

04

QUALITY GOVERNANCE IN MIANKALEH BIOSPHERE RESERVES, SOUTH-EASTERN REGION, CASPIAN SEA

Mahmood Yekeh Yazdandoost

Advisor Expert, Department of Environment (DoE), Iran
Email: yazdandoost3000@gmail.com

How to cite this paper:

Yazdandoost Mahmood
Yekeh (2024) Quality
Governance in Miankaleh
Biosphere Reserves, South-
Eastern Region, Caspian
Sea, Journal of Global
Resources, Vol. 10 (01)

DOI:

10.46587/JGR.2024.v10i01.004

Received: 28 Sep. 2023

Reviewed: 23 Oct. 2023

Final Accepted: 25 Nov. 2023

Abstract: *Quality governance consider as an effective managerial tool in supporting environmental integrity for conservation purposes in protected areas and biosphere reserves. It is appropriate to recognize a comprehensive program to assist the biosphere reserve's governance for better management, zonation and reporting achievement. In this way, we are supporting the biosphere reserves to fulfil their conservation, logistics and sustainability functions. Quality governance broadly produces all kinds of ecosystem services for biological productivity, human health and well-being. The objective of this research paper is to enhance sustainability in the healthy ecological systems by quality governance approaches. The result indicates, since there are different conditions in the biosphere reserves, there should be different institutional commitments and governance approaches to their evolutionary and adaptive programs. Moreover, quality governance in biosphere reserves requires sustainability thought with good structural decision-making capabilities at the national and local levels.*

Key words: Biosphere Reserves, Governance, Biodiversity, Sustainability, Management, Ecosystem Services

Introduction

Quality governance in the context of biosphere reserves level; is the combination of structures and processes that promote ecosystem functions, biodiversity conservation and energy flow into systems. It is for human and non-human health and well-being. It allows organization to develop chain of values through innovations and risk reductions. The biosphere reserves are the chief support of actions to conserve ecosystems, and maintain biodiversity and their populations by participation of local communities (Leverington, et al., 2010; Watson, et al., 2014). They are balancing nature protection programs with sustainable development goals by the involvement of stakeholders and local communities for the three basic and essential functions of biosphere reserves, namely: Conservation, Development and Logistical assistance. Biosphere-based Solutions to sustainability is governed by participation to ecosystem connectivity. A functional Earth connectivity and cohesiveness is necessary for boosting global economy and promoting societal responsibilities (Griggs et al., 2013). Biosphere reserves are natural sustainable development laboratories for learning and teaching programs on the effective elements of compliance in each geographical location. The specific provision to follow the functions of biosphere reserves is through the zonation system. The engagement of beneficiaries to accept the zonation system is a decisive requirement for effective fulfilment of biosphere reserve's programs (Deldicque, M., 2008; Pool-Stanvliet, R. et al., 2018). Practically the allocation of land for different activities in the process of conservation and development require a proper zonation system (Stoll-Kleemann, S. and Welp, M., 2008). After the zones are assigned, addressing adoption and solving any disagreement voice can be an important task for quality governance in stepping up the further affirmative activities. The biosphere reserves consolidate individual and community activities amid a slope, from strictly reserved site to buffer and then cooperative zone. In zonation system, only the core zone requires juridical protection. Thus, plasticity stands as a positive aspect in biosphere reserves, which facilitate the highly reserved site to the surrounding landscape (MAB, 2006). They may collectively enhance biodiversity conservation; local social life, livelihoods and connectivity to natural systems, and interconnect economic boost to cultural identity, through the involvement of indigenous and local community with the stakeholders in the planning, implementing and managing processes. Logistical support is of particular interest for socio-ecological arrangements, where the confirmed solidarity and cohesiveness between biophysical and social driving forces should exist.

In the past two decades, the term governance has been considered progressively for better conservation and the structural values, policies, processes, rules and the way of implementation in the biosphere reserves. The governance for sustainability should consider social interactions on environmental issues (Meadowcroft et al., 2005). With about one million species under threat of extinction, the only remedy can be a transformative change through most important preference (IPBES, 2019). Transformative change look into systemic challenges, by taking into consideration the compositional complications and the process of making decisions on natural uncertainties and unpredictability. Fairness and impartiality are the two basic elements while people decide about any transformative changes (Bennett et al., 2019; Leach et al., 2018). Moreover, transformative governance for sustainable development requires biosphere-centric priority to biodiversity conservation and ecosystem well-being. Biodiversity conservation is as a pre-condition requirement for sustaining human and ecological wellbeing, as well as achieving human and environmental justice (Human Rights Council, 2017; Kopnina, H., 2016; Schlosberg, D., 2007).

