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# Assessing national-level provision of conservation capacity building: lessons learnt from a case study of Kenya

MARK O'CONNELL, AMY DONNISON, KENNY LYNCH and RACHEL BENNETT

**Abstract** As global environmental pressures grow, the need for delivering relevant and sustainable capacity building in conservation has never been greater. Individuals, organizations and communities need the skills, knowledge and information that allow them to address environmental issues at a variety of spatial scales and in diverse contexts. Capacity is currently built through a range of activities, including tertiary education, training courses, online learning, mentoring and continuing professional development. However, a significant proportion of the current capacity-building provision is non-strategic, project-based and reactive. The conservation sector still lacks a coordinated approach to capacity building linked to broader conservation goals. Without an assessment of current capacity-building provision and future capacity needs, the delivery of capacity building in conservation will remain fundamentally ad hoc. The need for strategic conservation capacity building in sub-Saharan Africa has been identified and here we report on the first collation of online material to assess current conservation capacity provision in Kenya (the country with the greatest online capacity-building presence). We reviewed a total of 177 capacity-building initiatives delivered during 2014–2019 and recorded 55 separate metrics for each initiative. We present: (1) a broad overview of the data collation methods developed, (2) examples of data that will support strategic capacity-building strategies, and (3) the lessons learnt from this assessment.

**Keywords** Capacity building, conservation, Kenya, professional development, strategic assessment, training

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## Introduction

As global environmental pressures grow in number, extent and impact (Jones et al., 2018; Geldmann et al., 2019; IPBES, 2019) the need for delivering relevant

and sustainable capacity building in conservation has never been greater (Korn et al., 2004; Schmeller et al., 2017a,b). Individuals, organizations and communities need the skills, knowledge and information that allow them to address environmental issues at a variety of spatial scales, within diverse contexts and with varying levels of resources (Gillespie, 2009; O'Connell et al., 2017). This capacity is currently built through a range of activities, including tertiary education, training courses, online learning, mentoring and continuing professional development. However, a significant proportion of the current capacity-building provision is largely non-strategic, project-based and reactive (i.e. occurs as a result of organizations addressing their immediate capacity needs or individuals wishing to develop their personal competences). This has led to considerable duplication of capacity-building effort within and between organizations and ineffective mobilization and use of capacity-building funds and resources (Schmeller et al., 2017b). As a sector we still lack a coordinated approach to capacity building at the national or international level (i.e. an agreed list of capacity-building outcomes that are strategically linked to broader conservation goals at various spatial and temporal scales). In particular, assessments of future global capacity needs, and hence capacity-building needs, are missing. Without such assessments, the delivery of capacity building in conservation will remain fundamentally ad hoc and we will continue to be uncertain regarding what capacity is needed to meet the coming environmental challenges, where it should be delivered (geographically and in terms of professional levels) and how to best deliver it (i.e. cost-effective, sustainable, quantifiable and culturally appropriate methods).

In one part of the conservation sector (protected area management) there has been investment in developing an international strategic framework for capacity-building efforts. In 2015, the IUCN and the World Commission on Protected Areas produced a Strategic Framework for Capacity Development (Coad et al., 2015). Their 10-year objective was: 'Long-term and sustainable protected area capacity development opportunities, programmes and products to provide a foundation that will assist more effective, efficient, just, and equitable management of all types of protected areas, enhancing the ability of countries to meet their commitments under the Convention on Biological Diversity's Programme of Work for Protected Areas ... and the Aichi Targets' (IUCN, 2015, p. 1). However, despite the

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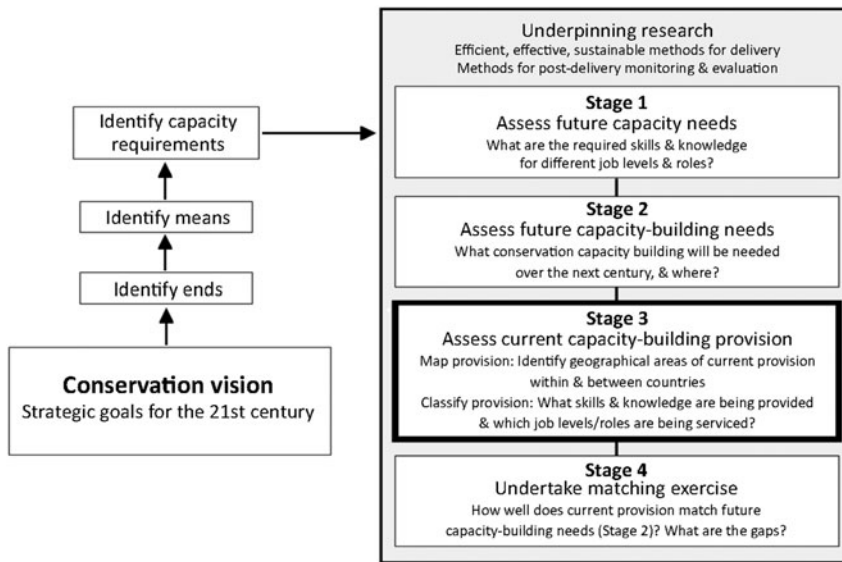


