4. Decisional framework

Clear policies dealing with human-wildlife conflict help to establish options that can be implemented either by the administrations (national or local), the wildlife authorities, the farmers and communities and/or the private sector.

In order to be effective, policies need to include:

- a clear definition of the roles of the various stakeholders listed above;
- a distinct definition of a "problem-causing animal";
- guidelines on human-wildlife conflict, on methods of measuring the extent and nature of conflict, and on management methods available and authorized (WWF SARPO, 2005).

Policies should be designed through a bottom-up approach involving all stakeholders and particularly local communities. They should be supported by the appropriate government departments, i.e. those concerned with wildlife but also with agriculture, water, infrastructures, etc. This is the best approach in designing transparent and workable policies to manage human-wildlife conflict. These policies can then lead the way to sound legislation and contribute to the success of human-wildlife conflict management.

To date, a few African countries have designed national policies on human-wildlife conflict. The national policy on human-wildlife conflict management adopted by the Government of Namibia in December 2007, is a good example which could be fruitfully used as a starting point by other countries.

From a practical point of view, in order to carry out informed and cost-effective management decisions, a three-phase approach should be implemented:

- collection of information on human-wildlife conflict;
- analysis of information and decision-making;
- choice and implementation of management options.

PHASE 1: INVESTIGATION

To report incidents and react quickly, an efficient information system is an obvious requirement. A centralized database to identify hot spots, recurrent animal problems, etc. is also a key tool. The long-term success of an information system will depend on the proper selection and training of those collecting the basic information. In addition, the methodology and format for the collection of information must be agreed on by all parties involved (WWF SARPO, 2005).

The systematic and objective gathering of information enables the responsible authorities to place the problems and threats caused by human-wildlife conflict in context, alongside other problems faced by local communities. It also ensures that resources are correctly directed, i.e. towards solving real issues rather than perceived problems.

BOX 30

Importance of a human-wildlife conflict database

A human-wildlife conflict database would both provide a detailed overview of the impact of conflict on local populations, and help identify which geographical zones are more vulnerable to human-wildlife conflict and which species are commonly involved in conflict. As a result, it would ensure adequate use of resources, help identify high-risk areas and the most relevant species, and encourage effective responses to emergencies (Nyhus and Tilson, 2004).

This database could even be used to prevent, or at least anticipate, human-wildlife conflict. Results of past research (Sitati *et al.*, 2003) suggest that spatial correlates of conflict can be identified, and areas of vulnerability mapped, to enable the development and deployment of appropriate conflict management measures. Innovative methods employing participatory Geographic Information Systems to design maps have been developed using local landmarks and features; these are being used to produce predictor variables for conflict and to develop options with communities for wildlife conflict mitigation by documenting distribution and types of conflict, species involved, the severity and causal factors of conflict (Muruthi, 2005). This information will be useful to local farmers, who often feel powerless to combat the problem, as well as the authorities who wish to help but have inadequate information to carry out prompt targeted action.

In the absence of reliable information, the scale and nature of human-wildlife conflict becomes a matter of personal opinion. Conflict between people and wildlife is an emotional issue and, as a result, reports and opinions can be biased, creating a false impression of the size of the problem (WWF SARPO, 2005).

The collection of reliable data is complicated by the fact that the real extent of the conflict is often obscured by the agendas of many interested parties. Several factors may affect the accuracy of the information collected. For example, agropastoralists are not always able to determine the exact cause of death of an animal (diseases, poor nutrition, poisonous bites) and may blame predators instead; the local government may underestimate the problem whilst failing to take account of isolated and unreported attacks (Polisar *et al.*, 2003); and farmers may intentionally exaggerate information for various reasons (e.g. in several countries, human-wildlife conflict are often used as a pretext to slaughter an elephant for meat). This issue of broad concern is quite common but can be easily overcome by verifying suspicious declarations against the local knowledge of field assistants or through field quadrant sampling surveys (Sekhar, 1998).

