

*The Need for (and Obstacles to)  
Regional Collective Action in  
Climate Adaptation*

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## **I. Introduction**

Over the last decade, discussions of climate change have increasingly turned from the unresolved challenge of climate mitigation to the growing challenge of climate adaptation. There are a variety of reasons for the increased attention to climate change. One is the recognition that climate change is already here, forcing the world to consider how best to adapt to the challenges that climate change poses. A second is the difficulty that the world community has encountered reducing greenhouse-gas emissions. So long as emissions continue to grow, adaptation becomes an increasingly important and difficult challenge. But a third is that many policy leaders and experts have seen climate adaptation as an easier issue for the world community to tackle. If we cannot make progress on climate mitigation, the reasoning seems to go, at least we can make progress on climate adaptation.

Unfortunately, the types of collective-action problems that have plagued the international community's efforts to reduce greenhouse gases are likely to prove an equally daunting hurdle to climate adaptation. Several collective action problems confront the world's efforts to ensure effective adaptation. First is the development of an international regime for funding climate adaptation by less developed nations. Significant funding will be needed. Yet developed nations individually have little incentive to step forward and provide the necessary funding. Despite pledges by developed nations to contribute sizable sums toward adaptation costs, actual fund flows have been disappointing. The World Bank and other international organizations estimate that over \$100 billion per year will be needed in adaptation funding by 2030.<sup>1</sup> As of 2010,

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<sup>1</sup> World Bank, 2010 World Development Report (2009).

however, less than \$300 million in total has been provided by developed nations, and commitment levels have typically exceeded actual payments by a factor of two.<sup>2</sup> Although developed nations made significant new pledges at Copenhagen, past history raises serious questions how likely the funding is to materialize.

A second, equally important collective-action problem is the need for regional cooperation in identifying, planning, and implementing adaptive measures. Most climate-adaptation discussions, and major policy decisions made to date have assumed that adaptation will occur largely at the national level. For example, the UNFCCC secretariat has required individual nations, not regions, to prepare adaptation programs, and the national plans have seldom emphasized regional cooperation. The major demand-side debate over funding, moreover, has centered on how to divide available funding among individual nations. The potential funding needs of regions have been largely ignored. Policies, in short, have treated nations as the key action unit for adaptation. And as discussed below, most adaptation actions to date have been national, not regional in scope.

Yet if the world is to successfully adapt to climate change, much of the heavy lifting will need to be at the regional level – particularly in highly fragmented areas of the world such as Africa, Central America, and Southeast Asia. National governments by themselves will enjoy only limited capacity to successfully address challenges of climate vulnerability. Regional cooperation will be essential, but unfortunately may not be easy.

This article examines the need for regional cooperation. How pervasive is the need for regional cooperation in climate adaptation, and in what types of settings will it be essential? What are the prospects for regional cooperation on key issues? And what policies should the international community adopt in order to promote the type of regional cooperation that will be necessary?

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<sup>2</sup> Krishna Krishnamurthy, *Adaptation Funding: A Priority in Cancun*, *Climatico*, Dec. 6, 2010, at <http://www.climaticoanalysis.org/tag/krishna-krishnamurthy/>.

The article's major thesis is that global discussions of climate adaptation must focus to a far greater extent on the need for regional action than discussions have in recent years. Regional action, of course, is no more a complete solution package to climate change than is national action. Both national and regional action is essential, and national and regional actions must be coordinated in an effective fashion. At the moment, however, corrective action is needed to ensure that the importance of regional cooperation is not ignored.

Part II briefly overviews the national bias that has pervaded discussions of climate adaptation to date. As suggested already, both policies and actions have focused far more on the national than on the regional, and less-developed countries have pushed strongly for national control of funds and programming. Part III examines the reasons why a broader regional focus is necessary. As explained, a regional approach is important for at least two reasons. First, many climate challenges involve either transboundary resources such as waterways or the transboundary movement of resources, including people, which cannot be addressed by one nation alone. In these cases, workable solutions require regional collaboration. Adaptive actions taken by one nation without consideration of neighboring countries can actually beggar their neighbors and undermine overall regional resilience. Second, many other climate challenges (e.g., agricultural security) can be managed more effectively at the regional than the national level, even when the challenges do not directly involve transnational impacts.

Part IV looks at the adequacy of current regional and international agreements and practices in addressing the major transnational climate challenges identified in Part III: international waterways, conservation, and climate refugees. The picture is largely discouraging, although bright spots exist. Most transboundary water treaties, for example, fail to provide effective adaptive capacity for dealing with changes in either mean water availability or variations around that mean. International agreements designed to address such problems as biodiversity loss and human migration similarly lack the ability to resolve the transnational problems that climate change are likely to present. As Part IV illustrates, many climate change problems are likely to require the negotiation of new transnational agreements or institutions for resolving regional conflicts. Yet, as Part IV also discusses, regional cooperation on such issues is likely to be difficult absent outside pressure or incentives.

Finally, Part V examines possible ways to encourage greater regional adaptive collaboration. Because of the collective action obstacles to voluntary regional collaboration, either outside pressure (e.g., binding or hortatory international conventions) or incentives (generally in the form of funding) will be needed. Part V looks specifically at the opportunity to use adaptation funding as an incentive to engage in greater regional planning and coordination. In the climate arena, the promise of adaptation funding is one of the few sources of leverage that the international community holds over nations in their choice of adaptation approaches. Adaptation funding could be used either as a carrot or a stick. Nations interested in engaging in regional planning or coordination could receive priority funding to support such efforts. Funding for national adaptation measures, moreover, could be withheld from nations failing to participate in important regional adaptation planning.

## **II. Today's Focus on National Adaptation Action**

Although the United Nations Framework Convention on Climate Change (UNFCCC) acknowledged and addressed the importance of climate adaptation, the convention treated the issue as largely secondary to that of mitigation.<sup>3</sup> International and national organizations, moreover, largely ignored the issue for almost a decade after negotiating the convention, focusing instead on mitigation. The focus began to change at COP7 (Marrakech 2001) and COP8 (Delhi 2002), where discussions highlighted the importance of adaptation and the need for international funding for adaptation actions. According to the Ministerial Declaration on Climate Change and Sustainable Development issued at COP8, climate adaptation was of “high priority” and required “urgent attention and action on the part of all countries.” To help promote climate adaptation, COP7 created three funds to support adaptation: the Adaptation Fund (AF), the Least Developed Countries Fund (LDCF), and the Special Climate Change Fund (SCCF).<sup>4</sup> COP7 also called on the international community to support the development of “national

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<sup>3</sup> Articles 2 and 3 of the UNFCCC, which set out the convention’s objectives and principles, speak only of mitigation. The majority of the commitments, as set out in Article 4, also concern mitigation, although the Convention calls on parties to formulate “measures to facilitate adequate adaptation,” to cooperate in “preparing for adaptation,” and to take “climate change into account” in their social, economic, and environmental policies. Arts. 4(1)(b), 4(1)(e), 4(1)(f). Developed countries also agree to assist developing nations in “meeting costs of adaptation.” Art. 4(4).

<sup>4</sup> See generally Manish Bapna & Heather McGray, Financing Adaptation: Opportunities for Innovation and Experimentation, in *Climate Change and Global Poverty: A Billion Lives in the Balance?* (Brookings Inst. 2009).

adaptation programmes of action” (NAPAs) by the least developed countries and established guidelines for NAPAs.<sup>5</sup> As noted in Part I, many nations and delegates hoped that, with mitigation stuck in the starting gates, adaptation would prove an easier topic to tackle.

