# Incorporating Climate Change Adaptation Into Framework Environmental Laws

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## – Summary –

This Article examines the various ways countries throughout the world have started to incorporate considerations of climate change adaptation into their framework environmental laws, implementing regulations, and other binding instruments. Drawing upon searches in databases of environmental laws, it examines national legislative and regulatory language, focusing on various types of provisions that address climate change adaptation. These laws serve as a valuable source of mechanisms that can be used to implement adaptation, providing a toolbox of approaches. The authors identify seven particularly important categories of adaptation provisions-assessment and science, planning, EIA, disaster preparedness and response, funding, coordination through creation of special committees and expert groups, and monitoring and evaluation of adaptation measures—and offer their reflections on practical considerations.

The effects of climate change vary from place to place, with droughts and wildfires in some regions, and floods and sea-level rise in others. These effects already reach countries all over the world and are predicted to increase in frequency and severity, taking a toll on these countries' social, economic, and ecological well-being.<sup>1</sup> The changing climate presents corresponding challenges for how countries govern their environment and natural resources.<sup>2</sup>

Historically, national environmental laws have sought to prevent substantial changes to the environment-for example, maintaining air quality, habitats, and species for current and future generations. Increasingly, though, countries are realizing that climate change undermines the whole concept of maintaining the status quo. Environmental laws now need to consider how to manage the environment, public health, and human activities in a realm of continuous (and often substantial) change. They need to consider how to incorporate climate change impacts into planning processes and into environmental impact assessments (EIAs)<sup>3</sup>; they need to consider how climate change will affect critical habitats and protected areas, and when and how to change those designations<sup>4</sup>; and they need to better prepare for both natural disasters and technological disasters triggered by floods, fires, and other natural disasters (so-called natechs).5

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- See, e.g., J.B. Ruhl, Climate Change Adaptation and the Structural Transformation of Environmental Law, 40 ENVTL. L. 363-431 (2010), available at https://biotech.law.lsu.edu/climate/docs/ssrn-id1517374.pdf.
- See, e.g., J.B. Ruhl, General Design Principles for Resilience and Adaptive Capacity in Legal Systems—With Applications to Climate Change Adaptation, 89 N.C. L. REV. 1373-403 (2010/2011), available at http://heinonline.org/ HOL/LandingPage?handle=hein.journals/nclr89&div=49&tid=&page.
- 3. See, e.g., Sirkku Juhola, Mainstreaming Climate Change Adaptation: The Case of Multi-Level Governance in Finland, in DEVELOPING ADAPTATION POLICY AND PRACTICE IN EUROPE: MULTI-LEVEL GOVERNANCE OF CLIMATE CHANGE 149 (Carina H. Keskitalo ed., Springer 2010); Trude Rauken et al., Mainstreaming Climate Change Adaptation at the Local Level, 20 INT'L J. JUSTICE & SUSTAINABILITY 408-23 (2015), available at http://www.tandfonline. com/doi/abs/10.1080/13549839.2014.880412.
- 4. Daniel Schramm et al., Environmental Law Institute, Legal and Policy Tools to Adapt Biodiversity Management to Climate Change: Resource Manual (2011).
- 5. Organisation for Economic Co-operation and Development, OECD Environment, Health, and Safety Publications Series on Chemical Accidents No. 27, Addendum Number 2 to the OECD Guiding Principles for Chemical Accident Prevention, Preparedness, and Response (2nd Ed.) to Address Natural Hazards Triggering Technological Accidents (Natechs) (2015), available at http://

This Article examines the various ways countries throughout the world have started to incorporate considerations of climate change adaptation into their framework environmental laws, implementing regulations, and other broadly binding instruments.<sup>6</sup> The research draws upon searches in a number of databases of environmental laws, including the Climate Change Laws of the World Database,<sup>7</sup> ECOLEX,<sup>8</sup> and FAOLEX.<sup>9</sup>

While some relevant laws date back a decade,<sup>10</sup> most of the laws have only recently been adopted.<sup>11</sup> Thus, the effectiveness of these laws is, for the most part, unclear. Many of the recent laws have not been fully implemented yet, and those that have been implemented often have not been thoroughly analyzed with regard to their effectiveness. Without this data, it is difficult to be certain which approaches work—let alone which represent "best" practice.

The Article starts with an overview of considerations related to incorporating climate change adaptation into environmental laws, including whether to amend existing legislation or draft new laws, whether to focus on national or subnational legislation and planning, and whether to have broad mandates or detailed provisions. It then examines national legislative and regulatory language, focusing on various types of provisions that address climate change adaptation. We identify seven particularly important categories of adaptation provisions, namely assessment and science, planning, EIA, disaster preparedness and response, funding, coordination through creation of special committees and expert groups, and monitoring and evaluation of adaptation measures. We conclude with a few reflections on practical considerations.

## I. Considerations in Incorporating Climate Change Adaptation Into Legislation

Countries have taken different approaches to integrating climate change adaptation into their environmental laws. Some amend existing environmental codes, while others create new laws. Some devise strong national legislation, while others focus on subnational laws. Some establish general mandates, while others build intricate, detailed provisions. Some address particular vulnerabilities and areas important to them, while others do not. Examples illustrating these various options are presented below.

## A. Creating New Legislation Versus Amending Existing Environmental Legislation

In addressing climate change adaptation through national legislation, as of January 2018, at least 11 countries<sup>12</sup> chose to incorporate adaptation provisions into their existing environmental codes, and at least 22 countries<sup>13</sup> created new climate change laws (see Figure 1). For example, Vietnam updated its Law on Environmental Protection<sup>14</sup> in 2014 to include a new chapter on response to climate change. Similarly, Bulgaria's Environmental Protection Act<sup>15</sup> was updated in 2011, Lao People's Democratic Republic's Environmental Protection Law<sup>16</sup> was revised in 2013, and El Salvador's Environmental Law was revised in 2012.<sup>17</sup> In all these cases, the amended environmental codes included considerations of climate change adaptation. France's Law No. 2010-788 of 12 July 2010 on National Commitment for the Environment<sup>18</sup> amended both France's Environmental Code and Rural and Maritime Fishing Code to include language related to climate change adaptation.

Countries that created new independent laws usually titled them Climate Change Acts or Climate Protection

www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=env/jm/mono(2015)1&doclanguage=en.

<sup>6.</sup> For discussions of amending sectoral legislation to account for climate change, see, for example, Carl Bruch & Jessica Troell, *Legalizing Adaptation: Water Law in a Changing Climate*, 36(6) WATER INT'L 828-45 (2011); SCHRAMM ET AL., *supra* note 4.

Grantham Research Institute on Climate Change and the Environment, *Climate Change Laws of the World*, http://www.lse.ac.uk/GranthamInsti-tute/climate-change-laws-of-the-world / (last visited Feb. 13, 2018).

<sup>8.</sup> ECOLEX, *Home Page*, https://www.ecolex.org/ (last visited Feb. 13, 2018).

Food and Agriculture Organization of the United Nations, *FAOLEX Database*, http://www.fao.org/faolex/en/ (last visited Feb. 13, 2018).

See Climate Change Act of 2008 ch. 27 (U.K.), http://extwprlegs1.fao.org/ docs/pdf/uk88225.pdf.

See, e.g., Climate Action and Low Carbon Development Act 2015 (No. 46 of 2015) (Ir.), http://extwprlegs1.fao.org/docs/pdf/ire150968.pdf; Climate Change Act (2015) (Fin.), http://www.finlex.fi/fi/laki/alkup/2015/20150609; Climate Protection Act (2017) (Aus.), http://extwprlegs1.fao.org/docs/pdf/aut135454.pdf.

<sup>12.</sup> At least the following 11 countries (colored in gray in Figure 1) have amended their framework environmental laws to adapt to climate change: Bulgaria, Burkina Faso, El Salvador, France, Indonesia, Laos, New Zealand, Tanzania, Turkmenistan, Tuvalu, and Vietnam.

<sup>13.</sup> At least the following 22 countries (colored in black in Figure 1) have created new climate change laws: Austria, Bolivia, Brazil, Bulgaria, China, Croatia, Finland, France, Guatemala, Iceland, Ireland, Kenya, Malta, Mexico, New Zealand, Pakistan, Papua New Guinea, the Philippines, South Korea, Switzerland, Tuvalu, and the United Kingdom.

Law on Environmental Protection No. 55/2014/QH13 ch. 4 (2014) (Viet.), http://extwprlegs1.fao.org/docs/pdf/vie168513.pdf.

Environmental Protection Act (2011) (Bulg.), http://extwprlegs1.fao.org/ docs/pdf/bul52883.pdf.

Environmental Protection Law (2013) (Laos), http://extwprlegs1.fao.org/ docs/pdf/lao151747.pdf.

