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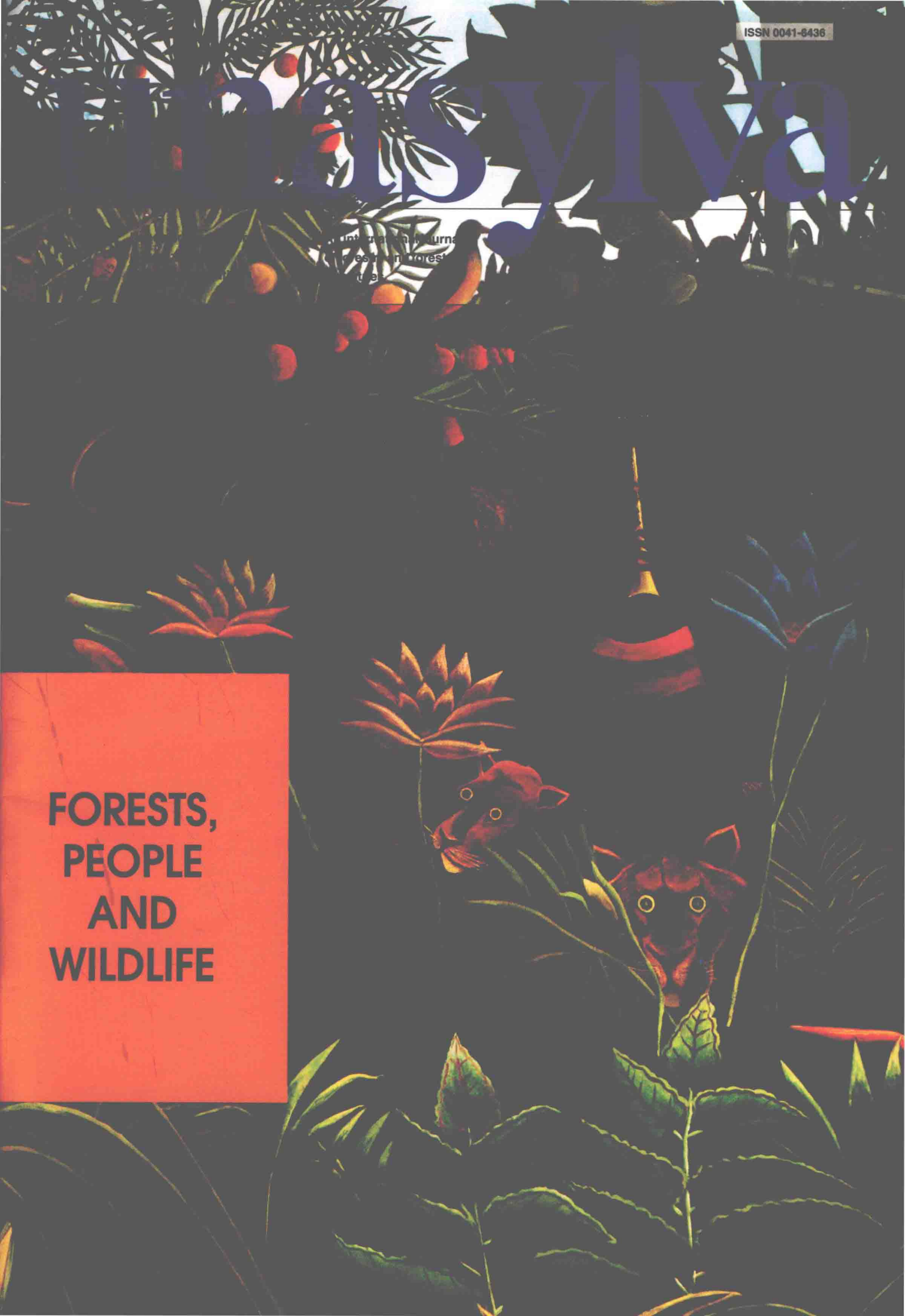

FORESTS, PEOPLE AND WILDLIFE

GUIDELINES FOR AUTHORS

Editorial focus and readership

Unasylva is an international journal of forestry and forest industries, produced in separate English, French and Spanish editions. *Unasylva* covers all aspects of forestry: policy and planning; conservation and management of forest-based plants and animals; rural socio-economic development; species improvement; industrial development; international trade; and environmental considerations, including the role of forests and trees in maintaining a sustainable base for agricultural production at the micro and macro levels as well as the effects of environmental change on forestry.

Articles submitted should be of interest to the broadest possible cross-section of *Unasylva*'s readership, which represents the following groups:

- government officials, particularly in national forest services and the administrative structures responsible for overall agricultural and rural development. This category also includes representatives of the United Nations and its specialized agencies as well as staff of government organizations dealing with forestry;
- non-governmental organizations dealing with forestry at the local, national and international levels;
- forestry schools and institutes, including their library users and staff members;
- industrial forestry operators, both government and private;
- individual professional foresters, especially those concerned with international forestry.

Submission of articles

Unasylva prefers to publish original articles written specifically for the journal, as opposed to papers prepared for presentation or publication elsewhere. The journal occasionally accepts previously published articles if they are judged to be of particular value and have had only limited distribution. Unsolicited manuscripts may be accepted, but authors are encouraged first to submit proposals rather than finished articles.

Unasylva reserves the right to edit all copy as deemed appropriate for length and the overall style of the journal. The Editors will attempt to maintain the style and point of view of the author(s). Wherever possible, the author(s) will be consulted with respect to major changes.

Copy specifications

Articles may be submitted in English, French or Spanish and should be between 2 000 and 4 000 words in length. However, shorter or longer articles may be considered or specifically requested in certain cases. Text should be submitted in electronic format, either on diskette or as an e-mail file attachment. In all cases, the word processing program used should be indicated.

The first page of the article should be a title page, providing the full name, title and contact address (including telephone, fax and e-mail if available) of the author(s) and including a brief abstract or summary of the article. Subsequent pages should be numbered sequentially.

Illustrative material

Authors are encouraged to provide supporting illustrative material with manuscripts. Tables, graphs, maps and drawings should be separate from the body of the text, with the point of reference indicated in the text. For the presentation of quantitative data, graphs are preferred to tables. Authors should provide precise data for the possible re-elaboration of graphs, which should be sent in electronic form. The program in which any graphs or maps are submitted should be indicated.

Photographs are printed in black and white; however, originals may be submitted either as black-and-white or colour prints, negatives, transparencies or high-resolution electronic files. Original material will be returned on request.

Style

Articles should be written in plain, concise language and in a style that is accessible and interesting to forestry professionals in general, and not only to specialists in the topic concerned. Jargon should be avoided and technical terms that may be unfamiliar to readers should be defined the first time they appear. Footnotes should be avoided as far as possible.

Measurement and currency

All measurements should be given in the metric system. When monetary data are mentioned, a conversion to US dollars or euros should be included, based on the current rate at the time the article is submitted.

Abbreviations

Abbreviations and acronyms should be defined the first time they are used; for example, the International Union of Forest Research Organizations (IUFRO).

