



Artigo original | Original article

Ethics and Biodiversity: theoretical framework of its disciplinary relevance for the PALOP countries

Carlos Almeida Pereira^{1, *}

¹ CIBIO/InBIO, Centro de Investigação em Biodiversidade e Recursos Genéticos, Laboratório Associado, Universidade do Porto, Campus Agrário de Vairão, 4485-661 Vairão, Portugal

*Corresponding author e-mail: carlos.pereira@cibio.up.pt

RESUMO

Não obstante a sua opulência em termos de diversidade biológica, o continente africano enfrenta sérios riscos no contexto de uma crise global ambiental. Cenários de mitigação dos impactos por via de estratégias de investigação científica têm vindo a ser procuradas numa base sólida, e serão certamente a solução mais eficaz. Contudo, para uma sustentabilidade a longo prazo desta estratégia, será crucial conjugá-la com metodologias de estruturação mental consolidadas, nas quais a proeminência do valor intrínseco dos ecossistemas naturais seja vigorosamente enfatizado, ainda que em correlação com a importância da biodiversidade para a prosperidade económica e social das comunidades. Na circunstância, as potenciais vantagens da integração de uma unidade curricular sobre “Ética e Biodiversidade” em cursos pós-graduados em Angola e outros Países Africanos de Língua Portuguesa (PALOPs), incluindo Cabo Verde, foram problematizadas, no contexto de um curso de mestrado em “Biodiversidade, Genética e Conservação” em desenvolvimento em associação com instituições de ensino superior de países africanos. A importância dessa abordagem decorre do facto de se constatar uma quase total ausência de formação na área de ética ambiental nestes países, conquanto que esta dimensão possa ser considerada crucial para a consecução dos Objectivos de Desenvolvimento Sustentável da Agenda 2030 das Nações Unidas.

Palavras-chave: crise global ambiental, estratégias científicas de mitigação, objectivos de desenvolvimento sustentável

ABSTRACT

Aside its richness in terms of biological diversity, African continent faces serious risks in the context of the global environmental crisis. Scenarios of mitigation of the impacts via scientific research strategies are being sought on a solid basis, and they will certainly be the most sensible solution. For a long-term sustainability of this approach, although, it would be crucial to conjugate them with consolidated mental structuration methodologies, in which the prominence of the intrinsic value of the natural ecosystems should be strongly emphasized, even if in correlation with the importance of biodiversity for communities' economic and social prosperity. In the circumstance, the potential advantages of the integration of a curricular unit on 'Ethics and Biodiversity' for post-graduate courses in Angola and other Portuguese-speaking African countries (PALOPs), including Cabo Verde, were problematized, in the context of a master's degree in 'Biodiversity, Genetics and Conservation' under development in association with higher education institutions from African countries. The importance of this approach stems from the fact that, in these countries, almost no training in the area of the environmental ethics is provided, though this dimension may be considered crucial for the achievement of the Sustainable Development Goals (SDGs) of the Agenda 2030 of the United Nations.

Keywords: global environmental crisis, scientific mitigation strategies, sustainable development goals

INTRODUCTION

Africa has an incalculable wealth in biodiversity. Its living organisms constitute about a quarter of the overall global picture and African biomes range from mangroves to deserts, from Mediterranean to tropical forests, from temperate to subtropical and mountain savannah, and even to ice-covered peaks (Huntley *et al.* 2019). PALOP countries do not diverge from this scenario. All reveal a remarkable profusion and variety with regard to plant and animal life, and a striking beauty of its plains and plateaus, its forests and woods. Angola, large nation on the southwest coast of Africa, is a place of a remarkably physiographic, climatic and biological variety (Huntley *et al.* 2019). Although it encompasses only 4% of the terrestrial area of Africa, Angola has a rich diversity of landscapes and seascapes, possesses the highest diversity of biomes, and is second only to mega-diverse South Africa in terms of number of ecoregions found within its borders (Huntley *et al.* 2019). Regarding the other PALOPs, a very significant part of Guinea-Bissau and Mozambique, as well as the whole area of

Cabo Verde and São Tomé & Príncipe, are included in the worldwide biodiversity hotspots (Myers 2003), and in all of them is positively recognizable a pronounced wealth of wildlife and vegetation, and the uniqueness and scientific value of their natural heritage.