There is no simple universal reporting system in place to capture and collate information relating to human-wildlife conflict. Problems sometimes occur in remote places and are never reported at all. Incidents may be reported to a number of different institutions – traditional tribal leadership, police and/or army or security

organizations, hospitals, mission stations, local government, wildlife authority etc, or any combination of these. Details of incidents taken at the time will vary between organizations and from one incident to another.

A universal reporting format introduced and circulated to all entities likely to receive such reports has proved useful in some cases in obtaining information retrospectively. Local enumerators are employed to canvas all of the above sources and record information gathered according to the universal format. This reporting form also provides information that can be used to analyse the data for biological, spatial, temporal, cultural and other patterns and determinants. In the case of conflict with crocodiles, for instance, this is done from an existing database currently holding over 500 records of attacks worldwide; an increasingly valuable research and management tool.

As a general rule, good-quality and high-value information should be gathered to develop and maintain an updated database containing the broadest array of records documenting the type and location of the incidents (Box 30).

When an incident of human-wildlife conflict is confirmed, the details of the conflict should be investigated before any management measures can be considered (Box 31). This is not easy; on the one hand, it is often difficult for the relevant authorities to get to the field, on the other, the victims sometimes tend to exaggerate deliberately or not, the importance of the conflict.

BOX 31

Investigations to be made in cases of human-wildlife conflict

In the case of a livestock raid, the first step before choosing any of the possible management methods is to identify the killer. Is it a lion or some other animal? Here, a five-step investigation procedure developed for caracal, brown hyenas, cheetahs, leopards, black-backed jackals and domestic dogs (Bowland, Mills and Lawson, 1994) could be adapted:

- determine if the prey animal was killed by a predator or died from other causes;
- define the size of the prey, i.e. small, medium or large (only the lion will prey on very large species);
- examine the various parts of the carcass carefully and systematically;
- look for specific behavioural traits of predators such as claw marks on the carcass, bites on the throat, etc.;
- search clues in the area surrounding the carcass (tracks, droppings, hair, etc.) or observe the behaviour of the herd (e.g. obvious signs of nervousness among the remaining animals on the morning after attack).

In addition, an understanding of the ecological, social and cultural context of conflict situations is useful. Some aspects that may be relevant in identifying appropriate solutions, such as human population density, the proportion of urban and rural populations and religious beliefs, are often overlooked.

Continues

Box 31 continued

It is useful to explore local perceptions of the severity of damage; how and whether people use particular strategies to minimize the level of crop damage occurring; who actually makes formal complaints about crop-raiding by elephants; and whether crop damage *per se* is the important issue or whether it is obscuring another issue. This information would help identify which methods are best suited to the community and which groups should be targeted in any intervention programme.

Another key point to be investigated is how local populations assess the effectiveness of different human-wildlife conflict management measures. This knowledge can be helpful in educating farmers and promoting the adoption of the most effective techniques. An assessment conducted under the FAO Kakum project in Ghana, for example, showed that farmers ranked elephant deterrent techniques as follows (from best to worst):

- disturbance shooting and burning fibres (ranked equally);
- shouting;
- beating drums;
- burning tyres;
- detonating bamboo bombs.

Further investigation is useful in guiding management decisions. The status of the wild population, for instance, is instrumental in choosing between lethal or non-lethal techniques. For some species such as crocodiles, the status of the population is not difficult to obtain through a programme of aerial surveys coupled with nocturnal spotlight surveys from a boat, as well as the use of data from ranching operations where these exist. The methodologies and analyses of these data are well established. However, determing the status of species such as baboons, which are more widespread and less linked to a specific habitat, could be more complicated.

In investigating the behaviour of baboons, the most pertinent strategy is to improve understanding of why there was a conflict, how it started and how it could be managed in the future to sustain the viability of exotic timber plantations without removing baboon populations in large numbers. This strategy of inquiry helped reverse the problem on three border timber estates in Zimbabwe.

PHASE 2: PROBLEM ANALYSIS AND DECISION-MAKING

In addition to providing a list of management methods, a human-wildlife conflict policy should also provide the authorities, managers and local populations with a decisional framework. This framework would help people identify and implement appropriate management strategies which may differ depending on prevailing conditions (ecological, socio-economic, etc.).