Bibliography

Articles should be accompanied by appropriate bibliographies. The name of the author(s) and date of publication should be indicated at appropriate points in the text (e.g. Franklin and Forman, 1987; Viana *et al.*, 1996), with the full reference given in a separate list at the end of the article. Note that the term *et al.* is used in the text reference when there are four or more authors. However, it should never be used in the bibliography, where all authors must be named.

Example of reference to an article in a periodical:
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Example of reference to a monograph:
Viana, V., Ervin, J., Donovan, R., Elliott, C. & Gholz, H. 1996. *Certification of forest products: issues and perspectives.* Washington, DC, Island Press.

Example of reference to an Internet document:
Burke, T.E. & Lemon, S.D. 1995. *Distributing forest planning information.* Rome, FAO. Available at: www.fao.org/waicent/forestinfo/burke/main.htm

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Cover:
From Henri Rousseau, *The dream* (1910)

Contents

Forests, people and wildlife

Unasylva celebrates 2010, the International Year of Biodiversity, by examining strategies for the successful cohabitation of forests, people and wildlife. This issue addresses the challenges of balancing conservation and use of plant and animal biodiversity in forest settings, particularly where people's livelihoods or species survival are at stake.

The first article, by E. Kaeslin and D. Williamson, summarizes some of the main issues and challenges to be considered in managing forests and wildlife so that both they and people benefit. Topics considered include threats to forests and forest wildlife from overuse and uncontrolled trade; human-wildlife conflict; the potential and risks of ecotourism; and the challenges of integrating conservation and development.

Especially in Africa, the increasing proximity of people and wildlife has multiplied the losses of life and property due to human-wildlife conflict. A short contribution introduces a toolkit developed by FAO and partners in southern Africa to assist villagers in selecting appropriate solutions according to the case.

S. Nguiffo and M. Talla analyse the ineffectiveness of wildlife law in Cameroon, attributing the frequent violations to the law's failure to recognize adequately the contribution of local customs to sustainable wildlife resource management. The article emphasizes the contradictions in a law that encourages wildlife safaris and sport hunting as a source of revenue for the State, but prohibits traditional hunting practices that are fundamental to local livelihoods and culture.

The next articles explore aspects of community involvement in biodiversity conservation. E.K. Alieu, drawing mostly on examples from Sierra Leone, underlines the value of incorporating traditional knowledge and practice in conservation strategies. He emphasizes that involving communities in conservation is the best way to obtain their support for it.

Rawee Thaworn, L. Kelley and Y. Yasmi present an example from Thailand where the creation of a national park prevented local communities from carrying out their livelihood activities. In this case exclusion – the more traditional paradigm for protecting biodiversity – resulted in serious conflict between villagers and park authorities. The authors describe the negotiation process that eventually succeeded in defusing the situation and restoring some of the villagers' rights to use the resources. This not only fostered the villagers' survival, but also encouraged them to become active promoters of protection measures.

Nepal has extensive experience in community conservation approaches. T.B. Khatri presents one of the solutions adopted to balance conservation and people's livelihoods in Nepal's protected areas: buffer zones where sustainable use of natural resources is permitted and a portion of revenue from protected area management (particularly tourism) is reinvested in local development.

In South Africa, the end of apartheid created a particular situation for devolving forest management, with previously appropriated land now being returned to its rightful owners. M.A.I. de Koning describes a model developed to negotiate co-management agreements for land restitution in protected areas. The viability of co-management is first evaluated based on the area's biodiversity and tourism value.

Ecotourism is a relatively new concept for bringing together forests, people and wildlife in beneficial ways. It can raise people's awareness of conservation needs and offer sustainable livelihood opportunities in rural areas. A. Bien explains its growth and particular success in Costa Rica, also noting the risks to be considered in developing policy to promote ecotourism. Next, a short piece describes a novel form of ecotourism: canopy walks, which although originally developed for research, now make it possible for all kinds of people, in all regions, to explore the forests from high above the ground.

Finally, L. Miles and B. Dickson examine the outlook for biodiversity conservation in the context of the global climate change negotiations. They outline how REDD-plus – actions on reducing emissions from deforestation and forest degradation, including conservation and enhancement of forest carbon stocks and sustainable management of forest – can be planned in such a way as to promote biodiversity benefits while combating climate change.

Additional shorter pieces highlight FAO's "One health" approach to animal health, which considers the connectivity among ecosystems, wildlife, livestock and people in addressing emerging disease threats; the merits of edible insects; building local capacity to implement the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) for timber species; and a project in Switzerland that provides opportunities for volunteers – including corporate employees – to do hands-on forest maintenance work, with benefits for both the forests and the volunteers.

Until recent decades, the main strategy for conserving forest biodiversity was to keep people out of the forest. There will always be cases where strict protection is necessary, but as the articles in this issue demonstrate, allowing local people, and sometimes tourists, to use and appreciate the resources may be a better way to ensure their conservation. Only those solutions that carefully balance varied interests, and that integrate (rather than separate) resource use and conservation, will be sustainable.

Forests, people and wildlife: challenges for a common future

E. Kaeslin and D. Williamson

An overview of conservation issues affecting the successful coexistence of forests, people and wildlife.

Edgar Kaeslin is Wildlife Officer in the Forest Assessment, Management and Conservation Division, FAO Forestry Department, Rome.
Douglas Williamson is a consultant based in Cambridge, United Kingdom; he was Wildlife Officer in the FAO Forestry Department until his retirement in 2006.

In addition to providing people with wood and other plant products for food, construction and income, and ecosystem services such as freshwater, soil protection and climate regulation, forests are also major habitats for wildlife. Forest wildlife likewise provides both products (e.g. honey, wild meat, even edible insects [see article by Vantomme in this issue]) and ecosystem services (e.g. pollination, seed dispersal). Forests and wildlife together provide a basis for commercial and/or recreational activities such as hunting, photography, hiking and birdwatching. On a global scale, the goods and services provided by forests and forest wildlife are worth many billions of dollars. Added to this is their cultural and spiritual value which cannot easily be expressed in monetary terms.

This article summarizes some of the main issues and challenges to be considered in managing forests, people and wildlife so that all three benefit.

THREATS TO FORESTS AND FOREST WILDLIFE

Despite their value, or often because of it, even protected forests and wildlife face a formidable array of threats attributable to people. These include:

- conversion of forest to agriculture;
- overgrazing of woodlands;
- unsustainable harvesting or collection of wood, fuelwood and non-wood forest products;
- excessive hunting;
- illegal wildlife trade;
- encroachment of human settlement;
- tourism and recreational pressure;
- mining and fossil fuel extraction;
- forest fires.

