only upon successful delivery of agreed metrics, the funding is not tied to specific actions, but can be used in ways that are most needed to achieve those metrics. Furthermore, the contracts are often longer than the traditional short-term conservation grant models, which is important for delivering long-term goals. This is a more flexible, targeted and sustainable option than most of the traditional conservation models, and could be an important way of generating more up-front funding for work to improve coexistence.

The world's first wildlife conservation bond was sold by the World Bank in 2021, with returns for investors to be determined by the growth of endangered black rhino populations in two South African reserves (Sguazzin, 2021). However, the success of such models depends on having clearly measurable impacts, and the 'service providers' (which here would be conservation practitioners) risk non-payment of funds if the outcome is not achieved, even for reasons outside of their control.

Ultimately, there is no single solution that will ensure the equitable, sustainable transfer of the wider value of wildlife to a local level. However, there is a considerable range of approaches, both traditional and novel, which can help not only to offset the local costs of wildlife, including the costs of human-wildlife conflict, but also to ensure that they are ultimately seen as a net benefit to the people most affected by their presence. This may take time, but each mechanism has shown success when used in appropriate ways, so these are promising tools for reducing the costs of wildlife presence, improving the benefits associated with them, strengthening and empowering local communities, and improving the chances of long-term coexistence with benefits for both people and wildlife.

Limitations of economic incentives

Economic incentives, whether monetised or in-kind, to improve the cost/benefit ratio of wildlife presence can have limitations. For example, some impacts caused by wildlife cannot be readily offset by financial means. The presence of impact-causing wildlife can lead to psychological trauma or stress, which is not possible to offset financially. Another potential limitation is that an economic benefit provided for reducing conflict or encouraging coexistence could be rejected in the future if an economic alternative is presented that may not be focused on reducing conflict or promoting coexistence. For these reasons, economic incentives cannot be the sole solution to achieving these aims.





Compensation and insurance

James Stevens, Paul Steele, Barbara Chesire, Nurzhafarina Othman, Betty Chebet & Zipporah Muchoki

What are compensation and insurance?

Compensation schemes work by reimbursing (fully or partially) people negatively affected by wildlife, without requiring the individuals' financial input, and are usually funded by an external agency (Wilson-Holt & Steele, 2019). Here we use 'compensation' as the collective term for this approach. In some countries other terms are used for the same concept, such as ex-gratia payment or relief payment, with the term used relating to whether the compensating body is contractually obliged to provide the reimbursement (compensation) or whether it is provided 'by favour' without accepting liability (ex-gratia) or as a consolation payment (relief payment). Generally, compensation is provided after the losses have occurred (also called 'ex-post' payments); however, there are also some examples of payments made before incidences have occurred, i.e. 'ex-ante' payments (Schwerdtner & Gruber, 2007; Swenson & Andrén, 2005).

Insurance-based schemes, on the other hand, work like a traditional insurance product, requiring the beneficiary to make regular payments (the 'premium') (financial or non-monetary) in the event of a future loss, which are pre-defined under a specific set of conditions. Microinsurance is a form of insurance that protects low-income individuals or individuals who have few savings against specific risks, in exchange for regular premiums that are proportionate to the livelihood and cost of the risk involved. Microinsurance premiums are often much smaller, but so is the amount insured. Microinsurance typically covers specific assets and is index based rather than indemnity based. Under an index-based scheme, the scheme reimburses the value of an index rather than a measurable loss (Box 25). A threshold is set, and the individuals will be insured if the index goes below that threshold (Sandmark et al., 2013).

Box 25

Microinsurance in agriculture

In the quest to increase their market share, overall growth and customer base, insurance companies in developing countries have adopted and embraced key factors that ensure

success in microinsurance. Due to the nature of microinsurance products and customers, these companies have had to adopt innovative and non-traditional ways of product design and alternative distribution models.

Some of the innovations in the field of agriculture include index-based insurance solutions, which, unlike conventional agriculture insurance, are designed for smallholder farmers. The index could be precipitation levels that weather stations in the scheme locations measure, the level of yield among crop farmers and vegetation cover for livestock farmers.

In some cases, the crop farmers are enrolled or 'onboarded' into the insurance scheme by filling in a simple form attached to certified seeds and/or other farm inputs whose price has a small loading to cater for the insurance premium. Once they sign up, they are eligible for a payout should there be prolonged dry spells (drought), either early or later into the season. Should the rains fail early in the season, leading to low germination, the farmer gets a payout in the form of a voucher that they can use to get certified seeds and fertiliser for the replanting season. It does not involve tedious claim processes like conventional insurance, because the value is predetermined and pegged on an index.