FIG. 1 The four stages of information gathering required to support an assessment of capacity-building needs at both the national and global scale. This project was designed to investigate potential methods and issues associated with undertaking a Stage 3 assessment.

implementation of this framework, at a national level the World Commission on Protected Areas has recognized that few sustained capacity-building programmes currently exist and where such within-country investment has occurred 'converting investment in capacity to improved performance of protected areas has been limited' (IUCN, 2015, p. 4).

Future national-level capacity-building strategies will also need to consider the wide range of issues regarding the delivery of capacity building. For example, current provision is largely focused on short-term training (Virji et al., 2012). There is a need to move towards additional tools such as workplace learning and mentoring, e-learning, peer-to-peer exchanges and servicing communities of practice (Wells et al., 2005; Virji et al., 2012; Ivey et al., 2013; O'Connell et al., 2017). This is vital because it is known that short-term or project-focused capacity building often results in the temporal decay or haemorrhaging of skills and knowledge (Arthur et al., 1998; Cheng & Hampson, 2008). Some delivery mechanisms also do not account for audience diversity in terms of language barriers and the cultural aspects of both learning and teaching (Korn et al., 2004; Trehwella et al., 2005; Derlink et al., 2018). Capacity building is often not focused on building institutionalized frameworks (i.e. the elimination of dependence on the outside delivery of capacity). This needs to be replaced by internal, continuous and strategic capacity-building opportunities that are linked to individual, organizational and regional conservation strategies and goals rather than specific one-off projects. Partnership approaches will be key to supporting this type of delivery (Wescott, 2002; O'Connell et al., 2017). Delivery methods mediated through higher-educational systems (capacity delivery through modular packages of knowledge) often struggle to bridge the gap between underpinning academic knowledge (e.g. ecology)

and the skills and competences required in conservation practice (Hogg et al., 2017; Bertuol-Garcia et al., 2018; Fabian et al., 2019). Furthermore, higher-education systems are often difficult to alter once they are in place and therefore are not always responsive to changing conservation needs and regional goals (Müller et al., 2015).

Adaptive and responsive capacity-building frameworks within and between organizations also require adequate monitoring and evaluation systems to be developed and implemented. Current capacity provision is largely non-adaptive (i.e. it is unable to respond quickly to internal or external change because it cannot monitor and evaluate short- and long-term conservation impacts; Horton, 2002).

Given the growing number, diversity and extent of environmental problems worldwide, the conservation sector will also need to scale up current levels of capacity-building provision to address these challenges (Schmeller et al., 2017a,b). Importantly, this scaling up is not only about providing greater numbers of capacity-building activities of greater diversity but is also concerned with geographical relevance. This is because access to and provision of conservation capacity building are currently spatially patchy (i.e. they are biased towards city hubs and away from rural or isolated areas; Müller et al., 2015).

If a strategic and coordinated national-level conservation capacity-building framework is to be developed, a matching exercise will be necessary to evaluate how well current capacity-building provision can meet future capacity needs, particularly in relation to ensuring this translates into the improved meeting of conservation goals. Figure 1 provides an overview of the four key stages of information gathering required to provide the raw materials for future national and global assessments. The key actions are: Stage 1, identify future capacity needs in the context of conservation goals and future environmental threats; Stage 2,

identify future capacity-building needs arising from the Stage 1 assessment; Stage 3, assess current capacity-building provision. These stages provide the means to identify specific capacity-building gaps that will need to be addressed (Stage 4).

In 2019, the University of Gloucestershire, UK, funded a 4-month postgraduate project as part of the institutional Global Challenge Research Fund. The project was designed to investigate potential methods and issues associated with undertaking a Stage 3 assessment (i.e. assessment of current levels of national capacity-building provision). Stages 1 and 2 will require the development of large-scale, well-resourced and multi-agency initiatives. However, a Stage 3 assessment provides high-utility information in the absence of the other stages. The broad project aim was to develop a method for collating, quantifying and characterizing current national-level capacity-building provision using online material. We were also interested in addressing two process-focused questions: (1) Are the requisite data and information on capacity-building provision readily available? (2) How much time and effort are required to collate such information?

