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## *The Two Fragilities: Vulnerability to Conflict, Environmental Stress, and Their Interactions as Challenges to Ending Poverty*

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This chapter examines two types of fragility, environmental and governmental, and their interactions. Increasing environmental fragility, resulting from both external climate change impacts and domestic activities, is a worsening problem in many developing countries. Climate adaptations include large-scale migration and accelerated exploitation of natural resources, leading to heightened risks of conflict. Examples from experiences in such countries as Bangladesh, Kenya, Nigeria, Sudan, and Uganda illustrate the conflict risks of maladaptation by individuals and communities. In addition, maladaptation by governments, such as shortsighted or interest-group-dominated environmental resource mismanagement, can also increase conflict risk and undermine development prospects. Violent conflict can also lead to significant environmental degradation,

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as experienced in, for example, Afghanistan, Nepal, Congo, and Sierra Leone. Accordingly, complementarities between the two fragilities—governmental and environmental—are becoming increasingly salient.

The issues raised in this chapter may seem abstract, if not a concern only for the distant future, even where the need to begin contingency planning is acknowledged. But the chapter offers thirty-five examples of how aspects of these problems—and also some promising solutions—have already emerged in recent years. It explores policy options to facilitate peaceful adaptation to environmental change, halt particularly problematic domestic environmental deterioration, and secure the livelihoods of affected populations. Anticipating that environmental stress will worsen in coming decades, the chapter concludes that there are likely to be benefits for both governments and development partners if they adopt an integrated approach to policies—and aid—in addressing conflict and environmental resilience in development and poverty policymaking and program design.

## **Introduction**

The attention of the development community has focused at last on the poorest people in the least developed countries facing the greatest challenges, as exemplified by the 2013 High Level Panel report, the 2013 World Bank commitment to focus on ending extreme poverty and boosting shared prosperity, and the Obama administration's stated development focus on ending extreme poverty. Doing so has brought attention to fragile and conflict-affected countries (FCACs), home to a large and growing fraction of those who are chronically poor and, among the poor, survive on the lowest average incomes. Reports from the IPCC, NOAA (2010), and other groups project that many of the same countries will be among those most negatively impacted by climate change in the coming fifteen-year development goal cycle and for decades to come. In addition, many of these countries face growing domestic-origin environmental stress. Yet the two issues—governmental and environmental fragility—are almost always treated separately. To be successful, these two problems will need to be addressed together, in a way that recognizes their growing interrelationships.

This chapter examines environmental stress and state fragility as two key constraints for ending poverty, with a focus on their interactions. It describes some likely feedbacks between problems of deteriorating environment and climate change and vulnerability to conflict. It considers initial policy implications and options to improve economic development and poverty reduction performance under conditions in which both problems are present; it also looks at the agenda for what we still need to learn. Attention to the quality of interaction between

planned (or policy) adaptation by governments and autonomous adaptation by communities to climate change is a priority concern, which requires careful balancing. Generally, in FCACs, greater reliance on well-formulated planned adaptation is called for in the mix of autonomous and planned adaptation, as adaptive responses can worsen social tensions. Yet planned adaptation, and other government policies, need to avoid risking further conflict by thwarting or reducing opportunities for autonomous adaptation. Moreover, policy goals will be better achieved when it is recognized that autonomous adaptation also has the potential to generate positive externalities, including social learning across neighboring communities. To be successful, domestic policy and development partner assistance will also require more integrated attention between climate change and domestic environmental problems. Overall, for FCACs it is essential to maintain a balance in governance reform between strengthening state capacity and improving citizen protections.

The development community recognizes that effectively addressing both conflict and environmental problems is essential to ending poverty and starting development in the least developed countries. For example, in the past two International Development Association (IDA) replenishments (IDA16 and IDA17), special themes include not only attention to FCACs but also attention to the need for low-income countries more generally to prepare for, and respond to, climate change. But relationships between these problems were all but ignored. Policy needs to be designed in an anticipatory way to build climate resilience, even if it is not known whether, for example, future stress will be based on too little or too much water. In the meantime, governments and citizens are beginning to respond to the specific climate change impacts that have already arrived, whether through adaptation or maladaptation.<sup>1</sup>

The World Bank actually produced back-to-back *World Development Reports* on climate change in 2010 and conflict in 2011. Yet surprisingly few explicit connections are made between conflict and environment in these and other major documents.<sup>2</sup> When references are found they typically are general, simulation based, or address one of the issues only indirectly. In-depth studies generally cover only a single country, but they are often insightful concerning more general problems and are described and interpreted in our broader framework throughout this chapter.

1. As explained below, some good examples are found in the UN-sponsored NAPA plans and in the plans of member countries of the Pilot Program for Climate Resilience (PPCR). In 2014 the U.S. government announced that climate change had arrived definitively in the United States and more urgent adaptation measures were needed ("U.S. Climate Report" 2014).

2. Indeed, in virtually its only mention, the 2010 *World Development Report* expressed skepticism that there was any convincing evidence at all of a climate-conflict link. It is possible that this is because the report did not systematically examine the indirect effects of maladaptation.

## A Preliminary Identification of Countries Potentially at Risk

There is a high degree of overlap between countries affected by the two fragilities. Table 11-1 shows how twenty-two countries rate in separate, well-known reports as vulnerable to or having poor policies regarding governance and conflict, on the one hand, and to climate change and other environmental impacts, on the other hand.<sup>3</sup> A provisional list of countries of high concern for potential interactions emerges from this simple exercise; these countries are concentrated in sub-Saharan Africa, but six from other regions are included. This working list of countries of high concern for the two fragilities (and their interactions) based on standard indexes include Afghanistan, Bangladesh, Burundi, Central African Republic, Chad, Côte d'Ivoire, Democratic Republic of Congo, Ethiopia, Guinea, Guinea-Bissau, Haiti, Liberia, Nepal, Niger, Nigeria, Pakistan, Sierra Leone, Somalia, South Sudan, Sudan, Yemen, and Zimbabwe. As introduced below through illustrations, subregions of many other countries are also at risk of a combination of environmental and conflict stresses.

The purpose in presenting table 11-1 is to assemble some independent assessments of poverty indicators, and either environmental or governmental fragilities, to supplement case studies with a more systematic comparative framework, and to encourage systematic and specific research.<sup>4</sup> Note that there is no implied reason to prefer the set of indicators in table 11-1 as more reliable than others (all rankings are subject to some valid criticisms); there are no explicit rankings of combined risks, nor is this preliminary list of twenty-two countries intended as a claim that some other countries may not be at least as vulnerable (if not more vulnerable) to the two fragilities. In particular, plausible substitutions for a few countries on this list could be made; those substitutions include Eritrea, Kenya, Mali, Myanmar, Syria, and Timor-Leste. Some small island states threatened with storms and sea level rise and experiencing governance challenges, such as Comoros, Kiribati, and Solomon Islands, are also candidates.

3. The indicators are not formally weighted. Indeed, availability of rankings for "marginal" countries such as Somalia varies across lists.

4. New indicators could help make further research progress in this area; these will need to address some subtleties. To illustrate, some lists of country vulnerability to climate change are based on the size of expected monetary losses such as reduced crop productivity and cyclone damage; yet other things equal, the magnitude of such losses will be much larger in richer countries with initially high agricultural and building values. Rich countries are also better able to adapt to such losses. Thus indicators based on the absolute size of monetary losses could be misleading for fragility research and policy analysis. If the focus is on ending poverty, indicators are needed to account for the impact on special vulnerabilities of people living in poverty and on the prospects for economic growth of low-income economies. Further, domestic environmental stress needs to be considered in conjunction with exogenous climate risk, among other considerations.