It is also necessary for the policy to establish a threshold level of damage which may be designated at zero or some higher level. Mitigation is then only considered when this level is exceeded.

A decision-tree process has been proposed to help decision-makers to make up their mind and determine which actions to pursue in mitigating human-wildlife conflict (FAO, 2005). This is made up of simple flow charts which cover likely eventualities and can help towards taking the correct decision as well as giving staff confidence in carrying out their task. A decision tree has been designed for each problem-causing animal species. As an example, the model for elephants is shown in Figure 2.

Decisions in response to a human-wildlife conflict situation are most often made at the central level, but can be delegated to the lowest appropriate institutional level to ensure that they are made quickly, efficiently and based on the best available information. This procedure has been adopted in Mozambique where decisions are made at the district level, or in Namibia where decision-making has been transferred to the Chief Control Wardens of the Directorate of Parks and Wildlife Managements at regional level. This allows for better reporting and monitoring as well as for a very quick response, so that the identified problem animal can be speedily dealt with.

At the same time, safeguards need to be set up to ensure that the elimination of wildlife is necessary. In Namibia for instance, the national policy on human-wildlife conflict has established guidelines relating to the delegation of authority (to determine when to eliminate a problem-causing animal), the elimination of a problem animal by an authorized conservancy, and the framework for deciding when a problem animal should be destroyed (Government of Namibia, 2007).

Ideally, a decision should be taken in collaboration with all stakeholders involved: primarily the local populations, possibly through a community-based organization; local government representatives; any private-sector tourism operators involved within the areas where conflict occurs (wildlife viewing and hunting); and scientists. The same stakeholders should also agree on mechanisms for reporting and implementing action (see Box 32).

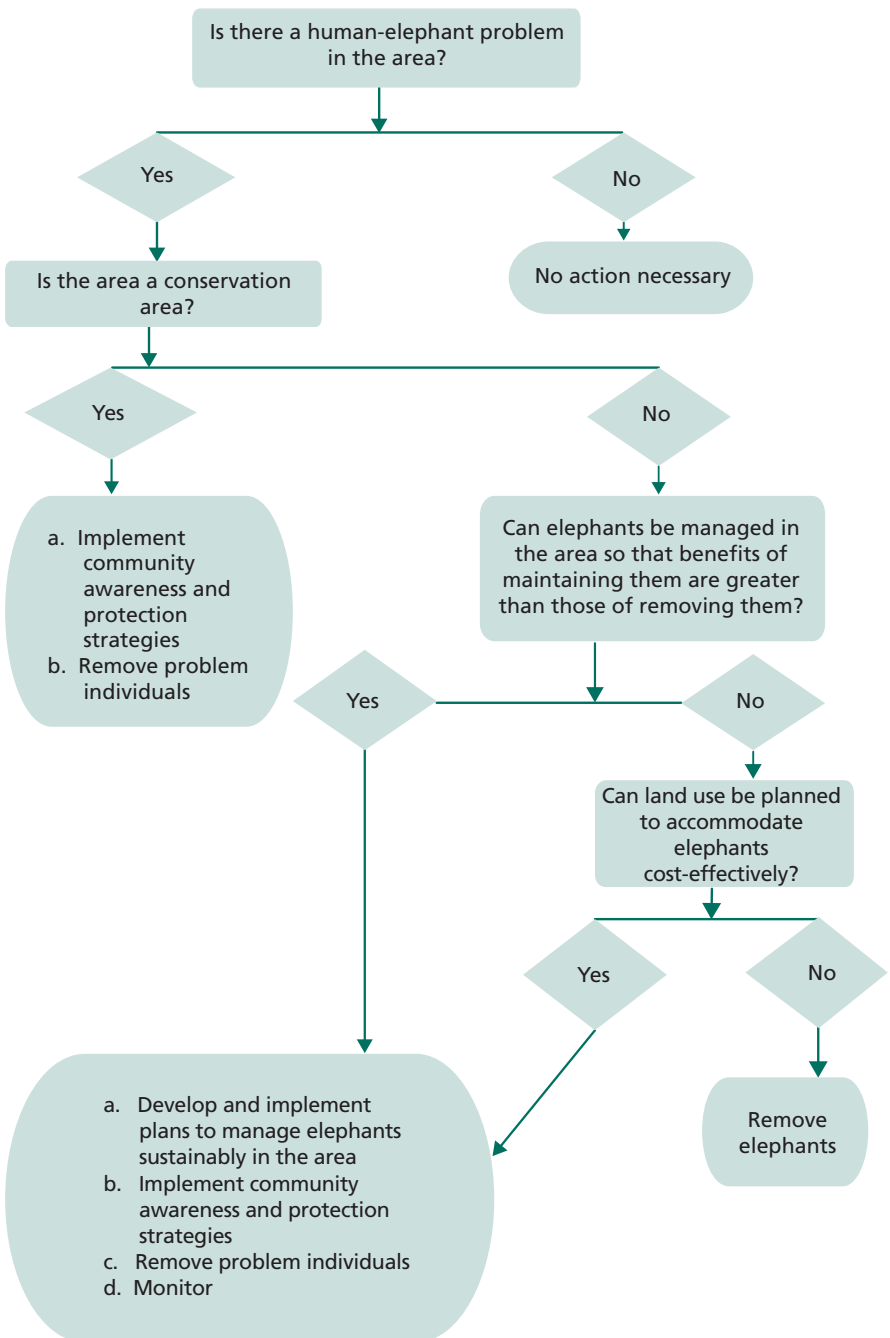
Finally, decision-making may deal both with cause and effect. For example, to lessen the damage caused by baboons in forested areas, it may be decided to address the problem by managing both the damage and the agent causing the damage (identified baboon troops or individuals). At each level thereafter, the choice of possible management activities may be constrained by their economic or practical feasibility, as well as by constraints imposed by lack of knowledge, legislation, certification programmes and/or public opinion.