Legislative Decree No. 158 (2012) (El Sal.), http://extwprlegs1.fao.org/ docs/pdf/els142831.pdf.

Law No. 2010-788 of 12 July 2010 on National Commitment for the Environment art. 117 (Fr.), https://www.legifrance.gouv.fr/affichTexte.do?cid Texte=JORFTEXT000022470434&categorieLien=id.



## Figure 1. Countries that have incorporated adaptation by amending their framework environmental laws and/or enacting new climate change laws

Note: The category of countries with new climate change laws does not include those that only enacted sectoral legislation or climate change laws covering a specific narrow topic, such as the creation of a climate change fund or a climate change committee.

Laws, and these laws addressed both mitigation and adaptation. For example, Finland enacted its Climate Change Act in 2015<sup>19</sup> and Iceland enacted its Climate Act in 2012.<sup>20</sup> Some countries both amend existing environmental laws and create new climate change laws. Bulgaria, for example, in addition to revising its Environmental Code, enacted the Climate Change Mitigation Act in 2014.<sup>21</sup> While these new laws are not the same as the Environmental Code, they have a similarly broad reach addressing a wide range of issues. As such, their structure, approach, and language are relevant to efforts to revise environmental laws to consider adaptation to climate change.

The reasons for enacting a new law instead of amending the existing environmental code may relate to the desire to focus on climate change in depth. Climate change laws generally tend to have longer passages dedicated to climate change adaptation. Another consideration may be that it can be easier to enact a new law than to amend an existing one; moreover, a dedicated law may have broader reach than the environmental code. For example, some countries address different sectors (and the respective competencies of the relevant governmental bodies responsible for those sectors) only in the codes that govern those particular sectors, rather than in the environmental code.<sup>22</sup> Since climate change adaptation requires a coordinated action across governmental sectors, several governmental bodies would need mandates to act. As a result, a country may consider creating a separate climate change law—if that is an option legally, administratively, and politically—rather than amending several codes, such as the water code, the forest code, the land code, the health code, and the biodiversity code, in addition to the environmental code.

The incorporation of adaptation into sector-specific codes allows focus on the aspects of climate change most relevant to those sectors, but it can be a time- and resource-intensive process. In the long run, there is merit in both an overarching framework for adaptation (whether in the environmental code or in a climate change law) and main-streaming adaptation into sector-specific legislation.<sup>23</sup>

#### B. Centralized Versus Regional Approach

Countries also have a choice in how to administer their approach to climate change adaptation. While some countries take a centralized approach to climate change adaptation (e.g., by revising national laws and focusing on national processes and institutions), others take a more decentralized approach. Countries opting for decentralization tend to already have strong regional governance (e.g., a federal system).<sup>24</sup> A decentralized approach is also useful

Climate Change Act (2015) (Fin.), http://www.finlex.fi/fi/laki/ alkup/2015/20150609.

<sup>20.</sup> Climate Act (2012) (Ice.), http://www.althingi.is/lagas/nuna/2012070. html.

Climate Change Mitigation Act (2014) (Bulg.), http://www5.moew.government.bg/?wpfb\_dl=17747.

See, e.g., Environmental Code art. 18 (Kaz.), http://adilet.zan.kz/eng/docs/ K070000212\_.

<sup>23.</sup> For example, Bulgaria's 2014 Climate Change Mitigation Act (notwithstanding its title) also requires sectors to incorporate adaptation measures. *See infra* note 32 and accompanying text.

<sup>24.</sup> On comparative environmental federalism generally, see VRINDA MANGLIK ET AL. ENVIRONMENTAL LAW INSTITUTE, COMPARATIVE FEDERALISM: BEST

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in places where different regions face different effects of climate change, as it allows accommodation of those differences. Local or regional plans provide the necessary territorial details and requirements, thus facilitating the creation of adaptation measures specific to regional needs.

Germany, for example, a federal country, has adopted both a climate change strategy and a national adaptation plan, but has no federal legislation addressing climate change adaptation. It does, however, have a number of state climate change adaptation laws.<sup>25</sup> Similarly, in Canada, while there is no federal climate change legislation, various provinces have enacted their own laws.<sup>26</sup>

Mexico, another federal country, has both federal and state legislation on climate change adaptation.<sup>27</sup> While the federal legislation provides a thorough overview of adaptation-related issues, it also requires states to create their own adaptation plans.<sup>28</sup> It specifies that state adaptation programs must include long-term planning, diagnosis of vulnerability and adaptation capacity, goals for adaptation, and adaptation measures, including reporting on and verification of those measures.<sup>29</sup> The existence of complementary laws at both the national and subnational levels is likely to increase the likelihood that adaptation to climate change is effectively addressed.

Where enactment of national legislation on climate change is contentious, some countries have utilized executive orders or decrees to take initial steps to adapt to climate change. In the United States, for example, executive orders discussed the importance of being prepared for the effects of climate change.<sup>30</sup> Executive Order No. 13653 (since revoked) created the Council on Climate Preparedness and Resilience and discussed planning for climate change by federal agencies.<sup>31</sup>

29. Id.

#### C. General Mandates Versus Detailed Provisions

Climate change adaptation laws vary regarding the level of detail with which they address adaptation. Some laws make general references to adaptation or effects of climate change, and create broad mandates or legal "hooks" for agencies and ministries to adopt regulations and take action. For example, Bulgaria's Climate Change Mitigation Act states that:

(2) The Ministers referred to in Paragraph 1 shall:

5. in consultation with the Minister of Environment and Water, develop measures for adaptation of their respective sectors to climate change and ensure the control of their implementation.<sup>32</sup>

This general mandate does not provide any information on how adaptation measures should be developed and implemented, but it can be elaborated in related regulations that describe these processes in detail. Moreover, the process sets in motion likely reforms to sector-specific legislation.

Similarly, Burkina Faso's Law on the Environmental Code merely states: "The Government is taking the necessary measures to adapt the occupation of the national territory to the demands of climate change, the maintenance of ecological balances and the improvement of the living environment."<sup>33</sup>

Austria's Climate Protection Act establishes the National Climate Protection Committee, responsible for advising the government on issues related to climate policy, reduction of emissions, and adjustment to the effects of climate change, but similarly does not provide further details on the processes involved.<sup>34</sup> Other countries that have provided general mandates (but few details) in their environmental legislative provisions on adaptation include, for example, Indonesia, Switzerland, and Tuvalu.

In contrast, many climate change adaptation laws contain detailed passages addressing various and numerous aspects of climate change adaptation, including assessment of risk and vulnerabilities, creation of national and regional plans, creation of designated bodies responsible for development and implementation of adaptation measures, and monitoring and evaluation of the created adaptation mechanisms. In fact, some laws contain whole chapters devoted to climate change adaptation.<sup>35</sup> Countries that have taken a more detailed approach to climate change adaptation in their environmental legislation include, for example, Bolivia, China, Croatia, Finland, France, Iceland, Ireland, the Philippines, the United Kingdom, and Vietnam.

PRACTICES ANALYSIS OF ENVIRONMENTAL PROTECTION AUTHORITIES IN FEDERAL STATES (2010).

<sup>25.</sup> See, e.g., Climate Protection Law Nordrhein-Westfalen (2013) (F.R.G.), https://www.ecolex.org/details/legislation/climate-protection-law-nordrhe in-westfalen-lex-faoc127153/?q=%22climate+change%22&type=legislation &xcountry=Germany&xdate\_min=&xxdate\_max=.

See, e.g., (Alberta) Climate Leadership Act (2016) (Can.), http://extwprlegs1.fao.org/docs/pdf/al159803.pdf; (Manitoba) Climate Change and Emissions Reductions Act (C.C.S.M. c. C135) (2013) (Can.), http://extwprlegs1.fao.org/docs/pdf/mn85997.pdf.

General Law on Climate Change (2012) (Mex.), https://www.iea.org/media/ workshops/2015/15thghgtradingworkshop/GeneralClimateChangeLaw\_ Englishversion.pdf; Law of Mitigation and Adaptation to Climate Change and Sustainable Development for the Federal District (2011) (Mex.), http:// www.fao.org/faolex/results/details/en/c/LEX-FAOC142255/.

<sup>28.</sup> General Law on Climate Change sec. 2, arts. 71-72 (2012) (Mex.).

<sup>30.</sup> See, e.g., Exec. Order No. 13693, Planning for Federal Sustainability in the Next Decade, 80 Fed. Reg. 15871 (Mar. 25, 2015), available at https://www.gpo.gov/fdsys/pkg/FR-2015-03-25/pdf/2015-07016.pdf; Exec. Order No. 13653, Preparing the United States for the Impacts of Climate Change, 78 Fed. Reg. 66817 (Nov. 6, 2013) (revoked by Exec. Order No. 13783 in 2017), available at https://obama whitehouse.archives.gov/the-press-office/2013/11/01/executive-orderpreparing-united-states-impacts-climate-change.

