

# Transboundary Protection of Biodiversity in the Context of Human and Environmental Security and Climate Change

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## 1 Introduction

Biodiversity underpins our quality of life, our economies, our cultures, our social stances and our national identities. Effective ecosystems, of which biodiversity is a crucial part, are essential to ensure services such as clean drinking water, unpolluted air, the decomposition of waste for fertile topsoil, food production, carbon sequestration, crop pollination and the control of pests and diseases.<sup>1</sup> These services provide the environmental and human security for present and future development.

Unfortunately, climate change impacts negatively on biodiversity in many ways.<sup>2</sup> Species extinction is only one of the many such impacts. Shifts in genetic composition, changes in the migration patterns of birds and the distribution patterns of flora, the spread of certain alien and invasive species, the altered life cycles of some species and the reduced (or increased) reproduction rates of others, increasingly occur across geopolitical boundaries and become “transboundary” in nature. For our present purposes, the term ‘transboundary’ is used to refer to any movement across international borders, and not only the boundaries of various habitats (such as river basins). This chapter argues that the protection of biodiversity in a transboundary setting is critical for

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- 1 Harold Mooney and others, ‘Biodiversity, climate change, and ecosystem services’ *Current Opinion in Environmental Sustainability* (2009) 1 pp. 46–54; Pauline Buffle *et al.*, ‘Payments for Ecosystem Services as a Means to Adapt to Climate Change in Madagascar’ (ELAN 2011); M.R.W. Rands *et al.*, ‘Biodiversity Conservation: Challenges Beyond 2010’ *Science* (2010) 329 pp. 1298–1303.
  - 2 K.J. Willis and S.A. Bhagwat, ‘Biodiversity and Climate Change’ *Science* (2009) 326 pp. 806–807; Sébastien Lavergne *et al.*, ‘Biodiversity and Climate Change: Integrating Evolutionary and Ecological Responses of Species and Communities’ *Annual Review of Ecology, Evolution, and Systematics* (2010) 41 pp. 321–350; Nicole E. Heller and Erika S. Zavaleta, ‘Biodiversity management in the face of climate change: A review of 22 years of recommendations’ *Biological Conservation* (2009) 142 pp. 14–32.

environmental and human security, which is especially threatened by climate change and associated heightened disaster risks. In doing so, it explains why biodiversity is important for environmental and human security, and it considers human and environmental security and biodiversity in the transboundary context. It also attempts to explain the ecological, political, economic and peace-building rationale informing these issues. Climate change as a transboundary threat is then investigated, and it is argued that climate change poses significant current and future disaster risks which have the potential to impact on biodiversity and, as a result, to adversely affect environmental and human security. The chapter concludes by suggesting a range of transformative actions to address possible human insecurity and the environment within the transboundary context of biodiversity protection.

## 2 Human and Environmental Security

Historically the end of the Cold War and heightened knowledge of the negative effects of unsustainable developmental paths and bad governance<sup>3</sup> increasingly emphasised the need for a more comprehensive definition of the concept of security.<sup>4</sup> As with other international conflicts, the Cold War ended due to significant reconfigurations of the political system in Europe.<sup>5</sup> This event heightened interest in security, its key components and its principles.<sup>6</sup> King and Murray<sup>7</sup> believe that it was in the period following the Cold War that the two dominant strands of foreign policy (economic development and military security) became intertwined. The former raised questions such as: who or what are the objects or referents of security; who provides security; for whom is security intended (individuals, groups, nations, regions, the world,

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3 Lloyd Axworthy, 'Human security and global governance: Putting people first' *Global governance* (2001) 7 p. 19.

4 Nina Graeger, 'Environmental security?' *Journal of Peace Research* (1996) pp. 109–116; Sabina Alkire, 'A Conceptual Framework for Human Security' University of Oxford (2003) pp. 13–22; Emma Rothschild, 'What is security?' *Daedalus* (1995) 124 pp. 53–98; Lloyd Axworthy, 'Human security and global governance: Putting people first' *Global governance* (2001) 7 p. 19.

5 James R. Arnold and Roberta Wiener, 'Cold War: The Essential Reference Guide' (ABC-CLIO 2012) p. 443.

6 Emma Rothschild, 'What is security?' *Daedalus* (1995) 124 pp. 53–98.

7 Gary King and Christopher J.L. Murray, 'Rethinking Human Security' *Political Science Quarterly* (2002) 116 pp. 585–610.

or intangibles such as values);<sup>8</sup> and does security also relate to environmental aspects that encapsulate human well-being and (environmental and human) health. Security, in both the human and environmental contexts, has ever since enjoyed ample attention on the policy,<sup>9</sup> diplomatic,<sup>10</sup> development,<sup>11</sup> economic,<sup>12</sup> military,<sup>13</sup> and research<sup>14</sup> agendas. Alkire<sup>15</sup> argues that human security now has many useful manifestations which could be used as the basis for operational responses by many different institutions. There are, however, inconsistencies in the definition and the use of the term 'security' which inhibit a uniform and consistent understanding.<sup>16</sup> According to Richmond and Franks,<sup>17</sup> there is also a need to redefine the term 'security' in such a way as to move away from the 'state' towards the 'individual', as it were.<sup>18</sup> This means that peace, security and wellbeing should be fostered by introducing political, social and economic reforms or transformations in terms of the security agenda, and environmental reforms should not be excluded from these

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- 8 D. Hannay in F. Dodds and T. Pippard, 'Human and environmental security: an agenda for change' *Earthscan* (2005) pp. 1–7.
- 9 Lloyd Axworthy, 'Human security and global governance: Putting people first' *Global governance* (2001) 7 p. 19.
- 10 Robert Grant McRae and Don Hubert, 'Human Security and the New Diplomacy' (McGill-Queen's University Press 2001) p. 279.
- 11 United Nations Development Project, 'Human Development Report 1994' (United Nations 1994).
- 12 Gary King and Christopher J.L. Murray, 'Rethinking Human Security' *Political Science Quarterly* (2002) 116 pp. 585–610.
- 13 Ken Booth, 'Theory of World Security' (Cambridge University Press 2007) pp. 489; Barend L. Prinsloo, 'The AU/UN hybrid peace operation in Africa—A new approach to maintain international peace and security' (Ph.D. Thesis, North-West University 2012).
- 14 Roland Paris, 'Human security: paradigm shift or hot air?' *International Security* (2001) 26 pp. 87–102.
- 15 Sabina Alkire, 'A Conceptual Framework for Human Security' (University of Oxford 2003) pp. 13–22.
- 16 Sabina Alkire, 'A Conceptual Framework for Human Security' (University of Oxford 2003) pp. 13–22; F. Dodds and T. Pippard, 'Human and environmental security: an agenda for change' *Earthscan* (2005) pp. 27–38; United Nations Development Project, 'Human Development Report 1994' (United Nations 1994); Roland Paris, 'Human security: paradigm shift or hot air?' *International Security* (2001) 26 pp. 87–102.
- 17 F. Dodds and T. Pippard, 'Human and environmental security: an agenda for change' *Earthscan* (2005) ch. 3.
- 18 Emma Rothschild, 'What is security?' *Daedalus* (1995) 124 pp. 53–98.

endeavours. Importantly, human security is not a new term, but a re-labelled one that has been conceived from older debates and ideas.<sup>19</sup>

The term 'human security' was popularised by the 1994 Human Development Report of the United Nations Development Programme (UNDP).<sup>20</sup> The Report highlights earlier incarnations of the term as being too narrowly circumscribed. Before 1994 security was mostly defined in terms of the safety of the state, which in turn was linked to military actions and peace-building.<sup>21</sup> Notably, the pre-1990s' concept entailed 'security of territory from external aggression, or . . . protection of national interest in foreign policy or . . . a global security from the threat of nuclear holocaust . . . forgotten were the legitimate concerns of ordinary people who sought security in their daily lives'.<sup>22</sup> Security was therefore not perceived as critically important for the individual. The Report proceeds to venture a new definition of security which should first mean 'safety from such chronic threats as hunger, disease and repression', and 'protection from sudden and hurtful disruptions in the patterns of daily life—whether in homes, in jobs or in communities'.<sup>23</sup> The Report further identifies seven elements of human security including the economy, food, health, the environment, personal security, community security, and political security. It is noteworthy that environmental security is perceived as being a subset of human security issues.<sup>24</sup> Thus, one could argue that without environmental security, human security is not completely possible, simply because people depend on Earth and its environmental systems and processes for their sustained livelihoods and development. UNDP's interpretation of 'security'

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19 Roland Paris, 'Human security: paradigm shift or hot air?' *International Security* (2001) 26 pp. 87–102.

20 United Nations Development Project, 'Human Development Report 1994' (United Nations 1994); Sabina Alkire, 'A Conceptual Framework for Human Security' (University of Oxford 2003) pp. 13–22.