Quality governance consider as an effective managerial tool in supporting environmental integrity for conservation purposes in protected areas and biosphere reserves. Governing reserved areas with rich biodiversity and complex issues is not an easy task. Because, in our interconnected globalized environment that many challenges are transboundary, the need for effective transformative thinking and action plan with the involvement of all beneficiaries is a difficult task. Transformative change consists structural shift of thought for redesigning new pattern of social life in connectivity, cohesiveness and achievements, within the process of ecological and social sustainability. Holscher, et al. (2018) said, social relations' process of changing refers to a basic, systemic change in the arrangement, way of life and exercises of socio-technological, socioeconomic or socio-organizational practices. Moreover, in transformation, the decision makers are always having to make decisive choices (Meadowcroft, J., 2009) and decisions on specific issues, like for example of ecological integrity. The quality governance needs transformational change on the direction of capacity building and financing on community solidarity and leadership, which should be institutionalized (Chaffin et al., 2016). With orientation to grow biodiversity governance, the nature-based solutions are also getting attention (Almassy et al., 2018). The action of nature-based solutions is specified by engagement, cooperation and acquisition that support multifaceted and adaptive governance (Frantzeskaki, 2019; Triyanti and Chu, 2018). Likewise, biodiversity and ecosystem services are intermingled with many aspects of socio-economic system, therefore with assigning novel vision for transformative governance, a vast expansive transformative change for addressing sustainability issues are required. It is well documented that, in socioeconomically unfair societies the rate of biodiversity extinction is much higher (IPBES, 2019).

Linner and Wibeck (2019) define transformation as a non-linear deep sustaining systemic shift that particularly initiate sociocultural, governmental, technical and environmental actions for change. Advances toward the issues on planetary socioecological extent, such as advances in resilience and transformative thinking and adaptation, sustain the concept of transformation to the necessary steps on elementary transition in human-environment interchanges and responses (O'Brien, 2012; Olsson et al., 2014; Westley et al., 2013). O'Brien and Sygna (2013) mention, transformations comprise of three domains, the practical, political and personal (3P) domain, which collectively empower societal modifications. In a similar way, IPBES defines transformational change as a basic, broad-based reorganization, which occur through technical, economic and social circumstances and arrangements, including patterns, targets and importance.

A biosphere reserve is a distinct design to improve the health, safety and success of human and nature. The main aim of biosphere reserves is the presentation of sustainable developments into conservation activities. It acts as stated in the Statutory Framework of the World Network of Biosphere Reserves. Biosphere reserves through top-down as well as bottom-up approaches build excellent situation for sustainability and innovation through quality governance. A biosphere reserve is an indicative of the distribution and affluence of the biota, in a defined geographical area of importance, for biological diversity and being a peaceful coexistence place between human and nature. With the present global scenario, it is estimated around one million species are bound to extinction. Biodiversity when managed by local communities and indigenous people, even though if decline, it happens with less rapidity (Diaz et al., 2019).

Quality governance broadly produces all kinds of ecosystem services for biological productivity, human health and well-being, and integrates Community-based Management (CbM), Public Resource Management (PRM), Adaptive-based Governance (AbG) to the sustainability of biosphere development (Folke et al., 2005; Olsson et al., 2006; Berkes and Folke, 1998; Agrawal and Ostrom, 2001; Ostrom, 1990; Slocombe, 1998). As we know, the key finding of Millennium Ecosystem Assessment (MEA) was the understanding of direct and indirect dependency of human health and well-being, on ecological systems. The services from ecosystem make a wide contribution to human society (Costanza, R., et al., 2017), in other words human survival and well-being depends on quality, quantity and diversity of services, which gain from ecosystem. The interconnection among human, animal and the environment indicate how one health for all operates (Galaz et al., 2015). This should be developed in biosphere reserves.