Table 11-1. Selected Countries of Concern with Comparative Metrics on Poverty, Environmental Fragility, and Governmental Fragility<sup>a</sup>

| Country                    | Poverty indicators          |           | Environmental fragility indicators |          |                        | Governmental fragility indicators |              |            |                  |
|----------------------------|-----------------------------|-----------|------------------------------------|----------|------------------------|-----------------------------------|--------------|------------|------------------|
|                            | % below \$1.25 <sup>b</sup> | MPI score | ND-GAIN rank <sup>c</sup>          | EPI rank | On vulner-ability list | FSI rank                          | On WBFS list | WBDBR rank | UNP              |
| Afghanistan                | n.a.                        | 0.293     | 170                                | 174      | n.a.                   | 7                                 | yes          | 183        | yes              |
| Bangladesh                 | 43.3 (2010)                 | 0.237     | 139                                | 169      | n.a.                   | 29                                | no           | 173        | no               |
| Burundi                    | 81.3 (2006)                 | 0.442     | 176                                | 167      | no                     | 21                                | yes          | 152        | no               |
| Central Africa Republic    | 62.8 (2008)                 | 0.424     | 174                                | 119      | no                     | 3                                 | yes          | 187        | yes              |
| Chad                       | 36.5 (2011)                 | n.a.      | 178                                | 156      | yes                    | 6                                 | yes          | 185        | no               |
| Congo, Democratic Republic | 87.7 (2005)                 | 0.399     | 174                                | 170      | yes                    | 4                                 | yes          | 184        | yes              |
| Côte d'Ivoire              | 35.0 (2008)                 | 0.307     | 154                                | 129      | no                     | 14                                | yes          | 147        | yes              |
| Ethiopia                   | 39.8 (2010)                 | 0.537     | 148                                | 131      | yes                    | 19                                | no           | 132        | no               |
| Guinea                     | 40.9 (2012)                 | 0.548     | 163                                | 162      | yes                    | 12                                | no           | 169        | no               |
| Guinea-Bissau              | 48.9 (2002)                 | 0.495     | 169                                | 144      | no                     | 16                                | yes          | 179        | no               |
| Haiti                      | 61.7 (2001)                 | 0.242     | 170                                | 176      | n.a.                   | 9                                 | yes          | 180        | yes              |
| Liberia                    | 83.8 (2007)                 | 0.459     | 168                                | 172      | no                     | 24                                | yes          | 174        | yes              |
| Nepal                      | 23.7 (2010)                 | 0.197     | 126                                | 139      | n.a.                   | 31                                | yes          | 108        | no               |
| Niger                      | 40.81 (2011)                | 0.584     | 170                                | 142      | yes                    | 19                                | no           | 168        | no               |
| Nigeria                    | 62.0 (2009)                 | 0.239     | 140                                | 134      | yes <sup>d</sup>       | 17                                | no           | 170        | no               |
| Pakistan                   | 12.7 (2010)                 | 0.237     | 122                                | 148      | n.a.                   | 10                                | no           | 128        | yes <sup>e</sup> |
| Sierra Leone               | 56.6 (2011)                 | 0.405     | 160                                | 173      | yes                    | 35                                | yes          | 140        | no               |
| Somalia                    | n.a.                        | 0.500     | n.a.                               | 178      | yes                    | 2                                 | yes          | n.a.       | no               |
| South Sudan                | n.a.                        | n.a.      | n.a.                               | n.a.     | yes                    | 1                                 | yes          | 186        | yes              |
| Sudan                      | 19.8 (2009)                 | n.a.      | 173                                | 171      | yes                    | 5                                 | yes          | 160        | yes <sup>f</sup> |
| Yemen                      | 9.8 (2005)                  | 0.191     | 165                                | 157      | n.a.                   | 8                                 | yes          | 137        | no               |
| Zimbabwe                   | n.a.                        | 0.181     | 146                                | 94       | yes <sup>d</sup>       | 11                                | yes          | 171        | no               |

a. MPI (Multidimensional Poverty Index, UNDP); ND-GAIN (Notre Dame Global Adaptation Index, 2013); EPI (Environment Performance Index, 2014); Vulnerability list (Busby and others, Vulnerability list, Africa only); FSI (Failed States Index); WBFS (World Bank Fragile Situations); WBDBR (World Bank Doing Business Ranking, 2014); UNP (UN Peacekeeping presence).

b. World Bank (<http://research.worldbank.org/PovertyNet/index.htm?2>).

c. ND-GAIN rank 1 (best) to 178 (worst—Chad).

d. 21st century only.

e. Specialized India-Pakistan mission.

f. Mission in Dafur.

Major links in the arguments are illustrated with at least one example with the type of evidence noted; these examples are intended for illustrative purposes motivating the types of research needed and do not constitute systematic case studies. A majority highlights the risks; but a few illustrate policy successes. About half the local cases are situated in countries listed in the table, including Afghanistan, Bangladesh, Côte d'Ivoire, Democratic Republic of Congo, Ethiopia, Nepal, Niger, Nigeria, Sierra Leone, Somalia, and Sudan. Research convincing (to this author) and relevant for present purposes is scarce for many countries on the list. When a key part of the argument can be illustrated more robustly with a relevant study from a developing country not on the list, it is used. For most of these other countries—particularly Guatemala, Kenya, Mexico, Sri Lanka, Syria, and Uganda—both governmental and environmental fragilities are a significant concern. The remaining examples are Bolivia, India, Indonesia, Maldives, Mozambique, Nicaragua, Tanzania, and Zambia, each of which faces at least one of these fragilities to some degree. Figure 11-1 highlights the relationships between the two forms of fragility. Each is affected by, and affects, growth and poverty reduction.