21 Barry Buzan and Lene Hansen, 'The Evolution of International Security Studies' (Cambridge University Press 2009) p. 8; Barend L. Prinsloo, 'The AU/UN hybrid peace operation in Africa—A new approach to maintain international peace and security' (Ph.D. Thesis, North-West University 2012).

22 United Nations Development Project, 'Human Development Report 1994' (United Nations 1994).

23 Roland Paris, 'Human security: paradigm shift or hot air?' *International Security* (2001) 26 pp. 87–102.

24 Roland Paris, 'Human security: paradigm shift or hot air?' *International Security* (2001) 26 pp. 87–102.

corresponds with that of commentators like Richmond and Franks,<sup>25</sup> who state that human security should be defined as the ‘freedom from want’ and the ‘freedom from fear’, and should be based, as Lidén and Eneströ <sup>26</sup> proclaim, on a ‘normative humanism and an ethical responsibility to reorientate security around the individual’. However, the perception mostly remains that the responsibility to provide security still rests with the state (especially in the light of the development of new forms of terrorism.)<sup>27</sup> The ability of certain states, however, to provide such security to the individual must be questioned. Failed states in the developing world have been notorious for gross human rights violations (e.g. Rwanda)<sup>28</sup> and the exploitation of the environment.<sup>29</sup> The idea of human security thus takes on an entirely new dimension which requires other regional and local actors to become the custodians of ‘human security’. Despite (or perhaps because of) the many definitions of the concept, it remains fundamentally imprecisely defined, as commentators like Paris<sup>30</sup> indicate. In this sense, human security could be compared with ‘sustainable development’, meaning people may encourage and support it without having a precise idea of what it actually entails. This could also mean that ‘most ardent backers of human security appear to have an interest in keeping the term expansive and vague’.<sup>31</sup> For the purpose of this chapter, human security will be defined as providing the political, economic, social, cultural, and environmental conditions in which people live knowing that their vital rights and freedoms are secure.

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25 F. Dodds and T. Pippard, ‘Human and environmental security: an agenda for change’ Earthscan (2005) ch. 3.

26 F. Dodds and T. Pippard, ‘Human and environmental security: an agenda for change’ Earthscan (2005) ch. 2.

27 F. Dodds and T. Pippard, ‘Human and environmental security: an agenda for change’ Earthscan (2005) pp. 27–28.

28 Barend L. Prinsloo, ‘The AU/UN hybrid peace operation in Africa—A new approach to maintain international peace and security’ (Ph.D. Thesis, North-West University 2012).

29 David John Frank and others, ‘The Nation-State and the Natural Environment over the Twentieth Century’ *American Sociological Review* (2000) 65 pp. 96–116.

30 Roland Paris, ‘Human security: paradigm shift or hot air?’ *International Security* (2001) 26 pp. 87–102.

31 Roland Paris, ‘Human security: paradigm shift or hot air?’ *International Security* (2001) 26 pp. 87–102.

As in the post-Cold War human security thinking explained above, environmental security was initially linked to violent conflict.<sup>32</sup> Dabelko<sup>33</sup> and Jensen and Lonergan<sup>34</sup> respectively state that in the past decades researchers and practitioners have moved from a nearly exclusive focus on the connections between environmental scarcity or abundance and conflict to a wider set of questions about the environment's roles all along the conflict continuum—including prevention, active conflict, conflict termination, and post-conflict peace-building and reconstruction. This wider agenda includes questions of cooperation and peace building around environmental interdependence, which assumes a fair number of transboundary considerations. In line with this shift in focus, for our present purposes, environmental security will not be considered in terms of its military application (e.g., the natural resources necessary for military deployment, or military deployment for environmental clean-up),<sup>35</sup> but instead for its contribution to human security (i.e. favourable environmental conditions contributing to rights and freedoms). As Khagram *et al.*,<sup>36</sup> emphasise, the relationships between the environment and human security are certainly close and complex: “[A] great deal of human security is tied to people’s access to natural resources and vulnerabilities to environmental change—and a great deal of environmental change is directly and indirectly affected by human activities and conflicts.”

Like the concept human security, environmental security has frequently appeared in research debates and it seems almost impossible to agree on a uniform definition for this concept.<sup>37</sup> Sachs<sup>38</sup> goes so far as to call environmental security ‘one of those poisonous concepts which cloud the mind’. But this

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32 Geoffrey D. Dabelko, ‘Environmental Change and Security Project Report’ (Woodrow Wilson International Centre for Scholars 2003) pp. 1–35.

33 Geoffrey D. Dabelko, ‘Environmental Change and Security Project Report’ (Woodrow Wilson International Centre for Scholars 2003) p. i.

34 David Jensen and Stephen Lonergan, ‘Assessing and Restoring Natural Resources in Post-Conflict Peacebuilding’ (Routledge 2012) pp. 17–18.

35 Jyrki Käkönen, ‘Green security or militarized environment’ (Dartmouth 1994).

36 Sanjeev Khagram and others, ‘From the Environment and Human Security to Sustainable Security and Development’ *Journal of Human Development* (2003) 4 pp. 289–313.

37 Nina Graeger, ‘Environmental security?’ *Journal of Peace Research* (1996) pp. 109–116; Maria Julia Trombetta, ‘Environmental security and climate change: analysing the discourse’ *Cambridge Review of International Affairs* (2008) 21 pp. 585–602; B.R. Allenby, ‘Environmental security: Concept and implementation’ *International Political Science Review* (2000) pp. 5–21; Geoffrey D. Dabelko, ‘Environmental Change and Security Project Report’ (Woodrow Wilson International Centre for Scholars 2003) p. i.

38 Jon Barnett, ‘The Meaning of Environmental Security’ (Zed Books 2001).

does not take us very far when seeking conceptual clarity. The study of environmental security revolved around a central idea that environmental problems (in particular, natural resource scarcity and environmental degradation) may lead to violent conflict between and among states and societies.<sup>39</sup> Thus, one of the major problems with defining the concept of environmental security was the 'propensity to include any and every aspect of security thinking'.<sup>40</sup> It is also likely that conceptual over-inclusivity is contributing to challenges in our efforts to link environmental and human security. The reasons for the challenging link between the environment and security reflect the fact that environmental problems are silenced due there being more urgent threats, and that even considering the environment as a security issue is a challenge in its own right.<sup>41</sup>

What is nevertheless clear today is that environmental security does not continue to exclusively relate to the conflict/peace agenda.<sup>42</sup> Factors such as climate change,<sup>43</sup> conservation,<sup>44</sup> and the protection of biodiversity<sup>45</sup> are

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- 39 Larry Swatuk, 'Environmental security in practice: Transboundary natural resources management in Southern Africa' (2004) p. 539.
- 40 Nina Graeger, 'Environmental security?' *Journal of Peace Research* (1996) pp. 109–116.
- 41 Maria Julia Trombetta, 'Environmental security and climate change: analysing the discourse' *Cambridge Review of International Affairs* (2008) 21 pp. 585–602.
- 42 Geoffrey D. Dabelko, 'Environmental Change and Security Project Report' (Woodrow Wilson International Centre for Scholars 2003) p. 171; David Jensen and Stephen Lonergan, 'Assessing and Restoring Natural Resources In Post-Conflict Peacebuilding' (Routledge 2012) p. 57.
- 43 IPCC, 'Climate Change 2007' p. 976; Martin Parry and others (eds.), (Cambridge University Press 2007); Jon Barnett and W. Neil Adger, 'Climate change, human security and violent conflict' *Political Geography* (2007) 26 pp. 639–655; M. Munasinghe, 'Exploring the linkages between climate change and sustainable development: A challenge for transdisciplinary research' *Conservation Ecology* art. no. 14 (2001) 5.
- 44 Charles C. Benight and others, 'Conservation of resources and coping self-efficacy predicting distress following a natural disaster: A causal model analysis where the environment meets the mind' *Anxiety, Stress & Coping* (1999) 12 pp. 107–126; Arndt Hampe and Rémy J. Petit, 'Conserving biodiversity under climate change: the rear edge matters' *Ecology Letters* (2005) 8 pp. 461–467; William Wolmer, 'Transboundary Conservation: The Politics of Ecological Integrity in the Great Limpopo Transfrontier Park' *Journal of Southern African Studies* (2003) 29 pp. 261–278.
- 45 M.R.W. Rands and others, 'Biodiversity Conservation: Challenges Beyond 2010' *Science* (2010) 329 pp. 1298–1303; K.J. Willis and S.A. Bhagwat, 'Biodiversity and Climate Change' *Science* (2009) 326 pp. 806–807; Sébastien Lavergne and others, 'Biodiversity and Climate Change: Integrating Evolutionary and Ecological Responses of Species and Communities' *Annual Review of Ecology, Evolution, and Systematics* (2010) 41 pp. 321–350; Harold Mooney and others, 'Biodiversity, climate change, and ecosystem services' *Current Opinion in Environmental Sustainability* (2009) 1 pp. 46–54.

increasingly linked to environmental security. After conducting intensive research into the concept of environmental security in the early 2000s, the Millennium Project defined it as:

environmental viability for life support, with three sub-elements: (a) preventing or repairing military damage to the environment, (b) preventing or responding to environmentally caused conflicts, and (c) protecting the environment due to its inherent moral value. It involves and reflects the ability of an entity, whether a nation or a society, to withstand environmental asset scarcity, environmental risks or adverse changes, or environment-related tensions or conflicts.<sup>46</sup>

This definition, however, does not consider the inextricable link and important role of the environment in ensuring human security (as defined above), or the broader issues of global environmental change due to human actions. We prefer to define environmental security as an issue that concerns the maintenance of the environment, including the many ecosystem services provided by the environment, which collectively form the essential support system on which all humankind and species depend.<sup>47</sup> This wide scope of interpretation of the term also affects its geopolitical application. Whereas human security could be and mostly still is linked to geopolitical boundaries (i.e. the safety of a nation or country), environmental security transcends such human borders (as does the protection of biodiversity, as is explained below), and it becomes particularly relevant in a transboundary context.