Notwithstanding its richness in terms of biological diversity, African continent faces serious risks in the circumstance of the global environmental crisis (Ellis 2019). Similarly to what generically occurs in the African continent, those referred countries faces unprecedented challenges on attempting to reconcile human well-being and economic prosperity with the protection of the surrounding environment (UNEP-WCMC 2016). Concomitantly, they are threatened with severe environmental risks, mainly through a rampant population growth. This results in extensive demographic pressure scenarios, accompanied by processes of unregulated urbanization (with the subsequent binomial pollution-diseases), and intensive agricultural exploitation (UNEP-WCMC 2016). This situation has a harmful impact on the natural

environment, which is, in some situations, critically damaged, and of difficult immediate restoration (UNEP-WCMC 2016). Consequently, the development of mitigation research strategies is pointed as a priority, namely in the sense of promoting collaborative actions among European and African countries to address the Aichi goals (United Nations 2011, UNEP-WCMC 2016), and the Objectives of the UN Agenda 2030 regarding biodiversity (UNESCO 2015). Prospects of mitigation of the impacts, via scientific research strategies, will be certainly the most sensible solution, but for a long-term sustainability of this approach, it would be crucial to conjugate them with consolidated mental structuration methodologies, otherwise it will fall short of the intended results in the absence of a paradigm shift (Loreau 2014). In these methodologies, the prominence of the intrinsic value of natural ecosystems, in view of its inherent ontological and ethical relevance, should be emphasized, in correlation with the conventional strategy of addressing the importance of biodiversity for communities' economic and social prosperity.

The underlying rationale is quite simple: on failing the dissemination of a mind-set and attitudinal change, which determinedly extol the inherent significance of the axiological dimension of the environment – besides its 'instrumental' importance for humankind – the current detrimental anthropocentric pattern will be perpetuated, as well as the harmful consequences arising from it (Loreau 2014).

In practical terms, even in an optimistic scenario, in which from the application of the research strategies and actions previously stated, an environmental recovery may occur, triggering in people the awareness about the tangible importance of biodiversity to their lives, the risk of re-incurring in the previous inaccuracies, in the medium term, will be always hanging over, threateningly. Once momentarily mitigated the menaces for

populations themselves, relapsing in harmful behaviours may always be a possibility, in the absence of an endemic reverence by the surrounding environment (Hébert 2014). Concomitantly, the motivation for the properly actions in this respect should also be intrinsic, and not only derived from external conventions or normative systems, i.e. national/ regional regulatory frameworks with penalizing schemes for the infractions, as in the hypothetical absence of the concerning law enforcement, the trigger for the ethical accomplishments will fade away (Loreau 2014). The challenge, therefore, is still beyond the recognition of the high importance of natural surrounding for current and future human generations, as exceeding the short-term gains that are the cause of most biological diversity loss. The challenge is to raise awareness to the fact that environment has a *per se* value that surpasses human referrals, and its obliteration is intrinsically immoral – and not only by reference to our human condition and our basic civilizational and social needs (Hébert 2014).

If a direct correlation between education and behavioural change seems unquestionable, a similar correspondence between biodiversity training and an optimized management of environmental resources also appears substantially highlighted in prominent scientific literature (Gayford 2000, Kassas 2002, Weely & Wals 2010). Therefore, the same should be expected in what refers to the paradigm shift proposed regarding the recognition of the *per se* value of environment.

Thus, in the context of this conceptualization, the pertinence of establishing a masters course in 'Biodiversity, Genetics and Conservation' with a curricular unit of 'Ethics and Biodiversity' for graduates in Biological Sciences was studied. The potential advantages of extending this approach to other PALOP countries, namely Cabo Verde, was stressed.