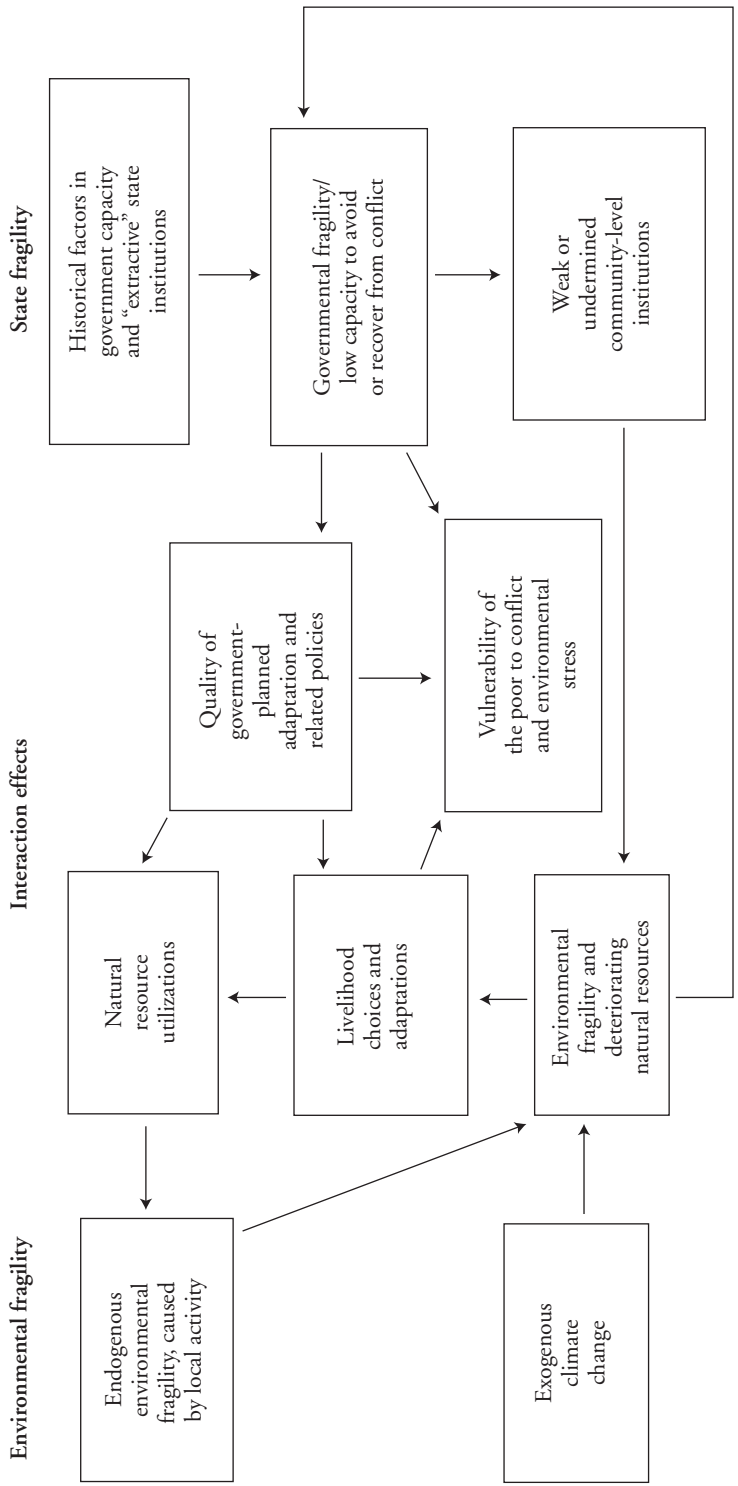
In FCACs, economic growth tends to be erratic or slow; sometimes this is a direct result of conflict, often particularly impacting the poor. Weak governance may also be a factor in violent conflict, again with particular harm to people living in poverty.<sup>5</sup> Moreover, environmental degradation can cause poverty and may cause slower overall growth, as described below.

Environmental degradation can also lead to conflict. The main effects of climate change on conflict will almost certainly operate primarily through the response to observed climate change (adaptation) as well as through actions taken in anticipation of climate change. The direct effects of climate change itself will not be the primary driver. In particular, adaptation (and anticipatory investments in climate resilience) on the parts of government, the private sector, and citizens/civil society is an essential response to the consequences of climate change. Successful adaptation may make individuals and societies less vulnerable to violent conflict (and perhaps even less prone to conflict). But unless managed well, the process of adaptation to climate change by groups in society may precipitate conflict. That is, the primary challenge is not so much that climate change causes conflict, but rather it is the way that people and states respond to the impacts of climate change and other environmental deterioration that can cause conflict.

There will likely also be some direct effects of climate on conflict. For example, studies suggest that higher temperatures can cause more aggressive

5. The poverty elasticity of growth is likely lower on average in FCACs; this is known to be the case for economies focused on natural resource exports, which also tend to be countries prone to conflict; but further investigation is needed.

Figure 11-1. Relationships between the Two Fragilities



Source: Author.

behavior (Burke and others 2009). But the social response will be crucial, whether through the impacts of adaptation behavior after change occurs or through the impacts of anticipatory actions based on expectations of future change, such as more general resilience policies. There are many ways that humans can adapt to climate changes such as higher average temperatures that do not involve conflict and violence.<sup>6</sup> In such cases the quality of interactions between planned (or policy) adaptation and autonomous local adaptation is of central importance.

Other feedbacks are present, underlining the difficulty of an effective response and again raising the possibility of a trap. One often-overlooked example is that poverty itself can lead to lower growth. The poor's lack of credit constrains their opportunities to escape poverty—this is a rationale for the policy focus on microfinance—but a wider consequence is lower growth due to shutting out some talented entrepreneurs. Similarly, lack of credit robs parents of their chance to educate their children, thus transmitting family poverty to the next generation and also reducing national growth prospects. Moreover, higher population growth leads to lower economic growth; while the lack of financial services also drives the “old-age security fertility motivation” (that is, giving birth to more children to increase the chance that parents will be cared for in old age). Further, chronic health and nutrition deficiencies not only make it difficult to escape poverty but also keep average productivity low.<sup>7</sup>

Finally, poverty and environmental degradation can be mutually reinforcing. For example, when the poor must grow more food they often resort to overusing their farmland, planting aggressively and not resting their soil. Generally, small-holder farmers are aware that the consequences are likely to be worsened soil fertility and lower productivity in subsequent growing seasons. But making this trade-off is less irrational than it may appear, because worse nutrition this year likely means undernourishment for the family, with possibly lifelong damage to their children's cognitive and physical development.<sup>8</sup> And while purchasing fertilizers (and undertaking other land improvements) may be a good investment by conventional calculations, this fact is of no help if the poor have no access to credit. The scope of these difficulties becomes even clearer under the lens of

6. For examples, see Das and Smith (2012) and references therein.

7. For a summary of these arguments and references, see Todaro and Smith (2014).

8. For suggestive models of environmental traps, see Sylwester (2004); and Larson and Bromley (1990). There is evidence of poverty trap problems among farmers in Ethiopia, particularly in the impoverished enset growing region (Kwak and Smith 2013). Another example is erosion, as found in Burundi after farming extended to very marginal lands, worsening poverty. Needing closer examination is its possible relationship to conflict, as observers have noted that access to land was restricted due to coffee growing, which was controlled by the elite. See also Bundervoet, Verwimp, and Akresh (2009).



behavioral economics (see for example Duflo, Kremer, and Robinson 2010). Clearly, all of these problems can be greatly magnified under conflict conditions.

In discussions of state fragility, the emphasis is most often on outright conflict, or potential for conflict, against the government and on its implications, such as reduction of government's capacity to enforce favorable national economic institutions. Several significant examples of climate- or adaptation-induced conflict refer to conflict between groups, which are not necessarily threats to (or by) the government per se. Yet such conflicts can also be important contributors to state fragility, which then may be used opportunistically by government opponents.<sup>9</sup> The effects of regional conflict can substantially worsen poverty as well as decrease effective enforcement of environmental protection. There are in addition more direct links between the environment and revolt and civil war. These conflicts, even if localized (indeed even if they have the potential for such conflict) can also lead to state fragility (for a survey, see Miguel, Hsiang, and Burke 2013).

Relatedly, fragility is often regional rather than national and may not lead to governmental fragility at the national level. But even in these cases, fragility is no less important for its location, when our focus is the impact on people living in extreme poverty in these regions.

While major international development and climate partners fail to make these potentially central connections explicit, the issues have not escaped the attention of a much larger player: the military. For example, the U.S. Department of Defense, *Quadrennial Defense Review* (U.S. Department of Defense 2010) notes explicitly that climate change may be "an accelerant of instability or conflict, placing a burden to respond on civilian institutions and militaries around the world." The CNA's "National Security and the Threat of Climate Change" (CNA Military Advisory Board 2014) characterizes climate change as a "threat multiplier" for instability. And the May 2010 White House "National Security Strategy" states that "the change wrought by a warming planet will lead to new conflicts over refugees and resources" (White House 2010).<sup>10</sup> Even so, the nature of any follow-up by the defense sector remains unclear.