The biosphere reserves are entirely a treaty between the local and indigenous community, with society (UNESCO, 1996) and is considered, as an unofficial social agreement for sustainability programs (2008). As a model, biosphere reserves persuade the local capacity for development to enhance sustainable use of natural resources, protection of ecological integrity, and the conservation of biodiversity. The biosphere reserve management system must be integrative, advantageous, productive, transformative, inclusive and participatory for the various stakeholders. Any biosphere reserve needs diverse and long-term funding to effectively implement sustainable development programs. Fundamental notion in sustainability transitional research contains system of government, landscapes and functions with mechanism referring to an ecological and technological system, and organizational development by making the most effective use (Geels, F.W. 2002). The objective of this research paper is to enhance sustainability in the healthy ecological systems by quality governance approaches. Thus, the scope of the project reflects the quality governance outlook at the biosphere reserves level. It firmly depends on the national environmental policy best practices for future biosphere development.

Methodology

The study involves structural approach to integrate adaptive and participatory management to biosphere reserves programs. Given the important contributions of biosphere reserves to sustainability issues this work look into Biosphere-based Solutions on sustainability, as a central operational value. The methodology for the quality governance in biosphere reserves comprises, assessment of biodiversity and ecological system, including the influences of socio-cultural values in the system.

Geographical Area

The geographical location is the Miankaleh Biosphere Reserve in the south-eastern region of the Caspian Sea. It was designated a Ramsar site in the year of 1975. The Miankaleh reserve is one of the fertile and most inestimable geological regions along the Caspian Sea. Different ecosystems exist in that region, which host diverse species of fauna and flora including millions of migrant birds. Though most of the inhabitants are ranchers, but in Miankaleh local community are involved with agriculture, horticulture, animal husbandry, traditional activities like; handicrafts, carpets and rugs weaving, poultry farming, nature-based tourism and eco-tourism. Wetlands, inter-tidal mud, shallow marine waters, forests, peatland, and agricultural areas are the significant habitats in this biosphere reserve. Besides hosting millions of migratory birds every year,

Miankaleh biosphere is the native place for diverse avian and reptile species. The fauna of the region includes Fox, jackals, wild cats, pigs, wild horses, among other animals. Important aquatic fauna includes salmon and starry sturgeon. Pheasant, white and black geese, flamingos, and pelicans are some examples of migratory birds. Raspberry bushes and bitter pomegranate trees are just a couple of flora species found in the region. The major challenges in Miankaleh biosphere reserve are deforestation, unplanned spread of villages, industrialization, overgrazing, illegal hunting, over fishing activity and population rise.

Results and Discussion

The pattern of perception structure has long been identified in developing policy and governance, especially on environmental issues (Douglas and Wildavsky, 1982; Stone, 1997; Bernstein, 2001) by researchers on environmental policies (Haas, 2002). In the modern age of cohesion and relationship, the present global structural policy should be reshaped, to policy connection and dependency (Horvath et al., 2022; Tremblay et al., 2020), because any change in one territory would bring change far away in other territories. In addition, any change in ecological system can become risk factor for emerging and spreading of established or otherwise newly encountered diseases. Biodiversity by dilution effect capacity; reduce the risks of diseases, because pathogens get diluted among reservoir species, so declining the danger of epidemics and pandemics in society (Schmidt and Ostfeld, 2001).

The ongoing dropping of biodiversity, even if not harm the current generation, will hurt future generations (Alvarez and Coolsaet, 2020). The biosphere dimension of Sustainable Development Goals, make the pavement for the rest of Sustainable Development Goals. On sustainability issues, UN (2015b) announces five areas of crucial importance, namely; people, planet, prosperity, peace, and partnerships (5Ps). The 5Ps can be applied directly to biosphere reserves. The current challenge in biosphere governance is the lack of leadership in accelerating comprehensive conservation policy and sustainable harvesting of quality and quantity reserves values for sustainable development. The assessment indicates Miankaleh biosphere reserve is under pressure through unsustainable development and unauthorized activities that severely influence biological diversity and productivity (fertility, fecundity, longevity) at the local and international level. Because Miankaleh wetland and its surrounding core area, support millions of migratory birds annually during winter season. Any disturbances in that region influence directly regional biological health and create mortality among native and migratory species. The diversity of animal species in Miankaleh indicate, there are: about 355 species of birds, 17 species of reptiles, 9 species of amphibians, 27 species of snakes, three species of turtles, 63 species of mammals and 70 species of inland water amphibians. The biodiversity of the region because of the various ecosystem disturbances through human activities are in the verge of decline.