MATERIAL AND METHODS

For studying the relevance of the establishment of a curricular unit on ‘Ethics and Biodiversity’, an online research, on the potential incidence of disciplines correlated to ethics in MSc in biodiversity-related areas (the research question that guided this study) was conducted for Angola and other concerned PALOP countries (Cabo Verde, Guinea Bissau, Mozambique, São Tomé & Príncipe). Sources for seeking the official information were the following: Angola Informativa – Catálogo Angolano de Cursos Superiores

(<https://www.angolaformativa.com/pt/top-cursos/>); Universidade de Cabo Verde, Uni-CV (<http://www.unicv.edu.cv/ensino/pos-graduacao/>); MZ Formativa – Catálogo Moçambicano de Cursos Superiores (<https://www.mzformativa.com/pt/oferta-formativa/mestrado/>); University of São Tomé (<https://ustp.st/cursos.php>); UniPiaget Guinea Bissau (<http://guine-bissau.unipiaget.org/#Curso>); University Amílcar Cabral (https://www.uan.ao/dt_logos/universidade-amilcar-cabral/).

RESULTS

This research in official governmental/institutional websites, combined with ratified information from the concerned Universities on the incidence of disciplines associated to

Ethics in MSc in biodiversity-related areas for the specified countries, has proved that almost no training is provided in this area (Fig. 1 and Table 1).

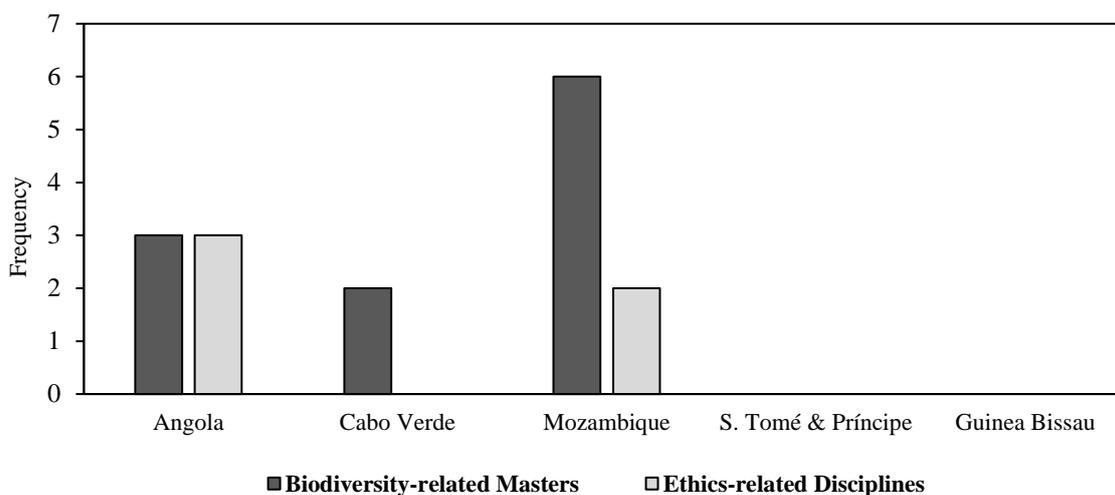


Fig. 1. Frequency of Biodiversity-related masters and Ethics-related disciplines. Check Material & Methods for further details.

It turns out that Guinea Bissau, and São Tomé & Príncipe have no postgraduate training in biodiversity-related areas (Table 1). On the other three countries that are conducting masters in this area (Angola, Cabo Verde and Mozambique) the scenario differed. The master’s in ‘Environmental Management and Governance’ from the Angolan University

Agostinho Neto (UAN) incorporates three collateral Ethics-related disciplines (‘Environmental Law’, ‘International Policies and Conventions’ and ‘Introduction to Environmental Policy and Governance’), and no Ethics-related disciplines occur in the other master’s (‘Agronomy and Natural Resources’ from University José Eduardo dos Santos

(UJES) and ‘Environmental Engineering’ from UAN; Table 1). Two master’s courses are conducted in Cabo Verde, at Uni-CV (‘Management and Environmental Policies’ and ‘Agricultural Information Management and Precision Agriculture’), but without any ethical reflection. In Mozambique, six master’s courses in the area of biodiversity are conducted at University Eduardo Mondlane

(UEM) (‘Aquatic Biology and Coastal System’; ‘Coastal and Environmental Geology’; Sustainable Aquaculture; Marine Biology and Fisheries Management; Biotechnology; Forest Sciences). However, incidence information regarding Ethics-related disciplines was obtained only for the master’s in Sustainable Aquaculture, and Marine Biology and Fisheries Management (Table 1).