## Environmental Challenges to Ending Poverty

As a foundation for examining the linkages between the two types of fragility, and their implications for ending poverty, this section first outlines, and

9. The resulting loss of local governmental authority can worsen the prospects of implementing poverty programs as well as of reducing and regulating environmental deterioration (whether for governments inclined to pursue these policies or for civil society or other actors who might otherwise step in).

10. Other security-oriented studies include Gautam (2012).

provides examples of, the effects of the environment on poverty and the effects of conflict on poverty. While the literature offers significantly less regarding how the linkages work in practice, summaries of some currently available examples are presented. Even though still relatively small in number, these examples help to identify gaps in data, research, and policy analysis on environment-conflict linkages.

### *Confronting Locally and Globally Inflicted Environmental Degradation*

Most developing countries are experiencing alarming environmental degradation. Thus far, much of this degradation results from poor national and local environmental policies and practices. In sub-Saharan Africa, more than one-fifth of the population already lives on degraded land, while surface water, including Lake Victoria, suffers from pollution, sedimentation, and over-fishing.<sup>11</sup> In South and West Asia, water quality and water tables are falling alarmingly. The global effects of climate change are inflicting further damage, and there is potential for these exogenous shocks to interact dangerously with domestically caused environmental damage. Agricultural productivity and other environmental resources are almost uniformly harmed by climate change in sub-Saharan Africa and South Asia (IPCC 2007, 2014; World Bank 2011b, 2013).

Broad-brush themes regarding impacts of global climate change are that sub-Saharan African countries will be disproportionately drought afflicted and suffer the worst impacts on agricultural productivity; South Asia will be disproportionately flood affected; countries with high exposure to the Pacific and Indian Oceans within the cyclone belt will be disproportionately storm afflicted; and Southeast Asia and small island developing states will be impacted by sea level rises (World Bank 2013). All countries are predicted to face higher temperatures and increased weather variances. The reports of the IPCC—warnings of prolonged droughts, expanded desertification, increased severity of storms, higher temperatures and more severe heat waves, deteriorated water resources, and reduced crop yields—have been a wake-up call.

Without concerted action, the world faces an approximate 4-degree C increase in average global temperatures this century, again with serious harm to low-income countries.<sup>12</sup> Studies underline that the projected 2-degree C rise within thirty years will lead to growing food shortages in Africa and accentuated water crises in South Asia. The impact of even higher temperature gains and

11. For an example of an in-depth study, see Hecky and others (2010). For general coverage see, for example, World Resources Institute and others (2005a).

12. World Bank (2012). As the temperature increase tops 2 degrees C and approaches 4 degrees C, extreme heat waves, rising sea levels, storms, droughts, floods, and losses of grasslands, farmlands, and marine ecosystems will result.

environmental degeneration is far more serious, with potentially calamitous rises in extreme poverty. The worst-case scenarios on poverty impact could turn the last mile into the midpoint of a double marathon.<sup>13</sup> Lest these problems seem far in the future, a World Bank (2013) follow-up study meticulously documents impacts already experienced, including spread of pests, changed growing seasons, extreme weather events, and sea-level rise resulting from the 0.8-degree C average temperature increase thus far.

Regarding domestically generated problems, South Asia suffers from rapidly falling water tables (as well as salinization) due primarily to bad irrigation policies (such as inefficient subsidies) and practice as well as urban pollution. Sub-Saharan Africa suffers from desertification. East and Southeast Asia suffer from industrial pollution, other air pollution problems, and water shortages.<sup>14</sup>

### *Addressing the New Challenges to Natural Resource–Based Livelihoods*

Despite rapid urbanization, a majority of people living in poverty in developing countries still depends on natural-resource-based livelihoods, including agriculture, animal husbandry, and various forms of foraging. Consequently, raising the productivity levels of these activities is an important “path out of poverty” (World Resources Institute 2005).

But such productivity gains are threatened by climate change (IPCC 2014) and domestic environmental deterioration. Environmental stresses on the poor are greatly compounded when they hold weak property rights and have low and often falling control over the resources on which they have traditionally depended. This vulnerability holds both individually and in collectively operated lands. Concerns continue that foreign “land grabs” will threaten domestic food security (von Braun and Meinzen-Dick 2009). Even individually held smallholder farms, as in East Africa, may be locally expropriated; and common property resource areas may be appropriated (whether legally or otherwise) by elites. “Investors” with mysterious government support may suddenly appear from distant cities, with obscure but confusing claims to land. Indeed, risks of

13. The most severe poverty projections naturally result from what are now considered unlikely outcomes, but there is option value in taking action to ensure against such outcomes; for an options approach, see Linquiti and Vonortas (2012). The UNDP compared its baseline forecasts to outcomes under environmental disaster and concluded, “Some 2.7 billion more people would live in extreme income poverty under the environmental disaster scenario than under the base case scenario.” Their modeling projected “an increase of 1.9 billion people in extreme income poverty due to environmental degradation.” In addition, “environmental calamities would keep some 800 million poor people from rising out of extreme income poverty, as they would otherwise have done under the base case scenario.” See UNDP (2012, 95).

14. To be clear, this is only a very broad summary and is not intended to downplay other threats to poverty reduction, such as contamination and deforestation in areas where people depend on natural resources—areas that include parts of Southeast Asia.

appropriation incentivize farmers to treat soils and other natural resources as short-run assets (Jacoby, Li, and Rozelle 2002). Expanding cash crops can grow the economy and help raise incomes of the poor—but usually not when the poor lose control of their only assets (land) in the process. The poor who lose their land may have little or no legal recourse. In the meantime, up to 97 percent of agriculture in sub-Saharan Africa is still rain fed (World Bank 2013). Failure to empower the poor in these circumstances can worsen poverty. Rather than raising long-run productivity, the seeds of conflict are sown.

It may be tempting to consider some of these projected impacts as unimportant to the extent that mass movement of people out of agricultural activities to cities is expected, with potential large-scale agriculture better able to cope with a changing climate. However, agriculture is likely to employ a much higher fraction of people in sub-Saharan Africa in comparison with other developing areas, particularly East Asia. The number of children reaching working age, in comparison to the very low base of manufacturing employment and the low productivity of most urban economic activities, very likely means that smallholder agriculture is here to stay in Africa for decades (Fox and others 2014). Moreover, with the slowdown of growth in India, this also may be the case in South Asia, albeit to a much lesser extent (*Financial Times*, January 16, 2014).

### *The Long-Lasting Impacts of Natural Disasters*

An important predicted consequence of climate change brought about by global warming that is likely to have negative impacts on many countries is more frequent and more severe natural disasters. Baez, de la Fuente, and Santos (2010) document that, rather than transient events, there is considerable evidence that shocks of different kinds (of which disasters are an important example) can have long-lasting negative impacts. Higher-income individuals, just as higher-income economies at a macroeconomic level, recover almost fully from most disasters after a moderate period of time. But despite impressive resilience in many cases, individuals living in poverty (and at a macroeconomic level, low-income economies) often do not recover, at least not fully as measured by income, schooling, and health. Another consequence can be conflict itself.

INCOME. Shocks to wealth and to flows of income can last for a decade or longer. Disasters have severe impacts, as measured by loss of life, decrease in GDP, and poverty in low-income areas (Rentschler 2013). Cross-national evidence that low-income countries face long-term negative consequences is presented in Toya and Skidmore (2007) and Loayza and others (2012), who also provide a brief literature review. As noted earlier, disasters may also raise the likelihood of conflict, magnifying the original effects. Specific country examples focusing on

income and wealth impacts on people living in poverty are presented for Côte d'Ivoire, Ethiopia, Nicaragua, Tanzania, and Bangladesh.