During the initial sign-up, the government or development partners highly subsidise the premium for the farmers. The subsidies are gradually withdrawn 5 years into the scheme; thus, the farmer pays the entire premium. This ensures the economic sustainability of these schemes and personal responsibility among the farmers.

The compensation and insurance process

Reporting of damage and its verification

When wildlife causes damage to property or livelihoods, people are required to report the damage to the appropriate administration and notify them of the incident (Figure 23). The administration managing the scheme then needs to attend to the incident to verify that the damage has occurred and that the claimant is eligible for payment. People tasked with verifying can include wildlife officers, community members, NGO staff, police, insurance agents or rapid response teams (Leslie et al., 2019) (Chapter 28 Response teams). Schemes will often have conditions attached to them, such as being limited to certain wildlife species or requiring measures to be in place to limit damage.

Making payments

If the claim is approved, then payment is made to the claimant. Depending on the scheme, payments can take various forms and cover varying percentages of the market value for the damaged assets. Some schemes will provide financial payment while others may replace damaged assets. Schemes can cover the entire costs of the assets or only partially cover the costs. For example, Botswana's state-funded governmental compensation scheme provides compensation for livestock and

agricultural loss caused by buffalo, cheetah, crocodile, elephant, hippopotamus, leopard, lion, rhinoceros and wild dog (Department of Wildlife and National Parks, 2013). For incidents involving lions and elephants, 100% of the value is compensated, but compensation drops to 35% of the asset value for the other species.

