

COMMENT

THEMATIC SECTION

Tradable Rights in
Conservation

Rights to trade for species conservation: exploring the issue of the radiated tortoise in Madagascar

The trade ban on species listed as critically endangered by the International Union for the Conservation of Nature (IUCN) Red List may be counter-productive, acting as a stimulus to illegal markets rather than a deterrent (Dickson 2008; Roe 2008; Abensperg-Traun 2009). Since illegal markets cannot have legal property rights, there is no basis for any form of sustainable harvesting based on property rights. Using the Malagasy radiated tortoise (*Astrochelys radiata*) as an example of a species that is threatened by domestic and international trade, we argue that legalizing the international trade could, under certain circumstances, provide the financial incentives that might reduce the domestic trade and subsistence harvest. This critically-endangered species may be more effectively conserved by assigning trading rights to local communities, rather than demanding a trade ban that cannot be enforced.

The assumptions and steps required to achieve this goal would be:

- Assign local human communities rights for sustainable harvest for income generation.
- Educate communities that the income through legal international trade exceeds the income achieved through illegal international trade, as well as providing domestic consumption benefits.
- Streamline the marketing chain, to ensure that the profit for the communities achieved from legal trade exceeds the profit from illegal trade by orders of magnitude.
- Promote and officially enforce exclusive harvest by the communities and fair distribution of the income.
- Control of the trade requires unambiguous permanent labels for individual animals, so that each individual on the market can be identified and tracked through the market chain.

The economic situation

Madagascar is ranked at 155 of the 187 countries covered by the United Nations Development Programme's Human Development Index (<http://hdr.undp.org/en/content/human-development-index-hdi>), with 81% of the human population considered to live in extreme poverty. Within Madagascar, the sub-arid south-western region represents the poorest part of the country. During lean seasons, people often rely heavily on natural forest products (SuLaMa 2011; R. Neudert *et al.* unpublished data 2013).

The animal situation

The radiated tortoise (*Astrochelys radiata*) has been facing a rapid decline for some time (Nussbaum & Raxworthy 2000; O'Brien *et al.* 2003), with a reduction of 47% of the population between 2000 and 2011 (Rafelarisoa *et al.* 2013). Due to its rapid decline, the species is classified as critically endangered by the IUCN Red List (Leuteritz & Rioux Paquette 2008). Even though it is protected under Malagasy and international law, exploitation has increased in recent years. The species is used locally as bushmeat (Walker & Rafelarisoa 2012). Several tonnes of dried tortoise meat are confiscated each year, corresponding to up to 50000 tortoises at a given time (Andriamarohasina 2011). Locally, tortoises are sold for US\$ 2.5–6.5. In addition, tortoises are traded in large quantities internationally. Animals sell for *c.* US\$ 200 in Asia and *c.* US\$ 5000 in the European pet markets (Todd 2011).

Alleviation of the problem

Tortoise populations could be managed by local communities (under a community-based natural resource management [CBNRM] scheme) as part of the *BioTrade* scheme (Abensperg-Traun 2009; <http://www.biotrade.org/index.asp>). Each community could be assigned an annual quota of animals for legal trade and export. Animals for trade could be marked individually via a subcutaneous microchip (passive integrated transponder [PIT] tag; Nussbaum & Raxworthy 2000) at a cost of *c.* US\$ 6 per animal. The PIT tag numbers assigned to each community could be managed and publicized by the relevant national CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) authority. This would enable each individual tortoise to be tracked, and provide the customer with a fully transparent record of origin for each animal, without the need for sophisticated analyses (unlike the problems associated with the trade in species' parts, such as wood, skins or ivory). The animals could be marketed by an international non-governmental organization (NGO), thus reducing the need for middlemen and enabling local communities to receive a greater share of the revenue. Since no investment is required if animals are collected from their natural habitat, protection of the animals simultaneously implies protection of its original habitat. It is vital to acknowledge that, under present arrangements, poaching gangs are so aggressive in their

approach that communities are powerless to stop their activity, and the development of legal trade needs the international customer to refrain from buying untagged animals. A legal trade in tagged animals should achieve better prices, thus compromising the profitability of the illegal trade. Despite these and other problems associated with CBNRM (see for example Dressler *et al.* 2010; Sommerville *et al.* 2010; Pollini & Lassoie 2011), market dynamics (Thorbjarnarson 1999) or insufficient knowledge (Smith *et al.* 2011), the marketing seems manageable and community-based management should thus promote better conservation (Roe 2008; McGuire *et al.* 2013; Tlustý *et al.* 2013).

Legalizing the trade of *A. radiata* as a conservation measure had been suggested before (Nussbaum and Raxworthy 2000; Lingard *et al.* 2003; Ganzhorn 2011), but has not been adopted by the conservation community due to the known problems with CBNRM. Yet, since the conservation measures currently in place do not seem to have impacted illegal activity and conservation over the last decades, it may be time to reconsider such conventional conservation approaches (Berkes 2007; Rissman 2013).

Acknowledgements

We thank the reviewers for their constructive comments.