Most adaptation work has focused on national rather than regional or global resilience to the threats of climate change (and has emphasized planning more than action). For example, all 45 NAPAs filed through the end of 2010 have focused on steps that might be taken at the national level to adapt to climate change and on priority adaptation projects within the jurisdictional boundaries of the filing countries. Similarly, the UNFCCC’s NAPA guidelines call for the analysis of national or sub-national actions that might be taken to increase resilience and adaptive capacity, ignoring the potential need or opportunity to address climate adaptation at a regional or broader international level. The guidelines thus call for a “country-driven approach” and a “national and/or subnational consultative process to solicit inputs and proposal ideas.”<sup>6</sup> The NAPA team is to develop national, not regional or transnational, strategies for climate adaptation, and to “identify and prioritize country-driven criteria for selecting priorities activities.”<sup>7</sup> The only recognition of transnational or international solutions or considerations is a provision that the country preparing a NAPA use a “set of locally-driven criteria ... to select priority adaptation activities,” including “*Synergy with other multilateral environmental agreements.*”<sup>8</sup>

Similarly, global adaptation funds, including the three COP-created adaptation funds, have by and large supported either national planning work (including NAPAs) or national or sub-national adaptation projects.<sup>9</sup> Of the over 200 adaptation awards made to date, only one has supported an effort to deal with climate adaptation on a regional rather than national basis: a project by either South American countries (Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Suriname, and Venezuela) to strengthen and integrate the management of transboundary water

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<sup>5</sup> Decision 5, CP.7; Decision 28, CP.7.

<sup>6</sup> Decision 28, CP.7, Annex, ¶¶ 7(f), 8(c)(i).

<sup>7</sup> Id. ¶ 8(b)(iv).

<sup>8</sup> Id. ¶ 15(c) (emphasis added).

<sup>9</sup> Despite practice, the adaptation funds contemplate that multilateral organizations might on occasion apply for funding. See, e.g., Jessica Brown, Neil Bird, & Liane Schalatek, Direct Access to the Adaptation Fund: Realizing the Potential of National Implementing Entities (Henrich Boll Stiftung, Climate Finance Policy Brief No. 3, Nov. 2010).

resources in the Amazon River Basin.<sup>10</sup> The principal purpose of the COP-established adaptation funds has been to promote national, not regional or international, planning and actions. For example, the LDCF, which has distributed the most money to date, supports the preparation and implementation of National Adaptation Programs of Actions (NAPAs). The SCCF supports long-term adaptation measures to increase the resilience of national development sectors. And the AF provides funds directly to developing countries for national adaptation actions.

In like manner, policy debates have assumed that adaptation measures will take place primarily at a national or sub-national scale. Debates over funding allocation thus have focused on how to divide funding among nations (e.g., whether to allocate funds based on national vulnerability and, if so, how to establish relative vulnerability) and on the degree of autonomy to allow nations receiving adaptation funds in the design and implementation of their adaptation measures. Most studies and discussions of effective adaptation planning have looked at how to improve national planning efforts. Little attention has been paid to the potential value of broader regional planning, the likely obstacles to effective adaptation measures at a regional scale, and whether adaptation funding might be better invested in a mix of regional and national adaptation measures rather than in just national action.

The potential benefits of regional adaptation planning and action have not been totally ignored. For example, in 2010, the USAID prepared an assessment of the opportunities for regional climate adaptation in the Asia-Pacific region.<sup>11</sup> The report found that the region's capacity to "cooperate and coordinate the development of transboundary management plans and adaptation strategies is ... weak"<sup>12</sup> and recommended various steps to improve regional adaptive capacity and encourage greater transnational cooperation. Other groups have looked at the

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<sup>10</sup> IW: Learn, Integrated and Sustainable Management of Transboundary Water Resources in the Amazon River Basin (available at [http://iwlearn.net/iw-projects/Fsp\\_112799471058](http://iwlearn.net/iw-projects/Fsp_112799471058) (last visited March 21, 2011)). The project was funded not from one of the COP-established adaptation funds but from the Strategic Priority on Adaptation, a three-year pilot program funded by the Global Environment Facility Trust Fund to demonstrate how to translate adaptation planning into full-scale projects.

<sup>11</sup> USAID/ASIA, Asia-Pacific Regional Climate Change Adaptation Assessment, Final Report: Findings and Recommendations (April 2010).

<sup>12</sup> Id. at 2.

opportunity to encourage regional adaptation strategies in various parts of Europe.<sup>13</sup> Such regional studies, however, remain the exception and have not led yet to a shift in attention for global adaptation mandates, programs, and funding. The next section of this Article discusses why such a shift is important moving forward.

### **III. The Importance of Regional Adaptation**

Regional cooperation will frequently be critical in climate adaptation. The influence and impact of many climate changes will be international in scope. For example, reduced precipitation or glacier runoff in the headwaters of an international river will affect not only the nation in which the headwaters are found but also in downstream nations. As explained below, moreover, adaptive capacity generally increases with spatial size. Multiple nations working together will find it easier to adapt to a changing climate than individual nations acting alone, even when climate impacts are not transnational in scale. As a general matter, governmental fragmentation reduces adaptive capacity. Effective adaptation therefore will require regional cooperation,<sup>14</sup> particularly in areas of the world with a large number of small countries.

#### **A. Transnational Impacts**

One major reason why regional adaptation will be critical is that many climate impacts will be transnational. Where impacts cross one or more international borders, effective adaptation frequently will be impossible without regional cooperation. Efforts to address transnational impacts at a purely national scale, moreover, are likely to impose significant costs or externalities on neighboring countries.

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<sup>13</sup> See, e.g., Maria Miguel Ribeiro, Cinzia Losenno, Thomas Sworak, Eric Massey, Rob Swart, Magnus Benzie, & Cornelius Laaser, Final Report: Design of Guidelines for the Elaboration of Regional Climate Change Adaptations Strategies (Ecologic Inst., Sept. 18, 2009); IncoNet, South East European Climate Change Framework Action Plan for Adaptation (Nov. 10, 2010).

<sup>14</sup> Robbert Biesbroek, Katrien Termeer, Pavel Kabat, & Judith Lostermann, Institutional Governance Barriers for the Development and Implementation of Climate Adaptation Strategies (International Human Dimensions Programme, Dec. 2, 2010).



## 1. International waterways.

Climate impacts on international waterways provide perhaps the best and most widely-discussed illustration of transnational climate impacts.<sup>15</sup> Nations share over 250 rivers.<sup>16</sup> The watersheds of these rivers cover approximately half of the terrestrial surface of the planet, and more importantly, approximately 40 percent of the world's population depends on them as a water source.<sup>17</sup> A large percentage of the world's groundwater is also found in shared aquifers, further increasing the percentage of the world's population reliant on shared water bodies. Reliance on international waterways is even more important in many developing regions of the world. In Africa, for example, 90 percent of all freshwater comes from international waters.<sup>18</sup>

Although individual countries can try to adapt to climate risks from international waterways (e.g., extreme or prolonged droughts, extreme or more frequent floods), effective adaptation will typically require regional rather than national action. Consider, for example, adaptation to drought. One promising form of technological adaptation might be the construction of a network of new reservoirs along the entire river system, including in multiple nations, designed to maximize the yield from the river system.<sup>19</sup> Individual nations seeking to address the problem on their own may find that the best reservoirs are in other countries or that additional reservoirs in other countries are needed to optimize the operation of local reservoirs. Regional management, in short, will be more effective than purely national planning.