The International Union for the Conservation of Nature (IUCN, 1999) defined three categories of threats to protected areas:

- removal of an individual element of a protected area without alteration

Forests and forest wildlife offer people not only products and ecosystem services but also recreational activities such as nature tourism, photography, hiking and birdwatching

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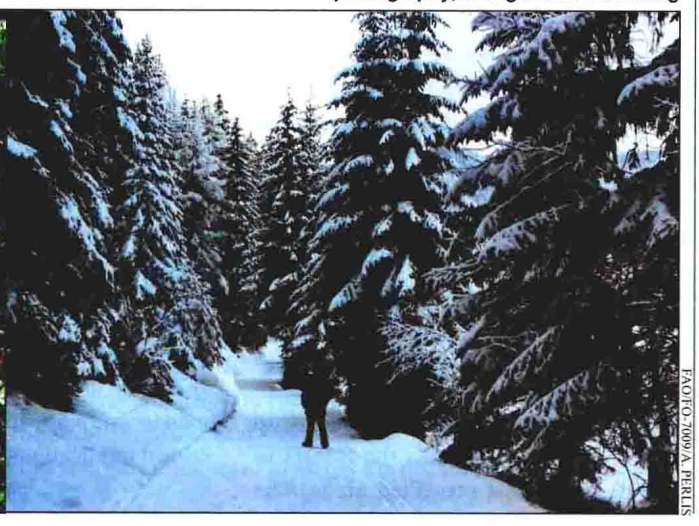

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Wildlife harvested for bushmeat includes certain reptiles, including this tropical American edible iguana

of the overall vegetation structure – for example, animal species hunted for the bushmeat trade, high value timber species and commercially important ornamental plants;

- overall impoverishment of the ecology of a protected area by, for example, persistent poaching, unregulated tourism and recreation or encroachment of human settlement;
- major conversion and degradation, for example, by the removal of forest cover, the routing of a major road through the protected area or the undertaking of mining operations.

There are two main drivers behind these threats: the increasing consumption of wealthier populations, which stimulates agricultural and industrial production, resource extraction and tourism; and poverty, which creates needs for land and resources, especially in developing countries.

These drivers are in turn related to factors such as population growth, economic growth, trade and development; legal and governance issues, including corruption; insecure land tenure; lack of scientific and technical capacity; international debt; economic and social inequality, including gender inequality; conflict and war.

These dynamics form the backdrop for any action to address the threats to forests and forest protected areas. The centrality of threats in the thinking of conservationists is reflected in the development of Threat Reduction Assessment (TRA) as a simple and practical method of estimating the success of conservation measures (Salafsky and Margoluis, 1998). In essence, this approach involves identifying the threats to a given conservation area, developing responses to these threats and monitoring the degree to which the responses are successful.

OVERUSE AND TRADE OF WILDLIFE RESOURCES – THE EMPTY FOREST SYNDROME

Of the many threats that forest wildlife faces, none has had a more severe impact than unsustainable, unregulated and often illegal hunting and trapping for commercial trade in wildlife and wildlife products, including the pet trade, across the developing world. Wild forest animals captured and traded as pets include mammals, birds, fish, amphibians, reptiles (e.g. tortoises, lizards) and even spiders (e.g. tarantulas). Wildlife products include bushmeat and high-value commodities such as ivory, rhinoceros horn and tiger bone. Animals harvested for bushmeat include common ungulates, rodents, large birds and reptiles (alligators, crocodiles, snakes) as well as larger threatened species such as chimpanzees, gorillas, bonobos, wild pigs and elephants.

As a result of faunal depletion, the remaining primary tropical and subtropical forests, which still provide good habitat for wild animals, are widely becoming empty of large vertebrates (see also Box on

Ethical considerations in forest and wildlife management and conservation

Jeremy Bentham (1748–1832), an English philosopher, legal and social reformer and early advocate of animal rights, articulated a criterion for identifying individuals whose interests need to be considered: their ability to suffer. Singer (1995) expressed this ethos as follows:

The capacity for suffering and enjoyment is ... not only necessary, but also sufficient for us to say that a being has interests, at an absolute minimum, an interest in not suffering. ... So the limit of sentience (... the capacity to suffer and/or experience enjoyment) is the only defensible boundary of concern for the interests of others.

Among the animals affected by human activities in terrestrial ecosystems, those that are the most closely related to humans – large-brained, highly sociable species such as bonobos, chimpanzees, gorillas, orang-utans and elephants – suffer in ways that humans can easily imagine. Bonobos and chimpanzees, *nota bene*, share around 98 percent of their DNA with humans.

For the animals that experience it, suffering is not an abstract philosophical issue, but a harsh physical reality. Their interests therefore need to be considered. How this should be done is an important question for forest and wildlife conservationists and managers. In an ethically responsible world an obvious response would be to include ethical implications in the overall planning and management of human activities.

D. WILLIAMSON

Crocodiles on sale in a fish market, Brazzaville, the Congo

p. 4). Forests thus deprived show not only shifts in the relative abundance of animal species, but also reduced seed dispersal and altered patterns of tree recruitment (Wright *et al.*, 2007) and may thereby be impairing the functioning of the globally important carbon sink provided by tropical forests (Brodie and Gibbs, 2009).

The Convention on Biological Diversity (CBD) Liaison Group on Bushmeat defines bushmeat hunting as the harvesting of wild animals in tropical and subtropical forests for food and non-food purposes, including for medicinal use (CBD, 2009). In Central Africa, an estimated 579 million forest mammals are consumed annually – up to 5 million tonnes of dressed bushmeat (Fa, Peres and Meeuwig, 2002). On Bioko Island, Equatorial Guinea, hunting has reduced primate populations by 90 percent in some areas and caused local extinction in others (Bennett, 2006).

Even in remote and protected areas, such as the Okapi Wildlife Reserve in the Democratic Republic of the Congo, the commercial bushmeat trade in markets hundreds of kilometres away threatens the survival of indigenous populations that depend on sustainable hunting for their subsistence and livelihoods (Pitman, 2010). In Africa the bushmeat trade is often facilitated by logging activities, because logging roads provide easy access to increasingly remote forests and logging trucks are used for transporting bushmeat. Moreover, logging companies often regard bushmeat as a free food supply which relieves them of the responsibility to provide for their labourers (Nasi *et al.*, 2008; Poulsen *et al.*, 2009).

Unsustainable hunting and trade in wildlife for use as food and in traditional medicine are also serious conservation and development concerns in East and Southeast Asia, where the severity of the problem is related to high human population densities, a long tradition of consuming wildlife products for medicinal use (e.g. tiger bone for arthritis, snake bile as a tonic) and exceedingly rapid economic growth. In Viet Nam, 12 species of large animals have become extinct, or virtually extinct, in the past 50 years, mainly as a result of hunting. Every major protected area in Southeast Asia has lost at least one species of large mammal to hunting, and most have lost many more (World Bank, 2005). Ho Chi Minh City, Viet Nam has an estimated 1 500 restaurants selling wildlife meat; every year 90 000 wild mammals are sold for meat in a single market in North Sulawesi; and 1.5 million live birds are sold annually in the Pramuka market of Jakarta (Bennett, 2006). When populations of a target species in one area decrease, markets seek their supplies from other species such as smaller mammals (e.g. rodents) or from other areas, causing ever-widening circles of loss.

Beyond the tropics, commercial wildlife trade also poses a threat to wildlife populations in Mongolia's temperate steppes and woodlands, as hundreds of thousands of Mongolians have turned to hunting wildlife – particularly for the large Chinese market – as one of the few available income alternatives in the post-Soviet era (World Bank, 2006).

In the Neotropics, the large-scale hunting of forest wildlife is still mostly within the limits of sustainability, mainly because of lower human densities. Species harvesting rates in relation to production have been found to be 30 times less in the Amazon than in the Congo Basin (Fa, Peres and Meeuwig, 2002). *But even in this part of the world, the* defaunation process is spreading rapidly (Box below).