Exec. Order No. 13653, Preparing the United States for the Impacts of Climate Change, secs. 5-6, 78 Fed. Reg. 66817, 66820-21 (Nov. 6, 2013) (revoked by Exec. Order No. 13783 in 2017), *available at* https://obama whitehouse.archives.gov/the-press-office/2013/11/01/executive-orderpreparing-united-states-impacts-climate-change.

<sup>32.</sup> Climate Change Mitigation Act art. 4(2)(5) (2014) (Bulg.), http://extwpr-legs1.fao.org/docs/pdf/bul52883.pdf.

Law No. 006-2013 on the Environment Code in Burkina Faso art. 24 (2013), http://extwprlegs1.fao.org/docs/pdf/bkf124369.pdf.

<sup>34.</sup> Climate Protection Act sec. 4(1)-(2) (2017) (Aus.).

See, e.g., Law on Environmental Protection No. 55/2014/QH13 ch. 4 (2014) (Viet.), http://extwprlegs1.fao.org/docs/pdf/vie168513.pdf; Climate Change (Management) Act (2015) (Papua N.G.), http://extwprlegs1. fao.org/docs/pdf/png155761.pdf.

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There are pros and cons with regard to both general mandates and detailed provisions. Amending national legislation can be a cumbersome and lengthy process. Moreover, climate science continues to evolve rapidly, and the specific future effects of climate change on a particular country may be uncertain. Therefore, if there is too much specificity in the legislative language with regard to adaptation measures and programs, changing those measures and programs to make them more effective may not be an easy task. On the other hand, if a mandate is too broad and provides no vehicle for implementation, evaluation, or enforcement, it may not create any impact.

Accordingly, countries frequently endeavor to provide enough detail in the law to ensure that it can be carried out effectively, but allow agencies some flexibility in devising the specific modalities through regulations. Another important point from a practical perspective is that the best adaptation measures are not always readily apparent and might require assessment of sectoral and territorial needs, which can be done by the agencies. Thus, the law can set a mandate for an agency to assess the needs, create appropriate adaptation measures based on its findings and within specified time frames, and then report on its actions and the effectiveness of the created measures.

Limited political will may also argue in favor of a general mandate. Further, countries may have limited knowledge about climate change and even the rudimentary measures that are necessary to adapt to climate change a situation that is often characterized by a lack of will to adopt substantial adaptation measures. In such situations, a country may provide a general mandate as a first step to collect information, start incorporating climate change considerations into planning processes, and generally build knowledge and awareness, with the understanding that subsequent and more detailed legislation will likely be necessary in due course.

### D. Focus on Specific Areas and Vulnerabilities to Climate Change

When incorporating climate change adaptation into environmental laws, some countries have concentrated on specific areas or sectors that are particularly vulnerable or important to them. This allows countries to address their most pressing needs and ensure that agencies take action with regard to all the vulnerable sectors.

For example, Croatia's Air Protection Act<sup>36</sup> states: "(2) Adaptation to climate change shall be effected through adaptation measures in the following sectors exposed to climate change: hydrology and water resources; agriculture; forestry; biodiversity and natural land ecosystems; biodiversity and marine ecosystems; coastal management and coastal area; tourism and human health." Similarly, China's Climate Change Response Law provides that: The State Council and the local people's governments at the local levels of coastal areas shall strengthen the monitoring and protection of marine and coastal ecosystems and carry out monitoring, investigation and assessment of sea level rise, coastal erosion, seawater intrusion and soil salinization, to improve coastal areas to withstand the ability of marine disasters.<sup>37</sup>

France's Law No. 2009-967 of 3 August 2009 on Programming Relating to the Implementation of the Grenelle de l'Environnement specifically mentions the importance of adaptation with regard to agriculture, forestry, and biodiversity.<sup>38</sup> France's Law No. 2010-788 of 12 July 2010 on National Commitment for the Environment similarly amends the Rural and Maritime Fishing Code by stating that the chambers of agriculture may, if it contributes to the preservation of natural resources, take water for irrigation on behalf of all the irrigating water collectors.<sup>39</sup>

Identifying in legislation specific sectors that are vulnerable to climate change can prioritize resources and political will, helping to ensure that action will be taken to increase resilience of those priority sectors. Many countries have also started incorporating considerations of adaptation to climate change into sectoral laws, such as those related to agriculture, water, forestry, marine and coastal management, and land.<sup>40</sup> In fact, sectoral legislation appears even in countries that did not incorporate climate change adaptation into their national framework laws.<sup>41</sup>

## II. Legal Provisions on Climate Change Adaptation

Aside from broad considerations about how to orient and structure environmental legislation addressing adaptation to climate change, there is also a question of what specific issues and language to include. Based on our review of existing laws, we have identified seven categories of provisions that are particularly important for climate change adaptation:

Air Protection Act art. 118 (2011) (Croat.), http://narodne-novine.nn.hr/ clanci/sluzbeni/2011\_11\_130\_2601.html.

People's Republic of China Climate Change Response Law art. 55 (2012), http://news.hexun.com/2012-03-18/139443646.html.

<sup>38.</sup> Law No. 2009-967 of 3 August 2009 on Programming Relating to the Implementation of the Grenelle de l'Environnement arts. 31, 34 (Fr.), https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT 000020949548. The Grenelle de l'Environnement is an environmental roundtable that brings together national government authorities, local authorities, industry, labor, and nongovernmental organizations.

Law No. 2010-788 of 12 July 2010 on National Commitment for the Environment ch. II, art. 151(I) (Fr.), https://www.legifrance.gouv.fr/affichTexte. do?cidTexte=JORFTEXT000022470434&categorieLien=id.

<sup>40.</sup> See, e.g., Flood Risk Management Act (2010) (Fin.), http://extwprlegs1.fao. org/docs/pdf/fin103265.pdf; Planning and Development (Amendment) Act (2010) (Ir.), http://extwprlegs1.fao.org/docs/pdf/ire103785.pdf; Law No. 13153 of 30 July 2015 Approving the National Policy to Fight Desertification and Mitigate the Effects of Drought (CNDC) and Creating the National Committee to Combat Desertification (Braz.), https://www.ecolex. org/details/legislation/law-no-13153-of-30-july-2015-approving-the-national-policy-to-fight-desertification-and-mitigate-the-effects-of-droughtcndc-and-creating-the-national-committee-to-combat-desertification-lex-fa oc147180/?q=&type=legislation&xkeywords=climate+change&xcountry= Brazil&xdate\_min=&xdate\_max=.

<sup>41.</sup> See, e.g., Water Resources Management Act (2011) (Zambia), http://www.lse. ac.uk/GranthamInstitute/law/the-water-resources-management-act-2011/.

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- 1. Assessment of risk and vulnerabilities to effects of climate change and the development and use of science and scientific research
- 2. Adaptation planning
- 3. EIA
- 4. Emergency prevention and response
- 5. Funding
- 6. Coordination, including through the creation of special committees and expert groups
- 7. Monitoring and evaluation of progress and adaptation measures (which implicates the ability to adjust measures based on new information and findings from evaluation)

Table 1 provides a brief overview of which countries have provisions in which categories. In order to provide the normative, procedural, and institutional frameworks necessary to climate change, legislation should address all seven of these categories. This part discusses these categories in turn. In addition to the seven key categories of adaptation language, there are also other categories that generally appear in robust laws addressing climate change adaptation, such as creation and implementation of adaptation measures, and education and public awareness.

Many laws specify which governmental bodies shall be responsible for the development and implementation of climate change adaptation measures and programs. This ensures that the requirements mandated in the legislation are properly and timely carried out by various agencies, committees, and other entities. Croatia's Air Protection Act,<sup>42</sup> for example, identifies governmental bodies responsible for ensuring the effectiveness of the adaptation mechanisms. Specifically, it names the Croatian Parliament, the government of the Republic of Croatia, and the representative and executive bodies of local and regional self-government units within and to the government of the Republic of Croatia.43 The Act also states that activities related to climate change adaptation are to be "implemented and ensured by central state administration bodies, administrative bodies of local and regional self-government units" and other legal persons with public authority.<sup>44</sup> Notably, the responsibility of ensuring the effectiveness of adaptation mechanisms in this case is shared between the federal and regional bodies, which can allow action at one level when it is absent or delayed at the other.

Laws that address climate change adaptation usually also acknowledge the importance of educating the public about and engaging the public in matters related to climate change. These laws often create rights for the public to know about impending climate change issues and government's efforts to respond to climate change, as well

43. Id. 44. Id. as mandates for governmental agencies to keep the public informed. For example, Vietnam's Law on Environmental Protection states that the "regulatory agency in charge of climate change issues" is responsible for providing information to the public, and that the population has the right to request information about climate change and is responsible for participation in activities devised in response to climate change.<sup>45</sup> This language creates both rights and responsibilities of the public.