—*Example 1: Famine in Ethiopia.* The effects of famine in Ethiopia endured for ten years after its initial impact. See Carter and others (2006) and Dercon (2004), using the Ethiopia Rural Household Survey; see also Kwak and Smith (2013).

—*Example 2: Drought in Tanzania.* A decade after the 1991–95 drought in Tanzania, the poorest households still had 17–40 percent lower consumption levels (Beegle, Dehejia, and Gatti 2006).

—*Example 3: Agricultural shocks in Côte d'Ivoire.* In regions of Côte d'Ivoire that experienced negative agricultural shocks in 1986–87, there were 20 percent lower enrollments compared with unaffected regions (Jensen 2000).

—*Example 4: Floods in Bangladesh.* In Bangladesh floods have destroyed houses, harmed crops, damaged physical capital, and reduced job opportunities. They have led to higher food prices (Islam 2013), with long-term impacts on the very poor (such as effects of malnutrition).

**SCHOOLING.** Negative shocks to families including but not limited to disasters have been demonstrated to have long-lasting impacts on schooling for families living in poverty.

—*Example 5: Negative income shocks in Mexico.* De Janvry and others (2006) show for the case of Mexico that children taken out of school due to a temporary shock are 30 percent less likely to return to school than similar children who were not taken out of school.

—*Example 6: Hurricane impact on children in Nicaragua.* In Nicaragua in the aftermath of Hurricane Mitch in 1998, child labor increased by over 50 percent (Baez and Santos 2007).

**HEALTH.** Negative shocks have been demonstrated to have long-lasting harmful impacts on health and nutrition for families living in poverty. Poor nutrition in childhood can have impacts over decades (Baez, de la Fuente, and Santos 2010). Children from nonpoor households can largely catch up to where they would have been in the absence of the disaster, but children from poor families generally cannot, transmitting poverty across generations. Insights can be gained also from positive shocks.

—*Example 7: Nutrition assistance in Guatemala.* Maluccio and others (2006) show that a rural nutrition program for children one to three years old that operated from 1969 to 1977 still showed large impacts on earnings three decades later, including wages that were some 46 percent higher than corresponding untreated stunted children.<sup>15</sup>

15. Background details presented at seminar by John Hoddinott at GWU in 2008.

—*Example 8: Rainfall in Indonesia.* Maccini and Yang (2009) find that women born in a year in which there was 20 percent higher rainfall had a corresponding 0.15 more years of schooling and 5.2 percent higher household incomes twenty-six to forty-seven years after birth.

CONFLICT. Recent evidence suggests that in some circumstances disasters can raise the chance of conflict itself, which in turn increases the likelihood of further negative consequences for people living in poverty, beyond the effect of the disasters themselves (see Miguel, Satyanath, and Sergenti 2004); we return to this topic below.

### *Environmental Degradation and Conflict: Traps along the Last Mile*

Conflict in low-income countries is tragically common; in recent decades more than two-thirds of African countries endured at least one conflict that lasted a year or more (Blattman and Miguel 2010). A number of potential poverty traps relate to environment or conflict or both. The conflict trap “shows how certain economic conditions make a country prone to civil war, and how, once conflict has started, the cycle of violence becomes a trap from which it is difficult to escape” (Collier 2007). Collier concludes that countries are at higher risk of civil war under combined conditions of low income, slow growth, and dependence on primary commodity exports (Collier 2003).

The fragility trap is a related concept describing a low-level equilibrium in which weak institutions, low investment, and slow growth lead to violent conflict, and which in turn keeps institutions weak, investment low, and growth slow (Andrimihaja, Cinyabuguma, and Devarajan 2011). Most countries classified as FCACs remain so for extended periods of time. Many—perhaps hundreds—of descriptive political economy case studies have explored the environment-conflict nexus, though with widely different standards of evidence and viewpoints about root causes.<sup>16</sup>

Environmental degradation alone can thwart efforts to escape from poverty. Overexploitation of resources such as lakes, pastures, and forests for which property rights are not well defined or that lack effective community management (Ostrom 2005) can worsen poverty, whether through the tragedy of the commons or outside theft and encroachment. There have been surprisingly little anticipatory development investments to prevent such breakdowns. With profitable opportunities for resource exports, the incentives to circumvent traditional property rights have also grown. Assisting development for, and

16. For a systematic project, see “Inventory of Conflict and the Environment,” based at American University, see [www1.american.edu/ted/ice/iceall.htm](http://www1.american.edu/ted/ice/iceall.htm) and [www1.american.edu/ted/ice/elements.htm](http://www1.american.edu/ted/ice/elements.htm).

facilitating the renewal of, local common property institutions in a manner sensitive to local conditions are priorities in addressing the conflict-environment nexus. Indeed, responsible use of shared resources is difficult but not impossible to restore.

—*Example 9: Cooperative common property management in Tanzania.* In the Suledo Forest community in central Tanzania, cooperative common property management was restored after both external and internal stresses led to a serious breakdown. Progress was made with support from SIDA; the Suledo Forest communities won a UNEP/UNDP Equator Prize for their successful combination of economic development and environmental sustainability (Smith 2005; UNDP 2013). However, the community faces continued threats from land grabs, and financial sustainability has become a serious challenge following SIDA's phasing out its support. Once again, it may be dangerously unrealistic to expect financial sustainability for commons management programs, as for poverty programs in the poorest countries more generally (Kremer and Miguel 2007).

## Consequences of Conflict and Their Challenges for Ending Poverty

Collier (2007) estimates that “the risk that a country in the bottom billion falls into civil war in any five-year period is nearly one in six.” He memorably calls the consequences of conflict “development in reverse.” Horrific conditions of refugees receive wide media coverage, while the long-run development impact of conflict gets less attention. Indeed, the evidence shows that most of the economic progress we associate with development—income gains, poverty reduction, and health and education standards—goes into decline during violent conflict (for reviews, see Lindgren 2005; Gupta and others 2002; Plumper and Neumayer 2006; and Stewart, Huang, and Wang 2001). Income growth turns significantly negative. Not surprisingly, conflict can have large fiscal consequences (Gupta and others 2002).

### *The Damage of Conflict to Economic Development*

Lost schooling and other impacts can reduce well-being for a lifetime, and inequality becomes greater as victimized ethnic groups suffer much more human capital loss.<sup>17</sup> Capital is lost through a combination of physical destruction and capital flight (Collier 2003). Government's ability to cushion these blows becomes more limited, with substantial spending cuts for health and

17. See, for example, Blattman and Miguel (2010); Blattman and Annan (2010); Bundervoet, Verwimp, and Akresh (2009); Li and Wen (2005); Messer, Cohen, and Marchione (2001); Messer and Cohen (2006); Cassar and others (2013); Chamarbagwala and Morán (2011); and Gupta and others (2002); for an overview see Todaro and Smith (2014, sec 14.5).

education. Social ties are lost when most needed for survival; lost social capital is also destructive to future development opportunities more generally (Blattman and Miguel 2010; Cassar and others 2013).

Akresh and others (2012) find that four decades after the 1967–70 Nigerian civil war those exposed between birth and adolescence have lower adult stature, which is related to lowered life expectancy and life earnings. Bundervoet, Verwimp, and Akresh (2009) find a negative impact on height from civil conflict in Burundi.