Private industry, trade in wild meat and changing local subsistence patterns: an example from Ecuador

Between 2005 and 2007, the trade of 11 717 kg of wild meat (mostly pacas, white-lipped peccaries, collared peccaries and woolly monkeys) was recorded in a wholesale wild meat market in Pompeya, near Yasuni National Park in Ecuador. The market was developed near a road built to facilitate oil extraction in the national park, offering an opportunity for local Waorani and Kichwa indigenous people to trade with commercial dealers. Free transport provided by the oil company within the park indirectly facilitated the hunting activities. Prices for wild meat were up to two times higher than those for domestic animal meat. Almost half of the wild meat delivered to the market was bought for resale at restaurants in Tena, a medium-sized town 234 km distant (Suárez *et al.*, 2009).

International trade in wildlife

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) regulates international trade in endangered wildlife species and derived products. Yet the illegal wildlife trade thrives nonetheless.

China is the world's largest importer of wildlife products, with continuous demand for turtles, ivory, tigers, pangolins, snakes and many other species used for food or medicines. The world's second largest importer of wildlife products is the United States of America, which since 2000 has imported almost 1.5 billion live animals, mostly from wild populations in Southeast Asia (Rosen and Smith, 2010). Between 1992 and 2002, trade in wildlife and wildlife products in the United States increased by 75 percent, and it shows no sign of abating.

Because of the ineffective enforcement of CITES regulations in many countries, the illegal wildlife trade is fertile ground for organized criminal groups smuggling exotic animals, plants and derivatives in and out of CITES member countries with little risk of prosecution. For example, it has been estimated that around 5 tonnes of bushmeat per week are smuggled in personal luggage through Charles de Gaulle airport (Paris, France), not only for private consumption, but as part of a lucrative business involving high prices and a wide range of species, many of which are CITES listed (Chaber *et al.*, 2010). Although the exact dimensions of this type of trade are unknown, it is understood to be among the world's largest illegitimate businesses, after narcotics (Zimmerman, 2003; Rosen and Smith, 2010).

A high proportion of today's illegal trade in wildlife and wildlife products is conducted through the Internet, with thousands of CITES-listed specimens offered for sale online every week (IFAW, 2008). This trade poses a huge challenge for biodiversity conservation, a risk of introducing invasive species (often with disastrous effects) and enormous potential for disease transmission to both humans and animals.

Indeed approximately 60 percent of human pathogens are known to be zoonotic, i.e. transmitted through animals, and since 1980 more than 35 new infectious diseases have emerged in humans, including HIV and Ebola viruses which have both been traced back to human consumption of infected African great apes (Karesh *et al.*, 2005; Rosen and Smith, 2010) (see Newman, Slingenbergh and Lubroth, following this article).

What can be done?

Although there is no single solution to the widespread overhunting of forest wildlife, three management components in general are needed to reverse unsustainable use: effective laws and law enforcement (see article by Nguiffo and Talla, this issue), awareness raising/education and the provision of protein or livelihood alternatives (Bushmeat Crisis Task Force, no date; CBD, 2009). In Cameroon, the Wildlife Conservation Society (WCS) and the Last Great Ape Organization (LAGA), a wildlife law enforcement NGO, have successfully worked with the government to reduce the illegal bushmeat trade through education, law enforcement and the development of alternative protein and income sources. Perhaps most effective was the WCS collaboration with Cameroonian railways, which led to regular inspections on trains for illegal animal products. The trade has lessened greatly now that its main mode of transport is under scrutiny.

To control illegal trade in wildlife effectively at the national and international levels (and also illegal trade in plant products – see article by Tong, Schmidt and Johnson), there is a need for decisive support to CITES member countries in their efforts to implement and enforce adequate national legislation to fulfil their CITES commitments. Increased education, networking and capacity building are also needed in most developing countries (Milner-Gulland *et al.*, 2003; Rosen and Smith, 2010).

HUMAN-WILDLIFE CONFLICT

Humans and wildlife come into conflict in many different contexts. The problem is most pronounced in areas of high or growing human and/or livestock densities where wildlife still occurs in

To prevent damage by elephants, chilli pepper can be used as an innovative repellent

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Climate change – increasing the pressure on forests and forest wildlife

In addition to storing about half the total carbon contained in land ecosystems, forests host the majority of terrestrial biodiversity, mainly in the tropics and subtropics. Even moderate climate change puts some of this biodiversity at considerable risk. The rise in average global temperatures will influence the length and severity of seasons and the frequency and severity of floods and droughts, increasing the prevalence of fire and predisposition to pests and pathogens – with expected impacts on forest habitats and species. About one-quarter of vascular plants and higher animals on the globe are estimated to be at an increasingly high risk of extinction as temperatures rise by 2° to 3°C above pre-industrial levels. It is very likely that even more modest losses in biodiversity would affect ecosystem services (Seppälä, Buck and Katila, 2009).

As global average temperatures continue to rise, it is important to develop strategies to conserve species and habitats that are unable to adapt. Measures to reduce the impacts of other human pressures – which still exceed those of climate change in most cases – are also likely to help reduce the overall vulnerability of forest ecosystems to climate change. More radical measures for adapting forests and wildlife to climate change include modifying or newly creating habitats, translocating whole animal and plant communities and moving boundaries of protected areas.

significant numbers. It is especially pronounced in Africa, where it has serious implications for food security (FAO, 2009). Examples include elephants raiding crops, lions killing livestock, baboons stealing food, birds damaging crops, hippopotamuses threatening fisherfolk or crocodiles attacking villagers when they collect water from a river.

Efforts to manage the problem have evoked considerable ingenuity, such as the use of cloths, projectiles or bricks impregnated with chilli pepper to serve as a repellent to crop-raiding elephants. Because of continuing human population growth, economic growth and expansion of human settlement, and a likely amplification of competition for natural habitats and resources as a result of climate change (see Box above), the incidence of human-wildlife conflict will probably increase in the foreseeable future, requiring ever more attention.

FAO, in collaboration with the International Cooperation Centre of Agricultural Research for Development (CIRAD), the World Wide Fund for Nature (WWF), the Zimbabwean Parks and Wildlife Management Authority and other organizations working in southern Africa, has developed a practical toolkit to assist rural communities in choosing the best possible options to prevent or mitigate human-wildlife conflicts (see Le Bel, Mapuvire and Czudek, this issue).

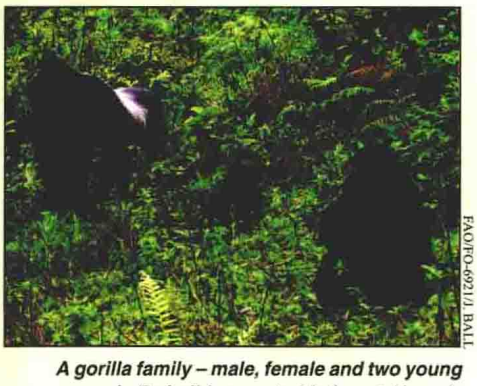
ECOTOURISM – OPPORTUNITIES AND COSTS

Ecotourism has the potential to make a substantial positive contribution to the management and conservation of forests and forest wildlife (Williamson, 2006). Ecotourism destinations are generally in rural areas, which tend to be poorer than urban areas and to offer fewer employment opportunities. In such areas, ecotourism offers potential to provide income and employment for local people (Box below).