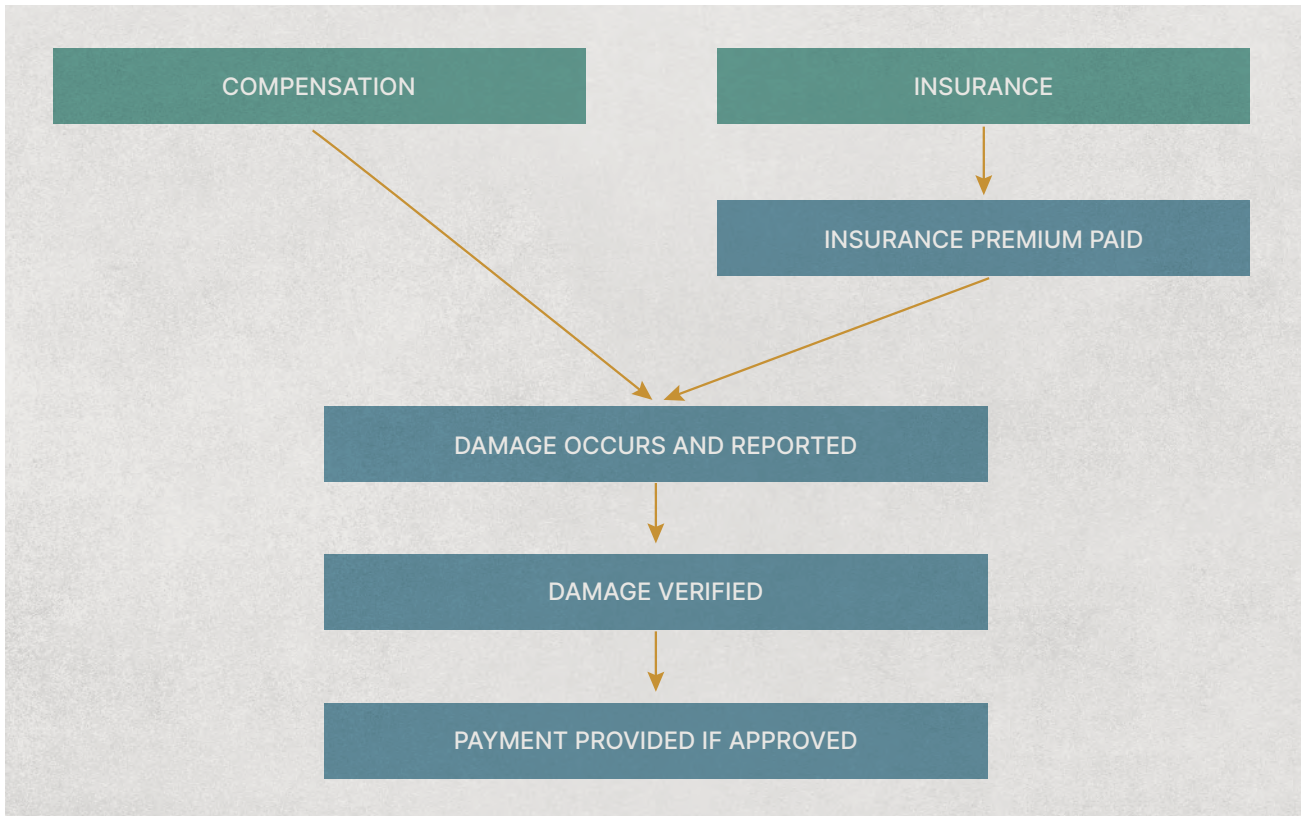


Figure 23. The compensation and insurance process. (Source: Compiled by the chapter authors)

Advantages and disadvantages of compensation and insurance

The differing structure and nature of the two schemes mean that there can be various ways of funding the scheme, verifying the damage and making payments. Thus they have a range of advantages, disadvantages and limitations, as outlined in Table 15. There can also be a form of combined scheme, whereby an insurance scheme is introduced, but the government pays the premiums.

Table 15. Comparing compensation and insurance schemes

	Compensation	Insurance
Who funds the scheme?	Government/NGO/community/association	Government/Individuals/Community/Association/Private sector

Who verifies the damage	Government/NGO/community/police/rapid response teams	Government/NGO/Private sector/Community
What form does the payment take?	Financial, replacement of the damaged asset	Financial, replacement of the damaged asset
Advantages	No opt-in is required to make a claim	Often a privately run scheme, improving accountability
	Often strong government ownership	Often strong private-sector engagement
		Beneficiaries pay a premium, thus 'buying into' the scheme
		Private insurance companies have the necessary skills and infrastructure for claims processing, verification and fraud control
Disadvantages	Subject to political change	Beneficiaries need to pay a premium when risks of impacts are often low, and premiums may not be affordable without financial support
	Less certainty of resources	Requirement for any scheme to be profitable for the insurance company to be interested
	Reduced clarity of payment terms	
	No 'buy-in' is required from impacted stakeholders	
Limitations	Do not cover the ancillary costs of living with wildlife or address the opportunity costs, which means incentives may remain for pre-emptive killing	
	Fail to provide real incentives for local people to deliver conservation as they do not foster environmental stewardship or ownership	
	Require quick verification	
	Wildlife becomes seen as the responsibility of external agencies	
	Skilled personnel may be required to accurately assess damage – for example, determining between a natural death that was subsequently fed on by a predator or a depredation	
	May not build on cultural and traditional knowledge or practices	
	Significant short-term benefits, but few long-term benefits	

(Source: Compiled by the chapter authors)

What are the requirements for an effective compensation or insurance scheme?

A compensation or insurance scheme requires several conditions to ensure that it is effective and likely to succeed (Wilson-Holt & Steele, 2019).

Fair and timely payments

Compensation schemes are often criticised for not offering adequate compensation to the claimant and for the time it takes to process and pay a claim (Hoare, 2012; Ravenelle & Nyhus, 2017). During the

initial phase of establishing any scheme, it is crucial to hold stakeholder discussions to determine what would be considered a fair payment for the asset to be compensated, what assets should be covered, the extent of damage that needs to occur before an asset is eligible and how much of the estimated value of an asset will be compensated (these are often calculated as a percentage of the asset's original value) (Nyhus et al., 2005). For example, some schemes may provide different compensation amounts depending on the asset's maturity. A calf may receive less compensation than an adult cow, potentially creating resentment from the farmer as they would argue that the calf would grow into an adult cow with greater value (Nyhus et al., 2003). These considerations must be discussed and agreed upon with the stakeholders before any scheme is initiated to ensure that the scheme is accepted.

Any payment to claimants needs to be made promptly. Due to the time it takes to verify and process a claim, long delays can occur, potentially creating conflict between the different parties as claimants reduce their support for the scheme (Anthony, 2021). Not only should payments be timely, but they should also be reliable.