To illustrate conservation towards sustainable development, the biosphere reserves at the local and national level may serve as experimental sites and models for learning the human-ecosystem coexistence and adaptability, and on the biosphere network approach the lessons learned at the specific sites may be accepted and get implemented elsewhere on the globe (UNESCO, 2005; Gregg, 1988). Besides attempting to protect and rehabilitate nature, a focal point for biosphere reserves governance right now and in future is to secure nature's share to people in a good quality. Each biosphere reserve encompasses a diversity of ecological systems, which require multi-management approaches to function well and as we become more attentive

about the change, the need for transition, become more urgent and instrumental. Quality governance with the goal of transformative change for sustainable development should act Inclusive, strategic and specified in biosphere reserves. Inclusive property of quality governance if apply in Miankaleh promotes participation by attraction, connection, reflection and change towards sustainable development achievement.

By requisitions, quality governance should involve various stakeholders at multiple levels and domains in its adoption, when we urge participation to earn collective goals. Driving forces crucial to achievement comprise multi-dimension governance approaches. The recognition and involvement of all community and native stakeholders, along with joint efforts of environmental department officials and conservation officers make the process more successful. Since there are different conditions in the biosphere reserves, there should be different institutional commitments and governance approach to their evolutionary and adaptive programs. Each biosphere model should give insight to sustainable development and be analogized on a global proportion. In Miankaleh, the quality governance and its effective implementation program need appropriate funding, logistics encouragement for research and training that create solidarity and unity for sustainable biodiversity and biocultural conservation. In addition, the engaged institutional capacity may supply proportional mechanisms to develop sustainable utilization of resources by the well-informed community (UNESCO, 1996). Community participation may closely examine biosphere authorities to the conception of the functions of biosphere reserves, rise their desire degrees, and promote practices. Linked public-private capacities may bring skills and efficiencies to biosphere governance transformation, with knowing that sometimes private business entrance may inhibit transformation.

In Miankaleh, capacity-building development have increased awareness among local communities about their interconnected environment and secured their participation for their territorial and sociocultural rights. They learned when live in sustain harmonious connection with nature, not only their economic development will boost but also their social relation will consolidate. The knowledge produced and experience achieved from one biosphere reserve should be exchanged with others to facilitate better vision on the future stakeholder coordination and managerial collaboration. Moreover, quality governance in biosphere reserves requires sustainability thought with good structural decision-making capabilities at the national and local level. As Kemp et al (2005) precisely noted the problem is the involvement of stakeholders and their cohesion capacity on pursuing effectively the sustainability demands. Systems theory is related to governance perspective, because it indicates ecological systems bearing complexity characters that will not be judged by simple direct response, and if presuming simple and easy response for the environmental complex issues, we are on the wrong and dangerous side of thinking (Kay and Schneider, 1994). Hence, the governance system is responsible for strategy design patterns and effective use of resources without pressurizing the resilience capacity of the biosphere reserves. As a result, the well-defined governance system, adaptive and resilient management, clearing house mechanisms, communication skills and capacity building, all together, create key path and credit to sustainable biosphere landscape development (Sayer, J. et al., 2013; UNESCO, 2020; Ros-Tonen, M. et al., 2014).

Recommendations

Biosphere reserves through quality governance should develop the compatibility associations between local communities and nature to advance the sustainability issues via discussing and transferring knowledge, reducing destitution, improving human health, enhancing cultural identity and values, and addressing climate change recovery. Here there are a few suggestions:

- Support local communities indigenous knowledge;
- Promote livelihood opportunities in compliance with sustainable development;
- Develop sustainable solutions to local challenges;
- Link quality governance to sustainable development goals;
- Design eco-tourism and natural-tourism opportunities;
- Develop communication for awareness raising;
- Support agro-forestry projects.

Conclusion

The sustainability transformations or transitions both distinguishes the necessity for basic changes by multiple actors in multiple spheres. Combining transformations and transitions through quality governance enable flexible changes to environment that concentrate on underlying causes of disturbances, delivering systems and the society. For fundamental change, they give special importance to societies/communities and their structures, and the underlying causes of unsustainability, while through transformation identifies connection and communication between governance and society. From the transformation aspect, the transformative shift, include numerous clearly defined transitions. Governance on environmental management dimension include all aspects of policies, planning, programming and legislative issues that consolidate human-environment interactions. The quality governance should remain integrative and inclusive to ensure biodiversity in biosphere conservation is a priority across sectors. Quality governance in the biosphere reserve is a comprehensive approach that consolidates ecological-social system in promoting biological conservation and ecological interconnectivity for sustainable development. It is expected in the zoned areas the levels of adoption would be more. Such adoption would influence participation towards sustainable development in the biosphere reserves. The enforcement by adoption should be through local support with strong voice.