—*Example 10: GDP cost of conflict in Sri Lanka.* Ganegodage and Rambaldi (2014) calculate that the civil conflict in Sri Lanka cost that country an annual average of 9 percent of its GDP; this is near the average impact estimated in previous studies on that conflict.<sup>18</sup>

—*Example 11: Human capital cost of civil war in Guatemala.* Chamarbagwala and Morán (2011) show that, in the 1985–96 period of the Guatemala civil conflict, rural Mayan males in district departments where more human rights violations were committed completed 1.09 (23 percent) less years of schooling, while rural Mayan females completed 1.17 (30 percent) less years of schooling. Gender and ethnic disparities in education also apparently increased as a result. The authors found smaller but still significant schooling impacts in two earlier periods of conflict.

### *Environmental Consequences of Conflict*

Conflict can also seriously damage the environment (Biggs 2004). In turn, the environmental impacts cause further harm to the poor. The direct environmental consequences of conflict are quite varied, though most of the impacts are strongly negative. Where governance breaks down in conflict-affected areas, local environmental conservation agreements and arrangements can collapse, while poverty increases; these conditions can accelerate natural resource exploitation (Mitchell 2013).

Encroachments onto protected areas can become more common, including opportunistic poaching. Conflict-related activities can result in chemical pollution of streams and rivers. In addition, a breakdown of state regulation and oversight can lead to unregulated mining, causing severe damage to water quality. There are also cases of deliberate despoilment as a weapon of war. Paradoxically, not all impacts are negative: evacuations of areas in response to conflict can suspend environmental degradation and allow for some ecological renewal. In addition to direct effects, there are also many indirect effects of maladaptation, to which we return in subsequent discussions.

18. Such estimates vary widely; Lindgren (2005) found a range of estimated impacts for Sri Lanka from 2.2 to 15.8 percent a year. The Ganegodage-Rambaldi results are in the middle of this pack.



—*Example 12: Impacts of conflict in Afghanistan.* UNEP (2003, 2008) concludes that the legacy of over three decades of conflict in Afghanistan is overuse and depletion of forest, biodiversity, water, and other vital resources, which in turn worsened economic conditions and further undermined safety. Degradation was caused in part by a complete collapse of local and national governance.

—*Example 13: Impacts of conflict in Nepal.* The conflict in Nepal led to destruction of infrastructure for protected areas. Murphy, Oli, and Gorzula (2005, 1) conclude that “a combination of factors, including Maoist attacks on guard posts, reallocation of troops to battle the insurgency, and the loss of political will for environmental conservation may have created conditions conducive for opportunistic resource exploitation” such as poaching. But conflict led to other regions of the county gaining forest regeneration and decreased poaching due to out-migration from the “middle hill region” of the country.

—*Example 14: Impacts of conflict in Sierra Leone.* The conflict in Sierra Leone led to large direct impacts with damaged water systems, agriculture, and forests; pollution from illegal and unregulated mining; and toxins released due to damage to warehouses. As in many countries, indirect effects include several forms of maladaptation (UNEP 2010).

—*Example 15: Impacts of conflict in the Democratic Republic of Congo.* The conflict in the Democratic Republic of Congo has caused environmental damage through battles in protected areas and forests, sabotage of water treatment centers and environmental monitoring equipment, poaching, increases in damaging charcoal production, and other encroachment onto protected areas (UNEP 2008).

Environmental degradation—including damage caused by conflict—harms prospects for ending poverty. At the same time, degradation, whether from local mismanagement or external climate change, can lead to new conflict or amplify existing conflict, deepening the impediments to poverty reduction. To examine this, we take a closer look at responses to environmental stressors and then consider the implications for conflict risks.

## Responses to Climate Change and Environmental Degradation

Analysts sometimes draw distinctions between two types of adaptation: autonomous and planned. While planned (or policy) adaptation receives most of the attention, it is inevitable that autonomous adaptation (that is undertaken by individuals, families, and communities below the level of formal government) will predominate over the planned (or policy) adaptation carried out by governments (Mendelsohn 2000; Malik and Smith 2012). Typically, the literature views both planned and autonomous adaptation as cushioning climate change’s otherwise harmful effects on people and communities. Among other things, this

is thought to reduce the risk that climate change exacerbates tensions—or at least the degree to which it does so (Barnett and Adger 2007; Stark, Mataya, and Lubovich 2009). But under some conditions, either type of adaptation can create or worsen social tensions, thereby increasing the risks of conflict. In low-income countries, the range of risks is likely to be greater from autonomous adaptation because it is more predominant and geographically widespread.

### *Autonomous Adaptation*

There is a wide range of potential autonomous adaptation behaviors (Malik and Smith 2012); and again, they almost certainly add up to a much larger total response than can be expected from planned adaptation (Mendelsohn 2000). Autonomous adaptation takes such forms as farmers responding to drought or worsened crop diseases and pests by altering crop or livestock varieties, altering pesticide use, using more groundwater, and increasing exploitation of common property resources. All these activities benefit those who undertake them, at least in the short run, although they can have negative effects on others. Affected rural residents may further alter their livelihood activities, such as adding day labor to their work mix or attempting an off-farm microenterprise. As conditions worsen further, rural dwellers frequently migrate—whether temporarily or permanently—either to different parts of the country or across national boundaries (Mendelsohn 2000; McLeman and Smit 2006). Autonomous adaptation in cities will also become increasingly important. Urban residents may change location to areas less threatened by storm damage (including flooding and mud slides), alter livelihood activities, and join new informal insurance arrangements.

Again, while these responses are helpful for those who move and change resource use, they can also lead to conflict that must be managed, as illustrated by the experience in Bangladesh.

—*Example 16: Water conflicts in Bangladesh.* In coastal Bangladesh, after tube well water became contaminated with salt water, affected residents began to fetch water from nearby unaffected wells, leading to tensions, including some violent conflict, with residents who depended upon the unaffected wells. Fears, however unwarranted, of reduced water availability or contamination, and perhaps a localized xenophobia, may have played a role (Bangladesh Institute 2009, 15). Conflict between shrimp and rice farmers has been reported (see the Bangladesh Climate Change Strategy and Action Plan).

### *Planned Adaptation, Government Policies, and Conflict*

Active and effective planned (or policy) adaptation is also necessary, as there are many essential activities that autonomous adaptation cannot accomplish, such as provision of large-scale public goods to assist adaptation. These public

goods range from climate proofing of infrastructure to improved institutions for managing natural resources.<sup>19</sup> Planned adaptation will be more effective if it recognizes autonomous adaptation and, where possible, works with it rather than ignores or thwarts it. Planned adaptation can also play a crucial role in complementing autonomous adaptation, helping it to be more effective. In this regard, one of its most important roles will be to moderate the risk of conflict.

Investments in climate resilience and planned adaptation encompass both “hard” and “soft” investments, including physical infrastructure, government capacity building at the national and local levels, and institutional activities, such as promulgating regulations and guidelines (to, for example, limit forms of development in low-lying or otherwise vulnerable areas). Governments in developing countries often treat soft investments as of secondary importance to investments in physical infrastructure, but when well planned and implemented, investments in capacity building may leverage the effectiveness of physical investments.