### 3 Situating Biodiversity Conservation in the Security Debate

Economic growth, industrialisation, modernisation and the western culture of consumption, among other such developments, have resulted in the unsustainable exploitation of the Earth's biodiversity.<sup>48</sup> We have now reached a point in our geological history which a certain school of thought now labels

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46 Jerome C. Glenn, Theodore J. Gordon and Renat Perelet, 'Environmental Security: Emerging International Definitions, Perceptions, and Policy Considerations' (U.S. Army Environmental Policy Institute 1998).

47 Elizabeth L. Chalecki, 'Environmental Security: A Case Study of Climate Change' (Pacific Institute for Studies in Development 2002).

48 Tim Allen and Tracey Skelton, 'Culture and Global Change' (Routledge 1999) p. 352; M.R.W. Rands and others, 'Biodiversity Conservation: Challenges Beyond 2010' *Science* (2010) 329 pp. 1298–1303.



the 'Anthropocene'.<sup>49</sup> In the Anthropocene people, as the primary ecological change agents, possess the means to drastically change nature and therefore have a significant effect on the Earth and its systems, including its biodiversity. There is ample evidence that human-induced climate change is one of the key drivers of these changes.<sup>50</sup> Warren *et al.*<sup>51</sup> estimate that more than half of the plants and one-third of the animals on Earth will lose more than half of their climatic range by 2080 if nothing is done now to reduce the rate of global warming and slow it down. To be sure, Djoghla and Dodds<sup>52</sup> proclaim that the loss of biodiversity is one of those 'critical "planetary boundaries" that have already been exceeded', with the Millennium Ecosystem Assessment<sup>53</sup> confirming the overwhelming contributions made by natural ecosystems to human life and wellbeing. These devastating impacts will arguably be compounded by the ever-increasing world population, with recent estimates suggesting nine billion people in the near future.<sup>54</sup> Despite recent global normative and political commitments to the conservation of biodiversity, such as the Convention on Biological Diversity's 2010 Targets<sup>55</sup> and the establishment of the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES),<sup>56</sup> little progress has been made in slowing the rate of biodiversity loss

49 The 'Anthropocene' denotes an epoch where human-driven processes have altered and are altering the normal cycles and processes of the Earth, and will have a lasting impact. Jan Zalasiewicz *et al.*, 'The New World of the Anthropocene' *Environmental Science & Technology* (2010) 44 pp. 2228–2231. Also see Kotzé in this volume.

50 IPCC, 'Climate Change 2007' Martin Parry and others (eds.), (Cambridge University Press 2007); United Nations, 'Climate Change 2007: Impacts, Adaptation and Vulnerability' (M.L. Parry and others (eds.), Cambridge University Press 2008); Wilfried Thuiller, 'Climate change and the ecologist' *Nature* (2007) 448 pp. 1–11; Elizabeth Burleson, 'Climate Change Consensus: Emerging International Law' (2010) 34 *William and Mary Environmental Law and Policy Review* p. 543

51 R. Warren and others, 'Quantifying the benefit of early climate change mitigation in avoiding biodiversity loss' *Nature Climate Change* (2013).

52 Ahmed Djoghla and Felix Dodds, 'Biodiversity and Ecosystem Insecurity' (Routledge 2011) p. 230.

53 The Millennium Ecosystem Assessment (MA) is a scientific undertaking involving over 1300 experts working in 95 countries. The MA was called for by the United Nations Secretary-General Kofi Annan in 2000. Initiated in 2001, the objective of the MA was to assess the consequences of ecosystem change for human wellbeing and the scientific basis for action needed to enhance the conservation and sustainable use of those systems and their contribution to human wellbeing.

54 John Parker, 'The 9 billion-people question' *The Economist* (February 4, 2011).

55 See <http://www.cbd.int/2010-target/>.

56 See: <http://www.ipbes.net>.

across the globe.<sup>57</sup> This is an alarming realisation considering the critical role that biodiversity plays in sustaining ecosystem integrity, health and services, as well as human and environmental security more generally.<sup>58</sup>

Some believe that one of the best ways of preserving biodiversity is to deliberately set aside land for that purpose.<sup>59</sup> This is evident in the protection of rain forests believed to be habitats for many endangered species. Unfortunately, there is a problem with this approach. In “setting aside land” a variety of different dynamics come into play which are exemplified by the following questions: What parts of the land are we talking about? Who are the (rightful) owners of the land? What is the strategic value of the land? Who is dependent on the land? Which habitats and species are prevalent? What human and environmental benefits will be derived from this specific piece of land as a protected area? What about the current land use? Who makes the decisions and on whose behalf? Does this piece of land stretch across geopolitical boundaries? If so, which laws and policies are applicable (e.g., traditional law, common law, regional and/or international law? Wolmer<sup>60</sup> believes that since the 1990s many interest groups have ‘found common cause in espousing the re-establishment of ecological integrity across artificial frontiers and administrative boundaries’. Notably, these so-called transfrontier conservation areas often involve many other issues that reach beyond the realms of biodiversity protection and natural resource management, such as national sovereignty,<sup>61</sup> land reform,<sup>62</sup> and poverty alleviation.<sup>63</sup> In fact, a variety of environmental

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57 David A. Keith and others, ‘Scientific Foundations for an IUCN Red List of Ecosystems’ *PLoS ONE* e62111 (2013) 8.

58 M.R.W. Rands and others, ‘Biodiversity Conservation: Challenges Beyond 2010’ pp. 1298–1303 *Science* (2010) 329; Ben Collen *et al.*, ‘Biodiversity Monitoring and Conservation’ (Wiley-Blackwell 2013) p. 464.

59 Even Bergseng and Arild Vatn, ‘Why protection of biodiversity creates conflict—Some evidence from the Nordic countries’ *Journal of Forest Economics* (2009) 15 pp. 147–165.

60 William Wolmer, ‘Transboundary Conservation: The Politics of Ecological Integrity in the Great Limpopo Transfrontier Park’ pp. 261–278 *Journal of Southern African Studies* (2003) 29.

61 Elizabeth Burleson, ‘Climate Change Consensus: Emerging International Law’ (2010) 34 *William and Mary Environmental Law and Policy Review* p. 543. Also see Venter in this volume.

62 Simon Metcalfe, ‘Impacts of transboundary protected areas on local communities in three Southern African initiatives’, (September 2003) pp. 1–27.

63 William Wolmer, ‘Transboundary Conservation: The Politics of Ecological Integrity in the Great Limpopo Transfrontier Park’ pp. 261–278 *Journal of Southern African Studies* (2003) 29. See also Bocchino in this volume.

and human security issues almost always permeates transfrontier areas. Some are of the opinion, however, that transfrontier protected areas alone are not sufficient to conserve biodiversity or sustain the ecosystem services on which human life depends.<sup>64</sup> Protected areas can also not fully ensure human security because the large and continuous areas of the original habitats have been both reduced in area and divided into many fragments. As Sandwith<sup>65</sup> states, 'the existing protected area network is either too small for maintenance of viable populations or isolated, thus limiting the biota's potential for dispersal and colonisation'. Clearly, then, the importance of a non-fragmented approach to biodiversity conservation through transfrontier conservation areas that seek to protect and enhance human and environmental security would be important.