Some laws also contain provisions that offer an opportunity for public participation in the creation of adaptation plans, strategies, and even regulations. Croatia's Air Protection Act,<sup>46</sup> for example, states that draft national action plans, national programs, and national reports "must be publicly disclosed for obtaining opinions, suggestions and objections" of the public. Similarly, Croatia's Amendment to Air Protection Act provides that the Adaptation Strategy and Action Plan must be published in the official gazette.<sup>47</sup> Malta's Climate Action Act<sup>48</sup> provides that regulations issued under the Act that relate to adaptation measures, collection of data, and other aspects of climate change adaptation must first be published in draft form in the *Government Gazette*, allowing the public to weigh in.

### A. Assessment and Science

Assessment of risks and vulnerabilities is one of the crucial first steps when it comes to climate change adaptation. Countries need to evaluate both the existing and predicted effects of climate change on various sectors and regions before they can decide what measures to adopt, how to prioritize adaptation work given their capacity and resources, and whether action should be taken at the local, sectoral, or national level. It is thus not surprising that many laws that address climate change adaptation generally address this assessment in detail. They often mention the importance of assessing the risks and vulnerabilities of various sectors, such as agriculture, water, and land, and specify for what period of time the assessment must be done.

For example, China's Climate Change Response Law states:

Article 49. The State shall establish an analysis and evaluation mechanism for the impacts of climate change and carry out the assessment of the impact of climate change on national food security, water security, ecological security, human health and safety, and take appropriate measures to enhance the adaptation, climate change capacity, and the sustainability of economic and social development.

<sup>42.</sup> Air Protection Act art. 6 (2011) (Croat.), http://narodne-novine.nn.hr/ clanci/sluzbeni/2011\_11\_130\_2601.html.

<sup>• • •</sup> 

Law on Environmental Protection No. 55/2014/QH13 art. 46 (2014) (Viet.), http://extwprlegs1.fao.org/docs/pdf/vie168513.pdf.

Air Protection Act art. 16 (2011) (Croat.), http://narodne-novine.nn.hr/ clanci/sluzbeni/2011\_11\_130\_2601.html.

<sup>47.</sup> Id. art. 118a.

Act No. XVII of 2015 (Climate Action Act) art. 13 (Malta), http://extwprlegs1.fao.org/docs/pdf/mlt148407.pdf.

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Article 55. The State Council and the local people's governments at the local levels of coastal areas shall strengthen the monitoring and protection of marine and coastal ecosystems and carry out monitoring, investigation and assessment of sea level rise, coastal erosion, seawater intrusion and soil salinization, to improve coastal areas to withstand the ability of marine disasters.<sup>49</sup>

Similarly, Article 118 of Croatia's Air Protection Act<sup>50</sup> states:

(1) Climate-friendly adaptation implies an assessment of the adverse impacts of climate change and the taking of appropriate measures to prevent or reduce the potential damage they may cause.

. . .

(5) The modeling, assessment of vulnerability and impacts for each sector referred to in . . . this Article shall be carried out for the period up to 2030 and shall be the basis for the preparation of the Climate Change Adaptation Action Plan.

In 2014, Croatia amended its Air Protection Act to extend the modeling and assessment out through 2040 and provide for the preparation of the Climate Change Adjustment Strategy that links to the action plan.<sup>51</sup>

Many climate change-related laws also stress the importance of relying on the best available science. Where science is limited, the laws may provide a mandate prioritizing the collection of data to improve decisionmaking for climate change adaptation. For example, Article 47 of Vietnam's Law on Environmental Protection<sup>52</sup> provides that:

47. Development and application of technological and scientific advances for the response to climate change

> 1. All activities relating to the study, transfer and application of technological and scientific advances for the response to climate change shall be given priority, including:

> > (a) Developing a single scientific discipline or a combination of scientific disciplines of the management, assessment, supervision and prediction of impacts caused by climate change on the socio-economic growth, environmental issues and community health;

. . .

2. Agencies, organizations and manufacturing or business establishments shall be responsible for conducting or engaging in scientific and technological researches, transfer and application with the aim of responding to the climate change.

Assessments of risks and vulnerabilities, as well as reliance on solid scientific data, are crucial for the creation of effective adaptation mechanisms that target the effects of climate change. In light of the potentially high costs of adaptation, science and assessment are also critical to making informed decisions about how to prioritize adaptation investments and actions. While specifics about how to conduct the assessment can be addressed in regulations, including how to do so with limited data and technology, the law should provide sufficient detail to ensure that the assessment is conducted, and conducted in a timely manner by capable entities. Provisions can thus address, for example, parties responsible for conducting the assessment, time lines or frequency of the assessments, and sectors of the economy that deserve particular attention. The law should also stress the importance of relying on the best available science.

#### B. Planning

Most framework environmental laws that mention adaptation contain provisions addressing adaptation in planning processes, including requirements for the creation of national and regional adaptation plans, and consideration of the needs of various sectors. Some laws only contain basic requirements. For example, Tanzania's Environmental Management Act<sup>53</sup> provides that:

The Minister shall, in consultation with relevant sector Ministries:

(c) require Ministries and independent Government departments to put in place strategies and action plans to deal with climate change and to advise schools and higher learning institutions to include matters relating to climate change in their curriculum;

This provision does not explain how these adaptation strategies and action plans should be developed, what particular sectors or time periods they should consider, when they should be completed, who should receive reports about their preparation and effectiveness, or how their effectiveness should be evaluated. Nevertheless, such provisions are important in providing a legal mandate to incorporate adaptation into planning processes.

France's Law No. 2009-967<sup>54</sup> contains a similar mandate for the creation of a national climate adaptation plan.

<sup>49.</sup> People's Republic of China Climate Change Response Law arts. 49, 55 (2012).

Air Protection Act art. 118 (2011) (Croat.), http://narodne-novine.nn.hr/ clanci/sluzbeni/2011\_11\_130\_2601.html.

Amendment to Air Protection Act art. 68 (2014), amending art. 118(5) of the Air Protection Act (Croat.).

Law on Environmental Protection No. 55/2014/QH13 art. 47 (2014) (Viet.), http://extwprlegs1.fao.org/docs/pdf/vie168513.pdf.

Environmental Management Act art. 75 (2004) (Tanz.), http://extwprlegs1. fao.org/docs/pdf/tan61491.pdf.

Law No. 2009-967 of 3 August 2009 on Programming Relating to the Implementation of the Grenelle de l'Environnement art. 42 (Fr.), https://www. legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000020949548.

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Although it states that the adaptation plan should be prepared for different sectors of activity by 2011, there are no specifics as to how or by whom.<sup>55</sup> Article 68 of France's Law No. 2010-788 of 12 July 2010 on National Commitment for the Environment<sup>56</sup> similarly requires each region to adopt a regional climate plan, albeit explicitly envisioning that additional details will be provided by government decree:

Art. L. 222-3.-Each region shall adopt a regional climate, air and energy plan within one year of the entry into force of Law No. 2010-788 of 12 July 2010 on National Commitment for the Environment.

A decree of the Conseil d'Etat shall lay down detailed rules for the application of this section and shall determine, in particular, local and regional authorities, groups of local and regional authorities, bodies and bodies consulted on the draft regional climate plan, air and energy either during its preparation or before its adoption, and the modalities of their consultation.

As a result of these two laws, both the French National Climate Change Adaptation Plan<sup>57</sup> and the regional climate, air, and energy plans for 26 regions<sup>58</sup> were developed. These plans helped begin important adaptation work and identify key areas for improvement at both the national and regional levels.<sup>59</sup> Consequently, even general mandates in the legislative text can drive governmental agencies to develop adaptation plans or to incorporate climate change adaptation considerations into other planning processes.

The laws of some countries contain detailed provisions regarding how adaptation plans should be formed and what they should include. For example, Finland's Climate Change Act contains lengthy provisions on the creation of the national adaptation plan.<sup>60</sup> Some of these provisions state that one of the purposes of planning is to determine the necessary adaptation measures, that the government must adopt a new adaptation plan at least once every 10 years, and that the plan must rely on up-to-date scientific information and consider the development of new technologies.<sup>61</sup> The level of detail in these requirements ensures not

only that adaptation planning is done, but that it is done according to certain standards, including with the use of the best available scientific data and a periodic creation of an adaptation plan. The fact that these standards are mandated legislatively, rather than through regulations, can make them more permanent and, depending on the country, more likely to be implemented.