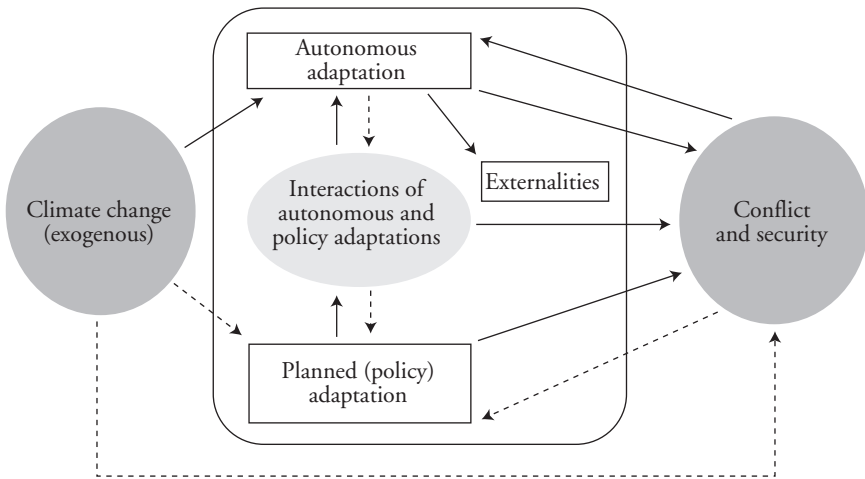
Planned adaptation can facilitate smooth autonomous adaptation by farmers and pastoralists and urban dwellers, reducing the risk of conflict. Examples are drought-resistant seed varieties, crops that can be harvested earlier in the season (when rains end earlier than their historical average), and crops that can better withstand inundation. Smooth autonomous adaptation by urban dwellers can be facilitated with infrastructure for defense against floods and landslides and access to clean water. While building resilience, these responses can decrease poverty and reduce the vulnerability of the poor to conflict. Of course, poorly planned and executed policy-based adaptation can constrain constructive autonomous adaptation or make them more costly. Accordingly, planned adaptation (and government policies more generally) can increase conflict risk when it undermines or restricts autonomous adaptation (Malik and Smith 2012).

### *Relationships between Planned and Autonomous Adaptation*

The relationships between planned and autonomous adaptation to climate change are highlighted in figure 11-2 (which is a subset of relationships shown in figure 11-1 expanded with this special emphasis). The figure indicates that autonomous adaptation can produce negative externalities that can lead to conflict. Planned adaptation can either harm or facilitate and assist autonomous adaptation. As experience accumulates, there is growing appreciation of

19. The poor generally rely on carefully tuned informal institutions to regulate common property usage (Ostrom 2005), but the delicate balances can be affected by the influx of population, particularly from different ethnic groups—an outcome that is likely to become increasingly common with climate change.

Figure 11-2. *Autonomous Adaptation: Interaction with Policy and Security Implications*



Source: Author.

the importance of ensuring that adaptation is conflict sensitive (Sayne, 2011; Tanzler, Maas, and Carius 2010).

—*Policy example 1: Land use policies.* Consider the example of institutions for land use regulation. Policies of population transfer out of low-lying areas vulnerable to flooding and storm surges—even if well intended—could fuel antistate violence. And when the population moves into nearby regions, social and environmental pressures increase, along with risks of conflict between communities. Even benign and well-meaning policies can have unintended consequences for the two fragilities. For example, constructing barriers to protect vulnerable lands might reduce conflict risks in the immediate area but could also worsen conditions if the barriers adversely affect the environment in nearby areas or otherwise lead to infringement on existing livelihoods.

—*Policy example 2: Migration policies.* Consider the impacts of migration policies. Desired migration on the part of the rural poor is projected to increase in areas most severely affected by climate change, as rural productivity and incomes fall in comparison to incomes elsewhere (whether in urban or relatively unaffected rural areas). Thus on the one hand out-migration can reduce local social and economic pressures; indeed, as climate change accelerates beyond the range of experience and of ready local adaptations, migration may turn out to be the single largest form of an autonomous adaptation response. Under these conditions, curtailing migration can worsen local conflict and accelerate

environmental degradation. But on the other hand, to the extent that migration leads to increased social and economic tensions in destination areas, policies to restrict migration either within the country or across national borders might mitigate conflict risks. The way this challenge is handled is of great consequence for the two fragilities, but the scope of the problem is very difficult to predict globally. Warner and others (2009) project that between 50 million and 700 million people will be displaced by climate change by the middle of this century. The wide range reflects the enormous uncertainties about the eventual impacts of climate change. But numbers in the higher part of this range would eclipse the current combined population of international migrants, internally displaced persons, and refugees. Moreover, it is not simply the numbers but the motivations for moving; rather than being attracted by rising incomes and job opportunities elsewhere, climate refugees will be fleeing worsening conditions in their home communities, placing them into more direct competition for resources and employment, thereby heightening the potential for conflict and instability in comparison with more conventional migration patterns.

### *Relationships between Government and Local Communities*

Types and magnitude of planned adaptation may be influenced—positively or negatively—by autonomous adaptations. Planned adaptation can be designed to leverage (and avoid negatively affecting) beneficial autonomous adaptation and to help mitigate the impacts of maladaptation in and among communities. Thus alternatives need to be carefully weighed.

Risks from the two fragilities are strongly influenced by the quality of relationships among government and local communities and identity groups. Even benign neglect can negate community efforts at autonomous adaptation, as their effectiveness may depend on complementary planned adaptation investments and policies. For example, restrictions on migration out of environmentally degraded or climate-affected areas into less affected areas may keep local tensions high and fuel antigovernment sentiment if the destination areas are perceived as being privileged by the state. If at the same time government is actively assisting other communities perceived as specially favored, resentment toward government may build. Other environmental policies may be perceived as even less benign; conflict may result from grievances such as diversion of water from one region to another. Indeed almost any policies that hinder autonomous adaptation could worsen both fragilities, and in mutually reinforcing ways.

A delicate balance is needed, and it will depend upon local conditions. Externalities of autonomous adaptation could push a region that is already vulnerable to conflict into outright conflict. Provided that the central government is competent and responsive, it would be desirable to place greater reliance on

well-designed policy adaptation in such regions and less on purely autonomous adaptation than would otherwise be the case. For example, well-designed and implemented policies and regulations can help to moderate resource-related spillovers. Negative externalities are caused by autonomous adaptations that adversely affect neighboring groups through reduced resource availability, including lowered water tables, salinization, deforestation, crop damage, and reduced foraging opportunities.<sup>20</sup> A clear understanding of the local context of such externalities can guide the formation and implementation of policies and programs to contain these spillovers.

The indirect effects of climate change on conflict are likely to prove the most salient in the longer term. But the literature also reports direct effects of weather on violence, including “witch killing” in Tanzania (Miguel 2005), property crimes in rural India (Blakeslee and Fishman 2013), and direct impacts of warming on civil war in Africa (Burke and others 2009). Burke, Hsiang, and Miguel (forthcoming) estimate that a one standard deviation temperature increase is associated with an 11 percent increase in the onset of intergroup conflict; it is unclear how to extrapolate from this.<sup>21</sup> But average temperatures are predicted to rise by at least 1 degree C by midcentury.

### **Special Challenges of Adaptation for Economic Development**

As noted earlier, severe harm to traditional rural livelihoods is projected as a result of climate change (Hatton and Williamson 2003; McLeman and Smit 2006; Naudé 2010; Warner and others 2009). A historically unprecedented level of migration may ensue. Twentieth-century evidence supports these projections. Marchiori, Maystadt, and Schumacher (2012) estimate that “temperature and rainfall anomalies caused a total net displacement of 5 million people during the period 1960–2000.” Researchers in security studies note much potential for conflict. In contrast, some analysts take the view that migration will not lead to much conflict (for example, Raleigh, Jordan, and Salehyan 2011). Hopefully, this view will prove correct; however, it is based on past patterns and gives little weight to some recent experience. Climate change is

20. Deforestation can also have broader weather effects over a wider area, notably reduced average rainfall; it can also facilitate larger floods affecting wider geographic areas; the case of deforestation in mountainous Meghalaya (north of Bangladesh) is a case in point.

