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Monitoring natural resources in protected areas:

developing biodiversity indicators in and around protected areas in East- and West Africa and the Middle East

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Key messages

- The Convention on Biological Diversity and other conventions recommend the development of indicators as a key tool for monitoring the implementation of National Biodiversity Strategies and Action Plans for reporting at global, national and sub-national levels and as part of the National Development Plans of each country.
- This policy brief focuses on gazetted protected areas in Uganda (Mount Elgon & Queen Elizabeth Biosphere Reserves (BR)), Rwanda (Nyungwe National Park (NP)), Ghana (Mole NP), Tanzania (Jozani Chwaka Bay BR & Lake Manyara NP) and Palestine (Wadi Qana protected area).
- These protected areas possess natural resources that include water and fishes, firewood, wildlife. The population in and around the protected areas benefit directly or indirectly from these resources, which can result into conflicts if not well managed.
- The development of Indicators that use data to measure the conditions of ecosystem services, drivers of change or human well-being is essen-

tial for an improved formulation of policies in the provision of ecosystem services to the population; hence addressing the African Union-constitutive act and the Sustainable Development Goals.



Fig. 1. Firewood collection in the Cyamudongo forest, Nyungwe National Park

Human-wildlife conflict in fringe communities of protected areas

The frequency and severity of human-wildlife conflicts indicates the rate of loss of wildlife species and human livelihoods. Farmers lose a lot of their products to crop raiding. People hunt wildlife giving crop vermin control as a pretext.

Mole National Park, Ghana

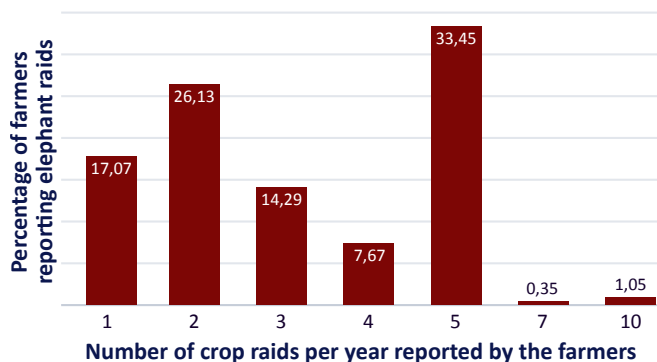


Fig. 2. Number of crop raids by elephants in Mole National Park, Ghana ¹

Jozani-Chwaka Bay BR, Tanzania



Fig. 3. Zanzibar red colobus monkey often blamed for farm crop raiding in the buffer zones of the park²

Nyungwe National Park, Rwanda

Farmers report crop raiding, involving chimpanzees and baboons.³

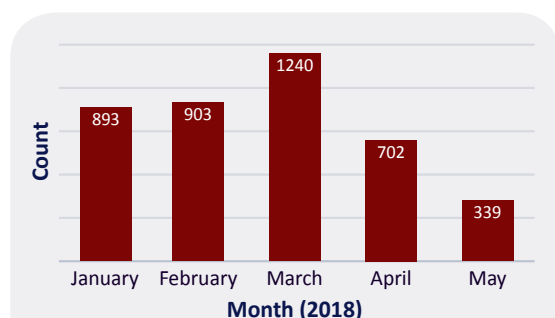


Fig. 4. Number of snares removed by park services in Nyungwe NP, Jan - May 2018

Farmers in the fringe communities around the parks seem not to achieve the results they want although they are using control methods. Efforts by the park authorities could help but cannot cover all affected communities due to resource constraint.



Revenge killing remains the order of the day for most aggrieved farmers.



Reducing the number of these human-wildlife conflicts will save biodiversity and improve the economic status of farmers leading to sustainable human development.

Fuelwood exploitation in and around protected areas

More than 90% of surrounding communities use fuelwood as a source of energy (firewood or charcoal). Fuelwood is used for domestic and commercial use (schools, restaurants, army camps, etc.). Decrease of fuelwood in buffer zones forces communities to encroach protected areas. Initiatives on energy saving have not yet achieved desired results. Example: improved cooking stoves are not effectively used in households leading to unclear effects with regards to firewood exploitation.