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<sup>15</sup> For useful discussions of climate change and international waterways, see Alena Drieschova, Mark Giordano, & Itay Fischhendler, *Governance Mechanisms to Address Flow Variability in Water Treaties*, 18 *Global Env'tl. Change* 285 (2008); Marisa Goulden, Declan Conway, & Aurelie Persechino, *Adaptation to Climate Change in International River Basins in Africa: A Review* (Tyndall Centre for Climate Change Research, Working Paper 127, Dec. 2008); Declan Conway, *From Headwater Tributaries to International River: Observing and Adapting to Climate Variability in the Nile Basin*, 15 *Global Env'tl. Change* 99 (2005); Itay Fischhendler, *Legal and Institutional Adaptation to Climate Uncertainty: A Study of International Rivers*, 6 *Water Pol'y* 281 (2003); A. Dan Tarlock, *How Well Can International Water Allocation Regimes Adapt to Global Climate Change?*, 15 *J. Land Use & Env'tl. L.* 423 (2000); Greta Goldenman, *Adapting to Climate Change: A Study of International Rivers and their Legal Arrangements*, 17 *Ecol. L.Q.* 741 (1990).

<sup>16</sup> Aaron T. Wolf, 1 *Water Pol'y* 251 (1998).

<sup>17</sup> UNEP, *Vital Water Graphics* (2002); Wolf, *supra* note xx, at 251.

<sup>18</sup> Goulden, Conway, & Persechino, *supra* note xx, at 2.

<sup>19</sup> Cf. Drieschova, Giordano, & Fischhendler, *supra* note xx, at 287 (observing that "manufacturing water through supply oriented solutions can be easier than negotiating it").

Turning to institutional approaches to adaptation, another promising approach to long-term drought will be the development of transnational water markets through which water users with little flexibility in water use can purchase water from users in other nations who can get along with less. In other cases, the most effective adaptation might involve switching water supplies or increasing efficiency in one or more countries, which other countries would be powerless to implement on their own.<sup>20</sup> Once again, regional management will improve on purely national efforts.

Purely national adaptation measures, moreover, may impose significant costs on other riparian countries along the waterway. Efforts by upstream nations to adapt to prolonged droughts by increasing storage or withdrawals, for example, is likely to impact water availability in downstream nations. Indeed, this is already a concern in a number of African water basins (such as the Limpopo and Zambezi basins),<sup>21</sup> where upstream countries are threatening to increase consumption levels to meet local conditions.

Similar problems are likely to plague purely national efforts to deal with increased flood risks. In some cases, national efforts might be sufficient – e.g., where the best means of avoiding flood risks is to build outside the flood plain. In other cases, however, transnational cooperation might be essential. For example, the best means of reducing flood risks in downstream nations might be to construct flood control infrastructure in upstream nations (e.g., levees or dams) or restore natural wetlands in those nations. Conversely, efforts by upstream nations to reduce local flood risks by levees might increase flood risks faced by downstream nations. National action, in short, is likely to be less effective and more likely to impose negative externalities on other countries in the watershed.

## **2. Conservation.**

In many instances, biodiversity protection will also present transnational challenges. In recent decades, most species other than birds and fish were largely tied to a given area and

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<sup>20</sup> Goulden, Conway, & Persechino, supra note xx, at 12; Collier, Conway, & Venables, supra note xx, at 347.

<sup>21</sup> Goulden, Conway, & Persechino, supra note xx, at 16-17.

habitat, facilitating national preservation efforts by spatially setting aside and protecting habitat.<sup>22</sup> (Migrating species, by contrast, have always required varying degrees of international cooperation, as in the 1979 Convention on Migratory Species of Wild Animals.<sup>23</sup>) With climate change, most species are now on the move, headed toward the poles and higher altitudes in a general search for more amenable temperatures and conditions.<sup>24</sup> Many of these species are moving out of traditional reserves that have been set aside for their protection.<sup>25</sup> A growing number of these species will cross international borders.<sup>26</sup>

Because many species and their habits will move across international borders, primarily national adaptation will again not fully address the climate challenge. Instead, active transboundary management will be needed.<sup>27</sup> In many cases, large transnational networks of habitat preserves with connecting corridors or “stepping stones” will be necessary.<sup>28</sup> Individual nations will be able to protect species before they cross borders, but will need to actively cooperate with neighboring countries for the creation of sustainable long-term protection. Effective conservation complexes will require active collaboration among nations to coordinate land preservation and other protection measures.<sup>29</sup> Countries to which species are likely to migrate, moreover, may be placed in the unusual situation of protecting habitat for species before they actually migrate in large numbers, as conservation necessarily becomes more proactive.<sup>30</sup> In some cases, regions may need to assist in the migration of species from one nation to another.<sup>31</sup>

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<sup>22</sup> Lee Hannah, A Global Conservation System for Climate-Change Adaptation, 24 *Cons. Bio.* 70, 70 (2009). Paleocological records, however, reveal that species’ habitats have historically shifted in response to climate changes. *Id.* at 71.

<sup>23</sup> 10 *ILM* 15 (1980).

<sup>24</sup> See, e.g., Terry Root & Steven Schneider, Conservation and Climate Change: The Challenges Ahead, 20 *Conservation Biology* 706 (2008).

<sup>25</sup> Miguel B. Araujo, Mar Cabeza, Wilfred Thuiller, Lee Hannah, & Paul H. Williams, Would Climate Change Drive Species Out of Reserves? An Assessment of Existing Reserve-Selection Methods, 10 *Global Change Bio.* 1618 (2004).

<sup>26</sup> Arie Trouwborst, International Nature Conservation Law and the Adaptation of Biodiversity to Climate Change: A Mismatch?, 21 *J. Envtl. L.* 419, 430 (2009).

<sup>27</sup> Hannah, *supra* note xx, at 72.

<sup>28</sup> Trouwborst, *supra* note xx, at 428-429.

<sup>29</sup> Hannah, *supra* note xx, at 74 (concluding that effective conservation “can only be planned when the population status, current area protected, and future protection needed is known for both countries”).

<sup>30</sup> Trouwborst, *supra* note xx, at 424 (emphasizing importance of “proactive and holistic” conservation in the face of climate change); Hannah, *supra* note xx, at 71-72 (noting the importance of adding new preserves to counter the loss of species representation in traditional habitat).

<sup>31</sup> See generally Alejandro Camacho, Assisted Migration: Redefining Nature and Natural Resource Law under Climate Change, 27 *Yale J. Reg.* 171 (2010).

For example, some have suggested that Great Britain and Iceland may need to collaborate in helping Scottish crossbills migrate from their current habitat to new habitat in Iceland.<sup>32</sup> More generally, conservation will need to become more dynamic, requiring nations to collaborate over time in ensuring that conservation measures are responsive to the changing patterns of species and their habitats.<sup>33</sup>

### 3. International climate migration.

Humans will be among the species that are migrating. Climate change refugees provide a third example of the transnational impacts of climate change that will require regional cooperation. At a 2007 meeting of the United Nations Security Council called to address the impacts of climate change on international peace and security, UN Secretary General Ban Ki-Moon and representatives of several governments identified the problem of climate refugees as a major source of future potential conflicts.<sup>34</sup> Climate change will displace millions of people throughout the world as a result of rising sea levels, storm surges, coastal erosion, flooding (resulting from melting glaciers or more severe weather events), water shortages, wildfires, disease outbreaks, and threats to crops or local fish stocks.<sup>35</sup> Various experts have estimate that these and other climate impacts could displace anywhere from 50 million to 200 million people by the middle or late 21<sup>st</sup> century.<sup>36</sup>

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<sup>32</sup> Trouvborst, supra note xx, at 429.