Once a claim has been reported to the compensation or insurance provider, it needs to be verified to ensure that it is real, that the claimant meets the scheme's conditions and to confirm the extent of the damage to determine how much payment the claimant should receive. Verifying claims can be costly, requiring considerable time to travel to sites and assess the claims (often in relatively remote locations), and necessitating expert analysis. However, verification officers can also be recruited from the hotspot locations and trained on how to verify claims, thus minimising these costs, but this can increase the potential for false claims, and therefore long-term costs (Hussain, 2000).

Methods need to be agreed and standardised with regard to assessing the damage, whether comprehensively determining all the damage or evaluating a subset of the damage to extrapolate. In some cases, assessing damage can be challenging, such as seal predation from fishing nets or otters in fishponds, when the predated fish are not visible, or in situations where the damage-causing species cannot be identified, or where direct damage does not occur, but the indirect impacts from a predation attempt, such as stressed animals, may lead to an increased rate of mortality at a later time (Bayani, 2016; Fjälling, 2005; Kloskowski, 2005; Nyhus et al., 2005; Schwerdtner & Gruber, 2007). It should not be underestimated how long such verification can take. However, technology can play a role in expediting the process. Using drones to assess claims, applications to record and tools to quickly send information to central platforms may assist in future claim assessment and verification (Rutten et al., 2018).

Some claims may require third-party assessments. For example, some schemes are starting to provide payments for claims beyond the direct impacts of wildlife, which are harder to quantify, such as the loss of earnings or the cost of rehabilitation following an injury by a wild animal or stress from a traumatic event that requires counselling (Ministry of Tourism and Wildlife, 2020). Only an accredited third party can verify these claims. Therefore, if a scheme includes such claims, processes should be in place for them to be confirmed.

Once the damage has been assessed and verified, administrative delays can often occur when processing the claim further. Therefore, effective institutional arrangements must be in place to make the process from reporting to payment as efficient as possible.

Incentives for damage prevention

Any scheme requires incentives for damage prevention and for damage prevention to be included in the eligibility criteria to reduce the chances of schemes being misused (Bulte & Rondeau, 2005). A

scheme without such incentives could create a moral hazard, leading to unintended outcomes (see Chapter 4, Avoiding unintended consequences), whereby because an impacted stakeholder would usually receive compensation, there is no attempt to prevent the damage. At a minimum, any scheme should require damage prevention actions for a claimant to receive compensation. It may be possible to incentivise damage prevention in insurance schemes by increasing premium fees when adequate safeguards are not in place, or providing damage prevention support to subscribers when they purchase an insurance policy. Adequate safeguards should be agreed with stakeholders to avoid conflicts arising.

Financial sustainability

Any scheme needs to be financially sustainable to ensure it is effective in the long term. One of the first requirements to establish whether a scheme could be financially sustainable is to determine how much a scheme might cost, based on historic human-wildlife conflict incident data (although see Chapter 5, Assessing the impacts of conflict, for the limitations of assessing impact data). With extensive datasets, not only is it possible to determine how much a scheme might cost, adjusting for which impacts are to be compensated and for the payments individuals can expect to receive in proportion to their loss, but it can also be possible to model how much schemes might cost in future years, taking into consideration trends in impacts and whether expected management of situations will reduce the number of incidents occurring (Ministry of Tourism and Wildlife, 2020). Accounting for all these factors, it is possible to estimate upper and lower limits for how much finance might be required per year, and the level of participation necessary to fund a scheme. It is also important to factor in not just how much will be required to compensate impacted claimants, but also how much any scheme will cost to run, including verifying and processing claims (Schwerdtner & Gruber, 2007).

Having identified how much a scheme may cost, it is essential to identify the funding source. Governments may be able to earmark revenue from tourist receipts or taxes, but this can be vulnerable to fiscal constraints and political will. Community schemes can be established where members of the community input financial support (or assets) to be made available if a community member needs to make a claim (Hussain, 2000). However, it is essential to understand the communities' willingness to pay into these schemes to ensure that sufficient funds can be gathered to respond to claims (Chen et al., 2013). Membership fees paid to specific associations can be used to contribute toward insurance premiums (Fourli, 1999). Donors are another source of finance, but they may not provide financial sustainability in the long term. Beneficiary claimants can fully or partly fund schemes through purchasing policies, which offers greater financial sustainability, but requires that impacted stakeholders view insurance as a viable option. There is a great risk of increased retaliation beyond any of the conservation gains if financial backing runs out and a scheme is stopped. This can lead to long-term negative conservation relationships between those impacted and other stakeholders.