## Methods

As there is an urgent need for strategic conservation capacity building in sub-Saharan Africa (O'Connell et al., 2017), we chose this region as the central focus for the online searches in relation to the provision of capacity building. Initial exploratory surveys of online data availability suggested that Kenya had the greatest number of capacity-related courses and events for which relevant information was readily available online. To develop a method that is replicable for other countries and to simplify the data-gathering process, we used the *Google* search engine (Google, Mountain View, USA) to obtain information on 177 capacity-building initiatives active in the 6-year period 2014–2019. We only searched for initiatives with an online presence (i.e. it was beyond our scope to assess the internal capacity-building activities of organizations). Furthermore, because of practical constraints we had no direct contact with organizations to check the details of the initiatives recorded. The online resources comprised NGO webpages, archived projects, project reports, newsletters, and university webpages and course brochures. The searches focused on identifying the capacity-building themes, delivery methods and geographical region of each initiative. The final database comprised 111 continuous and categorical variables (Supplementary Table 1). Not all of the capacity initiatives investigated contained information for all 111 variables and so sample sizes for the analyses varied. We assessed collation effort by recording the time taken to find, code and enter relevant information into a database. We interrogated this collated database to provide a characterization of current conservation capacity-building provision in

Kenya. Many analyses are possible using this dataset but here we present findings in four broad areas of particular value to developing future capacity-building strategies: (1) the thematic focus of available capacity-building initiatives, (2) the methods of delivery employed, (3) the types of organizations providing capacity building, and (4) the characteristics of the participants involved.

## Results

### Collation effort

It took a mean of 25 minutes to search for and collate information on a single capacity-building initiative and to enter its details into the database (range 3–120 minutes). Thus, for a national assessment of capacity provision described on 200 websites we estimate that it would take a total of c. 12 working days to complete data searching and entry. We experienced three additional collation issues: (1) It was essential to produce clear definitions and separations of the categories and subcategories used within the data collation exercise. (2) The information provided within many websites was inconsistent and most initiatives were missing data for one or more of the collation variables. Importantly, most initiative websites did not publish post-delivery information (e.g. the characteristics of the attendees, such as age, gender, job title, reason for attending). This information was probably collected by organizations but it was rare to find these data published on their websites. (3) A number of websites had broken links and this limited access. Some also had conflicting information across their pages (e.g. in terms of dates, locations and training content).

### Thematic focus

Of the 177 capacity-building initiatives investigated, 130 (73%) were delivered by academic institutions and 47 (27%) were delivered by non-academic organizations (i.e. where academic tertiary education or research was not the primary goal). For these two groups we assessed the focus of the initiative provision within three broad thematic types: conservation knowledge, technical skills and soft skills (Fig. 2).

There was a greater focus on knowledge-based provision and less emphasis on the provision of soft skills within the university sector. However, for the latter theme there were more university-based initiatives that included project design and management, communication and negotiation, and entrepreneurship. For non-academic organizations provision was generally evenly dispersed across the three themes. Figure 3 shows the range of subjects covered by academic courses at the tertiary level. Of the 128 courses reviewed, 42% were focused on conservation, wildlife or environmental management, with 47% focused on the