Detailed provisions about sectoral planning are also useful. Ireland's Climate Action and Low Carbon Development Act 2015 provides detailed instructions for the creation of the national adaptation framework, which describes the national strategy for the implementation of adaptation measures in different sectors, and the creation of sectoral plans.<sup>62</sup> Ireland did not specify the sectors for which adaptation plans are necessary, but some countries do. Croatia's Air Protection Law, for example, mentions hydrology, agriculture, forestry, natural land ecosystems, marine ecosystems, coastal management, tourism, and human health.<sup>63</sup>

Some countries also try to "mainstream" climate change adaptation into broader planning processes. For example, the Philippines' Climate Change Act<sup>64</sup> states that the Climate Change Commission has the power to "[e]nsure the mainstreaming of climate change . . . into the national, sectoral and local development plans and programs." Similarly, Vietnam's Law on Environmental Protection<sup>65</sup> provides as follows:

Article 39. General provisions on the response to climate change

1. All activities relating to the environmental protection must be harmoniously connected with the response to climate change.

Article 40. Integration of main contents of responses to climate change with the strategy, planning and proposal for socio-economic development

. . .

 Main contents of response to climate change must be included in the strategy, planning, proposal for socio-economic development as well as planning for industrial and sectoral development, which is applicable to objects required to make a report on strategic environment assessment as prescribed in Article 13 of this Law.

<sup>55.</sup> Id.

Law No. 2010-788 of 12 July 2010 on National Commitment for the Environment (Fr.), https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JOR FTEXT000022470434&categorieLien=id.

European Climate Adaptation Platform, National Climate Adaptation Plan—France (2011-2015) (2011), http://climate-adapt.eea.europa.eu/ metadata/publications/national-adaptation-plan-france-2011-2015 (last visited Feb. 13, 2018).

<sup>58.</sup> In France, there were regional climate, air, and energy plans created in 26 regions throughout the country. See DENISE WELCH, GREEN GROWTH KNOWLEDGE PLATFORM, GGBP CASE STUDY SERIES: FRENCH REGION-AL CLIMATE, AIR, AND ENERGY PLANS (2014), available at http://www.greengrowthknowledge.org/sites/default/files/downloads/best-practices/GGBP%20Case%20Study%20Series\_France\_Regional%20Climate-Air-Energy%20Plans.pdf.

NATIONAL OBSERVATORY ON THE EFFECTS OF CLIMATE CHANGE, ADAPTATION TO CLIMATE CHANGE: ASSESSMENT OF THE NATIONAL PROCESS AND REC-OMMENDATIONS (2016), *available at* https://www.ecologique-solidaire.gouv. fr/sites/default/files/ONERC\_Rapport\_2016\_EvaluationNap\_EN.pdf.
Climate Change Act sec. 6 (2015) (Fin.).

<sup>61.</sup> Id. secs. 6, 8.

Climate Action and Low Carbon Development Act 2015 (No. 46 of 2015) secs. 5-6 (Ir.), http://extwprlegs1.fao.org/docs/pdf/ire150968.pdf.

Air Protection Law art. 118 (2011) (Croat.), http://narodne-novine.nn.hr/ clanci/sluzbeni/2011\_11\_130\_2601.html.

Climate Change Act sec. 9 (2009) (Phil.), http://www.lse.ac.uk/ GranthamInstitute/law/the-climate-change-act-ra-9729-and-its-implementing-rules-and-regulations-irr-administrative-order-no-2010-01/.

Law on Environmental Protection No. 55/2014/QH13 arts. 39, 40 (2014) (Viet.), http://extwprlegs1.fao.org/docs/pdf/vie168513.pdf.

2. The integration of main contents of responses to climate change into the strategy, planning and proposal for socio-economic development as well as planning for industrial and sectoral development must rely on the assessment of correlation of activities described in the strategy, planning and proposal with the environment, climate change, and a range of measures to be taken for the environmental protection and response to climate change.

The "harmonious connection" of all environmental activities with climate change, mentioned in Vietnam's law, and integration of adaptation into planning for industrial and sectoral development could mean that climate change adaptation is generally considered whenever development, planning, or industrial decisions are made. Climate change would just be another criterion considered during various planning processes.

Likewise, Malta's Climate Action Act requires the government to ensure that adaptation to climate change is considered in the design and evaluation of policies, programs, and projects, and that these policies, programs, and projects are designed, to the extent possible, to ensure resilience to the effects of climate change.<sup>66</sup> While this mandate provides no specifics on how the government should do this, the mandate does nonetheless initiate internal processes that facilitate integration of climate change adaptation into planning.

Papua New Guinea requires every person and entity undertaking an activity in a number of sectors, including electricity generation, transportation, and forestry, to prepare an adaptation plan.<sup>67</sup> Thus, nearly any industrial activity needs to consider climate change and adaptation.

Bolivia's climate law, entitled Mother Earth Law and Comprehensive Development for Wellbeing, states that Bolivia will address impacts of climate change, in part, through integration of adaptation to climate change into the development programs and projects at the national level and at the level of autonomous territories, and by improving coordination processes between various entities charged with planning, management, and implementation.<sup>68</sup> This statutory language does not provide specifics, but Supreme Decree No. 1696,<sup>69</sup> issued in relation with the Law, provides that implementation involves the development of integrated technical and methodological procedures for intergovernmental coordination, coordinated development of territorial and sectoral plans, consideration of national and autonomous budgets, and consideration of technical capacity. This language should ensure coordinated efforts to integrate climate change adaptation into planning processes at various levels of the government.

Provisions that incorporate adaptation language into various planning processes and activities are important for the overall consideration of climate change adaptation, and it is helpful to mainstream climate change adaptation in addition to creating national and subnational adaptation plans. Such provisions exist in laws of many countries, including Bolivia, Croatia, Finland, Ireland, Kenya, Mexico, the Philippines, and Vietnam. The level of detail often depends on particular planning activities envisioned in the legislation. For example, when the law requires action by particular sectors or at the regional or local level, provisions related to planning tend to be longer and contain specific provisions detailing how to undertake those actions. However, as shown above, when it comes to the creation of national plans, the level of detail varies from country to country.

Adaptation planning is particularly important to climate change adaptation. As such, strong national legislation will address adaptation benefits with provisions about the creation of national, subnational, and sectoral plans, as well as about integration of adaptation into a wide range of planning and development activities. These legislative provisions should be sufficiently detailed to ensure prompt and effective implementation, and information about responsible parties, vulnerable sectors, time frames, and the types of activities and processes that should include adaptation might be particularly useful.

## C. EIA

EIA is an important and widespread process that requires the government to consider the possible effects that a proposed project has on the environment. Consideration of climate change in the context of EIA requires assessment of the following:

- 1. The **effects of the project on the climate** (e.g., if a coal-fired power plant will increase a country's emission of greenhouse gases)
- 2. The effects of climate change on the project, which can affect the long-term feasibility and economic viability of the project (e.g., if sea-level rise and increased storms will cause a road to be washed away, or if increasing water temperatures will inhibit cooling of a power plant)
- 3. The synergetic effects of climate change and the project on the environment (i.e., whether climate change will cause the project to have effects on the environment that would not have otherwise been noticeable) (consider for example a facility emitting effluent into a river; under current circumstances, the flow of the river is sufficient to dilute the effluent without much impact to the riverine environment; but climate change may reduce the river flow,

Act No. XVII of 2015 (Climate Action Act) art. 5 (Malta), http://extwprlegs1.fao.org/docs/pdf/mlt148407.pdf.

Climate Change (Management) Act secs. 53, 74 (2015) (Papua N.G.), http://extwprlegs1.fao.org/docs/pdf/png155761.pdf.

Mother Earth Law and Comprehensive Development for Wellbeing art. 17 (2012) (Bol.), http://www.fao.org/faolex/results/details/en/c/LEX-FAOC 117451/.

<sup>69.</sup> Supreme Decree No. 1696 art. 9 (2013) (Bol.), https://www.ecolex.org/ details/legislation/decreto-supremo-n-1696-reglamenta-la-ley-marco-de-lamadre-tierra-y-desarrollo-integral-para-vivir-bien-lex-faoc126812/?q=Boliv ia+climate+change&type=legislation&xdate\_min=&xdate\_max=.

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so that the effluent increases the concentrations of ambient pollution above regulatory limits)

The second and third aspects relate to climate adaptation, while the first relates to mitigation.

Whether by law or regulation, many countries already require EIAs to consider the potential effects of a project on climate or climate change. These include, for example, Finland,<sup>70</sup> Moldova,<sup>71</sup> Sweden,<sup>72</sup> and Turkmenistan.<sup>73</sup>

Examples of the second type of integration of climate change into EIA processes are less common. While an assessment of effects of a given project on climate change is important for the purpose of limiting human impacts, an assessment of the effects of climate change on a particular project would enable decisionmakers to better understand the project's viability in changing climatic conditions. After all, what is the point in building a road in a particular place or in a particular manner if it will soon be destroyed by flooding?