Box 26

How to set up an insurance scheme

In 2018, the International Institute for Environment and Development (IIED) and partners AB Consultants, the Institute of Policy Studies, Seratu Aatai and Actuarial Partners implemented the Livelihoods Insurance from Elephants (LIFE) project to facilitate private

markets to insure small-scale farmers and pastoralists from wildlife damage in Kenya and Sri Lanka. Taking the lessons learnt from the project, the partners have developed a guide on how to design and introduce an insurance scheme to promote human-wildlife coexistence, with seven clear steps outlined below (IIED, in prep):

- Step 1. Understand private insurance opportunities and challenges
- Step 2. Identify and agree on partners
- Step 3. Undertake market research and estimate actuarial risks
- Step 4. Finance insurance premiums
- Step 5. Design the insurance product and market structure
- Step 6. Pilot the insurance scheme and monitor effectiveness
- Step 7. National roll-out of insurance scheme

Conclusion

When initiating the process of planning and developing a compensation or insurance scheme, several aspects should be considered to ensure that it is effective:

- Conduct a theory of change and identify intended goals, aims and outcomes as well as any potential unintended consequences and assumptions. Attempt to mitigate for the many risks associated with these schemes.
- Potential claimants should be included during the scheme's development to ensure the scheme is appropriate and fair, receiving buy-in from potential claimants (see Chapter 13, Working with stakeholders and communities).
- In some circumstances, placing a financial value on an item may not be appropriate and could offend a potential claimant.
- Schemes do not reduce the impacts directly, but schemes with appropriate incentives may reduce impacts by improving the management of situations.
- Increasing the tolerance, ownership and stewardship of people living with wildlife may complement schemes to address the costs.
- Providing payments for damage caused only by certain species may result in animosity. For an impacted stakeholder, it may not matter whether their asset has been damaged by a wild animal eligible for payment or a wild animal that is not because, ultimately, a wild animal has damaged their asset.



Evaluating interventions

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Impact evaluations assess the causal link between an action (e.g. erecting a fence) and the outcomes (e.g. a change in the rate of crop raiding by elephants). This goes beyond understanding whether a project has been implemented (e.g. whether activities were completed) to understanding what changes happened due to the actions taken and why they happened as they did. Impact evaluation is thus defined as the systematic process of assessing the effects of an intervention (e.g. project or policy) by comparing what actually happened with what would have happened without it (i.e. the counterfactual).

What is the use of impact evaluation?

Impact evaluation has the following four primary uses (adapted from Adam et al. (2018):

1. Informs strategy and allows for adaptation over time to increase effectiveness (i.e. the degree to which the impact is achieved) and efficiency (i.e. the ratio between the amount of resources needed and the degree of impact achieved).
2. Allows for advocacy and communication of the value of the intervention.
3. Informs allocation of scarce resources (financial, institutional and/or human).
4. Ensures accountability to stakeholders (e.g. donors, local communities and partners).

How to evaluate impact

Step 1: Develop a theory of change

Given the complexities involved in the majority of human-wildlife conflict contexts, it is vital to start by laying out the desired impacts an intervention is expected to achieve. This can be done through a theory of change, a visual mapping approach that lays out the causal linkages between resource allocation (inputs), project activities (outputs), short-term change (outcomes) and long-term change (impacts) (Dickson et al., 2017) Chapter 15, Planning and theory of change). Furthermore, it is also

important to articulate both intended and unintended potential consequences of a project's activities at this stage in order to adapt strategies appropriately – for example, fencing a park is intended to decrease human-wildlife conflict, but it could inadvertently increase human-wildlife conflict if it alienates local stakeholders by restricting access to ancestral lands or water (Dickson et al. (2017) Chapter 4, Avoiding unintended consequences). It is critical that a participatory approach is used while building the theory of change. This helps to overcome biases that inevitably come with any single stakeholder group, and also fosters broad stakeholder ownership of the project.