Table 1. Details on Biodiversity-related masters and Ethics-related disciplines provided in the different universities from each PALOP country. Note that Biodiversity-related masters do not exist on São Tomé & Príncipe nor Guinea-Bissau. Check results for details on the university names (Uni).

Country	Masters designation	Uni	Ethics-related disciplines
Angola	Agronomy and Natural Resources	UJES	Not available
	Environmental Management and Governance	UAN	Environmental Law International Policies and Conventions Introduction to Environmental Policy and Governance
	Environmental Engineering	UAN	Not available
Cabo Verde	Management and Environmental Policies	Uni-CV	Not available
	Agricultural Information Management and Precision Agriculture	Uni-CV	Not available
Mozambique	Aquatic Biology and Coastal Systems	UEM	Not available
	Coastal and Environmental Geology	UEM	Not available
	Sustainable Aquaculture	UEM	Biosafety
	Marine Biology and Fisheries Management	UEM	Fisheries Legislation
	Biotechnology	UEM	Not available
	Forest Sciences	UEM	Not available

DISCUSSION

Most of the analysed countries lack training in the area of Environmental Ethics. Hence, a biodiversity-related post-graduate training, namely for recently graduated life sciences students, with a curricular unit of ‘Ethics and Biodiversity’ proposed among the syllabus of a future master’s course in ‘Biodiversity, Genetics and Conservation’, is pertinent. This would allow an axiological reflection on the prominence of the intrinsic value of the natural ecosystems, in view of its inherent ontological and ethical relevance. The pilot course would be set in an association between the University of Porto (Portugal) and the University Mandume ya Ndemufayo (Angola) and could be replicated in the other PALOP countries.

This course is completely aligned with the Sustainable Development Goals (SDGs) of the Agenda 2030, namely regarding ensuring inclusive and equitable quality education and protecting life on land (UNESCO, 2015). It will also go along with the aspirations of the Agenda 2063 ‘The Africa We Want’, specifically respecting the improvement of a strong cultural identity, a common heritage, shared values and ethics (African Union Commission, 2015). This could then be replicated in other PALOP countries, namely those in which CIBIO has established TwinLabs (<http://www.unescoliveonland.com/%20en/twinlabs>), including Cabo Verde. In this country, CIBIO’s collaborative

institutional network is solid and structured, and a consolidated scientific capacity building scheme has been established several years ago, namely with Uni-CV, contemplating bilateral cooperation in several academic areas, explicitly with regard to postgraduate training. Other Portuguese institutions, with international programmes currently running on the ground – e.g.: University of Coimbra, with a whole series of academic cooperation agreements with higher education institutions in Cabo Verde and, through the UNESCO Chair in Biodiversity and Conservation for Sustainable Development, with solid collaboration schemes in Angola (University Mandume Ya Ndemufayo) and in Mozambique (Lúrio University); University of Lisbon, with scientific, academic and cultural cooperation agreements with higher education institutions in Angola (ISCED-Huíla; Technical University of Angola) and Mozambique (Technical University of Mozambique; Catholic University of Mozambique; Pedagogical University of Mozambique); University of Aveiro, with cooperation protocols with Uni-CV (Cabo Verde) and with the Gorongosa National Park Research Center (Mozambique); University of Minho, through its international protocols with ISCED-Huíla (Angola) and with the Superior Institute of Health Sciences of Maputo (Mozambique); or Jean Piaget Institute of Cabo Verde, among others – may also contribute to the achievement of this objective.

In addition to seeking to request for a reflection on the intrinsic value of biodiversity, and on the need for a *per se* respect that is due to the surrounding environment, the objective of the discipline should be the discussion about the complex environmental dilemmas related to global biodiversity crisis. It should also promote comprehensive deliberation exercises and the structuring of ethical frameworks, values and principles, which may provide personal guidance and a theoretical background for policy options in this area. Concurrently, it will seek to operationalize excellent training in ethical issues related to biological diversity. It is expected to endow students with a general understanding of the concept of biodiversity, the fundamentals and principles of ethics, the operationalized values in sustainable management, of the laws and governance strategies involved in biological diversity preservation, and on the ethical issues that need to be considered for the genesis of policies and strategies for biodiversity conservation. Its study plan should encompass several curricular modules as, for instance: ‘Ethics and Biodiversity’; ‘Value of Biodiversity’; ‘Law, Governance and Biodiversity’; and ‘Ethics in Policies and Strategies in Preserving Biodiversity’. With this scheme, it is aimed to achieve the abovementioned SDGs, regarding biodiversity (UNESCO 2017a), as well as for the enrichment of the curricular (international) offer of the involved institutions.