<sup>33</sup> Hannah, supra note xx, at 70, 72.

<sup>34</sup> Bierman & Boras, supra note xx, at 12.

<sup>35</sup> Angela Williams, Turning the Tide: Recognizing Climate Change Refugees in International Law, 30 L. & Pol'y 502, 504-506 (2008); Frank Biermann & Ingrid Boas, Protecting Climate Refugees: The Case for a Global Protocol, 50 Env't 9 (2008).

<sup>36</sup> Norman Myers & Jennifer Kent, Environmental Exodus: An Emergent Crisis in the Global Arena (1995); Williams, supra note xx, at 506, citing Robert J. Nicholls, Coastal Flooding and Wetland Loss in the 21<sup>st</sup> Century: Changes under the SRES Climate and Socio-Economic Scenarios, 14 Global Envtl. Change 69 (2004); Norman Myers, Environmental Refugees: A growing Phenomenon of the 21<sup>st</sup> Century, 357 Philosophical Trans. 609 (2002). One should not put too much reliance on such estimates. "Such estimates have a large margin of error and depend on underlying assumptions about population growth, economic development, temperature increase, or the degree and timing of climate change impacts such as sea-level rise." Bierman & Boras, supra note xx, at 10. Whatever the exact number, however, the number of climate refugees is likely to dwarf the current 10 million non-climate refugees.

Most climate refugees are likely to resettle in other areas within their country, for reasons of family ties, cultural affinity, language, and proximity.<sup>37</sup> But a sizable number of climate refugees will again end up crossing transnational boundaries. In the case of small island nations, there may be nowhere else to migrate. The population of Tuvalu, a low-lying Pacific Island nation with 11,000 residents, has already begun examining relocation options.<sup>38</sup> Experts predict that displacement is likely to be particularly severe in many regions, such as Southeast Asia, Africa, and Central America,<sup>39</sup> that are highly fragmented and suffer from borders that do not necessarily correspond to cultural, family, or language differences. Even outside these regions, climate refugees might cross international borders in search of greater economic or social stability or job opportunities. Studies, for example, have predicted large migrations from sub-Saharan Africa to Europe, the Mediterranean, and the Middle East, and from Caribbean islands and Central America to the United States.<sup>40</sup>

International migration will inevitably require regional – or even international – cooperation. Many nations’ temptation will be to close their borders to climate refugees, who will typically bring large additional costs with little offsetting benefits. Even if receiving nations keep their borders open, refugees will typically enjoy neither political nor civil rights. On the flip side, source countries may have little reason to find attractive internal options for displaced populations if foreign migration is a viable option. Regional coordination, in short, will be essential to ensure carefully planned (and preferably voluntary) resettlement of climate-displaced populations, fair allocation of the cost of resettlement, and full integration of climate refugees into their new communities.<sup>41</sup>

International waterways, species conservation, and climate refugees are just three examples of the international character of many climate-change impacts. Other climate impacts also will be transnational in scope and therefore require regional or international cooperation. Emerging disease vectors, for example, will involve the migration of disease-carrying insects or viruses across international borders and cannot be addressed purely through the actions of

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<sup>37</sup> Bierman & Boras, *supra* note xx, at 11.

<sup>38</sup> Williams, *supra* note xx, at 515.

<sup>39</sup> Biermann & Boas, *supra* note xx, at 10-11.

<sup>40</sup> *Id.* at 11.

<sup>41</sup> See *id.* at 12-13 (setting out criteria for an effective international approach to climate refugees).

individual countries. Similarly, measures to prevent the spread of pests or viruses that are harmful to crops or forests will require a coordinated regional response. In all these and similar contexts, greater attention will need to be paid to the regional rather than the just the national.

## **B. Increasing Adaptive Capacity by Increasing Scale**

Regions will often be more effective than individual nations or sub-nations at adaptation, even when the impacts of climate change are entirely within the jurisdictional boundaries of the nations. Regions start with an informational advantage. Timely knowledge of climate risks and effective responses will be essential to effective adaptation.<sup>42</sup> Regions will enjoy economies of scale in the development and use of predictive and evaluative models, and they will have access to broader information from which climate problems can be understood and projected.

Information is often fragmented across nations, providing a suboptimal basis for climate adaptation.<sup>43</sup> In Southern Africa, for example, the Southern African Regional Climate Outlook Forum (SARCOF) has provided critical regional information on likely climate and precipitation, as well as resulting agricultural impacts and opportunities.<sup>44</sup>

In a related fashion, regions are able to share experiences in adapting to climate problems, ensuring better educated and more robust adaptive measures in the future. Regionalized adaptation planning can take advantage of the varying expertise and perspectives of individual nations, effectively learning from each other.<sup>45</sup> Regions can be particularly effective in advancing climate adaptation when they use the opportunity to collect cross-national information to build broad and active knowledge networks that include not only governmental agencies but also non-profit organizations and the commercial sectors.<sup>46</sup>

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<sup>42</sup> P.K. Aggarwal & Mannava V.K. Sivakumar, Global Climate Change and Food Security in South Asia: An Adaptation and Mitigation Framework, in R. Lal et al., *Climate Change and Food Security in South Asia* 253, 262 (2011).

<sup>43</sup> Beisbroek et al., *supra* note xx, at 6.

<sup>44</sup> See, e.g., Karen O'Brien & Coleen Vogel, *Coping with Climate Vulnerability: The Use of Seasonal Climate Forecasts in Southern Africa* (2003).

<sup>45</sup> Beisbroek et al., *supra* note xx, at 6; Aggarwal & Sivakumar, *supra* note xx, at 268-269.

<sup>46</sup> Mark Pelling & Chris High, *Understanding Adaptation: What Can Social Capital Offer Assessments of Adaptive Capacity?*, 15 *Global Env'tl. Change* 308 (2005).

Regionalization of climate information is not a panacea. Information regarding climate projections, potential impacts, and effective adaptive measures must both get to local decision makers with the power to implement the necessary adaptive steps and incorporate unique local conditions and preferences. Failure to link the local with the regional can undermine the advantages of regionalized information collection and analysis.<sup>47</sup> Multiple mechanisms, however, can provide such linkage, including the nesting of national and sub-national organizations within broader regional frameworks and the creation of institutional spaces for the sharing of information with local decision makers.<sup>48</sup>

In planning and implementing adaptive measures, regional organization will again enjoy economies of scale and may often be the most effective level at which to address climate impacts. Regional organizations, for example, may have greater capacity to deal with region-wide health risks or to construct needed new infrastructure. Regional agricultural entities may be able to develop new drought-tolerant genotypes of food that would be too costly for individual countries to develop.<sup>49</sup> In many cases, moreover, the solutions to climate problems might be regional in scope. Where climate change reduces the resource base or productivity of a particular area, for example, an effective adaptation might be relocation of labor and capital to neighboring areas with greater capacity.<sup>50</sup> Where the relocation is across borders, regional cooperation might be necessary to overcome formal restrictions on migration or on foreign ownership of land.<sup>51</sup> As a general matter, liberalization of labor markets and capital across an entire region is likely to promote adaptation to climate change.<sup>52</sup>

Regions also enjoy a critical advantage in being able to diversify away from localized risks. Climate impacts can be highly localized. One watershed in a region might be suffering from drought, while other watersheds in the same region are not. One nation might suffer from

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<sup>47</sup> See Coleen Vogel & Karen O'Brien, Who Can Eat Information? Examining the Effectiveness of Seasonal Climate Forecasts and Regional Climate Risk Management Strategies, 33 *Climate Research* 111 (2006).