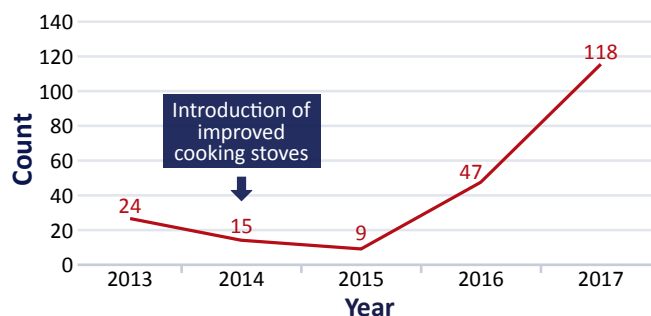


Fig. 5. Count of firewood collection in the Cyamudongo forest, Nyungwe NP between 2013 and 2017. Improved cooking stoves were disseminated in households since 2014

Freshwater resources in and around protected areas

Protected areas support freshwater resources that are important for human wellbeing but currently threatened by human activities. Case studies use freshwater (biodiversity and environmental) indicators to illustrate the link between the resources and human wellbeing.

Fish catches on **lakes Nyamusingiri and Kyasanduka in Queen Elisabeth BR** have declined to 22% and 30% of highest observed catches respectively, an indication of unsustainable fishing.

On **Lake Edward**, catch rates for exploited fish species are also declining and are currently (2017) at 42.9% of the highest observed levels in 2006.

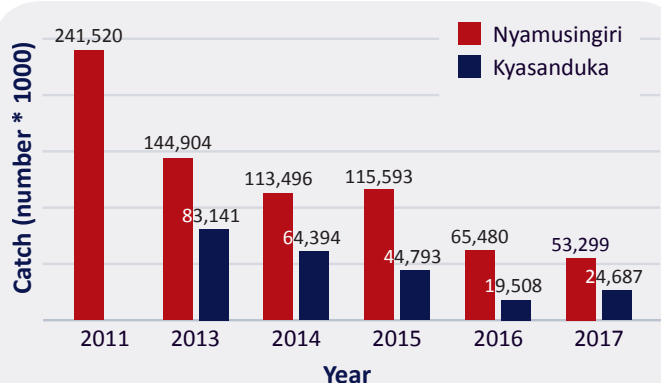


Fig. 6. Annual catch (number of fish) for tilapias in lakes Nyamusingiri and Kyasanduka⁴



Fig. 7. Annual catch rates (catch (kg)/boat/day) for exploited fishes on Lake Edward⁴

There is unsustainable exploitation of *Oreochromis esculentus*, a critically endangered fish species, in **Lake Manyara** (Northern Tanzania).

Another critically endangered fish species (*Labeo victorianus*, Ningu) found in Ugandan rivers **downstream the Mount Elgon** area is threatened by declining water quality and overfishing.



Fig. 8. *Labeo victorianus*

Water quality is declining in the buffer zone of Mount Elgon BR, Uganda due to human activities such as farming and settlements. An analysis of turbidity demonstrates significant differences between the protected areas and their buffer areas.

A natural pond in Palestine where water collects in the winter until the beginning of the summer, a unique spot for cultural heritage and ecotourism in Palestine.

The created ecosystem supports endangered species as the Syrian spade-footed toad (*Pelobates syriacus*) which is already extirpated in the Jordan and found nowhere else in the West Bank and the water crowfoot (*Ranunculus peltatus*), a rare flowering plant. The protection of this pond can benefit the endangered Palestinian heritage and offer ecotourism opportunities while conserving biodiversity.⁵



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Fig. 9 & 10. *Pelobates syriacus* and *Ranunculus peltatus*

Action points

- Institutions managing natural resources and governments should continuously collect data that will be used in the development of indicators (biological, socio-economic and cultural).
- Development of biodiversity indicators should be done in a consultative and participatory manner involving policy makers, implementing authorities and the population.
- Governments should facilitate multi-sectoral committees that will review the relevance and use of the indicators for their National Development Plans.

Recommendations

Human-wildlife conflicts

- Promote evidence based policies to reduce the incidence of human wildlife conflicts.
- Reduce crop raiding through a participatory approach, involving farmers and park managers.
- Train farmers on low cost farmer-led mitigation measures to reduce human-wildlife conflicts.
- Support the sustainable use and management of natural resources.

Fresh-water resources

- Promote sustainable land use practices in areas adjacent to protected areas or buffer zones to maintain good water quality.
- Promote sustainable fishing practices through enforcement of existing regulations to avoid overfishing.

- Mainstream freshwater biodiversity indicators into local government and national plans to initiate mitigation measures.
- Focus on aquatic biodiversity in the management plans of protected areas.

Fuelwood exploitation

- Encourage the use of efficient cooking stoves through provision, awareness and training, adoption and monitoring.
- Raise awareness about tree planting and increase community woodlots.

Protected areas

- Establish Community Resources Management Areas for ecotourism, sport hunting, fishing, beekeeping, etc.
- Enhance law enforcement in protected areas.

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