A potential biosphere reserve must embrace mosaics of ecological arrangements that are significant of large biogeographic territory. It should conserve biodiversity and ecological processes for sustainable development on a territorial scale. The Sustainable Development Goals achievement in biosphere reserves may influence Earth's productivity and connectivity for better future. For effective and comprehensive conservation, it is substantial to concentrate on biological as well as on biocultural diversity; also, biosphere reserve action plans should be encouraged on scientific findings and values. The portion of buffer zone embracing traditional cultural prospect with rich biodiversity may act as a paradigm for sustainable land production and harvesting, which are useful for transformation flow in the transition zone. In quality governance, cooperation plays an important role in achieving transformation for sustainable environmental management. The quality governance approach to biosphere reserves creates sustainable landscape management model. Hence, the quality governance involves the local communities into the institutional structure for decision-making and develops vision for Ecosystem-based Arrangements (EbA). As a result, the biosphere reserves managerial system should integrate, sustainability issues, biodiversity conservation and community development with the aim of adaptability and resiliency to the environmental changes, and through community and stakeholders participation, expand quality governance stability in all layers of sociocultural environment. However, understanding

biosphere reserves in the context of quality governance has not been fully developed yet, but been identified as good integrated management towards sustainability. Quality governance at multilevel operational processes can strengthen transformational change. Better plan will solidify better implementation. Moreover, the quality governance for biosphere reserves sustainability is a conducive process that requires social and environmental responsibility to eco-biological systems. The quality governance structures by engaging proper and effective participation of stakeholders and beneficiaries would be in a good status to promote biosphere reserve's functionality as well as productivity. Quality governance administratively should have a structural backbone, functional tasks and comprehensive procedural roadmap to perform well. The quality governance needs to interconnect numerous stakeholders' viewpoints to develop visions for decision-makings. The social capital building and institutional structures improvement create good circumstances towards biosphere reserves sustainable development. For protecting Miankaleh biosphere reserve a good adaptive, integrative and inclusive governance approach should be on the list of national agenda. The inclusive governance furnishes justice recognition as a central part of transformative governance. However, justice continuation needs to be integrative in making synergies amongst sectors, society, organizations and policy mechanisms. For biosphere reserves to be transformative, it is incumbent to advance from a conservation and development integration pattern to conservation, development and equity integration pattern. It comprises firmer identification of local perspectives from nature in decision-making proceedings and assistance in local environmental superintendency instead of detaching local subsistence from ecosystems conservation worthiness. In Miankaleh the decisive emphasis in combining components of quality governance, assure the long-range achievement at the local level.

Acknowledgement: All the scientific literatures released by academia, UN and other agencies including Department of Environment that have been used in this research paper are highly appreciated.

References

1. Agrawal, A. and Ostrom, E. (2001) Collective action, property rights, and decentralization in resource use in India and Nepal. *Politics & Society* 29: 485-514.
2. Almassy, D., et al. (2018). Urban nature atlas: A database of nature-based solutions across 100 European cities. Available from <https://bit.ly/35Q11rt>.
3. Alvarez, L., and Coolsaet, B. (2020) Decolonising environmental justice studies: Capitalism, Nature and Socialism. 31, 50–69.
4. Bennett, et al. (2019) Just transformations to sustainability. *Sustainability* 11(14), 3881.
5. Berkes, F., and Folke, C. (1998) *Linking social and ecological systems: Management practices and social mechanisms for building resilience*. Cambridge, UK: Cambridge University Press.
6. Bernstein, S. (2001) The compromise of liberal environmentalism. New York: Columbia Univ. press.
7. Chaffin, B. C., et al. (2016) Transformative environmental governance. *Annual Review of Environment and Resources* 41, 399–423.
8. Costanza, R., et al. (2017) Twenty years of ecosystem services: How far have we come and how far do we still need to go? *Ecosystem Services*, 28, 1–16.
9. Diaz, S. et al. (2019) Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the IPBES. Bonn: IPBES secretariat.
10. Deldicque, M. (2008) Dialogue in the itinerary of biosphere reserve creation. Bouamrane, M., Ed.; Man and Biosphere Programme. Paris. pp. 5–22.
11. Douglas, M., and Wildavsky, A. (1982) How can we know the risks we face? Why risk selection is a social process. *Risk Analysis* 2, 49–58.
12. Folke, C., Hahn, T., Olsson, P. and Norberg, J. (2005) Adaptive governance of social ecological systems. *Annual Review of Environment and Resources* 30: 441-473.
13. Frantzeskaki, N. (2019) Seven lessons for planning nature-based solutions in cities. *Environmental Science and Policy* 93, 101–111.