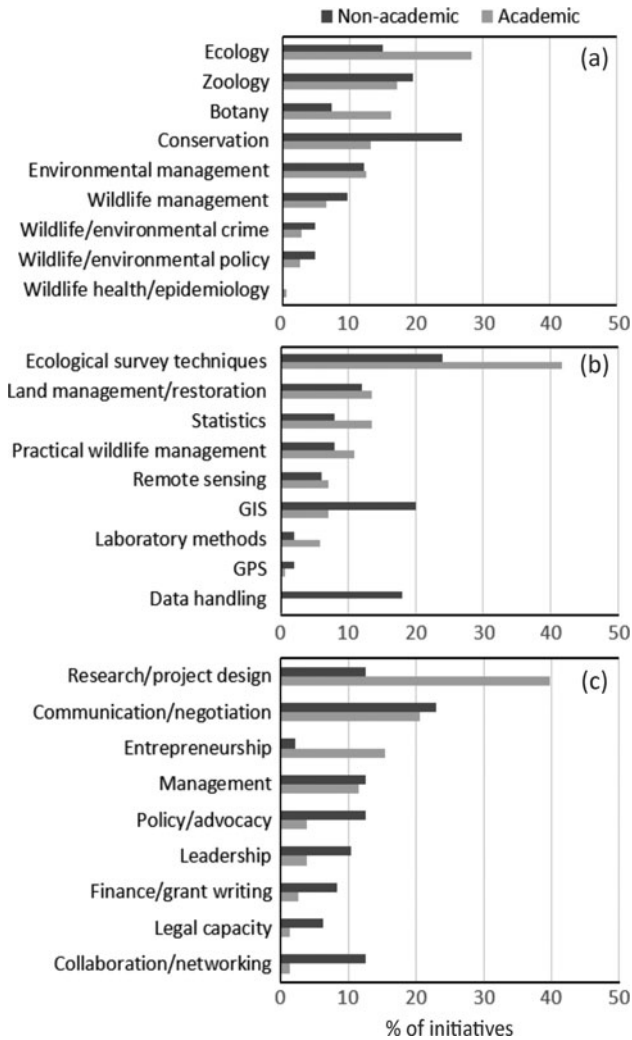


FIG. 2 Per cent of capacity-building initiatives assessed in this study delivered by academic institutions (n = 130) and non-academic organizations (n = 47) relating to (a) knowledge, (b) technical skills and (c) soft skills.

broader and more traditional natural science subjects of biology, botany, ecology and zoology.

Types of initiative providers and key methods of delivery

Seventy-two per cent of the initiatives recorded were delivered through academic institutions. Of those delivered by non-academic organizations 41% were provided by international NGOs, 15% by national (Kenyan) NGOs and 10% by Kenyan government agencies (Fig. 4a). For these non-academic initiatives we recorded six types of delivery method. Of these, specialist training courses accounted for 50% of all provision, with 30% delivered as workshops and 13% delivered through internships (Fig. 4b).

The data collation process demonstrated that capacity-building initiatives were often organized by an organization other than the one acting as the direct provider (i.e. a second

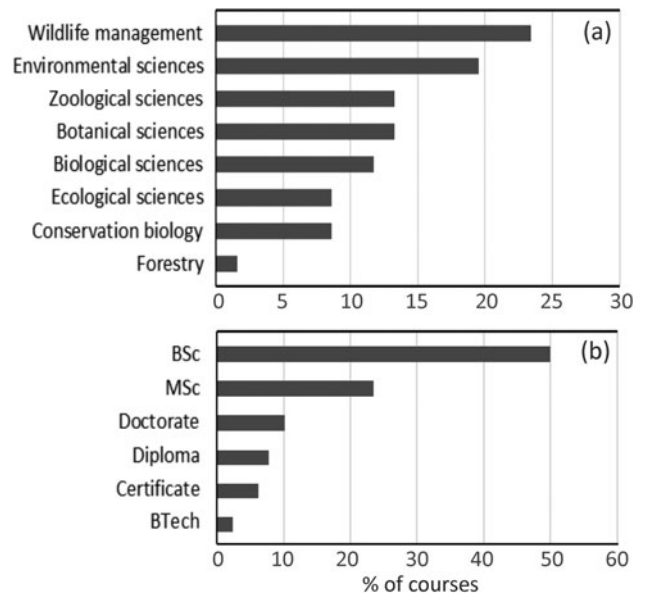


FIG. 3 Per cent of academic courses assessed in this study (n = 128) grouped by (a) subject and (b) attainment level. Note the different y-axis scales.

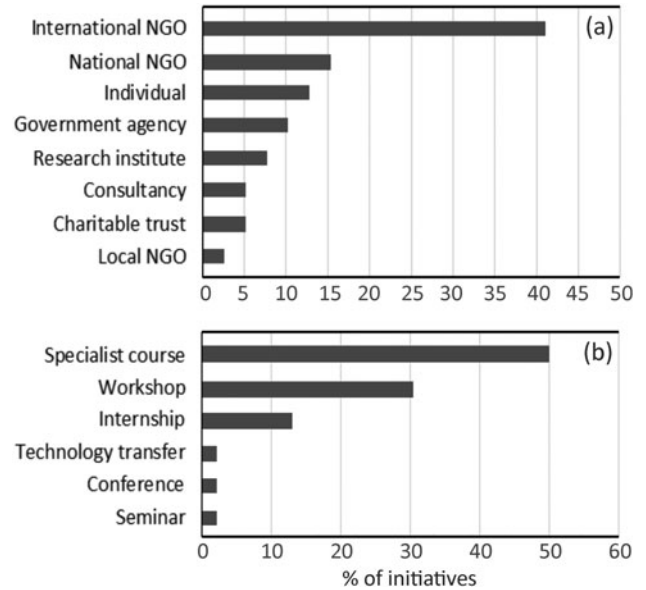


FIG. 4 Per cent of non-academic capacity-building initiatives assessed in this study (n = 47) grouped by (a) type of organization and (b) delivery method. Note the different y-axis scales.

overseeing organization was the primary facilitator or funding body). Of these overseeing organizations 60% were based in Kenya and 23% were based outside Africa.