#### 4 The Transboundary Context

The need in a transboundary context for a holistic and reciprocally connected approach to human and environmental security could be illustrated with reference to the regional interplay between water governance and biodiversity governance. This is because few natural resources lend themselves so well to the interaction between states and have a greater influence on human and environment security than water.<sup>66</sup> Also, water is important for biodiversity conservation and while water is vital in ensuring and sustaining biodiversity, biodiversity conversely is necessary for the self-purifying potential of bodies of water.<sup>67</sup> Most major watercourses form borders between states, and thus a common dependency sometimes regulates conflict and cooperation, which in turn raises a number of security issues. Recent research by Vörösmarty *et al.*,<sup>68</sup>

64 Belinda Reyers, 'Evaluating Transboundary Protected Areas: Achieving Biodiversity Targets', (September 12, 2003) pp. 1–11.

65 Trevor Sandwith *et al.*, 'Transboundary protected areas for peace and co-operation: based on the proceedings of workshops held in Bormio (1998) and Gland (2000)' (Gland, Switzerland: IUCN—the World Conservation Union 2001); Yongyut Trisurat, 'Transboundary biodiversity conservation of the Pha Taem Protected Forest Complex: A bioregional approach' *Applied Geography* (2006) 26 pp. 260–275.

66 Aaron T. Wolf and others, 'Chapter 5: Managing Water Conflict and Cooperation in Worldwatch Institute (ed)' *State of the World 2005* (W.W. Norton & Company 2005) Ch. 5.

67 S.A. Ostroumov, 'Biodiversity protection and quality of water: the role of feedbacks in ecosystems' *Doklady Biological Sciences* (2002) 382 pp. 138–141.

68 C.J. Vörösmarty and others, 'Global threats to human water security and river biodiversity' *Nature* (2010) 467 pp. 555–561.

considers human and biodiversity perspectives on water security, for example. The study found that nearly 80% of the world's population is exposed to high levels of threat in the context of water security. Similarly, a lack of precautionary investment in water conservation by all nations jeopardises biodiversity. The foregoing gives rise to an important question: what motivates governments to ensure human and environmental security through the conservation of biodiversity in a transboundary setting? Martin<sup>69</sup> proposes four reasons why governments and other actors have become interested in cooperation over transboundary biodiversity governance, namely the ecological, the political, the economic and the desire to promote peace.

#### 4.1 *The Ecological Rationale*

The ecological rationale for the transboundary protection of biodiversity is based on the need for larger scales of management and extended conservation areas/parks well beyond park and country boundaries.<sup>70</sup> Larger areas could cater for more diversification and an abundance in species, thereby allowing for a more sustainable approach to ecosystem governance as well. The Kavango Zambezi Transfrontier Conservation Area (KAZA-TFCA),<sup>71</sup> which spans five SADC countries,<sup>72</sup> is an example in this respect. Transfrontier governance of natural resources extends well beyond traditional protected areas and has the added advantage of inviting a large number of non-traditional actors such as surrounding communities, community-based organisations, non-governmental organisations, the private sector and even international donors to engage in the governance effort. Any effort to ensure environmental and human security in the context of biodiversity protection requires a new way of managing the transboundary landscape.<sup>73</sup>

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69 A. Martin *et al.*, 'Understanding the co-existence of conflict and cooperation: Transboundary ecosystem management in the Virunga Massif' *Journal of Peace Research* (2011) 48 pp. 621–635.

70 A. Martin *et al.*, 'Understanding the co-existence of conflict and cooperation: Transboundary ecosystem management in the Virunga Massif' *Journal of Peace Research* (2011) 48 pp. 621–635; Trevor Sandwith *et al.*, 'Transboundary protected areas for peace and co-operation: based on the proceedings of workshops held in Bormio (1998) and Gland (2000)' (Gland, Switzerland: IUCN—the World Conservation Union 2001) pp. 7–15; Yongyut Trisurat, 'Transboundary biodiversity conservation of the Pha Taem Protected Forest Complex: A bioregional approach' *Applied Geography* (2006) 26 pp. 260–275.

71 See: <http://www.kavangozambezi.org>.

72 Angola, Namibia, Zambia, Botswana and Zimbabwe.

73 John A. Wiens and Michael R. Moss, 'Issues and Perspectives in Landscape Ecology' (Cambridge University Press 2005) pp. 390.

#### 4.2 *The Political Rationale*

The transboundary protection of biodiversity has certain political benefits for countries.<sup>74</sup> In a transboundary setting, it is inevitable that senior political decision-makers interact. Such interaction holds many more benefits than just the establishment and management of protected areas or the joint management of resources. It could lead to better cooperation, understanding, and conflict resolution, and to the opening of lines of communication. In the case of Southern Africa, certain ideological concepts (such as regionalisation, regional integration, democratisation, peace-building and peace-keeping) and the history of freedom struggles (during the colonial and apartheid periods) go hand in hand with the establishment of transboundary protected areas,<sup>75</sup> mostly due to the expectation that institutionalised cross-border cooperation will enhance regionalisation. Regionalisation, in turn, is thought to hold a number of political benefits such as increased cooperation between regional states on a range of governance issues, when they would otherwise have shunned one another. Cooperation among states in transboundary conservation efforts and the protection of biodiversity even have the potential to spawn other modes of cooperation, such as attempts to mitigate and adapt to climate stimuli, or the transboundary management of natural hazards.

#### 4.3 *The Economic Rationale*

Sadoff and Grey<sup>76</sup> claim that transboundary cooperation brings about a basket of direct and indirect economic benefits. Economic benefits for states more often result from cooperation than from the efforts of individual states. Examples of the economic benefits derived from transboundary conservation in the SADC region are integrated development planning, ecotourism, poverty reduction, socio-economic benefits for local communities, building local markets and niches, introducing low-cost leapfrog technologies, and payment for the ecosystems services driven by communities.<sup>77</sup>

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74 A. Martin *et al.*, 'Understanding the co-existence of conflict and cooperation: Transboundary ecosystem management in the Virunga Massif' *Journal of Peace Research* (2011) 48 pp. 621–635.

75 A. Martin *et al.*, 'Understanding the co-existence of conflict and cooperation: Transboundary ecosystem management in the Virunga Massif' *Journal of Peace Research* (2011) 48 pp. 621–635.

76 C.W. Sadoff and D. Grey, 'Cooperation on international rivers: A continuum for securing and sharing benefits' *Water International* (2005) 30 pp. 1–8.

77 Although this view is contested by some. See, for example, Bocchino in this volume.

#### 4.4 *The Peace-building Rationale*

Initially, transboundary conservation areas were inspired by the notion of erecting so-called “peace parks” between states with the hope of achieving political and environmental cooperation which could become the catalyst for regional stability, and strengthening international relations among states (i.e. contributing to state security).<sup>78</sup> While this may be true to a certain extent, Bannon and Collier<sup>79</sup> caution against blind faith in the peace-building promises which peace parks bring. The history of conflict associated with transboundary protected areas (or parts thereof) could in itself pose a threat to human security and peace building. Such is the case on the Angola side of the KAZA-TFCA, which is still considered hazardous because of the many land mines in the area. Moreover, the economic benefits of transboundary areas might themselves lead to conflict.<sup>80</sup> Climate change also has the potential to upset the peaceful condition which peace parks aim to achieve, due to heightened competition for natural resources and the movement of people across borders.<sup>81</sup> Climate change can affect natural hazard profiles in various geographical areas and impact on biodiversity which, in turn, might heighten risks, and impact on vulnerable communities and their resilience. This has the potential to pose some significant security problems across borders; an issue which is returned to in the following section.

## 5 Climate Change as a Transboundary Threat

The science behind the argument that climate change is having and will increasingly have dramatic impacts on ecological and social systems is undeniable.<sup>82</sup> It is well known that climate change will affect habitats, change geographical

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78 A. Martin *et al.*, ‘Understanding the co-existence of conflict and cooperation: Transboundary ecosystem management in the Virunga Massif’ *Journal of Peace Research* (2011) 48 pp. 621–635.

79 Ian Bannon and Paul Collier, ‘Natural Resources and Violent Conflict’ (World Bank 2003) p. 409.

80 Jon Barnett and W. Neil Adger, ‘Climate change, human security and violent conflict’ pp. 639–655 *Political Geography* (2007) 26.

81 Jürgen Scheffran, Michael Brzoska, Hans Günter Brauch, Peter Michael Link, and Janpeter Schilling, ‘Climate Change, Human Security and Violent Conflict’ (Springer Berlin Heidelberg 2012) vol. 8.

82 IPCC, ‘Climate Change 2007—The Physical Science Basis’ (Susan Solomon and others (eds), Cambridge University Press 2007); CC IPCC, ‘Intergovernmental Panel on Climate Change’ Third Assessment Report (2001).

features, influence water availability, impact on food security, and undermine hard-earned development gains.<sup>83</sup> Barnett and Agner<sup>84</sup> argue that climate change could even lead to severe and violent conflict over ever-decreasing natural resources. These conflicts will arguably occur along traditional international state boundaries (not excluding transboundary conservation areas).<sup>85</sup> Climate change could also affect the political economy of energy resources due to the taking of mitigative actions (e.g., investment in the development of solar energy or the use of alternative, greener energy sources) to lessen the reliance on fossil fuels.<sup>86</sup> This in turn might have dramatic effects on the global economic system. Shah<sup>87</sup> notes that such a shift in energy focus would have a direct adverse impact on the standards of living in developed nations, but it would also have a dramatic negative impact on development in developing countries.