PHASE 3: CHOICE AND IMPLEMENTATION OF MANAGEMENT OPTIONS

The choice and implementation of management options lies with the state, which is generally regarded as the owner of wildlife. As mentioned above these responsibilities may be delegated to local entities.

Ideally measures for human-wildlife conflict management and implementation should be chosen based on the following criteria.

FIGURE 2
Decision process to determine appropriate management action in areas with human-elephant conflict



BOX 32

An example of integrated decision-making

The decision to remove individual crocodile(s) or to authorize a mass operation is linked to decisions on how this operation should be carried out:

- how many animals will be killed (a quota)?
- are there any age/size limitations?
- who will carry out the operation (government, private sector or other)?
- when (immediate, at next optimal seasonal opportunity, delayed)?
- how – lethal (i.e. slaughter and recover skins) or non-lethal (capture/captivity)?

Management action may need to be provided for in legislation and regulations to control such operations. The disposal of any products (skins or live animals) may need to be approved, subject to the constraints of national or international obligations (e.g. CITES). The decision to select and implement other relevant management activities such as education or awareness raising, the development of alternative water supplies and transport or communications interventions must be made at this time. This will require negotiation and agreement at the national and regional levels and involve partnerships with the developed world.

Rapidity and effectiveness

Management response should be swift and should generate effective and permanent results, without simply displacing the problem elsewhere. Any efforts at management that are not implemented in an absolutely rigorous and committed manner could result in failure, and possibly in an exacerbation of the problem. In the case of baboons for example, this could happen by inadvertently teaching the baboons how to avoid the controls, or by disrupting the social structure of the target troops which could result in greater reproduction and/or damage.

Socio-cultural appropriateness

Management options should be compatible with current legislation and local culture, and politically acceptable.