Types of participants

The most frequent (63%) group size for individual initiatives was ≤ 20 participants (Fig. 5). The data indicated a

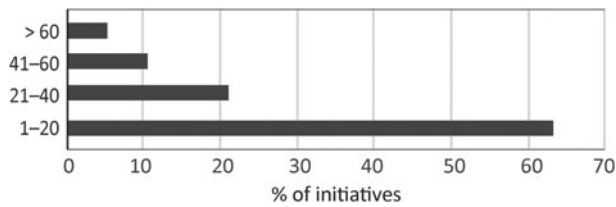


FIG. 5 Per cent of non-academic capacity-building initiatives assessed in this study by participant group size ( $n = 19$ ).

substantial gender bias towards male participants (69%). Only 29% of participants were from Kenya, with 67% being from other African nations and 4% from outside Africa.

## Discussion

Given the growing demands of the environmental sector in relation to the skills and knowledge of conservation professionals (Appleton et al., 2021) there is an urgent need to ensure that future capacity-building provision is fit for purpose (Lucas et al., 2017; Elliott et al., 2018). Current ad hoc and reactive capacity-building provision will need to be replaced by more strategic national-level approaches (Margules & Pressey, 2000; Schmeller et al., 2017b). We believe that our study is the first attempt to characterize current conservation capacity building at a national level and is thus an important first step towards the process outlined in Fig. 1. Although the information generated by this project could be used to support the strategic development of capacity building in Kenya, perhaps its main value is its evaluation of suitable data collation methods. In particular, we demonstrated that high-utility information can be gleaned from conservation and educational websites relatively quickly. Furthermore, the collated information can be coded at the point of collection to facilitate a broad range of subsequent analyses. We assumed that any capacity-building initiative taking place in Kenya would have an online presence. Although this is a reasonable assumption, the information collated did not include capacity building that was internal to organizations (e.g. mentoring or continuing professional development for staff). Future work in this area will need to include direct conversations with organizations to quantify this element of capacity building.

There is growing evidence of the importance of soft skills in conservation (White et al., 2015; Barlow et al., 2016; Elliott et al., 2018). Our findings suggest that in Kenya capacity associated with soft skills is currently being provided by both the higher education sector and conservation NGOs. However, such skills are not specific to conservation, and training in these areas could be available widely outside the sector. Future assessments of conservation capacity building will need to assess whether these skills are delivered

most effectively within a conservation context or are equally effective when delivered by non-specialist organizations.

Our findings suggest that in Kenya the higher education sector currently plays a significant role in conservation capacity building. However, future delivery in this sector will be driven largely by course viability rather than the strategic provision of subjects (i.e. where there is a commercial benefit, universities will provide traditional ecology, zoology and botany courses; Teferra, 2013). Students graduating from these courses are provided with a wide range of skills and knowledge, only some of which will be relevant if they wish to enter the conservation sector. Further work will be needed to develop commercially viable courses focused solely on conservation and wildlife management and to ensure that course content is developed in close association with conservation NGOs.

The results of our study also demonstrate the significant role of international NGOs in the provision of capacity-building initiatives in Kenya (43% of initiatives were organized by international NGOs). It is likely this will be similar in other sub-Saharan countries, reflecting a growth in the influence of international NGOs during the last 3 decades (Armitage et al., 2021). This influence covers a range of conservation elements, including setting conservation agendas, and international NGOs can provide greater levels of core funding than generally are available at a national level (Rodríguez et al., 2007; Green & Hadden, 2021). However, from a capacity-building perspective it will be important for values and operational structures that are culturally relevant at community- and national levels to be maintained and integrated into new training and education initiatives (O'Connell et al., 2017; Johnson et al., 2022). The data also indicated a substantial gender bias towards male participants (no other gender identity categories than male and female were available). Other studies have shown similar biases across various parts of the conservation sector (Tulloch, 2020; Chaudhury & Colla, 2021; Giakoumi et al., 2021). Although this is a pervasive, cross-society and multifaceted problem that is not specific to conservation, further specific research is required to identify how it could be addressed in the context of future capacity-building strategies for conservation.