Changes in social systems brought on by actual and perceived climatic effects could possibly lead to insecurities (such as food insecurities, unemployment and poverty, lack of land tenure and access to land, and climate migrancy).<sup>88</sup> The biggest threat of climate change is, however, the changes caused to the various cycles of the Earth, which increase the risk of more

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83 Global Climate Observing System *et al.*, 'Climate Information for Development Needs: An Action Plan for Africa' (African Union Commission November 29, 2006); E.L.F. Schipper, 'Climate change adaptation and development: Exploring the linkages' (Tyndall Centre for Climate Change Research 2007); United Nations, 'Climate Change 2007: Impacts, Adaptation and Vulnerability' (M.L. Parry and others (eds.), Cambridge University Press 2008).

84 Jon Barnett and W. Neil Adger, 'Climate change, human security and violent conflict' pp. 639–655 *Political Geography* (2007) 26.

85 David Jensen and Stephen Lonergan, 'Assessing and Restoring Natural Resources In Post-Conflict Peacebuilding' Routledge (2012); Geoffrey D. Dabelko, 'Environmental Change and Security Project Report' pp. 232–234 Woodrow Wilson International Centre for Scholars (2003).

86 David L. Levy and Daniel Egan, 'A Neo-Gramscian Approach to Corporate Political Strategy: Conflict and Accommodation in the Climate Change Negotiations' *Journal of Management Studies* (2003) 40 pp. 803–829.

87 Anup Shah, 'Reactions to Climate Change Negotiations and Action' (2012-03-05 2013), <<http://www.globalissues.org/article/179/reactions-to-climate-change-negotiations-and-action>> accessed 17 May 2013.

88 Hans G. Bohle *et al.*, 'Climate change and social vulnerability: Toward a sociology and geography of food insecurity' *Global Environmental Change* (1994) 4 pp. 37–48; Jon Barnett and W. Neil Adger, 'Climate change, human security and violent conflict' pp. 639–655 *Political Geography* (2007) 26; W.N. Adger, 'Vulnerability' *Global Environmental Change* (2006).

intense and frequent natural hazards (e.g. hydrological and meteorological events).<sup>89</sup> These hazards, if left unmitigated, could exploit human and environmental vulnerability and cause disasters of unknown proportions. One should not, however, think that climate change would manifest only in rapid onset hazards such as those that have received global media attention (e.g. the European heat wave (2003), Hurricane Katrina (2005), and Hurricane Sandy (2012)). Evidence suggests that changes in mean conditions (e.g. temperature, sea level rise and annual precipitation) over a longer time will change habitats and species, and impact on biodiversity.<sup>90</sup> Such changes in the composition of biodiversity have the potential to increase non-hydro-meteorological hazards such as wild fires (due to a greater biomass fuel load resulting from drier conditions); a greater threat to biodiversity from invasive species;<sup>91</sup> landslides (due to the loss of vegetation because of drought, erosion, or glacier regression);<sup>92</sup> and riverine flooding (possibly due to an influx of invasive species which block natural water courses).<sup>93</sup> Climate change will thus add to already abundant stressors on poor livelihoods in many countries, thus exposing them even

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89 Geoff O'Brien *et al.*, 'Climate change and disaster management' *Disasters* (2006) 30 pp. 64–80; I. Kelman, 'Climate change and small island developing states: a critical review' *Ecological and Environmental ...* (2009); Lisa Schipper and Mark Pelling, 'Disaster risk, climate change and international development: scope for, and challenges to, integration' *Disasters* (2006) 30 pp. 19–38; William Solecki and others, 'Climate change adaptation strategies and disaster risk reduction in cities: connections, contentions, and synergies' *Current Opinion in Environmental Sustainability* (2011) 3 pp. 135–141; Paul Venton and Sarah La Trobe, 'Linking climate change adaptation and disaster risk reduction' *Tearfund* (2008) p. 16.

90 Arndt Hampe and Rémy J. Petit, 'Conserving biodiversity under climate change: the rear edge matters' pp. 461–467 *Ecology Letters* (2005) 8; Michael Oppenheimer and Richard B. Alley, 'The West Antarctic ice sheet and long-term climate policy' *Climatic Change* (2004) 64 pp. 1–10; IPCC, 'Climate Change 2007' p. 976 Martin Parry *et al.*, (eds.), Cambridge University Press (2007); Jon Barnett and W. Neil Adger, 'Climate change, human security and violent conflict' pp. 639–655 *Political Geography* (2007) 26; C.D. Thomas and others, 'Extinction risk from climate change' *Nature* (2004) pp. 145–148.

91 James M. Vose *et al.*, 'Effects of Climatic Variability and Change on Forest Ecosystems' (U.S. Department of Agriculture 2012) p. 265; Oscar Grillo and Gianfranco Venora, 'Biodiversity Loss in a Changing Planet' (InTech 2011) Ch. 1.

92 Mauro Soldati *et al.*, 'Landslides and climate change in the Italian Dolomites since the Late glacial' *Geomorphic Impacts of Rapid Environmental Change* (2004) 55 pp. 141–161.

93 Margaret A. Palmer *et al.*, 'Climate change and the world's river basins: anticipating management options' *Frontiers in Ecology and the Environment* (2008) 6 pp. 81–89; United Nations International Strategy for Disaster Reduction, 'Global Assessment Report on Disaster Risk Reduction' (United Nations Office for Disaster Risk Reduction 2013).



more,<sup>94</sup> while at the same time negatively impacting on biodiversity and other environmental resources.<sup>95</sup> Collectively, these will have enormous impacts on human and environmental security. Climate change therefore remains perhaps the most critically important factor to consider when contemplating transboundary efforts to protect biodiversity with a view to increasing human and environmental security. Notably, it is the issue of climate-related disasters that has become increasingly relevant in this discussion.

## 6 The Risk of Disasters

It is trite that climate change is already leading to many regional disasters, and/or increased risks of disasters occurring in many regions of the world, including Southern Africa. The world is facing an increasing frequency of occurrence of disasters of greater intensity and severity, which are having a devastating impact on development (i.e. setting back hard-earned development gains),<sup>96</sup> livelihoods (e.g. the loss of limited assets increases vulnerability),<sup>97</sup> and biodiversity (to the extent that prolonged drought and flooding could lead to the loss of biodiversity).<sup>98</sup> Disasters are often transboundary in nature and thus could have dramatic effects on human and environmental security. The linkage between human and environmental security, the transboundary protection of biodiversity, and the reduction of the risk of disaster lies in the components of disaster risk.

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94 IUCN *et al.*, 'Sustainable Livelihoods & Climate Change Adaptation' (IISD 2004).

95 Harold Mooney *et al.*, 'Biodiversity, climate change, and ecosystem services' pp. 46–54 *Current Opinion in Environmental Sustainability* (2009) 1; K.J. Willis and S.A. Bhagwat, 'Biodiversity and Climate Change' pp. 806–807 *Science* (2009) 326.

96 Riyanti Djalante *et al.*, 'Adaptive governance and managing resilience to natural hazards' *International Journal of Disaster Risk Science* (2012) 2 pp. 1–14; United Nations International Strategy for Disaster Reduction, 'Global Assessment Report on Disaster Risk Reduction' (United Nations Office for Disaster Risk Reduction 2013); Andrew E. Collins, 'Disaster and Development' (Routledge 2009).

97 Gideon van Riet, 'Slow-onset disaster and sustainable livelihoods: the Vaal River in the vicinity of Parys' (2009) p. 488.

98 Ahmed Djoghlaif and Felix Dodds, 'Biodiversity and Ecosystem Insecurity' (Routledge 2011) p. 230; Keith Smith, 'Environmental Hazards: Assessing Risk and Reducing Disaster' (5 edn, Routledge 2009); Larry Swatuk, 'Environmental security in practice: Transboundary natural resources management in Southern Africa' (2004).