The International Ecotourism Society (www.ecotourism.org) defines ecotourism as "responsible travel to natural areas that conserves the environment and improves the well-being of local people". It can be distinguished from general nature tourism by its emphasis on conservation, education, traveller responsibility and active community participation. Contemporary ecotourism encompasses a diversity of experiences ranging from luxury safaris for wealthy nature lovers, with plush accomodation

Ecotourism contributes to gorilla conservation and livelihood generation in Uganda

In Uganda, where approximately 60 percent of the estimated 720 remaining mountain gorillas live, the annual income from gorilla viewing treks increased from US$113 million to $400 million from 2000 to 2007, an increase of 36 percent per year (Rukundo, 2009). Uganda receives about 20 000 visitors per year to view the apes. In 2007, visitor permits brought in US$4.7 million; hotels and services created 70 000 jobs; and revenue sharing funded 181 community projects – for clinics, schools, community centres, bridges, roads, maize mills and water access. Tourism now tops Uganda's foreign exchange earnings (Redmond, Mapesa, and Rwetsiba, 2008).



FAO/FO-6921/J. BALL

A gorilla family – male, female and two young – in Bwindi-Impenetrable forest, Uganda

and motorized game viewing, to wilderness treks in which the participants travel by foot on rugged trails and sleep on the ground in small tents.

Eagles, McCool and Haynes (2002) identified three clusters of potential benefits from ecotourism:

- ***enhancing economic opportunity***, for example, through increased employment, increased income, commercial opportunities for local suppliers, local manufacture of goods, new markets and foreign exchange, improved living standards, tax revenues, new skills and funding for protected areas and communities;
- ***protecting the natural and cultural heritage***, which conserves biodiversity at the level of genes, species and ecosystems, brings out the value of biodiversity, propagates conservation values and contributes to protected area financing;
- ***enhancing the quality of life*** by promoting aesthetic, ethical and spiritual values, providing environmental education, improving intercultural understanding, stimulating the development of arts and crafts and raising the educational level of local people, thus helping them to value their own culture and environment.

Ecotourism unequivocally generates benefits for a range of stakeholders, for example national and international ecotourism businesses, operators of hotels and eating places, local food producers, local artisans and producers of curios for tourists, local tourist guides, and people and companies working in transport (from national and international airlines to local drivers) – not to forget the national and international tourists who benefit from the intrinsic value of the forest experience.

Ecotourism, however, also entails costs – economic, social and environmental.

Economic costs are generated by increased demand for expanded public services, such as road, health and security infrastructure, which results from the presence of large numbers of visitors. The cost of protected area management may also increase by the need to service, manage and monitor tourism, but this in general can be compensated through levying park fees and additional income opportunities.

Social costs arise, for example, from excessive numbers of visitors who interfere with local activities; insufficient attention to the needs and required involvement of local people by governments that prioritize short-term economic gain from tourists; denial of access to resources in protected areas that have traditionally been important to local people; and large gaps in wealth between tourists and local people, which can result in exploitation of local people and indifference to their needs and concerns.

Tourism can result in many different forms of damage to the environment, plants and animals alike, such as disruption of ecosystems by infrastructure development, soil erosion, habitat degradation, water pollution, disturbance, injury and contagion with potentially harmful pathogens/diseases.

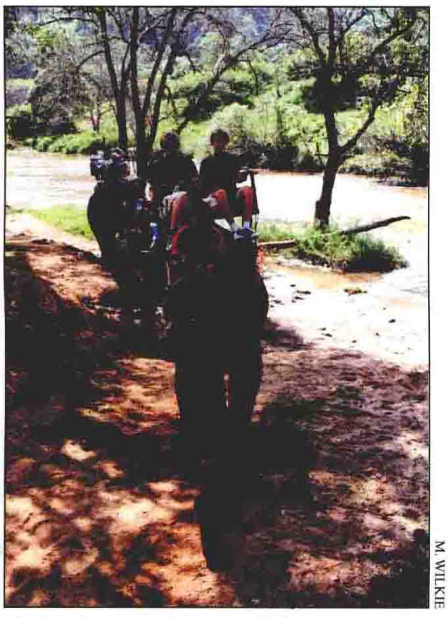
It is indeed at the centre of the concept of ecotourism that such detrimental impacts are avoided. If nature tourism activities are not based on the following principles, they do not qualify as ecotourism:

- conscientious, low-impact visitor behaviour;
- sensitivity towards, and appreciation of, local cultures and biodiversity;
- support for local conservation efforts;
- sustainable benefits to local communities;
- local participation in decision-making;
- educational components for both travellers and local communities.

None of the above-mentioned problems are insuperable, and if ecotourism is well planned and managed it can often make a substantial contribution to the sustainable financing of a protected area and provide multiple socio-economic and ecological benefits. The prerequisites include solid marketing strategies to create access to sufficient numbers of clients in an increasingly competitive market. Making good use of tourist revenues by reinvesting them into improved management actions can contribute markedly to

Contemporary ecotourism encompasses a diversity of experiences ranging from luxury safaris to rugged wilderness treks; shown, horseback safari in Botswana

K. MCLEOD



M. WILKIE

Ecotourism generates economic benefits for local guides and tour operators, and cultural and spiritual benefits for the national and international tourists who enjoy the experience (Thailand)

the long-term integrity of a protected area (see article by Bien in this issue). Particular efforts need to be made to ensure that economic benefits of tourism reach the poor (UNWTO and SNV, 2010).

Not all rural areas, however, are suitable for ecotourism activities. Planners should evaluate carefully whether ecotourism is an option in a given location and what kind is most promising by considering special features, existing infrastructure and past experiences. Heavy dependence on tourism revenues can also be risky because of fluctuations in visitor numbers as a result of economic and political change, social unrest or environmental disasters. Diversification of economic activities, for example by promoting non-wood forest products, is therefore advisable to avoid overdependence on tourism.

INTEGRATED CONSERVATION AND DEVELOPMENT – DOES IT ADDRESS THE PROBLEMS?

One approach for responding to the threats faced by forests and associated wildlife involves integrating the management of natural resources with economic development to improve the quality of life of rural people. Such integrated conservation and development projects (ICDPs) have been given a variety of designations, for example, "people-centred conservation and development", "eco-development", "grassroots conservation" and "community-based natural resource management".

Community-based conservation can be a significant complement to conventional government-led protected area management and enforcement activities, especially in developing countries with limited budgets. When local people are involved in and benefit from the management of natural resources, they are more likely to support conservation efforts.

In adopting an ICDP approach, however, it is important to avoid certain assumptions. It should not be assumed, for example, that local people and their livelihood practices constitute the main threat to the biodiversity resources of a given area, since outside agents, such as commercial bushmeat hunters, may be a bigger threat. New livelihood options may not actually reduce human pressures on biodiversity if they are seen by the community as additional opportunities rather than alternatives to exploiting biodiversity. And the capacity of traditional approaches (e.g. providing jobs and opportunities for local people to produce goods and services for tourists) to generate sustainable benefits for local people should not be overlooked.