14. Galaz, et al. (2015) The political economy of One Health research and policy. STEPS Working Paper 81. Brighton: STEPS Centre.
15. Geels, F. W. (2002) Technological transitions as evolutionary reconfiguration processes: A Multi-level perspective and a case study. *Research Policy* 31, 1257–1274.
16. Griggs et al. (2013) Sustainable Development Goals for people and planet. *Nature*, 495, 305–307.
17. Haas, P. (2002) UN conferences and constructivist governance of the environment. *Global Gov.* 8, 73
18. Holscher, et al. (2018) Transition versus transformation: What is the difference? *Environmental Innovation and Societal Transitions* 27, 1–3.
19. Horvath et al. (2022). Review and assessment of methods to analyze SDG entity interactions. *Environmental Science & Policy*, 131, 160–176.
20. Human Rights Council. (2017) Report of the Special Rapporteur on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment. A/HR.
21. IPBES (2019) Summary for policymakers of the global assessment report on biodiversity and ecosystem services. Bonn, IPBES secretariat.
22. Kay, J.J. and Schneider, E. (1994) Embracing Complexity: The Challenge of the Ecosystem Approach. *Alternatives* 20(3): 32-39.
23. Kemp, R., Parto, S. and Gibson, R. B. (2005) Governance for Sustainable Development: Moving from Theory to Practice. *International Journal of Sustainable Development* 8(1):12-30.
24. Kopnina, H. (2016) Half the Earth for people. Ethical questions in cons. *Bio. Conservation* 203.
25. Leverington, et al. (2010) A global analysis of protected area management effectiveness. *Environmental Management* 46, 685–698.
26. Linner, B.O., and Wibeck, V. (2019) Sustainability transformations: Agents and drivers across societies. Cambridge University Press.
27. MAB (2006) *Meeting of the International Coordinating Council, 19th Session*. October 23-27. Paris.
28. Meadowcroft, J., Farrell, K. N. and Spangenberg, J. (2005) Developing a framework for sustainability governance in the European Union. *International Journal of Sustainable Development* 8 (1/2): 3-11.
29. Meadowcroft, J. (2009) What about the politics? Sustainable development, transition management, and long-term energy transitions. *Policy Sciences* 42, 323–340.
30. O'Brien, K., and Sygna, L. (2013) Responding to climate change: The three spheres of transformation. pp.16–23. University of Oslo.
31. Olsson, et al. (2006). Shooting the Rapids: Navigating Transitions to Adaptive Governance of Social-Ecological Systems. *Ecology and Society* 11(1).
32. Ostrom, E. (1990) *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge, MA: Cambridge University Press.
33. Pool-Stanvliet, R. et al. (2018) Criteria for selection and evaluation of biosphere reserves in support of the UNESCO MAB program in South Africa. *Land Use Policy*. 76, 654–663.
34. Ros-Tonen, M., et al. (2014) From Co-Management to Landscape Governance: Whither Ghana's Modified Taungya System? *Forests*, 5, 2996–3021.
35. Sayer, J. et al. (2013) Ten principles for a landscape approach to reconciling agriculture, conservation, and other competing land uses. *Proc. Natl. Acad. Sci. USA*. 110, 8349–8356.
36. Schlosberg, D. (2007) *Defining environmental justice: Theories, movements, and nature*. Oxford University Press.
37. Schmidt, K. A., and Ostfeld, R. S. (2001) Biodiversity and the dilution effect in disease ecology. *Ecology* 82, 609–619.
38. Stoll-Kleemann, S. and Welp, M. (2008) Participatory and Integrated Management of Biosphere Reserves. *GAIA*. 17, 161–168.
39. Tremblay et al. (2020) Sustainable Development Goals interactions. *Sustainable Development*, 28(6), 1584–1596.
40. UN (2015b) *Transforming our World: The 2030 Agenda for Sustainable Development*, Accessed 30 September 2021.
41. UNESCO (2020) *World Network of Biosphere Reserves*.
42. Watson, et al. (2014) The performance and potential of protected areas. *Nature* 515, 67–73.
43. Westley, et al. (2013) A theory of transformative agency in linked social-ecological systems. *Ecology and Society* 18, 27.