The risk of disasters can be determined through an understanding of the interaction between three main factors, namely hazards (natural and anthropogenic), vulnerabilities to these hazards (which could be political, economic, physical, environmental and/or social in nature), and coping mechanisms (which could include adaptation and mitigation measures).<sup>99</sup> Disasters occur due to the exploitation of vulnerabilities by hazards. The link between an increase in the likelihood of disasters occurring and biodiversity is mainly, but not exclusively, found within hazard and biological sciences. For instance, Chamier *et al.*,<sup>100</sup> assert that over 200 introduced plant species in South Africa are regarded as invasive. Many of these invasive species are predominantly found in riparian ecosystems and their spread results in native species loss, increased biomass and wild fire intensity, which causes erosion, as well as decreased river flows that lead to upstream flooding. Transboundary invasive species can further influence grazing (for wildlife as well as cattle) by increasing evaporation rates and changing the plant chemistry of the biomass. Moreover, research by Jeschke<sup>101</sup> points to the emerging transboundary transmission of pathogens both through invasive species and the so-called 'novel hosts' (such as synthetic organisms and genetically modified organisms (GMOs)). There is also an increase in the cross-species transmission of diseases (such as Bovine Tuberculosis) which are linked to climatic change.<sup>102</sup> This phenomenon is of particular importance in rural communities where people share habitats and water sources with livestock and wildlife. Notably, water scarcity is more pronounced in conditions of drought (particularly in areas near national parks and game reserves including transboundary conservation areas where people might be immune-compromised as a result of diseases such as HIV/AIDS). The loss of biodiversity can therefore have a direct bearing on the level of disaster risk which humans face, and the protection of biodiversity, especially in the transboundary context, should thus be seen as a reduction of the risk of disaster as well as a climate adaptation measure.

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99 United Nations International Strategy for Disaster Reduction, 'Living with Risk' (United Nations Publications 2004).

100 J. Chamier *et al.*, 'Impacts of invasive alien plants on water quality, with particular emphasis on South Africa' *Water SA* (2012) 38 pp. 345–356.

101 Jonathan M. Jeschke *et al.*, 'Novel Organisms: Comparing Invasive Species, GMOs, and Emerging Pathogens' *AMBIO* (2013) pp. 1–8.

102 Erasto V. Mbugi *et al.*, 'Tuberculosis cross-species transmission in Tanzania: Towards a One-Health concept' *Onderstepoort Journal of Veterinary Research* (2012) 79 pp. 1–6.

## 7 Transformative Actions for Human and Environmental Security in the Transboundary Biodiversity Context

This chapter has thus far described the complex interaction between biodiversity, human and environmental security, climate change and disaster risk reduction in a transboundary context. It has been shown that all of these issues are interlinked and that the protection of biodiversity in a transboundary context is crucial for the promotion of human and environmental security in the face of the threat of impending climate disasters. Providing solutions to optimise the conservation of biodiversity, reduce the risk of disaster and promote human and environmental security in the face of climate change remains an enormous challenge which will require monumental transformative actions. These actions could include, among others: adaptive and participatory transboundary conservation and landscape planning;<sup>103</sup> identifying and implementing protected areas and/or environmentally managed biological corridors;<sup>104</sup> rapid livelihood adaptation to reduce economic vulnerability;<sup>105</sup> ensuring community ownership of ecosystem goods and services, through the sustainable use of natural resources and the protection of biodiversity;<sup>106</sup> enhancing transboundary communities' interaction and cooperation;<sup>107</sup> promoting advocacy and social mobilisation to address the underlying causes of vulnerability such as poor governance, degraded ecosystems, inequitable control and inequitable access to resources, and limited access to basic services;<sup>108</sup> conducting community-based disaster risk assessments and establishing local

103 John A. Wiens and Michael R. Moss, 'Issues and Perspectives in Landscape Ecology' (Cambridge University Press 2005) p. 390.

104 Trevor Sandwith *et al.*, 'Transboundary protected areas for peace and co-operation: based on the proceedings of workshops held in Bormio (1998) and Gland (2000)' (Gland, Switzerland: IUCN—the World Conservation Union 2001).

105 David Jensen and Stephen Lonergan, 'Assessing and Restoring Natural Resources In Post-Conflict Peacebuilding' Routledge (2012); James M. Vose *et al.*, 'Effects of Climatic Variability and Change on Forest Ecosystems' (U.S. Department of Agriculture 2012) pp. 265.

106 Juliette C. Young *et al.*, 'Less government intervention in biodiversity management: risks and opportunities' *Biodiversity and Conservation* (2012) 21 pp. 1095–1100.

107 Juliette C. Young *et al.*, 'Less government intervention in biodiversity management: risks and opportunities' *Biodiversity and Conservation* (2012) 21 pp. 1095–1100.

108 Vincent Gudmia Mfonfu, 'International Advocacy on Biodiversity Conservation', August 1, 2011.

development plans;<sup>109</sup> and incorporating customary laws and traditional rights into formal legal and political decision-making on the ownership and use of natural resources, community action and local disaster risk reduction.<sup>110</sup> We turn to these issues in detail below.

### 7.1 *Adaptive and Participatory Transboundary Conservation and Landscape Planning*

There is no common approach to adaptive and participatory transboundary approaches to conservation and landscape planning. Community-based Adaptation (CbA) and Ecosystem-based Adaptation (EbA) are, however, two approaches which could be employed to enhance the adaptive ability and the human and environmental security of the communities most at risk.<sup>111</sup> CbA is a process led by communities, which empowers them to plan for and cope with adverse impacts, shocks and stresses to their livelihoods. EbA is similar to CbA, but uses the services of ecosystems and biodiversity as a strategy to help the communities to cope with adverse circumstances.<sup>112</sup> Girot *et al.*,<sup>113</sup> suggest that these two approaches will be more useful if they are used together to address deficiencies in the mainstream, infrastructure-based approaches to adaptation, and to promote a more balanced and integrated approach to increasing

109 Rajib Shaw, 'Community-Based Disaster Risk Reduction' Community, Environment and Disaster Risk Management (Rajib Shaw (ed.), Emerald Group Publishing Limited 2012); Gideon van Riet and Dewald van Niekerk, 'Capacity development for participatory disaster risk assessment' Environmental Hazards (2012) 11 pp. 213–225.

110 Eklabya Sharma and Nakul Chettri, 'ICIMOD's Transboundary Biodiversity Management Initiative in the Hindu Kush-Himalayas' Mountain Research and Development (2005) 25 pp. 278–281; Chettri, Thapa, and Shakya, 'Participatory conservation planning in Kangchenjunga transboundary biodiversity conservation landscape'; Yongyut Trisurat, 'Transboundary biodiversity conservation of the Pha Taem Protected Forest Complex: A bioregional approach' Applied Geography (2006) 26 pp. 260–275; Arndt Hampe and Rémy J. Petit, 'Conserving biodiversity under climate change: the rear edge matters' pp. 461–467 Ecology Letters (2005) 8; C.D. Thomas *et al.*, 'Extinction risk from climate change' Nature (2004) pp. 145–148.; Martin, Rutagarama, Cascao, Gray, and Chhotray, 'Understanding the co-existence of conflict and cooperation: Transboundary ecosystem management in the Virunga Massif' pp. 621–635.

111 Hannah Reid, 'Improving the evidence for ecosystem-based adaptation' (IIED 2011); Pascal Girot *et al.*, 'Integrating Community and Ecosystem-Based Approaches in Climate Change Adaptation Responses' (ELAN April 11, 2012).

112 Jen Stephens, 'A Review of Grey Literature Evidence on Ecosystem-Based Approaches for Adaptation Effectiveness' (USAID Forestry and Biodiversity Office 2012).

113 Pascal Girot *et al.*, 'Integrating Community and Ecosystem-Based Approaches in Climate Change Adaptation Responses' (ELAN April 11, 2012).

the resilience of the communities. It is also suggested that countries and practitioners should assist one another in such integrated adaptation approaches, because a participatory transboundary approach can be fully effective only in this way.<sup>114</sup> For instance, practitioners are attempting to mainstream adaptation into conservation and landscape planning and disaster risk management planning processes,<sup>115</sup> which will provide them with a platform for bottom-up adaptation planning and structured systems. An example of where protected areas have been identified and participatory actions supported is the forests in the Congo Basin, where the Central African Regional Programme for the Environment (CARPE) has developed an adaptive, pragmatic approach to conservation and land-use planning.<sup>116</sup>

## 7.2 *Rapid Livelihood Adaptation*

The notion of 'livelihood', according to an International Institute for Sustainable Development (IISD) report, involves the capabilities, activities and assets that are required for living.<sup>117</sup> When livelihoods can cope, adapt, recover from risk stressors and maintain and enhance capabilities, only then are they sustainable. Poor communities are usually the most vulnerable when it comes to risks, stressors and disasters, because they have the least resources to adapt and cope.<sup>118</sup> Communities living in and around transboundary protected areas face even greater challenges to secure their livelihoods. Under these often dire circumstances, rapid livelihood adaptation (which contributes to human and environmental security) can be achieved through a holistic governance approach that includes natural resource management; agriculture and income diversification; proper environmental management; culture, equity and gender governance; inclusive policy and partnership development; and information and knowledge management.<sup>119</sup> Underpinning these, are the promotion

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114 Angela Andrade Pérez *et al.*, 'Building resilience to climate change: ecosystem-based adaptation and lessons from the field' (Gland, Switzerland: IUCN 2010).