Step 2: Prioritise questions and select indicators

The theory of change also allows projects to identify options of what to evaluate. For example, an human-wildlife conflict mitigation project's intended outcomes could include a reduction of retaliatory killing (e.g. of lions), safe dispersal of the conflict species as well as improvement in livelihoods of the community members. While a single impact evaluation may not be able to capture all the outcomes in a theory of change, the theory of change provides a basis on which projects can prioritise key outcomes. Identifying these outcomes also helps to identify the most suitable methods for conducting the evaluation (Dickson et al., 2017). Once the project personnel have identified the key questions they would like to evaluate, they should select the appropriate indicators that will help answer these questions. These indicators should be SMART (Specific, Measurable, Attainable and action orientated, Relevant and Time-bound). In the example in Box 27, there is a key assumption that a reduction in illegal killing of lions will contribute to the recovery of species populations. In this case, it is therefore also important to monitor the lion population size to see whether it is increasing, decreasing or staying the same, in addition to understanding other factors driving population trends (e.g. availability of prey or habitat loss).

One key consideration here is time, as impacts can take a long time to become observable, particularly those that are linked with biological indicators. For instance, the reduction in killing of a conflict species may be observable within 2–3 years; however, the recovery of the population of said species may take up to 10 years to be confirmed. It is therefore essential to include a timeframe for the questions to be answered and to understand that those timelines have both practical, methodological and financial implications.

Step 3: Choose the method

Impact evaluations benefit from the use of quantitative and qualitative methods to understand and attribute change to a particular intervention. While quantitative approaches are good at estimating trends and the magnitude of a change (or lack thereof), qualitative approaches focus on understanding the nature and the characteristics of a change (or lack thereof), and which pathways it took. Therefore, mixed-methods approaches are most effective at understanding both aspects of the central question: 'What worked, and why?' Commonly used methods are discussed in Table 16. Each approach has pros and cons, and the balance will change with each particular project, implementer and location. Different methods also present capacity and skillset challenges for those involved.

Step 4: Collect and analyse data

The analysis of data with the goal of understanding cause-effect relationships is a complex process that requires not only knowledge of general social science methods (see Chapter 19, Social science research) but also specific understanding of experimental design and statistics that are specialised for causal inference (White and Raitzer (2017).

Box 27

Worked example: Lion Guardians

The Lion Guardians project was established in 2006 to promote coexistence between humans and lions in southern Kenya (www.lionguardians.org). Its primary goal was to reduce the retaliatory killing of lions (i.e. human-lion conflict resulting from lions killing livestock, in addition to the cultural killing of lions) with the aim to stem the decline of the lion population. To achieve this, the project employed Maasai warriors to proactively mitigate conflict by monitoring lion whereabouts and warning herders when lions were near, recovering lost livestock, reinforcing livestock corrals and stopping retaliatory hunts; all within the local cultural norms.

Step 1: Develop a theory of change

The project developed a clear theory of change built on research on motivations for lion killing and listening to the communities living with wildlife (Chapter 15, Panning and theory of change). The central hypothesis of the project was that by engaging community members who were killing lions in helping to protect them, and blending traditional knowledge on livestock protection and bush skills (e.g. tracking, Chapter 9, Culture and wildlife, and Chapter 14, Traditional ecological knowledge) with modern scientific methods (e.g. GPS, call-in, Chapter 20, Ecological research methods), they would be able to build the community's tolerance to living with lions and help reduce the illegal killing of lions.

Step 2: Prioritise questions and select indicators

A key question was how the effective project activities were at promoting coexistence between lions and people. Given that tolerance is not easy to measure, the project identified killing of lions by people as a proxy for tolerance and prioritised this outcome in their evaluation, alongside monitoring the lion population to understand how it was changing.

Step 3: Choose the method

To understand the effectiveness of its particular actions in reducing lion killing, the project decided to use a quantitative approach. More specifically, Lion Guardians chose a counterfactual analysis to better understand the level of conservation impact that was attributable to conservation actions. Additionally, they chose a statistical matching method because there were other conservation interventions in the same geographical space, and Lion Guardians wanted to be able to understand how much of the changes being observed could be attributed to its work. This worked well as it was able to identify a control population with similar characteristics where the only existing conservation intervention was Lion Guardians. Since then, this landscape has changed, with other interventions being implemented in the control area (Hazzah et al., 2014).

Step 4: Collect and analyse data

A system of data collection was developed that ensured the key activities were being monitored and data addressing the central question were being collected. Statisticians were engaged to help analyse the data and guide the counterfactual analysis.

Lessons learnt

Performance measures need to be aligned with the overall goal of the project. At times, measures such as kilometres walked became the focus of performance measurement even though they did not necessarily contribute to the goal of the project (building tolerance to save lions). Clearer prioritisation of outcomes at the start of the project, and as the project progressed, would have helped in ensuring that data being collected and analysed would be useful in understanding the effectiveness of the project and inform better adaptive management.