<sup>48</sup> See, e.g., Carl Folke, Thomas Hahn, Per Olsson, & Jon Norberg, Adaptive Governance of Social-Ecological Systems, 30 *Ann. Rev. of Env'tl. Res.* 441 (2005); Voegl & O'Brien, supra note xx, at 119; Thompson, supra note xx.

<sup>49</sup> Aggarwal & Sivakumar, supra note xx, at 269.

<sup>50</sup> Paul Collier, Gordon Conway, & Tony Venables, 24 *Climate Change and Africa*, *Oxford Rev. of Econ. Pol'y* 337, 343 (2008).

<sup>51</sup> *Id.*

<sup>52</sup> *Id.* at 343-344, 347.

abnormally low crop yields because of weather or other conditions, while other nations simultaneously enjoy bumper yields.<sup>53</sup> Historically, for example, climatic extremes in any given year have hit parts but not all of South Asia.<sup>54</sup> In these situations, expansion of the governance scale can help increase climate resilience. Scale expansion effectively diversifies the risk of climate impacts in a given region, increasing adaptive capacity. Thus, a country that is currently suffering from low crop yields can purchase grain and other food products from neighboring countries that are not.<sup>55</sup> Regional adaptation might include the creation of a regional food bank or security fund.<sup>56</sup>

In a similar fashion, regionalization of climate adaptation can also help spread the costs of adaptation measures where the nations in the region all share a similar magnitude of risk from climate change but the risks faced by each country are not highly correlated. In many regions, climate change is likely to have a heterogeneous and unpredictable impact on individual nations. To the degree that the nations are willing to share the risks of climate impacts and adaptation across the region, each nation can reduce its *ex ante* climate risks, although its *ex post* costs may be more or less than the costs that it would have incurred if it had acted nationally rather than regionally.

A final benefit of regionalization is an enhanced ability to avoid adaptation externalities. As discussed earlier in connection with transnational climate impacts, actions by one nation to adapt to climate change can negatively affect other nations.<sup>57</sup> For example, if one nation decides to limit grain exports because of a climate-induced drought, the adaptation may eliminate local impacts, but only by shifting the food shortage to neighboring nations. Such “beggar thy neighbor” actions are already common in response to food shortages and droughts in many parts of the developing world.<sup>58</sup> Increased use of air conditioning to adapt to hotter summers in a

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<sup>53</sup> Collier, Conway, & Venables, *supra* note xx, at 347.

<sup>54</sup> Aggarwal & Sivakumar, *supra* note xx, at 268.

<sup>55</sup> Collier, Conway, & Venables, *supra* note xx, at 347.

<sup>56</sup> Aggarwal & Sivakumar, *supra* note xx, at 268.

<sup>57</sup> “Crucially, an action that is successful for one ... level of government may not be classed as successful by another.” See W. Neil Adger, Nigel W. Arnell, & Emma L. Tompkins, *Successful Adaptation to Climate Change Across Scales*, 15 *Global Env'tl. Change* 77, 78 (2005).

<sup>58</sup> See, e.g., Collier, Conway, & Venables, *supra* note xx, at 347 (describing Tanzanian restrictions on food exports to Kenya).



major urban area may similarly help reduce heat-related deaths but put strains on regional energy production. Engineering actions to reduce coastal erosion in one nation can impact the coastal areas of neighboring countries.<sup>59</sup>

#### **IV. Existing Regional & International Agreements**

Given the importance of regional actions, how easy will it be to provide for regional responses? This section examines existing regional and international agreements on dealing with international waterways, conservation, and environmental refugees to answer this and several subsidiary questions. First, are existing agreements adequate to address the types of impacts that climate change is likely to generate, or will new agreements be needed? Second, what do existing agreements say about the ease with which nations will be able to engage in effective regional adaptation? Finally, what types of regional agreements or institutions will be useful in the future in adapting to climate change?

##### **A. International Waterways**

At least on first impression, the history of international waterway management provides reason to be optimistic that nations will be able to cooperate at a regional scale to adapt to climate change. Nations have shown a strong propensity to deal with international water issues through collaboration rather than conflict. In one study of freshwater disputes between 1948 and 1999, riparian nations solved two-thirds of the disputes through cooperative action.<sup>60</sup>

Nations riparian to international waterways have used several methods to advance transnational management, including formal treaties and the creation of regional institutions. 117 of the world's 263 international river basins have at least one transnational treaty governing their use and development; many have more than one.<sup>61</sup> In total, nations that share international

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<sup>59</sup> See Adger et al., *supra* note xx, at 80.

<sup>60</sup> Shira B. Yoffe, Aaron T. Wolf, & Mark Giordano, Conflict and Cooperation over International Freshwater Resources: Indicators of Basins at Risk, 39 J. Am. Water Res. Ass'n 1109 (2003).

<sup>61</sup> Aaron T. Wolf, Shira B. Yoffe, & Mark Giordano, International Waters: Identifying Basins at Risk, 5 Water Pol'y 29, 45 (2003).

waterways have negotiated over 300 treaties dealing with non-navigational issues since 1814.<sup>62</sup> Regional institutions, moreover, have advanced transnational cooperation even in the absence of a treaty or beyond the terms of a treaty. Regional institutions that have played a key role in advancing cooperative management of international waterways in Africa, for example, include the African Ministerial Council on Water (AMCOW), East African Community (EAC), New Partnership for Africa's Development (NEPAD), Southern African Development Community (SADC), and UN Economic Commission for Africa (ECA).<sup>63</sup>

International water treaties have often shown significant creativity and sensitivity in meeting the diverse needs of their signatories. In seeking to “stretch” available water supply, for example, treaties have relied not only on the traditional approach of constructing dams and reservoirs but on ecosystem restoration and offstream storage. Several treaties provide for temporary adjustments, normally in the form of water “loans,” in the face of unusual climatic conditions. At least one treaty provides for “humanitarian” diversions.<sup>64</sup>

Water agreements, moreover, have often established a platform for negotiating future issues. Many water treaties not only provide for the explicit resolution of existing disputes but also for various forms of cooperation in the resolution of future issues – providing a “halo” effect that goes beyond the four corners of the treaty itself.<sup>65</sup> The terms of some treaties, moreover, have changed over time in response to new conditions and needs. Canada and the United States, for example, have modified their Boundary Waters Treaty several times in response to changing conditions and concerns: first at the outbreak of World War II, to allow for greater hydropower generation to support the war effort, and again in 1950 to help better protect Niagara Falls through minimum flow requirements.<sup>66</sup>

The history of water treaties also gives hope that nations may be able to negotiate future treaties to deal with climate issues. Nations have often found shared interests in the management

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<sup>62</sup> Wolf, supra note xx, at [5].

<sup>63</sup> Goulden, Conway, & Persechino, supra note xx, at 21-22.

<sup>64</sup> Wolf, supra note xx, at [5].