Reviewing ICDPs, Schreckenberg, Luttrell and Moss (2006) recognized "the need to address concerns that the benefits from participatory forest management may not be sufficient to cover the costs imposed on poor communities, which raises doubts about the longer term viability of the approach". The costs could include, for example, the disruption or curtailment of established patterns of resource use by local people.

Although the challenges remain high and success depends on the context, the integration of conservation and development is standard practice today. New FAO projects in Central Africa and Mongolia, for example, are being designed with community wildlife management components. Some positive examples are described in other articles in this issue (see Alieu; Khatri; and Rawee Thaworn, Kelley and Yasmi). Increasingly, communities are demanding the rights to manage their natural resources. Some governments are responding by making the necessary policy and legislative changes to help communities receive the benefits from such transfer of responsibility. Such devolution, however, also implies a need to share the costs (see article by de Koning).

CONCLUSIONS

Since time immemorial people have benefited in a diversity of ways from forests and forest wildlife, but in the contemporary world much damage has been done to both forests and wildlife through unsustainable resource use, which is also often illegal. Unless measures are taken to curtail unsustainable and/or illegal resource use, the benefits from forest and wildlife will continue to dwindle, in many cases to the detriment of those who are already poor.

Experience suggests that breaking the supply chain is an effective way of reducing illegal and unsustainable exploitation of forest wildlife, but additional measures urgently need to be applied. These include improved law enforcement capacity, public awareness and education campaigns and generating benefits for local communities through employment and improved economic opportunities, such as in providing goods (e.g. local arts and crafts) and services (e.g. tourist guide services). Full involvement of local people in managing and benefiting from the products and services delivered by forests and wildlife is crucial for the sustainable conservation of these vital resources. ◆

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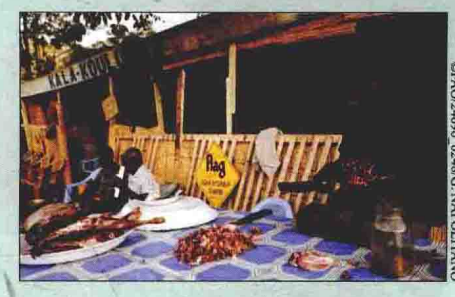
One health – one destiny: appreciating the connectivity of health among ecosystems, wildlife, livestock and people

S.H. Newman, J. Slingenbergh and J. Lubroth



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FAO's current work in animal health addresses emerging infectious diseases at the animal-human-ecosystem interface.

The concept of addressing the connectivity between animal and human health is not new. In the 1960s, Calvin Schwabe, a veterinary epidemiologist and parasitologist in the United States, coined the expression "One Medicine" calling for a unified approach between veterinary and human medicine to combat zoonotic diseases – those diseases transmitted from animals to humans. Building on this concept, the Wildlife Conservation Society developed the term "One World, One Health™" and established, with the participation of FAO, the Manhattan Principles, which focus on preventing the emergence and re-emergence of diseases in the modern globalized world. The concept has continued to evolve; in 2010 FAO and international partners began to use the term "One Health" to express the linkages between animal and human health and their dependence on ecological or environmental health. It has become clear that the emergence of infectious diseases, while complex in nature, is driven to some extent by ecosystem changes associated with growing global human population, increasing demands for animal protein, unsustainable natural resource consumption, loss of biodiversity and habitat fragmentation, which lead to the loss of ecosystem services. More intensive farming systems are also fertile breeding grounds for pathogens that can infect multiple hosts including livestock, wildlife and people.

Natural systems such as forests, grasslands, wetlands and oceans provide ecological services that all life depends on. Forests, for example, help purify air and water and mitigate greenhouse gas buildup in the atmosphere. Alteration in natural systems – whether in a rural, modified peri-urban or urban setting – results in decreased ecosystem services, leading to disease and increased health risks for all of the species in the ecosystem, including plants, wildlife, livestock and humans. Climate change and loss of ecosystem resilience, furthermore, are paving the road for the emergence of new conservation and health challenges.

Approximately 70 percent of the 1.5 billion poorest people depend on livestock and natural resources. Poor sanitary and biosecurity conditions, in densely populated human-dominated, modified multispecies environments, provide opportunities for pathogens to more easily transit among potential host species. Subsistence bushmeat consumption, wildlife farming and wildlife trade bring people into contact with a great diversity of forest-dwelling birds, mammals and reptiles, exposing people to novel pathogens.

In a globalized world where pathogens can travel the world in a day, emerging diseases, especially those affecting humans, livestock or wildlife, can have large negative socio-economic implications. Impacts can be severe for public health, livelihoods and food security, as well as for international trade and tourism.

Since 2006, FAO has been a key partner in a series of interministerial conferences on animal, avian and pandemic influenza. The 2007 conference (New Delhi, India) addressed the larger issue of emerging infectious diseases at the animal-human-ecosystem interface. The Hanoi Declaration adopted at the 2010 conference reaffirmed that to be capable of addressing high-impact disease threats that arise at this interface (e.g. H5N1 highly pathogenic avian influenza and pandemic [H1N1] influenza), health systems require: international and regional cooperation, national political commitment, intersectoral collaboration, timely and transparent communication and capacity building. As part of the Food Chain Crisis Management Framework, FAO has recently developed a One Health programme to guide the implementation of FAO's work in animal health by drawing on expertise from many disciplines, including forestry, fisheries, natural resources and law.

Approximately 60 percent of emerging infectious diseases of humans are zoonotic. Of these, 70 percent originate from wildlife (often forest dwelling). These pathogens and diseases include HIV/AIDS, Nipah, Hendra and West Nile viruses, as well as ebola, rabies, severe acute respiratory syndrome (SARS) and monkey pox. It is clear that the solution to the challenge of emerging infectious diseases relies on collaboration and integration of multiple disciplines and partners including ministries of forestry and environment, agriculture and health. While more science is necessary to understand the complex relationships among disease emergence, transmission and ecological systems, science alone is not the solution. It is also essential to address the social and cultural dimensions of societies where issues concerning livestock, wildlife, humans and entire ecosystems intersect. Changes in thinking and behaviour must be encouraged, and future decision-making must be cognizant of the repercussions of poor natural resource management and their implications for civilization.

Scott H. Newman is Wildlife Unit Coordinator and **Jan Slingenbergh** is Senior Animal Health Officer, Emergency Prevention System for Transboundary Animal and Plant Pests and Diseases (EMPRES), Animal Production and Health Division, FAO, Rome.
Juan Lubroth is Chief of the Animal Health Service, Animal Production and Health Division, FAO, Rome.

Human-Wildlife Conflict Toolkit: comprehensive solutions for farmers and communities

S. Le Bel, G. Mapuvire and R. Czudek

A new toolkit suggests strategies and practical tips to make the increasingly tight cohabitation between people and wildlife safer.