U.S. Executive Order No. 13653 (subsequently revoked) required each federal agency to develop a plan that integrates consideration of climate change into the agency's operations, including "identification and assessment of climate change-related impacts on and risks to the agency's ability to accomplish its missions, operations, and programs."74 This mandate sought to ensure that various projects planned by federal agencies would be assessed with regard to the effects of climate change on those projects. This could have saved large amounts of money, since projects that would have been destroyed would be designed differently, sited elsewhere, or (perhaps) not be built.

The U.S. Council on Environmental Quality (CEQ) also addressed integration of climate change into EIA processes. Specifically, the CEQ issued a memorandum for the heads of federal departments and agencies, which was nonbinding guidance (subsequently withdrawn) on how to address climate change in accordance with the National Environmental Policy Act (NEPA).<sup>75</sup> The purpose of this memorandum was to "provide for greater clarity and more consistency in how agencies address climate change in the environmental impact assessment process."76 The memorandum explained that when addressing climate change, agencies should assess both the potential effects of a proposed action on climate change and the effects of climate change on a proposed action.<sup>7</sup>

Consideration of the effects of climate change on a proposed project is also supported by international guides on best practices. For example, the European Union's Guidance on Integrating Climate Change and Biodiversity Into Environmental Impact Assessment stresses the importance of assessing both the short-term and long-term effects of climate change on a proposed project.78 The guidance explains that given the realities of climate change, a project must be assessed against an "evolving environmental baseline," and that consideration of climate impacts and disaster risks can increase a project's resilience.<sup>79</sup>

In other words, if a decisionmaker considers the exposure of a particular project to various disasters and other climatic events before approving it, there is a better chance that that project survives in the long run. The European Union guidance also points out that an EIA should not complete "snapshot" analyses that focus on a single point in time, but should instead consider "trends and scenarios with and without the proposed project."80 As such, the guidance is an example of an approach that considers the third type of integration of climate change into EIAs.

#### D. Disaster Prevention and Response

Disaster prevention and response is another area particularly important to climate change adaptation. Given the widespread projections for intensifying climatic events, many countries are improving their capacity to predict disasters through early warning systems, to limit the effects of storms, droughts, and other events on various sectors, and to put measures in place that allow them to respond to disasters quickly. Sometimes such language is included in the framework environmental legislation, sometimes it is in disaster legislation, and sometimes it is in both.

For example, Article 52 of China's Climate Change Response Law provides that "[t]he competent agricultural administrative department of the State Council shall formulate agricultural measures to deal with climate change, improve the farmland protection system and grain early warning system, strengthen the construction of agricultural meteorological service system, and establish and

<sup>70.</sup> Act Relative to Procedures of Environmental Impact Assessment (No. 468 of 1994) sec. 2 (2005) (Fin.), http://extwprlegs1.fao.org/docs/pdf/ fin11999.pdf.

<sup>71.</sup> Law No. 851-XIII on Environmental Audit and Environmental Impact Assessment app., art. 6.1 (2003) (Mold.), https://www.ecolex.org/details/ legislation/law-no-851-xiii-on-environmental-audit-and-environmentalimpact-assessment-lex-faoc075075/?q=%D0%AD%D0%9A%D0%A1% D0%9F%D0%95%D0%A0%D0%Â2%D0%98%D0%97%D0%90+% D0%BA%D0%BB%D0%B8%D0%BC%D0%B0%D1%82&type=legisl  $ation \&xdate\_min=\&xdate\_max=\&leg\_type\_of\_document=Legislation.$ 

<sup>72.</sup> Environmental Code sec. 3 (1998) (Swed.), http://extwprlegs1.fao.org/ docs/pdf/swe50970.pdf.

<sup>73.</sup> Law on Environmental Audits arts. 1-2 (2014) (Turkm.), https://www.ecolex.org/details/legislation/law-on-environmental-protection-lex-faoc13275 5/?q=%D0%BA%D0%BB%D0%B8%D0%BC%D0%B0%D1%82&ty pe=legislation&xcountry=Turkmenistan&xdate\_min=&xdate\_max=.

<sup>74.</sup> Exec. Order No. 13653, Preparing the United States for the Impacts of Climate Change, 78 Fed. Reg. 66817 (Nov. 6, 2013) (revoked by Exec. Order No. 13783 in 2017), available at https://obama whitehouse.archives.gov/the-press-office/2013/11/01/executive-orderpreparing-united-states-impacts-climate-change.

Memorandum From Christina Goldfuss, Managing Director, CEQ, to 75. Heads of Federal Departments and Agencies (Aug. 1, 2016) (Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National En-

vironmental Policy Act Reviews) (withdrawn in 2017, pursuant to Exec. Order No. 13783), https://ceq.doe.gov/docs/ceq-regulations-and-guidance/nepa\_final\_ghg\_guidance.pdf; 42 U.S.C. §\$4321-4370h; ELR STAT. NEPA §§2-209.

<sup>76.</sup> Id. Id

<sup>77.</sup> 

EUROPEAN UNION, GUIDANCE ON INTEGRATING CLIMATE CHANGE AND 78. BIODIVERSITY INTO ENVIRONMENTAL IMPACT ASSESSMENT (2013), available at http://ec.europa.eu/environment/eia/pdf/EIA%20Guidance.pdf.

<sup>79.</sup> Id. 80 Id

improve the early warning system for disaster prevention and mitigation.<sup>781</sup> The law pays particular attention to disaster-related risks associated with sea-level rise (Article 55) and building codes to withstand extreme weather events (Article 56).<sup>82</sup> In Article 60, it provides a broad mandate to "strengthen the monitoring, early warning and forecasting of all kinds of extreme weather and climate events, and prevent and cope with extreme weather, climate disasters and their derivative disasters.<sup>783</sup> It also establishes a climate change emergency relief system that is designed "to ensure that the loss of disasters caused by climate change is minimized."<sup>84</sup> Monitoring of the effects of climate change, early warning and forecasting of climate-related disasters, and creation of a climate change emergency relief system are all key to disaster prevention and response.

Similarly, according to Bolivia's Mother Earth Law and Comprehensive Development for Wellbeing,<sup>85</sup> the Bolivian government has a mandate to prevent and diminish risks caused by natural disasters and climate change effects. It is required to create mechanisms that focus on prevention and management of disaster risks; develop processes for information, research, planning, and implementation of intervention mechanisms to strengthen territorial management in autonomous territories; and develop networks of climate information, early alert systems, and strategies of information dissemination.<sup>86</sup> Interestingly, this law also emphasizes the importance of "considering the experiences and wisdom of indigenous nations of peasant origin, intercultural and Afrobolivian communities with regard to local climate prediction indicators."87 Consequently, the law acknowledges that indigenous communities may have knowledge about local climate indicators that would help predict and prepare for disasters.

As mentioned above, countries also incorporate climate change adaptation into their specific disaster management laws. South Africa, for example, amended its Disaster Management Act to include definitions of "adaptation" and "climate change," so that its regular procedures for dealing with disasters and disaster risk management would include disasters associated with climate change.<sup>88</sup>

Given the dangers associated with climate-related disasters, national legislation that addresses adaptation would strongly benefit from provisions about disaster prevention and response. It can mandate regular monitoring of climatic conditions and forecasting of climate-related disasters, the use of early warning systems, reliance on accurate and latest data, investment in research and technology that would enable accurate and prompt notifications about cli-

86. *Id*.

matic events, development of networks of climate information, and creation of emergency relief systems.

#### E. Funding

A top priority for many countries is providing the means to finance the measures necessary to adapt to climate change. As a result, many countries have adopted legislative requirements aimed to reduce the costs of adaptation, and to secure and distribute funding to assist adaptation. For example, Article 7(1)(c) of Ireland's Climate Action and Low Carbon Development Act 2015 requires the minister and the government to take into account "the need to achieve the objectives of a national adaptation framework at the least cost to the national economy and adopt measures that are cost-effective and do not impose an unreasonable burden on the Exchequer."<sup>89</sup>

In order to support the mobilization of adaptation funding, a law can also create dedicated funds from which money can be drawn for specific activities. Often, the funds address both adaptation and mitigation. For example, Iceland's Climate Act<sup>90</sup> created the Climate Fund:

The Climate Fund is a special fund under the auspices of the minister. The mission of the Fund is to support projects that contribute to the reduction of greenhouse gas emissions in Iceland, adaptation to the effects of climate change and increased public awareness of climate change, their consequences and possible measures to counter them. This can, for example, be done by strengthening:

- a. Development work and research in the field of climate-friendly technological development and innovation in Iceland;
- b. Projects related to research, presentation and education on the effects of climate change and the role of the public, institutions and companies in tackling climate change and adapting them; and
- c. Projects that contribute to the recovery of wetlands and projects [that] are contributing to the binding of carbon in vegetation and soils, such as forestry and land reclamation.