References

- Abensperg-Traun, M. (2009) CITES, sustainable use of wild species and incentive-driven conservation in developing countries, with an emphasis on southern Africa. *Biological Conservation* **142**: 948–963.
- Andriamarohasina, S. (2011) Les gendarmes ont découvert plus de huit tonnes de viande de tortue fumée. *L'Express de Madagascar*, Antananarivo: 7 October 2011.
- Berkes, F. (2007) Community-based conservation in a globalized world. *Proceedings of the National Academy of Sciences USA* **104**: 15188–15193.
- Dickson, B. (2008) CITES and the livelihoods of the poor. *Oryx* **42**: 548–553.
- Dressler, W., Buscher, B., Schoon, M., Brockington, D., Hayes, T., Kull, C.A., McCarthy, J. & Shrestha, K. (2010) From hope to crisis and back again? A critical history of the global CBNRM narrative. *Environmental Conservation* **37**: 5–15.
- Ganzhorn, J.U. (2011) Conservation through payments for an ecosystem service? *Madagascar Conservation and Development* **6**: 55–56.
- Leuteritz, T. & Rioux Paquette, S. (2008) *Astrochelys radiata*. In: The IUCN Red List of Threatened Species [www document]. URL <http://www.iucnredlist.org/details/9014/0>
- Lingard, M., Raharison, N., Rabakonandrianina, E., Rakotoarisoa, J.-A. & Elmqvist, T. (2003) The role of local taboos in conservation and management of species: the radiated tortoise in southern Madagascar. *Conservation and Society* **1**: 223–246.
- McGuire, S., Rafeliasoa, T.H., Randriamanantenasa, H., Randrianindrina, V.R.A., Shore, G.D. & Louis, E.E. (2013) Community outreach and education promoting the conservation of the radiated tortoise, *Astrochelys radiata*, in Lavavolo, Madagascar. *Chelonian Research Monographs* **6**: 197–104.
- Nussbaum, R.A. & Raxworthy, C.J. (2000) Commentary on conservation of 'Sokatra', the radiated tortoise (*Geochelone radiata*) of Madagascar. *Amphibian and Reptile Conservation* **2**: 6–14.
- O'Brien, S., Emahalala, E.R., Beard, V., Rakotondrainy, R.M., Reid, A., Raharisoa, V. & Coulson, T. (2003) Decline of the Madagascar radiated tortoise *Geochelone radiata* due to overexploitation. *Oryx* **37**: 338–343.
- Pollini, J. & Lassoie, J.P. (2011) Trapping farmer communities within global environmental regimes: the case of the GELOSE legislation in Madagascar. *Society and Natural Resources* **24**: 814–830.
- Rafeliasoa, T.H., Walker, R.C.J. & Louis, E.E. (2013) Decline in the range and population density of radiated tortoises, *Astrochelys radiata*, in southern Madagascar. *Chelonian Research Monographs* **6**: 86–92.
- Rissman, A.R. (2013) Rethinking property rights: comparative analysis of conservation easements for wildlife conservation. *Environmental Conservation* **40**: 222–230.
- Roe, D. (2008) Trading nature: a report, with case studies, on the contribution of wildlife trade management to sustainable livelihoods and the Millennium Development Goals. Report. TRAFFIC International Cambridge, UK and WWF International, Gland, Switzerland.
- Smith, M.J., Benitez-Diaz, H., Clemente-Munoz, M.A., Donaldson, J., Hutton, J.M., McGough, H.N., Medellin, R.A., Morgan, D.H.W., O'Cruidain, C., Oldfield, T.E.E., Schippmann, U. & Williams, R.J. (2011) Assessing the impacts of international trade on CITES-listed species: current practices and opportunities for scientific research. *Biological Conservation* **144**: 82–91.
- Sommerville, M., Milner-Gulland, E.J., Rahajaharison, M. & Jones, J.P.G. (2010) Impact of a community-based payment for environmental services intervention on forest use in Menabe, Madagascar. *Conservation Biology* **24**: 1488–1498.
- SuLaMa (2011) Projet SuLaMa: recherche participative pour appuyer la gestion durable des terres du Plateau Mahafaly dans le

- sud-ouest de Madagascar [www document]. URL http://www.sulama.de/files/rapport_marp_2011_small.pdf
- Thorbjarnarson, J. (1999) Crocodile tears and skins: International trade, economic constraints, and limits to the sustainable use of crocodilians. *Conservation Biology* 13: 465–470.
- Thlusty, M.F., Rhyne, A.L., Kaufman, L., Hutchins, M., Reid, G.M., Andrews, C., Boyle, P., Hemdal, J., McGilvray, F. & Dowd, S. (2013) Opportunities for public aquariums to increase the sustainability of the aquatic animal trade. *Zoo Biology* 32: 1–12.
- Todd, M. (2011) Trade in Malagasy reptiles and amphibians in Thailand. Report. TRAFFIC Southeast Asia [www document]. URL http://www.traffic.org/species-reports/traffic_species_reptiles30.pdf
- Walker, R.C.J. & Rafeliasoa, T.H. (2012) Distribution of radiated tortoise (*Astrochelys radiata*) bushmeat poaching effort. *Chelonian Conservation and Biology* 11: 223–226.
- JÖRG U. GANZHORN^{1*}, THEODORE MANJOAZY², OLINGA PÄPLOW¹, ROMA RANDRIANAVELONA³, JULIE H. RAZAFIMANAHAKA³, WILLIAM M. RONTO⁴, ESTER VOGT⁵, FRANK WÄTZOLD⁵ AND RYAN C. J. WALKER⁶
- ¹Animal Ecology and Conservation, Hamburg University, Martin-Luther-King Platz 3, 20146 Hamburg, Germany, ²Département Biologie Animale, Université d'Antananarivo, BP 906, Antananarivo 101, Madagascar, ³Faculté des Sciences, Université de Tuléar, Tuléar, Madagascar, ⁴Voakajy, Lot II F 14 P Bis A Andraisoro, BP 5181, 101 Antananarivo, Madagascar, ⁵Environmental Economics, Brandenburg University of Technology, Erich-Weinert-Strasse 1, 03046 Cottbus, Germany and ⁶Department of Environment, Earth and Ecosystems, Open University, Milton Keynes MK7 6AA, UK and Nautilus Ecology, Oak House, Pond Lane, Greetham, Rutland LE15 7NW, UK

*Correspondence: Jörg U. Ganzhorn e-mail: ganzhorn@zoologie.uni-hamburg.de