Human-wildlife conflict is a growing global problem. It is not restricted to a particular geographical region or climate condition, but is common to all areas where wildlife and human populations coexist and share limited resources (Distefano, 2004). The February 2010 meeting of the Southern African Development Community (SADC) Technical Committee on Wildlife pronounced that wild animals represent the number-one problem for Africa's rural populations in terms of both personal security and economic loss, and the situation is getting worse. The population of the African continent, which has the world's largest reserves of wildlife, is expected to double from 0.8 billion to 1.8 billion people in the next 40 years (ILRI, 2009). Africans will not only be packing more tightly into cities; they and their crops will also be increasingly pressing up against territory populated by wildlife.

Human-wildlife conflict is a problem for farmers, and ultimately it must be tackled by the farmers themselves. However, although numerous research articles, reports, recommendations, guidelines and training manuals have been produced in recent years to address the problem, most have been aimed at technical support agencies, government wildlife departments, and conservation and/or development oriented non-governmental organizations (NGOs). Few tools have been developed for and adopted by rural farmers and communities.

In southern Africa, FAO and Bio-Hub, a consortium of conservation agencies – the International Cooperation Centre of Agricultural Research for Development (CIRAD), the Worldwide Fund for Nature (WWF), the African Wildlife Foundation (AWF) and the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) – have teamed up to assist local populations in dealing with human-wildlife conflict. With FAO support, Bio-Hub held a workshop in December 2008 to brainstorm ways of developing and implementing a community- and farmer-based, practically oriented approach to human-wildlife conflict mitigation. A tangible result has been the Human-Wildlife Conflict Toolkit, released in 2010 and currently being tested in southern and western Africa.

The toolkit is designed for use by extensionists working with local communities. Four four-day "training of trainers" workshops were organized in Zimbabwe between December 2009 and July 2010, involving extensionists, researchers, conservationists, private-sector representatives, workers from government and NGOs, local game scouts, village heads and other traditional leaders. The workshops were publicized through the Community-Based Natural Resource Management Network (www.cbnrm.net). In total, more than 200 toolkit prototypes were distributed during the workshops for preliminary field tests with local communities in Botswana, Gabon, Malawi, Mozambique, South Africa, Zambia and Zimbabwe.

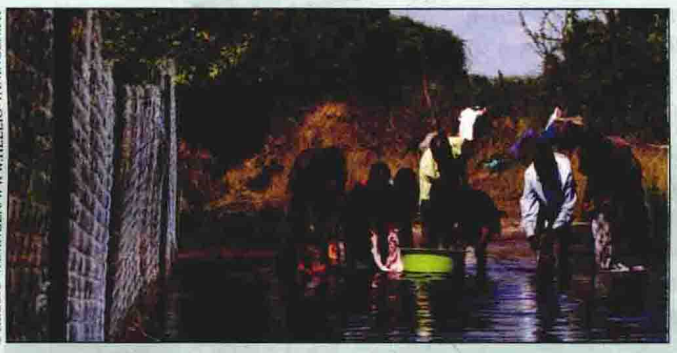
IGF/P. CHARDONNET

Human-wildlife conflict is a growing problem where wildlife and human populations exist at close quarters: an elephant foraging in a garden

CIRAD

The human-wildlife conflict toolkit

Sébastien Le Bel is the International Cooperation Centre of Agricultural Research for Development (CIRAD) Representative in Zimbabwe, Harare.
George Mapuvire is Bio-Hub Coordinator, c/o CIRAD, Harare, Zimbabwe.
Rene Czudek is Forestry Officer in the FAO Subregional Office for Southern Africa, Harare, Zimbabwe.



Fencing protects a watering point from Nile crocodile

Villagers scare wild animals with fire

The toolkit produced by Bio-Hub and FAO recognizes some of the challenges and gaps in implementing mitigation measures. It acknowledges that human-wildlife conflict is multifaceted and that some of the mitigation practices advanced to date are ineffective on their own over time. Therefore the toolkit presents tools and practices that can have great success when used in combination. It is designed not only to help protect people, their livestock and their crops from wild animals but, just as important, to safeguard wild animals from people.

The materials help communities identify control options in five colour-coded categories:

- awareness raising (blue);
- access prevention (green);
- translocation (brown);
- driving animals away (yellow);
- as a last resort, lethal control (red).

A booklet entitled "Individual animals and index to the tools" provides descriptions, photos and drawings of the 16 main problem animals, their typical behaviours and their spoor (tracks). Solutions vary according to whether the need is to protect people, villages, livestock, water or crops. The index identifies (by number) solutions in each of the colour categories, in columns according to what it is the user needs to protect. Stencils direct users to the right column of solutions for their needs. Finally, a booklet of tools describes each colour-coded and numbered option in detail, including the technique, its advantages and disadvantages and also its cost effectiveness.

Some examples of solutions that may be effective in certain situations include:

- chasing elephants away from field crops with the trademarked "Mhiripiri Bomber"©, a plastic gun that fires ping-pong balls containing a highly concentrated chilli solution at 50 m range (Le Bel *et al.*, 2010);
- using enclosures to protect fishermen or villagers from Nile crocodile – the animal causing the most human deaths in Zambia and Mozambique – at watering points;
- driving away crop-raiding hippopotamuses by shining a strong light in their eyes;
- investing in a guard dog or donkey to warn of the approach of predators and keep them away.

As a general strategy, the toolkit emphasizes conflict prevention through advance land-use planning, for example ensuring that crops are planted where they are less accessible to problem animals, and providing corridors for wildlife to go to and from water. Awareness raising and training in how people can live safely alongside wild animals also constitute a fundamental set of solutions.

The review and development of the toolkit is ongoing. A template for providing feedback and sharing additional strategies is being distributed through the workshop participants, and the toolkit is designed in such a way that new information can be inserted. Planned activities include the addition of CD-ROMs to the toolkit and the creation of an online version.