<sup>65</sup> See Wolf, Yoffe, & Giordano, supra note xx, at 45 (noting that levels of cooperation have increased on average in the three-year period following treaty signature); Goulden, Conway, & Persechino, supra note xx, at 24 (“co-riparian relations are more cooperative in basins that have treaties”).

<sup>66</sup> Wolf, supra note xx, at [8].

of international river basins with limited water supplies for the local population. Dam projects in upstream nations, for example, have often benefited multiple nations on the river: producing hydropower for the upstream nations and more reliable flows for downstream nations. Where actions have benefited one nation more than others, side payments (generally in the form of help in financing needed infrastructure) have typically been forged to make agreement attractive to all nations.<sup>67</sup>

However, despite the progress made in managing international river systems, climate change will severely test the existing regime of treaties and institutions. As noted, less than half of all international rivers currently enjoy international treaties. Moreover, many of the treaties that do exist involve only a subset of the riparian nations along the waterway, precluding comprehensive adaptation measures.<sup>68</sup> Existing treaties are frequently vague, and a majority of the treaties have no provisions for effective conflict resolution.<sup>69</sup>

Most existing treaties, moreover, largely assume a stationary climate system and do not provide an effective system for addressing significant shifts in local climate regimes.<sup>70</sup> Some treaties include provisions that could actually limit the adaptive measures that some of the signatory nations or their water users might need to take in the future.<sup>71</sup> To anticipate and provide for climate change, treaties ideally should provide for either (1) automatic adjustments in water allocations and management in response to local climatic shifts (what is sometimes called “autonomous adaptation”) or (2) future adaptive capacity in the form of processes or institutions designed to allow riparian governments to evaluate and adopt needed adaptive measures.<sup>72</sup> Treaties, for example, could provide for percentage allocations of water or for international water markets (both forms of autonomous adaptation) or could establish a transnational water commission with the authority to adjust water formulas during lengthy periods of drought.

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<sup>67</sup> Id. at [7].

<sup>68</sup> Goulden, Conway, & Persechino, supra note xx, at 15.

<sup>69</sup> Wolf, supra note xx, at [11] (54% of treaties have no conflict resolution provision, 80% have no enforcement).

<sup>70</sup> Goulden, Conway, & Persechino, supra note xx, at 9; Drieschova, Giordano, & Fischhendler, supra note xx; Itay Fischhendler, Legal and Institutional Adaptation to Climate Uncertainty: A Study of International Rivers, 6 *Water Pol’y* 281, 282 (2004); Goldenman, supra note xx.

<sup>71</sup> Goulden, Conway, & Persechino, supra note xx, at 15.

<sup>72</sup> For a general discussion of policy approaches to climate change (including autonomous adaptation and adaptive capacity), see Barton H. Thompson, Jr., *Facilitating Adaptation to Climate Change: Themes for Law & Policy* (working paper, July 31, 2009).

Inflexible treaties are likely to break down in the face of climate change, resulting in unnecessary economic and social losses and risking significant international conflict. Water disputes often result from treaty inflexibility or the inability of existing institutions to keep pace with changing conditions.<sup>73</sup> For this reason, the 1997 UN Convention on the Law of the Non-Navigational Uses of International Watercourses, the Berlin Rules on Water Resources, and a variety of experts all have urged that transnational water treaties include provisions to address unexpected changes in water availability. Inflexibility in existing treaties has already led to calls for renegotiation and mistrust among signatory states.<sup>74</sup>

A study of transnational water agreements negotiated since 1980 (which one would expect to be more likely to address climatic shifts than earlier treaties) found that a high percentage of the treaties dealt only with flood and not with water scarcity.<sup>75</sup> Of those that dealt with water scarcity, two-thirds of the treaties addressed the need to vary flow in response to changes in climatic or hydrologic conditions.<sup>76</sup> Only six percent of the treaties, however, provided for a flexible and enforceable system for allocating water in the face of different climatic conditions.<sup>77</sup> None provided for international water markets. The largest percentage of treaties provided flexibility only by setting out general “principles” for future allocation agreements or by providing for future consultations for addressing climate changes. Approximately 30 percent of the treaties were inflexible, often setting out fixed allocations that did not depend on water conditions.<sup>78</sup>

Renegotiating existing treaties or negotiating new treaties to deal with climate change may not be easy without outside pressure or financial support. In the past, third-party encouragement has often been necessary in the negotiation of treaties or other cooperative actions.<sup>79</sup> Development banks have often provided that pressure by refusing to fund infrastructure projects on international waterways until all riparian nations agreed on the project

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<sup>73</sup> Yoffe, Wolf, & Giordano, *supra* note xx; Drieschova, Giordano, & Fischhendler, *supra* note xx, at 287.

<sup>74</sup> See Drieschova, Giordano, & Fischhendler, *supra* note xx, at 286.

<sup>75</sup> Drieschova, Giordano, & Fischhendler, *supra* note xx, at 2892.

<sup>76</sup> *Id.* at 288.

<sup>77</sup> Many such mechanisms, moreover, provide merely for short-term modifications. Fischhendler, *supra* note xx, at 283.

<sup>78</sup> *Id.* at 291 fig.2.

<sup>79</sup> Goulden, Conway, & Persechino, *supra* note xx, at 24.

and on any necessary division of waters.<sup>80</sup> In recent years, however, nations have often sought funding through the private market, bypassing such requirements, particularly where a project has been controversial or treaty negotiations would be difficult.<sup>81</sup>

New or renegotiated treaties that adequately address climate change may actually need greater pressure than in the past. Where treaties already exist, they can act as conceptual “anchors,” defining the status quo and making it difficult to change fundamental terms. Despite some successes noted earlier, nations have agreed to modify transboundary environmental agreements only in exceptional circumstances where it has clearly been in the interest of all parties or where the modifications have been minor.<sup>82</sup> Where treaties have led to significant infrastructure such as dams and reservoirs, nations also may resist changes for fear the changes will lead to stranded costs.<sup>83</sup>

Climate change, moreover, may call for treaty provisions that are more difficult to negotiate than in the past. Nations historically negotiated treaties in the face of existing or foreseeable disputes and on the assumption of stability. This permitted nations to evaluate tradeoffs and demonstrate to their populations the net benefit of a treaty. As discussed above, future treaties should either provide for autonomous adaptation or give regional institutions greater adaptive capacity to modify terms in light of future changes. Autonomous adaptation requires governments to give up a future right today without an immediate need or popular justification and without knowing all the elements of the future that might reflect on the wisdom of the agreement.<sup>84</sup> Awarding adaptive capacity to a regional agency, on the other hand, gives up sovereign authority, again without a conflict that demands it and often in situations where there is significant distrust among nations.<sup>85</sup> Politicians generally prefer enforceable treaties to

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<sup>80</sup> Wolf, Yoffe, & Giordano, *supra* note xx, at 49.

<sup>81</sup> See, e.g., *id.* (noting that the “most controversial projects of the day – Turkey’s GAP project, India’s Narmada River project and China’s Three Gorges Dam – are all proceeding through the studied avoidance of development banks and their mores”).

<sup>82</sup> Drieschova, Giordano, & Fischhendler, *supra* note xx, at 287, citing Stephen C. McCaffrey, *The Need for Flexibility in Freshwater Treaty Regimes*, 27 *Nat. Res. F.* 156 (2003).

<sup>83</sup> Drieschova, Giordano, & Fischhendler, *supra* note xx, at 292.