115 David Yanggen *et al.*, 'Landscape-scale Conservation in the Congo Basin' (IUCN 2010); Clara Bocchino and Richard Burroughs, 'Synergies across the natural resources management fields in Southern Africa: Disaster Risk Reduction and One Health' *Jàmbá: Journal of Disaster Risk Studies* 10 pages (2013) 5; IISD, 'Livelihoods and Climate Change' (IUCN, IISD and SEI 2003).

116 David Yanggen *et al.*, 'Landscape-scale Conservation in the Congo Basin' (IUCN 2010).

117 IISD, 'Livelihoods and Climate Change' (IUCN, IISD and SEI 2003).

118 Benjamin Wisner *et al.*, 'At risk' (2nd edn, Routledge 2004) p. 471.

119 Eklabya Sharma and Nakul Chettri, 'ICIMOD's Transboundary Biodiversity Management Initiative in the Hindu Kush-Himalayas' *Mountain Research and Development* (2005) 25 pp. 278–281.

and restoration of biodiversity connectivity within and between transboundary landscapes.<sup>120</sup>

### 7.3 *Community Ownership of Ecosystem Goods and Services*

The legacies of colonialism and the perpetuation of the colonial bureaucratic system by independent governments in Africa have largely ensured the lack of community ownership of ecosystem goods and services.<sup>121</sup> Linked to the challenges of land tenure and uneven land distribution, communities (especially those in rural areas) find it difficult to adapt appropriately in the face of uncertainties.<sup>122</sup> There are, however, initiatives to address this problem. The Ecosystem and Livelihoods Adaptation Network (ELAN), a global network working to enhance poor and marginalised people's resilience in the face of the impacts of climate change, aims to promote an integrated approach to adaptation across boundaries. Its work involves adaptation planning and action that adheres both to human rights-based principles and principles of ecosystem sustainability, recognising their co-dependent roles in successfully managing climate variability and long-term change.<sup>123</sup> To this end, ELAN has developed a series of case studies that illustrates the transformative action of community ownership of ecosystem goods and services.<sup>124</sup> Stephens,<sup>125</sup> in his research on the effectiveness of ecosystems-based adaptation approaches, concludes that most of the case studies surveyed (32 in total) which employ community ownership of ecosystems goods and services were in fact effective. Moreover, he found EbA to be an effective tool to use in transboundary biodiversity

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120 Eklabya Sharma and Nakul Chettri, 'ICIMOD's Transboundary Biodiversity Management Initiative in the Hindu Kush-Himalayas' Mountain Research and Development (2005) 25 pp. 278–281.

121 Ulrike Müller-Glodde, 'Where there is no participation: Insights, strategies, case studies, "do's" and "don'ts" in regional rural development' (GTZ 1991) pp. 4–8.

122 Walter Leal Filho (ed.), 'Experiences of Climate Change Adaptation in Africa' Climate Change Management (1st edn, Springer 2011) p. 324.

123 Pascal Girot *et al.*, 'Integrating Community and Ecosystem-Based Approaches in Climate Change Adaptation Responses' (ELAN April 11, 2012).

124 Hannah Reid, 'Improving the evidence for ecosystem-based adaptation' (IIED 2011); Robert Munroe and Nathalie Doswald, 'Effectiveness of Ecosystem-Based Approaches to Adaptation: a Critical Review' (Cambridge Conservation Initiative 2011); Robert Munroe and others, 'Review of the evidence base for ecosystem-based approaches for adaptation to climate change' Environmental Evidence (2012) 1 p. 13.

125 Jen Stephens, 'A Review of Grey Literature Evidence on Ecosystem-Based Approaches for Adaptation Effectiveness' (USAID Forestry and Biodiversity Office 2012).

protection once it is linked to community ownership of ecosystems goods and services (see the discussion above).

#### 7.4 *Transboundary Communities' Interaction, Cooperation and Connectivity*

One of the most effective ways to obtain broad support for biological linkages is to integrate planning and management with other livelihood-focused programmes that deliver benefits in sustainable land management.<sup>126</sup> In fact, local support for the protection of transboundary biodiversity can in most instances be gained only if transformative actions actually address the livelihood goals of the communities in question.<sup>127</sup> These goals include the recognition of their local identity, effective participation, and secure rights to land and natural resources. However, where limited natural resources are available, particularly in the transboundary setting, conflict is inevitable, producing unavoidable stresses on human and environmental security.<sup>128</sup> One should also be mindful of the fact that in many instances the communities might not have the understanding, the rights or institutions to effectively engage in transboundary dialogue. Thus one can argue that communities will engage in certain adaptive actions only if they can see the direct benefit of doing so.<sup>129</sup>

Commenting on protected areas, Metcalfe,<sup>130</sup> states that while the establishment of protected areas in Southern Africa was perceived in conservation circles as a success story, the relationship between parks and neighbouring communities was often characterised as exclusionary or fragmented. Later, insights from conservation biology emphasised the need for what Metcalfe terms “ecological connectivity”, and noted that many protected areas were not big enough to conserve biodiversity (see the discussion above). Protected area authorities realised that they needed to collaborate with neighbours that had been alienated through colonialism, the creation of protected areas, and the

126 Andrew Fawcett Bennett, ‘Linkages in The Landscape’ (World Conservation Union 2003) p. 147.

127 Simon Metcalfe, ‘Impacts of transboundary protected areas on local communities in three Southern African initiatives’, (September 2003) pp. 1–27.

128 Bergsens and Vatn, ‘Why protection of biodiversity creates conflict—Some evidence from the Nordic countries’ pp. 147–165.

129 Ulrike Müller-Glodde, ‘Where there is no participation: Insights, strategies, case studies, “do’s” and “don’ts” in regional rural development’ (GTZ 1991) pp. 4–8; John G. Griffin Jr., ‘Transboundary Natural Resources Management (TBNRM) Journal of Sustainable Forestry (2003) 17 pp. 229–230.

130 Simon Metcalfe, ‘Impacts of transboundary protected areas on local communities in three Southern African initiatives’, (September 2003) pp. 1–27.

promulgation of certain laws and policies which controlled commercial access to natural resources, for instance.<sup>131</sup> The 1990s saw increased advocacy for the devolution of natural resource management rights to communities living in or near protected areas. Although Southern Africa has been a leader in the field of community-based natural resources management, communities are still struggling to secure and manage fully devolved resource use rights.<sup>132</sup> Thus, in a developing state context that is plagued by climate concerns, such as most Southern Africa countries find themselves in, the engagement and cooperation between communities becomes more crucial for enhancing their common human and environmental security.

### 7.5 *Advocacy and Social Mobilisation*

Rapid transformation to address climate change and threats to human and environmental security can be effective only if the message is communicated to a wide audience.<sup>133</sup> Social mobilisation and advocacy activities must be undertaken as an integral component of transboundary governance that also considers adaptation to climate change and the reduction of the risk of disaster. This could potentially ensure the full and active participation and cooperation of all stakeholders, including government and non-governmental agencies, in developing the popular understanding of and interest in the transboundary protection of biodiversity. In this model, advocacy and social mobilisation aim to generate support and assistance from government and community sectors and groups.<sup>134</sup> Mfonfu,<sup>135</sup> however, believes that communities are notoriously unable to influence role-players and to make their voices heard. This observation may be understood as arising from the absence of an advocacy plan, and hence of the lack of a clear message to communicate, which can not in any event be communicated because of the lack of effective channels of communication. The existence of various voices and conflicting interests in the

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131 Simon Metcalfe, 'Impacts of transboundary protected areas on local communities in three Southern African initiatives', (September 2003) pp. 1–27.

132 Anthony Turton, 'A South African perspective on a possible benefit-sharing approach for transboundary waters in the SADC region' *Water Alternatives* (2008) 1 pp. 180–200.

133 Tanya le Roux, 'An exploration of the role of communication during the in-crisis situation' *Jàmá: Journal of Disaster Risk Studies* (2013); Sarah Pink, 'Urban social movements and small places' *City* (2009) 13 pp. 451–465.

134 World Education (INGO) Philippines, Inc., 'The Children's Participation in Integrated Production and Pest Management (CP IPPM) Program' (World Education (INGO) Philippines, Inc. 2005).