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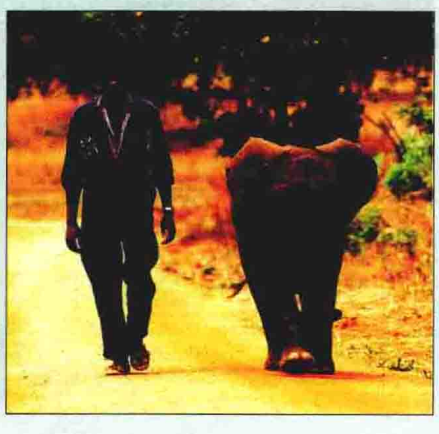
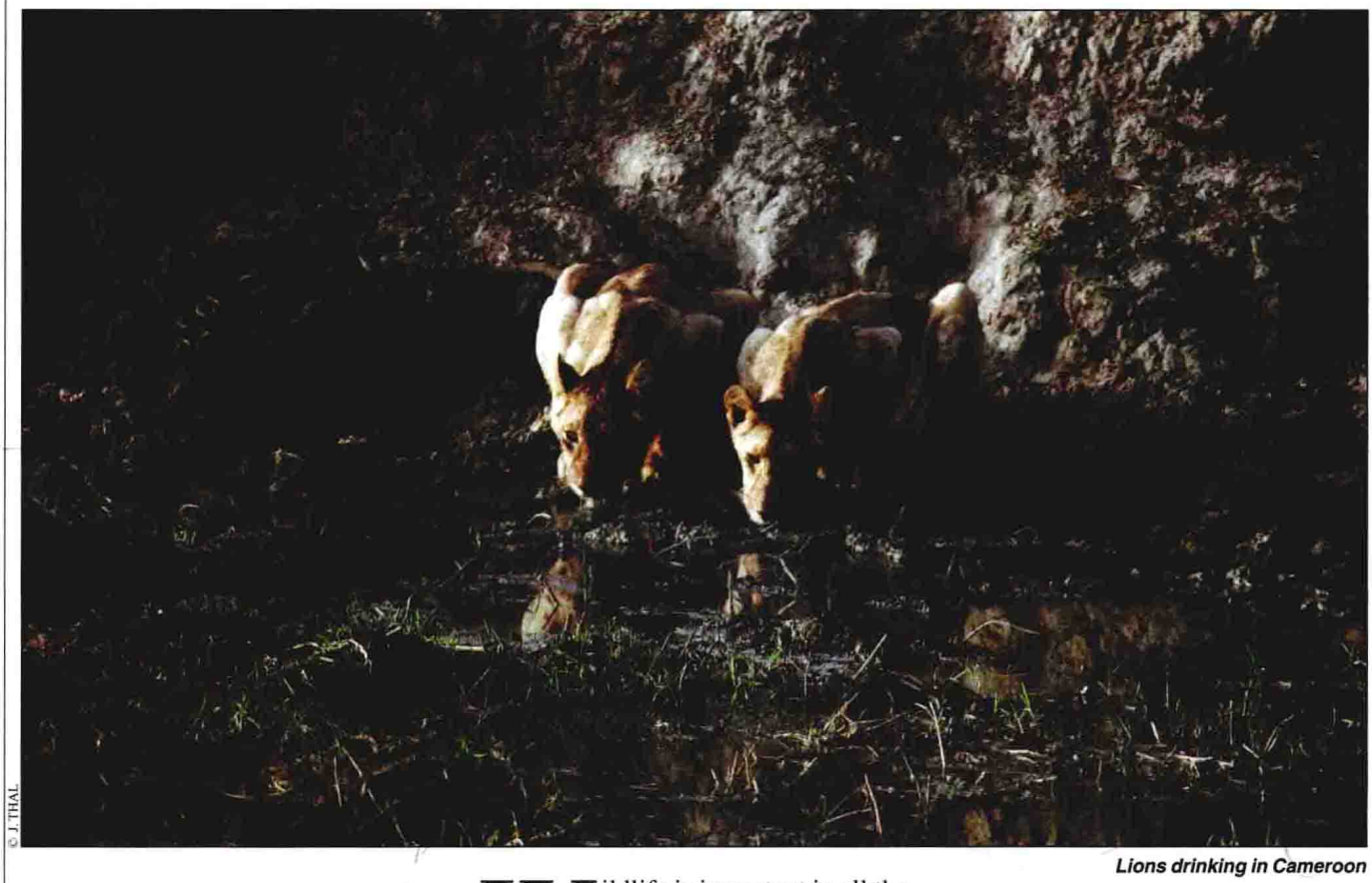


The hope is that in the long run, people and wildlife can live together and walk side by side

Cameroon's wildlife legislation: local custom versus legal conception

S. Nguiffo and M. Talla

To be effective, wildlife law needs to recognize local uses of wildlife; to take into account the contribution of traditional customs and practices to sustainable wildlife resource management; and to harmonize conservation and social goals.



Lions drinking in Cameroon

Samuel Nguiffo is the Director of the Centre pour l'Environnement et le Développement, a non-governmental organization based in Yaoundé, Cameroon.
Marius Talla is an independent researcher on wildlife conservation and sustainable development related to natural resources in the Congo Basin, based in Yaoundé, Cameroon.

Wildlife is important in all the countries of the Congo Basin, although local communities and the State may view it in different ways. At the local level it is used for food and for medicinal and cultural purposes (especially in rituals and as emblems of traditional dignitaries), and it is traded through barter or commerce. The State adopts legislation intended to protect wildlife and makes all decisions related to its management, protection and use. The same legislation, however, excludes communities from wildlife management and this could paradoxically have negative effects for wildlife conservation.

The legal framework for wildlife in the Congo Basin countries had its origin in the colonial era. A decree of 18 November 1947 regulated hunting in the African territories coming under the French Ministry of Overseas Territories. This legislation was inspired by the London Convention (19 May 1900) on the protection of animals in Africa and by the Convention Relative to the Preservation of Fauna and Flora in Their Natural State (8 November 1933), also adopted in London (see FAO, 2006). These documents were intended to ensure recognition of then-new uses of

wildlife (especially scientific, touristic and decorative) that were introduced into the region with colonization, and to reconcile the many uses of wildlife resources.

Since independence, the law of Cameroon has continued along the same lines, resulting in a situation that is sometimes schizophrenic: senior officials accustomed to consuming bushmeat are in the position of passing and supervising the application of laws that are contrary to their culture.

In these circumstances, the system tends to be ineffective. Infringements of wildlife legislation are numerous, both through an increase in the bushmeat trade in large cities and through international trade in live protected species or trophies. Examples include the illegal export of four gorillas to a Malaysian zoo, which were sent back to South Africa and finally returned to Cameroon (IFAW, 2006); the export of 1 200 parrots with false CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) certificates (*Le Jour*, 2010); and the seizure in Hong Kong of 3.9 tonnes of ivory originating in Cameroon (Afrique en ligne, 2010). Moreover, restaurants in Yaoundé and Douala – and indeed Cameroonian restaurants in European cites – are still serving dishes based on bushmeat, which often comes from illegal trade. Global Forest Watch (2000) showed that most infringements of forest law in Cameroon's Eastern Province concerned wildlife, often involving farmers. Such activities persist despite political statements advocating increased severity in dealing with poachers.

This article analyses why the written law is inappropriate for ensuring optimal protection for wildlife in Cameroon. Some of the conclusions may be extrapolated to other countries in the Congo Basin, where authoritarian management of wildlife is the norm (e.g. Mukerjee, 2009).

Effective wildlife management is hampered by a combination of three main factors: the law's failure to recognize adequately the contribution of local customs to sustainable wildlife resource management; the outlawing of many traditional and local practices; and the lack of clarity in the messages conveyed by the law.

RESTRICTED CONTRIBUTION OF LOCAL COMMUNITIES

In Cameroon, wildlife is governed by Law 94-01 of 19 January 1994, which lays down a legal code for forests, wildlife and fisheries. Supplementing this law, Decree 95-466-PM of 20 July 1995 specifies how the code is to be applied.

Traditional methods of wildlife management were based on subsistence aims and cultural values and were not necessarily destructive of wildlife. The current law, however, privileges non-traditional practices: wildlife safaris, scientific research, sport or trophy hunting and wildlife as a source of income for the State. The objective of species conservation is clearly stated, and the law aims to achieve this by limiting, or indeed forbidding, extraction of the most threatened species, banning hunting in certain zones and prohibiting certain hunting methods.

This legislation was formulated without the people's participation and without taking the rights and interests of local communities into sufficient account. The legislation was thus deprived of

Cameroon's wildlife law fails to recognize adequately the contribution of local customs to sustainable wildlife resource management (a Cameroonian villager hangs an antelope)

CIFOR/E. DOUNIAS