Although we attempted to characterize particular aspects of current capacity provision, it was not possible to evaluate or quantify the quality of the initiatives investigated. Previous studies have attempted to ensure lasting impacts from conservation actions by identifying a range of standards (Nygren & Jokinen, 2013; CMP, 2020), and a similar drive exists for developing standards in capacity provision and evaluation. A key standard could be in relation to the benefits derived from ensuring a collaborative approach to capacity building, as has been demonstrated in many conservation actions (Head, 2003; Fisher et al., 2020). Another could be stakeholder participation in the development and evaluation of course content (Reed, 2008). This could reduce the current

repetition of effort and facilitate the generation of standardized methods, resulting in improved course evaluation (Sawrey et al., 2019). This is particularly important for comparisons between countries and regions.

All of the data within the collated database were spatially referenced and could therefore be mapped within a geographical information system (GIS). This provides the potential for introducing a spatial element to the assessment (e.g. to identify hotspots and coldspots of capacity provision). The GIS could also be used to analyse the capacity-building data in relation to socio-economic and population demography data. Such analyses would provide further insights into and greater understanding of the observed patterns of capacity provision and associated gaps. This will be key for addressing spatial disparities of provision for organizations and communities in remoter areas and for understanding the demographic and socio-economic contexts in which the provision of capacity building takes place. If future conservation capacity building is to be developed in a strategic way, a number of wider contexts will have to be addressed in addition to the national assessment described in this study: (1) A collaborative partnership should be developed to fund and extend this type of approach to other countries and regions. The initial focus could be on lower- and middle-income countries with high biodiversity and experiencing high levels of threat to biodiversity. Such partnerships should also access the lessons learnt from other sectors (Elliott et al., 2018). (2) There is currently no clear consensus regarding which activities constitute capacity building in conservation. For example, we did not include statistics courses in the current analysis unless they specifically focused on conservation or the environment. However, statistical analysis is regularly undertaken and used in conservation and is a required competence for a number of key conservation roles. In this evaluation we tended to be inclusive (i.e. we added information to the database when in doubt) but an agreed typology needs to be developed to standardize future assessments. (3) One of the lessons we learnt during the project was that the information provided within many of the websites was inconsistent and there were many broken links. To improve the quality of the data for future capacity assessments, an improvement to the method applied in this case study would be to budget for additional time to allow for clarification through direct contact with the capacity-building provider. (4) Research is needed to evaluate how the results of an online assessment of capacity-building provision might be altered when in-house capacity-building activities (e.g. mentoring and continuing professional development) are included. (5) National assessments of this nature will need to be conducted by conservation practitioners within the country to check the quality of the information gathered using their local knowledge and understanding of the conservation landscape and constraints. A conservation practitioner from another country in the region should also

be involved in the assessment, to provide feedback on the transferability of the methods to other countries within the region. (6) Spatially referencing the initiatives in terms of both delivery and organization would enable future visualization of the data within a GIS for a broad range of stakeholder audiences. Spatial analyses should also be undertaken to provide an understanding of the demographic and socio-economic contexts in which the provision of capacity building for conservation takes place.

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**Author contributions** Project conception, securing funding: MO, KL, RB; data collation, primary analysis: AD; writing: MO, supported by AD, KL, RB.

**Conflicts of interest** None.

**Ethical standards** This research abided by the *Oryx* guidelines on ethical standards. The research did not involve human subjects, experimentation with animals and/or collection of specimens.

## References

- APPLETON, M., BARBORAK, J., DALTRY, J., LONG, B., O'CONNELL, M., OWEN, N. & VALENCIA, L. (2021) How should conservation be professionalized? *Oryx*, published online 1 December 2021.
- ARMITAGE, D., MBATHA, P., MUHL, E.-K., RICE, W. & SOWMAN, M. (2021) Governance principles for community-centered conservation in the post-2020 global biodiversity framework. *Conservation Science and Practice*, 2, e160.
- ARTHUR, JR, W., BENNETT, JR, W., STANUSH, P.L. & MCNELLY, T.L. (1998) Factors that influence skill decay and retention: a quantitative review and analysis. *Human Performance*, 11, 57–101.
- BARLOW, A., BARLOW, C.G., BODDAM-WHETHAM, L. & ROBINSON, B. (2016) A rapid assessment of the current status of project management skills in the conservation sector. *Journal of Nature Conservation*, 34, 126–132.
- BERTUOL-GARCIA, D., MORSELLO, C., EL-HANI, C.N. & PARDINI, R. (2018) A conceptual framework for understanding the perspectives on the causes of the science–practice gap in ecology and conservation. *Biological Reviews*, 93, 1032–1055.
- CHAUDHURY, A. & COLLA, S. (2021) Next steps in dismantling discrimination: lessons from ecology and conservation science. *Conservation Letters*, 14, e12774.
- CHENG, E.W. & HAMPSON, I. (2008) Transfer of training: a review and new insights. *International Journal of Management Reviews*, 10, 327–341.
- CMP (CONSERVATION MEASURES PARTNERSHIP) (2020) *Open Standards for the Practice of Conservation, Version 4.0*. [conservationstandards.org/wp-content/uploads/sites/3/2020/12/CMP-Open-Standards-for-the-Practice-of-Conservation-v4.0-English.pdf](https://conservationstandards.org/wp-content/uploads/sites/3/2020/12/CMP-Open-Standards-for-the-Practice-of-Conservation-v4.0-English.pdf) [accessed 16 March 2022].
- COAD, L., LEVERINGTON, F., KNIGHTS, K., GELDMANN, J., EASSOM, A., KAPOS, V. et al. (2015). Measuring impact of protected area management interventions: current and future use of the global database of protected area management effectiveness. *Philosophical Transactions of the Royal Society B*, 370, 20140281.