Table 16. Methods for evaluating the impact of actions to mitigate human-wildlife conflict. (For a more detailed list, see White and Raitzer (2017))

	Description	Strengths	Challenges
Quantitative methods			
Randomised controlled trial (RCT) (e.g. Branco et al. (2019))	<p>Experimental units (e.g. communities, individuals) are randomly allocated to treatment and control groups</p> <p>Indicators of interest are measured and compared across both groups, often through time</p>	<p>Randomisation helps address biases that can arise when allocating units to treatment or control groups</p>	<p>Needs large number of units for randomisation to help reduce bias</p> <p>Most conservation interventions are impossible to randomise</p> <p>Timescale of change needs to be realistic; conservation impacts can take a long time to be observable</p> <p>Intervention may spill over from treatment to control units</p> <p>Often impossible to 'blind' participants regarding the experimental group they are part of, which may impact outcomes</p> <p>Requires intervention to be withheld from control group, which can be seen as problematic; however, it can be argued that this could apply to any intervention, because few, if any, interventions have the resources to reach all people afflicted by a given problem</p>
Difference in differences (DiD) (e.g. Sibanda et al. (2020))	<p>Comparison of change in the outcome between treatment and comparison groups over time</p>	<p>Easier to implement than RCT</p> <p>Requires less technical knowledge to analyse</p>	<p>Vulnerable to selection bias, where units in control and treatment groups are not comparable, either due to their characteristics or due to expectations regarding future trends</p>

			<p>Timescale of change needs to be realistic; conservation impacts can take a long time to be observable</p> <p>Intervention may spill over from treatment to control units</p> <p>Often impossible to 'blind' participants regarding the experimental group they are part of, which may impact outcomes</p>
Matching (e.g. Suich (2013))	<p>Subset of DiD in which treatment and control groups are matched using statistical methods to identify control units that are similar to treatment units according to a set of predefined measurable characteristics</p>	<p>Easier to implement than RCT</p> <p>Can be used alongside regression-based approaches to produce 'double-robust' estimates</p>	<p>Assumes that similarities between treatment and control groups in observable characteristics reflect balance in unobserved characteristics (counterfactuals)</p> <p>Timescale of change needs to be realistic; conservation impacts can take a long time to be observable</p> <p>Intervention may spill over from treatment to control units</p> <p>Often impossible to 'blind' participants regarding the experimental group they are part of, which may impact outcomes</p>
Qualitative methods			
Process tracing (e.g. Laffan and O'mahony (2008))	<p>Establish whether, and how, a potential intervention influenced a specified change</p> <p>This is done by assessing the strength of evidence linking activities through time and space to the relevant change, based on what is necessary and sufficient to cause change</p>	<p>Can be used to examine recurring events</p>	<p>Relies on the existence of background knowledge to evaluate hypotheses that may present limitations in data-poor contexts</p> <p>Relies more heavily than other methods on researcher's assessment of the strength of particular strands of evidence, which can result in more vulnerability to observer bias</p>
General elimination methodology (e.g. Salazar et al. (2019))	<p>Sets out to identify potential causes of effects by critically examining the multiple suggested casual pathways that different stakeholders believe have been involved</p> <p>Any pathway for which there is no evidence is dismissed</p>	<p>Obtains a broad view of the issue by mapping different pathways that may have led to change of interest; this makes it less vulnerable to confirmation bias</p> <p>Can be used retrospectively and focus on interventions that have happened a long time ago; this can be crucial when biological outcomes are of interest</p> <p>Can provide information about synergies between different interventions focused on the same outcome</p>	<p>Vulnerable to interpreting absence of evidence as indication that there is a lack of causality, particularly in data-poor contexts</p> <p>Relies on stakeholders to cover all the meaningful causal pathways of interest</p> <p>Requires extensive data collection and analysis effort if number of stakeholders is large</p>

Most significant change (e.g. Wilder and Walpole (2008))

Uses personal accounts of change and decides which are the most significant and why. Focuses on similarities and differences in what different groups and individuals value.

Allows for the exploration of the different costs and benefits experienced by different stakeholders as a result of the intervention. Can be used to examine recurring events

Often focuses on those likely to experience very positive or negative impacts, not on the average experience. Best used in conjugation with other techniques. It may be hard to maintain stakeholders engaged through the multiple research cycles.