In many situations, strategies or methods for addressing the human-wildlife conflict issue are constrained by local, national or international regulations, laws or treaties. The effectiveness of certain management practices is directly dependent on the establishment and application of policies and guidelines over a wide range of human activities. In various countries, existing wildlife policies are outdated, contradictory and require clarification, in particular those regarding land development planning and its impact on wildlife habitats. As mentioned before, policies on land tenure, controlled utilization of wildlife through hunting and the trade of wildlife products, game farming, tourism development and compensation schemes should be strengthened and made to conform to the current national context and population requirements (Hoare, 1992).

Local culture and religious and traditional beliefs should be taken into account, given that these can interfere with the implementation of some management techniques. For instance, the Muslim prohibition against the consumption of pork and related species, or the fact that some species – such as crocodiles in Burkina Faso – are regarded as taboo (see Box 9), affect the use of lethal methods in some parts of Africa.

The whole mitigation process must be properly documented in a manner that will satisfy international scrutiny and public opinion, which is often sensitive to animal welfare issues. The South African moratorium on the lethal control of baboon populations since May 2006 illustrates the weight of public and media concern.

Cost-effectiveness and stakeholder involvement

Human-wildlife conflict management measures should be cost-effective, should be implemented at the appropriate level (family, village, national and regional) and should involve the relevant stakeholders. A transboundary natural resource management approach may sometimes be necessary. In the case of damage caused by baboons, for example, mitigation strategies should address both the range of the baboons and the occurrence of the problem. It is ineffective for a single forest plantation to implement mitigation strategies if neighbouring stakeholders are pursuing different strategies or none at all.

It is of fundamental importance that those who are most affected by the problem be included in the solution. This is best achieved by transferring ownership of the management strategies to local communities affected (Box 33).

BOX 33

Community-based control of problem elephants

The Mid-Zambezi Elephant Project in Zimbabwe developed a system for community-based control in response to the understanding that current problem-elephant control techniques did not effectively assist communities living alongside elephants (Osborn and Parker, 2002). The system provides farmers with the necessary skills, resources and confidence to defend their crops. It was successfully implemented around Kakum Conservation Area in Ghana as a result of a three-year FAO Technical Cooperation Programme (TCP) project implemented by Conservation International.

Community-based control of problem elephants helps alleviate crop damage when used in combination with other methods, but it does not necessarily offer a complete solution. Based on the findings of the Kakum project FAO recommends the adoption a multi-stage approach to implement management measures, beginning with low-input, low-cost methods for which farmers can take full responsibility. If these methods do not succeed after a period of time, then higher-input methods should be implemented.

Simple and reliable monitoring procedures

The results of each wildlife problem management initiative should be monitored to determine its effectiveness and consolidate or modify the mitigation process if necessary (Box 34). Monitoring should also take into account any possible side effects on wildlife, such as the restriction of animal requirements, effects on non-target species and the environment as a whole, and cost-effectiveness. This is particularly important for timber plantations where the harvestable product takes more than one season or year to reach a suitable size for harvesting, and the product is therefore repeatedly exposed to damage.

AN ADAPTIVE PROCESS

To summarize, human-wildlife conflict management is an adaptive process which includes the following phases:

- determining human-wildlife conflict status (information gathering);
- setting objectives (policy/options to reduce conflict);
- implementing human-wildlife conflict management (policy/options);
- establishing whether objectives have been achieved (information gathering: has reduction of human-wildlife conflict been achieved? what is the impact?);
- modifying the objective if necessary (policy/options).

BOX 34

The event book: an example of simple human-wildlife conflict monitoring

The "event book" approach developed in Namibia by WWF, Namibia Nature Foundation and the Ministry of Environment and Tourism is a simple human-wildlife conflict monitoring system that can be used by communities. The community decides what it wishes to monitor. Technicians develop the monitoring structure accordingly, and the entire process, including analysis, is carried out locally. The approach concentrates on measuring effort and is based on the use of icons and visual displays which allow non-literate people to participate. For each incident of human-wildlife conflict, one cell is marked. This simple approach soon displays valuable information that is directly usable by communities (WWF SARPO, 2005). The approach has already gained wide acceptance in Namibia and Mozambique and is now being introduced in Botswana and Zambia.