Similarly, Malta has created a climate action fund.<sup>91</sup> The money in this fund can be used for a variety of activities, including research and development, promotion of education, public awareness, and training.

Some laws provide means for generating money to go into the fund to support various adaptation-related activities. Croatia's Air Protection Act, for example, states that funds

<sup>81.</sup> People's Republic of China Climate Change Response Law art. 52 (2012).

<sup>82.</sup> Id. arts. 55, 56.

<sup>83.</sup> Id. art. 60.

<sup>84.</sup> Id. art. 61.

Mother Earth Law and Comprehensive Development for Wellbeing art. 17 (2012) (Bol.), http://www.fao.org/faolex/results/details/en/c/ LEX-FAOC117451/.

<sup>87.</sup> Id.

Disaster Management Amendment Act (2015) (S. Afr.), http://extwprlegs1. fao.org/docs/pdf/saf152886.pdf.

Climate Action and Low Carbon Development Act 2015 (No. 46 of 2015) (Ir.), http://extwprlegs1.fao.org/docs/pdf/ire150968.pdf.

Climate Act art. 29 (2012) (Ice.), http://www.althingi.is/lagas/nuna/ 2012070.html.

Act No. XVII of 2015 (Climate Action Act) art. 16 (Malta), http://extwprlegs1.fao.org/docs/pdf/mlt148407.pdf.

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gained through an auction of emission units shall be paid into the Fund for Environmental Protection and Energy Efficiency, and three of the enumerated purposes for which the funds may be used are adaptation to climate change, adaptation in other countries, and research to adapt to climate change.<sup>92</sup> The law moreover provides that the national budget and other sources, such as "donations, loans, state aid, international aid, [and] foreign investment funds," shall provide funding for climate change adaptation.<sup>93</sup>

Similarly, Bulgaria's 2014 Climate Change Mitigation Act allows projects in various sectors of the economy (including energy, transportation, agriculture, forestry, and water management) that result in reduction or removal of greenhouse gas emissions by implementing adaptation measures to be financed through revenues from the sale of assigned emission units.<sup>94</sup> Article 56 of the Act states that revenues obtained from the auctioning of aviation allowances can be used for adaptation in Bulgaria and developing countries, as well as for research and development related to adaptation.<sup>95</sup> This law also allows the revenues from auctioning of greenhouse gas emission allowances to fund demonstration projects for adaptation.<sup>96</sup>

Although many countries have created climate funds, this does not mean that such a fund is necessary. A fund can serve as a vehicle to collect and distribute money, but a question remains with regard to whether its existence helps secure funding that would not otherwise be available. If some funding sources can only contribute money to a special climate fund, then a question remains whether such a fund must be created anew or whether an existing environmental fund can be used, in which an account for climate change adaptation is created.

## F. Coordination Through Creation of Special Committees and Expert Groups

Countries often create special committees and expert groups to facilitate coordination and tackle various aspects of climate change adaptation. In many cases, these committees are interagency or interministerial. Members of these committees and groups often possess expert knowledge about climate change or related fields, such as science, economy, and law. Their duties can range from providing advice to governmental bodies and formulating a strategy on climate change to coordinating efforts of various agencies, approving and overseeing implementation of programs, administering a climate change fund, and overseeing the dissemination of information on adaptation measures.

For example, members of the Philippines' Climate Change Commission, created under §9 of its Climate Change Act, have numerous powers and functions: (a) **Ensure the mainstreaming of climate change**, in synergy with disaster risk reduction, into the national, sectoral and local development plans and programs;

(b) **Coordinate and synchronize climate change programs** of national government agencies;

(c) **Formulate a Framework Strategy** on Climate Change to serve as the basis for a program for climate change planning, research and development, extension, and monitoring of activities on climate change;

(d) **Exercise policy coordination** to ensure the attainment of goals set in the framework strategy and program on climate change;

(e) **Recommend legislation, policies, strategies, programs** on and appropriations for climate change adaptation and mitigation and other related activities;

(f) **Recommend key development investments in climate-sensitive sectors** such as water resources, agriculture, forestry, coastal and marine resources, health, and infrastructure to ensure the achievement of national sustainable development goals;

• • •

(l) Formulate and update guidelines for determining vulnerability to climate change impacts and adaptation assessments and facilitate the provision of technical assistance for their implementation and monitoring;

(m) **Coordinate with local government units** (LGUs) and private entities to address vulnerability to climate change impacts of regions, provinces, cities and municipalities;

(n) Facilitate capacity building for local adaptation planning, implementation and monitoring of climate change initiatives in vulnerable communities and areas;

(o) **Promote and provide technical and financial support to local research and development** programs and projects in vulnerable communities and areas; and

(p) Oversee the dissemination of information on climate change, local vulnerabilities and risks, relevant laws and protocols and adaptation and mitigation measures.<sup>97</sup>

Similarly, Guatemala has created the Climate Change Council pursuant to its climate change legislation.<sup>98</sup> This

Air Protection Act (2011) (Croat.), http://narodne-novine.nn.hr/clanci/ sluzbeni/2011\_11\_130\_2601.html.

<sup>93.</sup> Id., art. 122.

<sup>94.</sup> Climate Change Mitigation Act art. 23 (2014) (Bulg.).

<sup>95.</sup> Id. art. 56.

<sup>96.</sup> Id. art. 57.

Climate Change Act sec. 9 (2009) (Phil.) (emphasis added), http://www. lse.ac.uk/GranthamInstitute/law/the-climate-change-act-ra-9729-and-itsimplementing-rules-and-regulations-irr-administrative-order-no-2010-01/.

Congressional Decree 7 (Framework Law to Regulate Reduction of Vulnerability, Mandatory Adaptation to the Effects of Climate Change, and the

council has the power to regulate and supervise implementation of various actions related to climate change adaptation, including those developed under adaptation strategies and action plans.

Kenya's Climate Change Council acts as an overarching national coordination body to ensure mainstreaming of climate change functions at the national and county levels, approve the National Climate Change Adaptation Plan and oversee its implementation, advise national and county governments on legislative and policy responses to climate change, approve a national public awareness strategy that addresses gender and generational issues, provide policy direction on research and training, provide guidance on review and harmonization of sectoral laws and policies, and administer the Climate Change Fund.<sup>99</sup> This wide range of duties makes the Climate Change Council a key body for adaptation-related matters. The fact that it coordinates mainstreaming of adaptation, oversees implementation of the adaptation plan, and provides guidance on harmonization of sectoral laws and policies means that it is put in the center of important communications between sectors and levels of government.

Similarly, Mexico's General Law on Climate Change creates the Intersecretarial Commission for Climate Change, whose duties include promoting coordination between federal bodies, formulating and implementing national adaptation policies and their incorporation into sectoral programs, approving the national strategy, proposing and supporting research and technology, and publishing an annual activity report.<sup>100</sup>

Papua New Guinea has created both the Climate Change and Development Authority and the National Climate Change Board that oversees the authority. The authority is directed to promulgate measures to mitigate climate change and to facilitate adaptation to climate change. It is also directed to study and conduct risk assessments associated with climate change adaptation.<sup>101</sup> The board is directed to control and guide the authority, and is also directed to administer the implementation of adaptation programs to ensure that Papua New Guinea adapts to climate change effects and builds resilience to them.<sup>102</sup> One representative must be chosen from the National Council on Women. A member representing industry must be appointed from among the members of the Papua New Guinea Chamber of Commerce and Industry and the Papua New Guinea Chamber of Mining and Petroleum.<sup>103</sup> Ex officio members include representatives from secretaries and managing directors of various government offices.<sup>104</sup> Essentially, the board is an interministerial body that advises and oversees the more technical authority.

Finland's Climate Change Act of 2015<sup>105</sup> provides that the government will create an expert body, called the Finnish Climate Panel, that will be tasked with compiling and differentiating scientific information on adaptation so as to design and monitor climate change policy. This climate panel will have representation from different disciplines, and its members will serve for a limited period of time.<sup>106</sup> Other countries that have created special committees and expert groups include Austria,<sup>107</sup> Bulgaria,<sup>108</sup> China,<sup>109</sup> Croatia,<sup>110</sup> Malta,<sup>111</sup> Tuvalu,<sup>112</sup> and the United Kingdom.<sup>113</sup>

Creation of an interministerial committee can prove particularly useful for adaptation matters, as the committee can facilitate cooperation among different ministries, support integration of adaptation into sectoral plans and processes, develop a strong national adaptation strategy that considers the needs of different sectors, and otherwise coordinate adaptation-related activities. Representatives from different ministries have different expertise in matters, and the full measure of this diverse experience is necessary for the committee to effectuate strategies and solutions that work across sectors. This committee could also enlist services of nongovernmental experts in other fields important to adaptation, such as science, economics, and law.