CONCLUDING REMARKS

If PALOP's natural levels of biological diversity are expected to be preserved and improved, political and educational strategies should be structurally pursued. National authorities and academics from those nations are completely aware of the problem, and have already signalized several conservation actions and national networks of protected areas (e.g. MAOH 2014). At the same time, a change of mentalities, in the terms previously suggested,

equally proves to be mandatory, as well as the inclusion of advanced training programmes in which an ethical reflection related to biodiversity issues shall be integrated. Therefore, the incorporation of a theoretical field on ‘Ethics and Biodiversity’ could be of an outstanding significance. This could be achieved either by means of the implementation of new master's courses in Biodiversity, or by the reformulation of already

existing ones (namely through the inclusion of that disciplinary area in the corpus of masters in Biology already established). Bearing in mind the existence of many collaborations and strong research connections of European Universities with some of these nations, a significant part of the path seems already traced.

ACKNOWLEDGEMENTS

I would like to thank the editor-in-chief for the guidance and pertinent suggestions.

REFERENCES

- African Union Commission (2015) *Agenda 2063 The Africa We Want*. Africa Union Commission, Addis Ababa, Ethiopia, 24 pp.
- Araújo, S., Lima, L., Monteiro, R. Medina, A. & Gomes, I. (2015) *Fifth National Report on the Status of Biodiversity in Cabo Verde*. Direcção Nacional do Ambiente, Praia, Cabo Verde, 95 pp.
- Ellis, E. (2019) Evolution: Biodiversity in the Anthropocene. *Current Biology*, 29, 829–833.
- Gayford, C. (2000) Biodiversity Education: a teacher's perspective. *Environmental Education Research*, 6, 347–361.
- Hébert, I.-M. (2014) Reverence for the Conscious of Nature. In: Vacoeh, D. & Castrillón F. (Eds.), *Ecopsychology, Phenomenology and the Environment. The Experience of Nature*. Springer, USA, pp. 27–46.
- Huntley, B. J., Russo, V., Lages, F. & Ferrand, N. (Eds) (2019) *Biodiversity of Angola. Science & Conservation: A Modern Synthesis*. Springer, Cham, Switzerland, 549 pp.
- Kassas, M. (2002) Environmental education: biodiversity. *The Environmentalist*, 22, 345–351.
- Loreau, M. (2014) Reconciling utilitarian and non-utilitarian approaches to biodiversity conservation. *Ethics in Science and Environmental Politics*, 14, 27–32.
- MAHOT – Ministério do Ambiente, Habitação e Ordenamento do Território (2014) *Estratégia Nacional e Plano de Acção para a Conservação da Biodiversidade 2015–2030*. Direcção Nacional do Ambiente, Praia, Cabo Verde, 128 pp.
- Meyers, N. (2003) Biodiversity hotspots revisited. *BioScience*, 53, 916–917.
- UNEP-WCMC (2016) *The State of Biodiversity in Africa: A mid-term review of progress towards the Aichi Biodiversity Targets*. UNEP-WCMC, Cambridge, UK, 96 pp.
- UNESCO (2015) *Transforming our world: the 2030 Agenda for Sustainable Development*. United Nations General Assembly, New York, USA, 41 pp.
- UNESCO (2017a) *Education for Sustainable Development Goals: Learning Objectives*. UNESCO, Paris, France, 63 pp.
- UNESCO (2017b) *Rethinking Education Towards a Global Common Good?* UNESCO, Paris, France, 85 pp.
- United Nations (2011) *Strategic Plan for Biodiversity (2011-2020) and the Aichi Biodiversity Targets*. United Nations, New York, USA, 2 pp.
- Weely, D. & Wals, A. (2010) Making biodiversity meaningful through environmental education. *International Journal of Science Education*, 24, 1143–1156.

Received 7 August 2019

Accepted 20 April 2020