<sup>84</sup> See Fischhendler, *supra* note xx, at 296 (noting that it is difficult to get politicians to agree to mechanisms whose benefits, if they arrive at all, “will only be felt at some time in the future”).

<sup>85</sup> *Id.* at 294.

have clear rights and obligations.<sup>86</sup> The types of alternatives frequently found in transnational water treaties today – e.g., agreements to confer and agree on future changes, agreements to exchange data, or the creation of a regional management entity with little autonomous authority – recognize the importance of flexibility and can sometimes reduce future negotiation barriers, but are unlikely to eliminate future conflict or lead to prompt and effective adaptation.

## **B. Transnational Conservation**

Neither protection of migratory species nor collaboration in cross-border conservation is new. A number of international and regional treaties provide for the protection of migratory species. In one of the earliest efforts to protect species moving across international boundaries, the United States and Great Britain entered into a 1916 bilateral convention for the protection of migratory birds; the United States subsequently entered into similar conventions with Mexico (1936), Japan (1972), and the former Soviet Union (1976). The 1979 Convention on Migratory Species (CMS), adopted by 111 parties, provides for the global protection of migratory animal species. For “Endangered Migratory Species,” CMS calls for strong and immediate protection, including, where “feasible and appropriate,” the restoration of habitat and the elimination of obstacles to effective migration. More broadly, the 1992 Convention on Biological Diversity (CBD), with 191 parties, provides for the protection of all species, whether or not migratory.

Multiple nations have also participated in the development of multinational conservation complexes. Over 100 multinational protected areas currently exist, encompassing almost 500 separate reserves.<sup>87</sup> In establishing these multinational complexes, nations have typically engaged in joint planning efforts and have often established new preserves to supplement and complement existing reserves.<sup>88</sup> Such efforts, however, have often required years or decades to implement.<sup>89</sup> Few such transnational systems, moreover, impose obligations on nations to continue to coordinate in planning and implementation actions after the initial formation of the

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<sup>86</sup> Id. at 295.

<sup>87</sup> Hannah, *supra* note xx, at 72.

<sup>88</sup> Id. at 72-73.

<sup>89</sup> See, e.g., id. at 73 (describing the La Amistad reserve, involving both Costa Rica and Panama, that took a decade to effectuate).

reserve complex, nor do they provide for adaptation in the face of changing conditions.<sup>90</sup> Existing multinational protected areas, in short, are largely static not dynamic.

International conservation bodies have recognized the importance of climate change and called on nations to take additional steps to respond to the challenge. In 2008, for example, the CMS COP expressed concern about the impacts of climate change on the habitat and behavior of migratory species and urged parties to the convention to “design and implement adaptation strategies” for those species likely to be “threatened or impacted by climate change.”<sup>91</sup> A number of regional agreements entered into within the CMS framework have similarly urged new action to adapt protection to climate change.<sup>92</sup> In 2004 and 2006, the CBD COP similarly urged its parties to “integrate climate change adaptation measures in protected area planning ... and in the plan of protected area systems” and to “cooperate regionally in activities aimed at enhancing habitat connectivity across ecological gradients, with the aim of enhancing ecosystem resilience and to facilitate the migration and dispersal of species with limited tolerance to altered climatic conditions.”<sup>93</sup> None of these international and regional agreements, however, provide for binding enforcement and, with the exception of the Convention on Biological Diversity, none is comprehensive in its reach.<sup>94</sup>

Despite the transboundary conservation work that has taken place to date, effective regional collaboration in the face of climate change will not be easy. While most existing efforts have been reactive (protecting existing habitat for species that already face significant threats), future conservation efforts will need to be proactive (protecting and restoring lands that a much broader set of species may need in order to migrate in the face of climate change).<sup>95</sup> To accomplish this goal, studies suggest that cross-border conservation efforts may need to expand

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<sup>90</sup> See, e.g., Fischhendler, *supra* note xx, at 439 (discussing the European Union Birds and Habitats Directives).

<sup>91</sup> CMS COP Resolution 9.7, §§ 1, 2, 4, 12 (Dec. 5, 2008).

<sup>92</sup> See Fischhendler, *supra* note xx, at 435 (discussing the African-Eurasian Waterbirds Agreement (AEWA)).

<sup>93</sup> CBD COP Decision VII/28, ¶ 1(4)(5) (Feb. 20, 2004); CBD COP Decision VIII/30, ¶ 4 (March 31, 2006). In 2008, the COP again urged the parties to the CBD to “enhance the integration of climate-change considerations related to biodiversity in their implementation of the Convention.” CBD COP Decision IX/16, ¶¶ A(4)(b), (i) (May 30, 2008).

<sup>94</sup> The CMS, for example, is limited to migratory species, defined as species that “cyclically and predictably” or “periodically” cross one or more international borders. CMS, §§ I(1)(a), IV(4).

<sup>95</sup> Trouwborst, *supra* note xx, at 424; Hannah, *supra* note xx, at 70.

dramatically.<sup>96</sup> Conservation networks will need to include extensive core areas and provide significant connectivity, generally stretching across broad swaths of terrain.<sup>97</sup> Moreover, while past efforts at conservation have focused on preservation of existing habitat, effective migration may require restoration of degraded habitat.<sup>98</sup> Transnational conservation also will need to focus on a much broader set of species; indeed, in some cases, conservation will focus less on shifts in species than on shifts in entire ecosystems.<sup>99</sup> Finally, future conservation networks will need to be dynamic, shifting over time along with our evolving understanding of climate change and its effect on species.<sup>100</sup>

The steps needed to conserve species in the face of climate change will be expensive. As noted, climate change adaptation will require the preservation of substantial new areas of land. And land restoration, which often was not needed under static conservation, can cost two to three times as much as preservation.<sup>101</sup> At least one expert has estimated that the total costs of protecting species migrating as a result of climate change could be “on the order of 10-20% of human adaptation funding.”<sup>102</sup> Many developing countries will not be able to undertake such conservation (nor want to) without significant outside support.<sup>103</sup> Few nations, moreover, are likely to voluntarily undertake such expense to address the future *possibility* that species will cross borders into their territory. Faced by multiple other adaptation needs, nations may self-interestedly see conservation of such species as the obligation of the countries in which they are currently found.

As noted earlier, species protection in the face of climate change may also require assisted translocation of species.<sup>104</sup> Here again, expense will be a factor.<sup>105</sup> Moreover, even if countries are willing to accept responsibility for protecting species that naturally migrate into

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<sup>96</sup> Hannah, *supra* note xx, at 71-72.

<sup>97</sup> Fischhendler, *supra* note xx, at 429.

<sup>98</sup> See, e.g., Hannah, *supra* note xx, at 74 (discussing conservation needs in connection with Madagascar).

<sup>99</sup> Fischhendler, *supra* note xx, at 430.

<sup>100</sup> Hannah, *supra* note xx, at 70.

<sup>101</sup> Hannah, *supra* note xx, at 75.

<sup>102</sup> *Id.* at 76.

<sup>103</sup> *Id.* at 75-76.

<sup>104</sup> See Fischhendler, *supra* note xx, at 429; Camacho, *supra* note xx.

<sup>105</sup> Hannah, *supra* note xx, at 75.



their territory, countries are likely to balk at volunteering to be the recipients of translocated species, particularly if the species come with a significant future conservation price tag.