- DERLINK, M., WERNHAM, C., BERTONCELI, I., KOVÁCS, A., SAUROLA, P., DUKE, G. et al. (2018) A review of raptor and owl monitoring activity across Europe: its implications for capacity building towards pan-European monitoring. *Bird Study*, 65, S4–S20.
- ELLIOTT, L., RYAN, M. & WYBORN, C. (2018) Global patterns in conservation capacity development. *Biological Conservation*, 221, 261–269.
- FABIAN, Y., BOLLMANN, K., BRANG, P., HEIRI, C., OLSCHESKI, R., RIGLING, A. et al. (2019) How to close the science–practice gap in nature conservation? Information sources used by practitioners. *Biological Conservation*, 235, 93–101.
- FISHER, J., STUTZMAN, H., VEDOVETO, M., DELGADO, D., RIVERO, R., QUERTEHUARI DARIQUEBE, W. et al. (2020) Collaborative governance and conflict management: lessons learned and good practices from a case study in the Amazon basin. *Society and Natural Resources*, 33, 538–553.
- GELDMANN, J., MANICA, A., BURGESS, N.D., COAD, L. & BALMFORD, A. (2019) A global-level assessment of the effectiveness of protected areas at resisting anthropogenic pressures. *Proceedings of the National Academy of Sciences of the United States of America*, 116, 23209–23215.
- GIAKOUMI, S., PITA, C., COLL, M., FRASCHETTI, S., GISSI, E., KATARA, I. et al. (2021) Persistent gender bias in marine science and conservation calls for action to achieve equity. *Biological Conservation*, 257, 109134.
- GILLESPIE, A. (2009) The conservation of wildlife in Africa: basic steps for the 21st century. *New Zealand Journal of Environmental Law*, 13, 161–188.
- GREEN, J.F. & HADDEN, J. (2021) How did environmental governance become complex? Understanding mutualism between environmental NGOs and international organizations (September 3, 2021). *International Studies Review*. Available at SSRN [ssrn.com/abstract=3916959](https://ssrn.com/abstract=3916959) [accessed 16 March 2022].
- HEAD, G. (2003) Effective collaboration: deep collaboration as an essential element of the learning process. *Journal of Educational Enquiry*, 4, 2003.
- HOGG, C.J., GRUEBER, C.E., PEMBERTON, D., FOX, S., LEE, A.V., IVY, J.A. & BELOV, K. (2017) ‘Devil tools & tech’: a synergy of conservation research and management practice. *Conservation Letters*, 10, 133–138.
- HORTON, D. (2002) *Planning, Implementing, and Evaluating Capacity Development*. Unpublished research briefing paper. International Service for National Agricultural Research, The Hague, The Netherlands.
- IPBES (INTERGOVERNMENTAL SCIENCE-POLICY PLATFORM ON BIODIVERSITY AND ECOSYSTEM SERVICES) (2019) *Draft Global Assessment Report on Biodiversity and Ecosystem Services of the Intergovernmental Science–Policy Platform on Biodiversity and Ecosystem Services* (eds E.S. Brondizio, J. Settele, S. Díaz & H.T. Ngo). IPBES, Bonn, Germany.
- IUCN (2015) *Strategic Framework for Capacity Development in Protected Areas and Other Conserved Territories 2015–2025*. IUCN, Gland, Switzerland.
- IVEY, P., GEBER, H. & NÄNNI, I. (2013) An innovative South African approach to mentoring novice professionals in biodiversity management. *International Journal of Evidence Based Coaching & Mentoring*, 11, 85–111.
- JOHNSON, A., SAYPANYA, S., HANSEL, T. & RAO, M. (2022) More than an academic exercise: structuring international partnerships to build research and professional capacity for conservation impact. *Conservation Science and Practice*, 4, e539.
- JONES, K.R., VENTER, O., FULLER, R.A., ALLAN, J.R., MAXWELL, S.L., NEGRET, P.J. & WATSON, J.E. (2018) One-third of global protected land is under intense human pressure. *Science*, 360, 788–791.