## G. Monitoring and Evaluation of Progress and Adaptation Measures

In many cases, adaptation measures are partial, no-regrets measures. This is to say that countries often do not know the full extent of the future impacts of climate change, do not know how much is necessary to adapt, and do not have a political mandate (yet) to undertake the most expensive measures. As a result, they often adopt measures that they know will be needed (even if not necessarily sufficient) to adapt to climate change.

The questions then arise: How effective are these initial measures? How much more is needed? In order to answer these questions, and then determine future adaptation measures, monitoring and evaluation is essential. To guide this process, countries provide requirements to develop reports on progress made in adapting and specify who is responsible for preparing the report, using what data, when or how often, and how to review, as well as who reviews the

113. Climate Change Act ch. 27, pt. 4, sec. 57 (2008) (U.K.).

Mitigation of Greenhouse Gas Effects) art. 8 (2013) (Guat.), http://extwpr-legs1.fao.org/docs/pdf/gua140260.pdf.

Climate Change Act sec. 6 (2016) (Kenya), http://www.kenyalaw.org/lex/ actview.xql?actid=No.%2011%20of%202016.

<sup>100.</sup> General Law on Climate Change art. 47 (2012) (Mex.), https://www.eco lex.org/details/legislation/ley-general-de-cambio-climatico-lex-faoc1132 84/?q=ley+general+de+cambio&type=legislation&xcountry=Mexico&xda te\_min=&xdate\_max.

Climate Change (Management) Act sec. 11 (2015) (Papua N.G.), http:// extwprlegs1.fao.org/docs/pdf/png155761.pdf.

<sup>102.</sup> Id. secs. 12-13.

<sup>103.</sup> Id. sec. 16(2).

<sup>104.</sup> Id.

Climate Change Act sec. 16 (2015) (Fin.), http://www.finlex.fi/fi/laki/ alkup/2015/20150609.

<sup>106.</sup> Id.

<sup>107.</sup> Climate Protection Act sec. 4 (2014) (Aus.).

<sup>108.</sup> Climate Change Mitigation Act art. 6 (2014) (Bulg.).

<sup>109.</sup> People's Republic of China Climate Change Response Law art. 52 (2012).

<sup>110.</sup> Air Protection Act art. 78 (2014) (Croat.).

<sup>111.</sup> Act No. XVII of 2015 (Climate Action Act) art. 10 (Malta), http://extwprlegs1.fao.org/docs/pdf/mlt148407.pdf.

<sup>112.</sup> Climate Change and Disaster Survival Fund Act art. 10 (2015) (Tuvalu), http://extwprlegs1.fao.org/docs/pdf/tuv152292.pdf.

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report and provides feedback before it becomes final. Many adaptation laws have at least some form of a monitoring or reporting requirement.

The United Kingdom's Climate Change Act, for example, contains detailed provisions related to the creation and issuance of reports on progress with regard to adaptation.<sup>114</sup> Currently, the Secretary of State for the Department for Business, Energy & Industrial Strategy is required to report to the Parliament on both the assessment of current and predicted impacts of climate change, and on the objectives related to adaptation, and various proposals and policies meeting those objectives.<sup>115</sup> These reports must receive input from the United Kingdom's Climate Change Commission.<sup>116</sup>

In addition, the secretary may request a separate entity to prepare a report on the assessment of current and predicted impacts of climate change, a statement about proposals and policies for adaptation to climate change, or an assessment of the progress toward implementation.<sup>117</sup> The secretary must then publish the report in the manner he or she finds appropriate.<sup>118</sup> These reporting provisions provide substantial detail with regard to the responsible entities, contents of reports, and allotted time limits. Consequently, they should provide the government with sufficient information on how and when measures should be changed.

Finland's Climate Change Act similarly states that the government must monitor and biannually report on the implementation of the created climate policy plans in order to establish whether the policy measures set under the law meet the expected adaptation targets.<sup>119</sup> Based on that evaluation, the government can then devise additional measures to achieve set objectives.<sup>120</sup> The biannual report must include an "estimate of the adequacy and effectiveness of the adaptation measures contained in the Adaptation Plan," along with an account of the implementation of the planned measures for each administrative sector.<sup>121</sup> These provisions, too, offer sufficient detail with regard to responsibility.

Some other laws provide less information regarding how monitoring and reporting should be accomplished. Croatia's Air Protection Act provides for the creation of the Inter-Sectoral Policy Coordination Commission to monitor, evaluate, and report on the implementation of adaptation measures and planning of policies, but does not specify what should be included in these reports.<sup>122</sup> Lao People's Democratic Republic's Environmental Protection Law requires a completion of a periodic report that describes the present state of the environment and activities that may impact it, including with regard to climate change adaptation, and assesses implementation of action

116. Id. sec. 59.

plans and strategies.<sup>123</sup> However, this law does not provide many details about the report.

Similarly, Turkmenistan's Law on Environmental Protection states that the authorized body together with relevant ministries must periodically prepare national reports about climate change and deliver them to the Cabinet of Ministers of Turkmenistan, but provides no specifics.<sup>124</sup> Without a detailed explanation of the purpose, content, responsible parties, and time line for reports that evaluate various activities related to climate change adaptation, either in the legislation or implementing regulations, it would be difficult to ensure the completion of such reports.

Monitoring and evaluation provisions are particularly important for effective long-term adaptation, as they allow the government and society to assess whether and how adaptation measures should be revised. Such provisions should most definitely be included in the legislation addressing climate change adaptation.

#### III. Conclusions

Our research shows that a growing number of countries have incorporated provisions related to climate change adaptation either into their existing environmental laws or through new broadly applicable climate change laws. Regardless of whether a country adopts new legislation or revises existing legislation, though, adaptation provisions tend to emphasize one or more of the seven key themes: assessment of vulnerabilities to the effects of climate change, creation of national and local adaptation plans and mainstreaming adaptation into sectoral plans, EIA, disaster preparedness and response, funding, coordination through special committees and expert groups, and monitoring and evaluation, with other considerations also being taken into account.

Countries adopt different legislative approaches to these issues. Some provisions are brief mandates or legal hooks (albeit often potentially broad), which provide the basis for developing implementing regulations; while others provide detailed instructions, requiring specific actions by various governmental bodies and outlining responsibilities for each.

One certainty is that these laws can serve as a valuable source of the types of mechanisms that can be used to address adaptation in the legislation, providing a toolbox of approaches. As a carpenter often relies on diverse tools to build and maintain a house, so do countries rely on a variety of tools (from assessing risks and vulnerability to monitoring effectiveness of adaptation measures) at different levels (national, regional, and local). No one tool is sufficient, but together—and with a blueprint and effort—the house and the country can weather what lies ahead.

<sup>114.</sup> Id. secs. 56, 58, 59, 62, 63.

<sup>115.</sup> Id. secs. 56, 58.

<sup>117.</sup> Id. sec. 62. 118. Id. sec. 63.

<sup>119.</sup> Climate Change Act sec. 12 (2015) (Fin.).

<sup>120.</sup> Id.

<sup>121.</sup> Id. sec. 14.

<sup>122.</sup> Air Protection Act art. 78 (2011) (Croat.), http://narodne-novine.nn.hr/ clanci/sluzbeni/2011\_11\_130\_2601.html.

Environmental Protection Law art. 28 (2013) (Laos), http://www.laolandissues.org/wp-content/uploads/2012/03/Environmental-Protection-Law-2013English.pdf.

<sup>124.</sup> Law on Environmental Protection sec. 5 (2014) (Turkm.), https://www. ecolex.org/details/legislation/law-on-environmental-protection-lex-faoc132 755/?q=%D0%BA%D0%BB%D0%B8%D0%BC%D0%B0%D1%82& type=legislation&xcountry=Turkmenistan&xdate\_min=&xdate\_max=.

Table 1. Countries addressing adaptation in national framework environmental laws and climate change laws

## ENVIRONMENTAL LAW REPORTER

Emergency Prevention and Response			×		×		
Monitoring and Evaluation of adaptation measures							×
e Change aptation) ee/Council	Use of nongovernmental expertise						
Climat (or Adi Committ	Committee/ Council, generally				×		×
Funding					×	×	
EIA							
	Planning at sectoral level		×	×		×	
Adaptation Planning	Planning at subnational level		×	×		×	×
	National Adaptation Plan or Strategy						
ent of Risks nerability	Adaptation Planning	×	×	×	×	×	×
	Assessment of risks and vulnerability				×	×	×
Assessm and Vul	Climate science and data			×		×	×
Country		Switzerland	Tanzania	Turkmenistan	Tuvalu	Viet Nam	United Kingdom

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