### C. Assimilation of Climate Refugees

Of the three transnational challenges identified in Part III(A), the problem of climate refugees is likely to be the most difficult to address. No regional or international agreement currently addresses the problem. The 1951 Convention Relating to the Status of Refugees (“Refugee Convention”) applies only to a narrow category of refugees who have a “well founded fear of being persecuted” because of “race, religion, nationality, membership of a particular social group or political opinion.”<sup>106</sup> Efforts to extend the treaty to environmental refugees have been unsuccessful.<sup>107</sup> Governments have opposed extension of the treaty for multiple reasons, including (1) the belief that governments should provide internally for members of their own population displaced for environmental reasons,<sup>108</sup> (2) the difficulty of determining exactly who is an “environmental refugee” and therefore entitled to protection, (3) the potentially large number of people who might be protected under an extension, and (4) the concern that expanding the definition of refugee under the convention would “devalue” the status of traditional refugees.<sup>109</sup> A proposal by the Maldives in 2006 to amend the Refugee Convention to explicitly cover climate refugees has not moved forward.<sup>110</sup>

Efforts to date to relocate human populations threatened by climate change to foreign nations have met with little success. For example, the island nation of Tuvalu, discussed in Part III, failed in its efforts to arrange with Australia for relocation of its population. The Australian government declined relocation in part because it did not believe that the Tuvalu population

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<sup>106</sup> Refugee Convention, art. IA.

<sup>107</sup> Williams, supra note xx, at 506-508.

<sup>108</sup> Williams, supra note xx, at 509-510; N. Geissler, The International Protection of Internally Displaced Persons, 11 Int’l J. Refugee L. 451 (1999). This belief finds reflection in the United Nations Refugee Agency’s Guiding Principles on Internal Displacement, which provides for the internal protection of person “forced or obliged to flee or to leave their homes or places of habitual residence, in particular as a result of . . . natural or human-made disasters” and who have not crossed an international border. Guiding Principles on Internal Displacement, ¶ 2.

<sup>109</sup> Williams, supra note xx, at 509; David Keane, The Environmental Causes and Consequences of Migration: A Search for the Meaning of “Environmental Refugees,” 16 Georgetown Int’l Envtl. L. Rev. 209 (2004).

<sup>110</sup> Bierman & Boras, supra note xx, at 11.

faced any imminent danger from rising sea levels.<sup>111</sup> Broader concerns about the precedent of accepting large populations, however, also played a significant role. By contrast, New Zealand, which is one of the few developed countries in the world to actively encourage immigration, agreed to a Pacific Access Category (PAC) that provides for the annual immigration of a fixed number of Tuvaluans. But the PAC agreement is limited to English speaking residents of Tuvalu between the ages of 18 and 45 who have an acceptable offer of employment in New Zealand.<sup>112</sup>

It seems highly unlikely that most nations in the future will voluntarily accept climate refugees from other nations, particularly without significant outside incentive. Climate refugees are likely to far outnumber existing refugees (by a potential factor of 20); indeed, entire communities are likely to move, placing great stress on the receiving nation.<sup>113</sup> Climate refugees are likely to impose huge costs on the host country, particularly if water, food supplies, and infrastructure are already suffering stress in the region. Many of the regions likely to generate significant numbers of international climate refugees also suffer from significant historic tensions among nations.<sup>114</sup>

## V. Toward Regional Cooperation

Given the importance of greater regional cooperation in climate adaptation, what steps can the global community take to promote such cooperation. This section briefly evaluates two major options: (1) international agreements and programs, and (2) adaptation funding.

A number of experts have argued that international agreements or programs are needed to promote the type of transnational cooperation urged in earlier sections of this Article. For example, to address the problem of climate refugees, several authors have proposed the adoption of a new protocol under the UNFCCC.<sup>115</sup> The protocol would set up a new legal and political regime for ensuring planned and voluntary resettlement of climate refugees. Some authors have proposed that a central executive body evaluate and determine when to recognize climate

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<sup>111</sup> Williams, supra note xx, at 515.

<sup>112</sup> Williams, supra note xx, at 515; Friends of the Earth, A Citizens' Guide to Climate Refugees (2005).

<sup>113</sup> Bierman & Boras, supra note xx, at 11-12.

<sup>114</sup> Williams, supra note xx, at 505.

<sup>115</sup> See, e.g., id. at 517-524; Bierman & Boas, supra note xx, at 11-15.

refugees, as well as determine the rights and support measures to award to particular climate refugees.<sup>116</sup> Other authors have suggested that such responsibilities would be better handled at a regional level, with regional entities operating under an international umbrella.<sup>117</sup>

International agreements or policies can play a valuable role in helping to shape regional cooperation – providing guidance as to when regional cooperation should be established, who should be involved in regional management, what issues regional management should address, and the types of tools that it might employ. However, for the reasons discussed in Part IV, international agreements or policies are unlikely to lead to regional cooperation without third-party pressure or assistance. In many cases of regional cooperation, some national parties will incur costs that are not balanced by local benefits. Nations will give up existing water claims or provide a home to migrating species or climate refugees. For this reason, virtually all viable proposals for international regimes provide for external funding of regional entities and the actions that they take.

Adaptation funding provides a major source of leverage over how climate adaptation is carried out. Several options are available. First, some or all adaptation funding could be provided to regional organizations. In the simplest approach, a portion of adaptation funding could be used to fund specific regional regimes, as well as the impacts of their actions. Adaptation funding, for example, could be used to support international watershed management and to provide compensation to states that suffer injury as a result of more flexible measures. Similarly, adaptation funding could be used to support regional refugee entities and to compensate nations for the costs of accepting refugees. Funding support is also needed for regional organizations that can provide climate predictions and information about both climate threats and solutions to local nations and their residents.

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<sup>116</sup> See, e.g., Bierman & Boas, *supra* note xx, at 14.

<sup>117</sup> See, e.g., Williams, *supra* note 518. As Williams argues, “regional cooperation and bilateral agreement that build on existing geopolitical and economic relationships and, moreover, that allow states to develop responsive policies in a timeframe appropriate to the relative capacity of the countries involved, appears a model better suited to climate change displacement. Indeed, regional agreements are more likely to be able to achieve a greater level of commitment from participating states than might otherwise be achieved at the international level.” *Id.*

A more complex approach would establish general regional regimes that also would be responsible for dividing funding among the nations within the regions. Regional regimes would effectively become the principal mechanisms for allocating adaptation funding at all levels. Although this approach might ensure closer integration of regional and national management, defining the contours of regional units would be a major challenge. The boundaries of regional entities can readily be defined around specific “problemsheds” – e.g., a watershed for water management, neighboring countries for conservation complexes. The boundaries of general regional entities, however, could suffer from being both under- and over-inclusive and be readily contested. Keeping problem-specific regimes separate from general funds allocation also is more likely to ensure that the problem-specific regimes are adequately funded.

Funding for individual nations might also be contingent on their participation in regional regimes. Nations that seek funding to deal with threatened shortages from an international waterways, for example, might be required to show that they are participating in existing regional management regimes (or are seeking to establish them) and that they have taken such regimes into account in their national planning. Such a requirement could both encourage countries to participate in regional regimes and ensure that regional options are integrated into national adaptation management.

Many less-developed nations are likely to oppose these measures. As noted in Part I, international adaptation funding historically has been inadequate, and nations may wish to see what funding does exist go directly to national measures before supporting regional measures that might seem of more indirect importance. Less-developed nations have lobbied hard for direct control over adaptation funding and are likely to see regional proposals as a step back toward global control. For the reasons discussed above, however, adequate funding of regional measures is critical to successful adaptation in the long run.