135 Vincent Gudmia Mfonfu, 'International Advocacy on Biodiversity Conservation', August 1, 2011.



protection of biodiversity can also muddle the advocacy message. Thus, Mfonfu emphasises the need for communities to think about what their needs are and how they would like to articulate them. In some instances these needs can be best communicated by community-based or non-governmental organisations on behalf of the communities. Most biodiversity conservation and management decisions today are reached at international conferences, which are forums far removed from local communities. Some examples exist, however, of how multiple civil society organisations across many countries have been able to influence global policy. The Global Network for Civil Society Organisations for Disaster Reduction (GNDR) is one such example. Through continued advocacy, joint research and lobbying, the network was able to change the international focus on the application of disaster risk reduction and climate change adaptation to become more community focused.<sup>136</sup>

### 7.6 *Community-based Disaster Risk Assessments and Local Development Plans*

The need for participatory and community-based disaster risk assessments to engage communities and create an understanding of their disaster risk profile has been emphasised by various scholars.<sup>137</sup> They believe that only once such an understanding is achieved can meaningful solutions to pressing climate change and disaster risk issues be found. Disaster risk and the impacts of climate change can take on significant transboundary proportions. Thus, a transboundary approach to understanding disaster risk is needed. Mercer<sup>138</sup> explains that participatory research techniques for disaster risk assessment purposes have evolved out of the 'radical' paradigm<sup>139</sup> in disaster studies, which views disasters as complex socio-economic and political problems (as opposed to the dominant view which places hazards at the centre of

136 Global Network of Civil Society Organisations for Disaster Reduction, 'If we do not join hands...'. (Global Network for Civil Society Organisations for Disaster Reduction 2011).

137 'Chapter 17 African Experiences in Community-Based Disaster Risk Reduction' in, *Community, Environment and Disaster Risk Management*, vol. 10 (Emerald Group Publishing 2012), *Community, Environment and Disaster Risk Management; Capacity development for participatory disaster risk assessment*; 'Disaster risk assessment in South Africa: some current challenges' (2009) 40 *South African Review of Sociology* pp. 194–208.

138 Mercer 'Reflections on the use of participatory research for disaster risk reduction' *Area* (2008).

139 Kenneth Hewitt, 'Regions of risk' (Addison Wesley Longman 1997); J. Lewis, 'Development in disaster-prone places: studies of vulnerability' (1999); Benjamin Wisner *et al.*, 'At risk' (2nd edn, Routledge 2004) p. 471.

understanding people's behaviour). Utilising participatory techniques<sup>140</sup> assists in bridging the disaster risk/development divide, mostly because communities are tackling multiple challenges in an integrated manner.<sup>141</sup> Only once communities understand and voice the threats to their security do developmental solutions become possible. The argument is thus that community-driven development will in essence aim to enhance the community's own security. Central to community participation is the notion that a certain underlying logic, rules and customs have a significant influence on how people perceive their current circumstances and how they choose development alternatives. These alternatives could be firmly rooted in their access to ecosystem goods and services, the use of natural resources, participatory conservation, and even transboundary ecotourism. Therefore, communities, many of which do not understand how disaster risks and climate change could in the long term impact on their livelihoods, will almost always follow a short-term gains route.<sup>142</sup> Notably, the protection of biodiversity is almost always not a very high priority for them.<sup>143</sup> Thus, the creation of an understanding of what is valuable, important and worthy of protection is possible through an integrated development planning process which addresses all of these issues.<sup>144</sup>

### 7.7 *Incorporating Customary Laws and Rights into the Management of Biodiversity*

The Convention on Biological Diversity 1992, recognises the close relationship with and dependence of local and indigenous communities on biodiversity. Article 8(j) of the Convention, for instance, requires governments, subject to national legislation and as far as possible and as appropriate, to:

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- 140 Robert Chambers, 'Participatory Workshops: A Sourcebook of 21 Sets of Ideas and Activities' (Routledge 2002); R. Chambers, 'The origins and practice of participatory rural appraisal' *World development* (1994) 22 pp. 953–969.
- 141 Gideon van Riet and Dewald van Niekerk, 'Capacity development for participatory disaster risk assessment' *Environmental Hazards* (2012) 11 pp. 213–225.; Van Niekerk and Coetzee, 'Chapter 17 African Experiences in Community-Based Disaster Risk Reduction'.
- 142 Eric Damian Kelly, 'Community Planning' (Island Press 2009); M.K. Van Aalst *et al.*, 'Community level adaptation to climate change: the potential role of participatory community risk assessment' *Global Environmental Change* (2008) 18 pp. 165–179.
- 143 V. Arunachalam, 'Participatory conservation: a means of encouraging community biodiversity' *Plant Genetic Resources Newsletter* (2000) 122 pp. 1–6.
- 144 Christo Fabricius, 'Rights, resources & rural development: Community based natural resource management in Southern Africa' *Earthscan* (2004) p. 10

respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of [their] holders... and encourage the equitable sharing of the benefits arising from [their] utilization.

It is generally believed that through generations of experimentation and as custodians, indigenous people have developed an expansive body of knowledge for the sustainable use and management of natural resources.<sup>145</sup> Indigenous people, for the most part, possess systematic knowledge of plants, animals and the natural phenomena of the ecosystems and their surroundings.<sup>146</sup> This rich knowledge, linked with their close relationship with their lands, has enabled them to live in harmony with nature. However, with the colonisation of their lands and territories over the centuries, the process of plundering resources and land dispossessions began. Not only did this process limit or remove the access communities had to resources, but in many instances it divided communities by imposing new colonial boundaries on them, and in an instant it created transboundary conflicts in the management of natural resources which had not been present before.<sup>147</sup> Some colonial states in Africa (mostly those that were colonised by Britain) furthermore used a system of legal duality: one law for the European settlers and another for indigenous people—mostly in an effort to formally exclude indigenous people from political, civil and economic society.<sup>148</sup> Where customary law continued to be used, its application and content were distorted to fulfil these colonial objectives.<sup>149</sup>

145 D. Downes and S. Laird, 'Community registries of biodiversity-Related knowledge' (1999) UNCTAD Biotrade Initiative.

146 He Hong and others, 'Indigenous Knowledge and Customary Law in Natural Resource Management' (AIPP 2010) p. 57.

147 Jennifer Mohamed-Katerere, 'Participatory natural resources management in the communal lands of Zimbabwe: What role for customary law' *African Studies Quarterly* (2001) 5 pp. 1–27; Aaron T. Wolf and others, 'Chapter 5: Managing Water Conflict and Cooperation in Worldwatch Institute (ed)' *State of the World 2005* (W.W. Norton & Company 2005) Ch. 5.

148 This was, for example, formerly the case in colonial and then apartheid South Africa.

149 Jennifer Mohamed-Katerere, 'Participatory natural resources management in the communal lands of Zimbabwe: What role for customary law' *African Studies Quarterly* (2001) 5 pp. 1–27; He Hong and others, 'Indigenous Knowledge and Customary Law in Natural Resource Management' (AIPP 2010) p. 57.

Dore<sup>150</sup> argues, though, that despite its colonial legacy, most of the traditional institutions in Zimbabwe have survived intact. This finding is also supported by the research of Fortmann<sup>151</sup> in relation to Botswana. Traditional rules and laws have been reinvented in the sense that the pressure of population growth has resulted in resource scarcity that has modified traditional institutions. Therefore in enhancing human and environmental security it is necessary for planners and policy-makers to realise the need for continued incorporation of customary laws and traditions into decision-making for transboundary biodiversity conservation.<sup>152</sup> In many instances, these customary laws span boundaries, are closest to the people, and are more effective than formalised western concepts of law.<sup>153</sup>

## 8 Conclusion

This chapter has sought to provide some insight into the very complex interaction of the transboundary protection of biodiversity and its related human and environment security issues, in the light of climate change and the heightened risk of disaster. Vulnerability and risk reduction, together with resilience building, remain some of the most important modern governance interventions which must be closely linked to an understanding of transboundary issues. The chapter has argued for an integrated approach which must facilitate transformative behaviour, actions and decisions.

As the call for people to adapt to climate change mounts, so too there should be changes in the way in which we think about the transboundary conservation of biodiversity and our efforts to enhance human and environmental security. Special attention must be given to protected areas and environmentally managed biological corridors, and rapid livelihood adaptation is needed to enhance both environmental and human security. In such a process, community ownership, advocacy and social mobilisation are of paramount

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150 'Transforming Traditional Institutions for Sustainable Natural Resource Management: History, Narratives and Evidence From Zimbabwe's Communal Areas' (2001) 5 *African Studies Quarterly*.

151 Louise Fortmann, 'Peasant and official views of rangeland use in Botswana: Fifty years of devastation?' *Land Use Policy* (1989) 6 pp. 197–202.

152 D. Downes and S. Laird, 'Community registries of biodiversity-Related knowledge' (1999) UNCTAD Biotrade Initiative pp. 2–22.

153 Eklabya Sharma and Nakul Chettri, 'ICIMOD's Transboundary Biodiversity Management Initiative in the Hindu Kush-Himalayas' *Mountain Research and Development* (2005) 25 pp. 278–281.

importance. Communities need to understand their disaster risk profiles and integrate this knowledge into the planning of their future development path. Only once these transformative actions are being readily undertaken can one look for small but significant changes for the better in the very complex system on which people are dependent.