- KORN, H., SCHLIEP, R. & EPPLE, C. (eds) (2004) *Report of the International Workshop ‘Capacity-Building for Biodiversity in Central and Eastern Europe’*. IUCN, Gland, Switzerland.
- LUCAS, J., GORA, E. & ALONSO, A. (2017) A view of the global conservation job market and how to succeed in it. *Conservation Biology*, 31, 1223–1231.
- MARGULES, C.R. & PRESSEY, R.L. (2000) Systematic conservation planning. *Nature*, 405, 243–253.
- MÜLLER, E., APPLETON, M.R., RICCI, G., VALVERDE, A. & REYNOLDS, D. (2015) Capacity development. In *Protected Area Governance and Management* (eds G.L. Worboys, M. Lockwood, A. Kothari, S. Feary & I. Pulsford), pp. 251–290. ANU Press, Canberra, Australia.
- NYGREN, N.V. & JOKINEN, A. (2013) Significance of affect and ethics in applying conservation standards: the practices of flying squirrel surveyors. *Geoforum*, 46, 79–90.
- O’CONNELL, M., NASIRWA, O., CARTER, M., FARMER, K., APPLETON, M., ARINAITWE, J. et al. (2017) Capacity building for conservation: problems and potential solutions for sub-Saharan Africa. *Oryx*, 53, 273–283.
- REED, M.S. (2008) Stakeholder participation for environmental management: a literature review. *Biological Conservation*, 141, 2417–2431.
- RODRÍGUEZ, J.P., TABER, A.B., DASZAK, P., SUKUMAR, R., VALLADARES-PADUA, C., PADUA, S. et al. (2007) Globalization of conservation: a view from the south. *Science*, 317, 755–756.
- SAWREY, B., COPSEY, J. & MILNER-GULLAND, E.J. (2019) Evaluating impacts of training in conservation: a case study in Mauritius. *Oryx*, 53, 117–125.
- SCHMELLER, D.S., ARVANITIDIS, C., BÖHM, M., BRUMMITT, N., CHATZINIKOLAOU, E., COSTELLO, M.J. et al. (2017a) Case studies of capacity building for biodiversity monitoring. In *The GEO Handbook on Biodiversity Observation Networks* (eds M. Walters & R.J. Scholes), pp. 309–326. Springer, Cham, Switzerland.
- SCHMELLER, D.S., BÖHM, M., ARVANITIDIS, C., BARBER-MEYER, S., BRUMMITT, N., CHANDLER, M. et al. (2017b) Building capacity in biodiversity monitoring at the global scale. *Biodiversity and Conservation*, 26, 2765–2790.
- TEFERRA, D. (2013) Funding higher education in Africa: state, trends and perspectives. *Journal of Higher Education in Africa/Revue de l’Enseignement Supérieur en Afrique*, 11, 19–51.
- TREWHELLA, W.J., RODRIGUEZ-CLARK, K.M., CORP, N., ENTWISTLE, A., GARRETT, S.R.T., GRANER, E. et al. (2005) Environmental education as a component of multidisciplinary conservation programs: lessons from conservation initiatives for critically endangered fruit bats in the western Indian Ocean. *Conservation Biology*, 19, 75–85.
- TULLOCH, A.I.T. (2020) Improving sex and gender identity equity and inclusion at conservation and ecology conferences. *Nature Ecology and Evolution*, 4, 1311–1320.
- VIRJI, H., PADGHAM, J. & SEIPT, C. (2012) Capacity building to support knowledge systems for resilient development – approaches, actions, and needs. *Current Opinion in Environmental Sustainability*, 4, 115–121.
- WELLS, K.M.S., RYAN, M.R., CAMPA, III, H. & SMITH, K.A. (2005) Mentoring guidelines for wildlife professionals. *Wildlife Society Bulletin*, 33, 565–573.
- WESCOTT, G. (2002) Partnerships for capacity building: community, governments and universities working together. *Ocean & Coastal Management*, 45, 549–571.
- WHITE, R.L., SUTTON, A.E., SALGUERO-GÓMEZ, R., BRAY, T.C., CAMPBELL, H., CIERAAD, E. et al. (2015) The next generation of action ecology: novel approaches towards global ecological research. *Ecosphere*, 6, 1–16.