(Source: Compiled by the chapter authors)



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Conclusion

There remains scope for significant progress in the field of impact measurement for human-wildlife conflict interventions. This will only be possible if impact evaluation is reframed as being a vital part of the project planning and implementation cycle, and is prioritised accordingly both by conservation implementers and donors, including during budget- and resource-allocation processes. Rather than presenting a threat to credibility, rigorous impact evaluation is a mark of best practice (regardless of the results of the evaluation), providing valuable insights and lessons learnt that can, over time, amplify the contributions of the conservation sector to mitigating human-wildlife conflict.



Afterword

When our team from the IUCN SSC Human-Wildlife Conflict Task Force (now the IUCN SSC Human-Wildlife Conflict & Coexistence Specialist Group) began planning out the contents of these Guidelines in late 2019, human-wildlife conflict was beginning to enter the global intergovernmental stage. We were invited to provide inputs on the inclusion of human-wildlife conflict in a very early text version of the UN Convention on Biological Diversity Post-2020 Global Biodiversity Framework.

Soon after this we opened registration for our first major international conference on human-wildlife conflict and coexistence to be held in April 2020. We were taken aback by the speed at which the 600 spaces in the conference were taken, with all available tickets sold in a few weeks. But this conference was not to happen, not yet. By February 2020 we had made the decision to cancel the conference as almost all countries in the world were locking down for the Covid-19 pandemic, and much international travel was suspended.

While the world was at a standstill, stories emerged of wildlife appearing in towns, villages and lands deserted of people. We briefly caught a glimpse of what coexistence might look like if species could wander safely into human habitats. This intriguing inversion was short-lived, however, and followed quickly by the realisation that if people were not earning benefits – for example, through the sudden loss of all tourism income – that imbalance of benefit and cost could quickly turn into serious consequences for many species. It was a clear, live demonstration of the fundamental importance of creating ways for local communities to benefit from biodiversity conservation if coexistence is to be a reality.

During these pandemic years, while our Specialist Group drafted the 32 chapters of these Guidelines, we also published several shorter pieces, including the IUCN SSC *Position Statement on the Management of Human-Wildlife Conflict*, a briefing paper and definition of human-wildlife conflict, a short piece on *Perspectives on Human-Wildlife Coexistence* and the IUCN *Issues Brief on Human-Wildlife Conflict*, all translated into several languages and available on the HWCCSG website.

These initial pieces helped our multidisciplinary group to articulate its collective thinking on the topic. Human-wildlife conflict and coexistence theory and practice is a constantly evolving field; all who work in this area – whether newly or with decades of experience – are continuously learning and refining their insights and reflections. With this in mind, we have called this volume the *first edition* in anticipation of further revised and refined editions in coming years. We hope that this edition will be field-tested by practitioners around the world for clarity, relevance and usefulness, and we invite reflections and suggestions for future improvements via the portal of our human-wildlife conflict Guidelines community of practice at www.hwctf.org/guidelines.

With these Guidelines, we hope to provide a comprehensive introduction to all those new to the topic, and a key reference guide or gap-filler for those who have worked in the human-wildlife conflict and coexistence field for some time. Managing human-wildlife conflict and nurturing coexistence is an adaptive endeavour, requiring continuous learning and dialogue. The aim is not to resolve all conflict, this is never possible because it defies nature itself – conflicts always exist and are a part of all life. Rather, the aim is to manage conflicts and generate conditions for coexistence to emerge, thrive and sustain itself.

As I write this afterword, 3 years after we began the collaborative effort of producing these Guidelines, the UN CBD Post-2020 Global Biodiversity Framework has been adopted at COP15 in Montréal, Canada. Within this long-negotiated text there is an objective (Target 4), which states that all countries must ‘... effectively manage human-wildlife interactions to minimise human-wildlife conflict for coexistence’. We hope that these Guidelines – in this first edition and beyond – can prove a useful tool for all those working to translate this ambition into practice.

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*on behalf of the IUCN SSC Human-Wildlife Conflict & Coexistence Specialist Group
Oxford, 19 December 2022*

An aerial photograph of a winding river flowing through a lush green landscape. The river meanders through a mix of dense forest and open meadows. The sky is a clear, pale blue with a few wispy clouds. The overall scene is peaceful and scenic.

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