21. Perhaps a majority of such effects operate through economic channels such as crop losses. But otherwise, it is plausible that these average temperature effects could be mitigated by physiological adaptation, as people become used to greater heat throughout the year. Climate change may also produce greater temperature variation, with more frequent heat waves, featuring larger jumps above the new normal range of temperatures; still, improved knowledge of how to respond to heat waves (Das and Smith 2012) could also have the effect of mitigating violent responses.

leading to weather patterns not experienced previously in many areas. Migration on such a scale could be qualitatively different, resulting in competition for resources and employment. Migration is often rural to rural, not only rural to urban (UNEP 2011; Werz and Conley 2012). The result can be maladaptation, with possibly the largest impacts being farmer-pastoralist conflicts, sometimes called farmer-rancher wars.

### *A Closer Look at Migration as an Adaptation*

Altered patterns of seasonal migration have their own impact:

—*Example 17: Conflict in Sudan among pastoralists and farmers.* A recent example of the potential for problems is reported from Sudan, where changes in water availability and crop cover led pastoralists to alter their seasonal migration patterns, which in turn led to worsened tensions both among pastoralists and between pastoralists and settled farmers (Bronkhorst 2011; UNEP 2007).

—*Example 18: Conflict in Nigeria among pastoralists and farmers.* In Nigeria, shortages of water and livestock feed, caused in part by short-term drought and perhaps longer-term desertification, led pastoralists to alter their traditional grazing routes. At the same time, settled farmers responded to drought and other changes by cultivating larger expanses of land. A result was that pastoralists were squeezed for land, which led to violent farmer-pastoralist clashes, resulting in several hundred deaths (Sayne 2011).

—*Example 19: Pastoralist conflict in Kenya.* In Kenya, severe drought persuaded traditional pastoralists to settle near fixed—but limited—water sources that area farmers already depended upon (Conservation Development Center 2009), again leading to conflict.

—*Example 20: Famine in Somalia.* When famine hit Somalia in 2010, it was already afflicted by conflict and close to being a failed state. Governmental fragility was a multiplier to environmental fragility; migration was a predictable adaptation response, yet millions embarked on a dangerous, all too often fatal, trek to dangerously overcrowded and unsanitary refugee camps (USAID 2012; Todaro and Smith 2014).

Other forms of migration-related conflict are emerging, notably conflict regarding employment opportunities (Reuveny 2007), where migration is intentionally permanent.

—*Example 21: Employment conflict in Bangladesh between locals and climate migrants.* In Bangladesh, tensions—including outright violence—between so-called climate migrants and their new neighbors have been fueled in part by the decline in informal sector wages, as the labor supply of unskilled workers correspondingly rose. There has also been competition for land, causing “high levels of physical insecurity and conflict” (Bangladesh Institute of International and Strategic Studies 2009).

—*Example 22: Employment conflict in Uganda between locals and climate migrants.* In Uganda, migration caused by climate or weather shocks has led to lower employment or wages for both new migrants and the existing residents (Strobi and Valfort 2013), resulting in tensions.

To determine the extent to which climate change can cause outright civil war or similar nationwide upheavals will require more evidence. But once again, generally it is not so much the direct effect of weather and climate as the manner in which government and civil society respond. There is suggestive comparative-historical evidence that large climate shifts in the past have led to violent upheavals and even civilization collapse.<sup>22</sup> Probably the most actively discussed contemporary candidate is the civil war in Syria.<sup>23</sup>

—*Example 23: Extreme drought as a contributory factor in the Syrian civil war.* The harsh impacts of the Syrian civil war include approximately 9 million internal and external refugees, many of whom, living in refugee camps, have fallen into poverty. It cannot be said simply that Syria's severe drought "caused" the civil war, because the government presided over a middle-income economy and had the resources to respond to the hardships due to the drought; and because other factors were clearly present, notably the demonstration effect from other Arab Spring countries. However, it is reasonable to conclude that the failure of government to respond to the economic and social impacts of the drought—such as unemployment among young climate migrants—compounded by the government's prior water resource mismanagement, was likely a significant contributory factor in instigating the civil war.<sup>24</sup>

—*Example 24: Climate change as a cause of the Darfur crisis.* The severe and long-lasting strife in Darfur was also on a nearly national scale, not just encompassing one large region but involving other regions and extensively involving the national government in Khartoum. Analyses by the United Nations Environment Program and analysts such as Andrew Guzman provide evidence that drought and resource degradation was a "spark" for the large-scale genocidal campaign in Darfur.<sup>25</sup>

22. For an interesting though somewhat controversial explication of this view with historical examples, see Diamond (2005). Bai and Kung (2011) examine "climate shocks and sino-nomadic conflict," using data on nomadic incursions into settled Han Chinese regions spanning two thousand years. The authors utilize drought and flood data as proxies for precipitation changes and show that nomadic incursions are positively correlated with less rainfall.

23. Another widely discussed candidate is the 2012 upheaval in Mali, which may have been spurred by drought.

24. For examples of studies making these arguments, see Gleick (2014) and de Châtel (2014). The topic has been widely discussed in the media, including by Friedman (2013) and Greenwood (2014).

25. For an overview of the case that the Darfur crisis was triggered by climate change, see Guzman (2013, chap. 5). For UNEP's analysis, see [http://postconflict.unep.ch/sudanreport/sudan\\_website/](http://postconflict.unep.ch/sudanreport/sudan_website/) and in particular its assessment report, UNEP (2007).



*Special Urban Challenges of Governmental and Environmental Fragility*

One of the largest adaptations to rural climate change will inevitably be accelerated rural-to-urban migration. Indeed, there is already evidence that some of the high urban migration rates in Africa are driven by environmental stress, such as water availability, that is caused in part by climate change (Marchiori, Maystadt, and Schumacher 2012). The likely movement of affected communities into urban areas could lead to growing numbers of people in informal settlements being exposed to flooding, diseases, and heat waves (the latter would be amplified by the urban heat island effect).

Adaptation in urban areas receives much less attention than that in rural areas, but it will also be important. Even though poverty remains an overwhelmingly rural phenomenon, with over three-quarters of those living on \$1.25 or less being rural, urban poverty is increasingly important, as more than half of the population of developing countries will live in cities by 2020 (United Nations Population Division 2013). For example, in China, although urban incomes are rising overall, the average income shortfall of the urban poor in China has worsened due to the influx of people from poor rural areas.<sup>26</sup> Conditions are precarious for some migrants, and there are signs of growing tensions.

Globally, an estimated billion people live in slum conditions, often in high-risk neighborhoods, with low-quality housing and little if any access to public services. Climate change and poor domestic environmental practices, such as unregulated dumping, may worsen water quality and availability in urban areas. Meanwhile, deteriorating rural conditions will bring new climate migrants; new informal settlements can lead to additional obstacles in waterways and untreated waste, worsening the damage to structures as well as to public health. Climate change may also worsen the intensity and frequency of extreme weather in urban areas, particularly heat waves, storms, flooding, and landslides; and sea level rises are a growing threat. A few of the cities most threatened are located in countries, such as Bangladesh, with at least moderate if not high risk for conflict (World Bank 2013; Brecht and others 2012).

Urban neighborhoods lacking infrastructure and basic public services are vulnerable to both environmental and governmental fragilities: to both extreme weather and urban violence.<sup>27</sup> Indeed, in the face of climate change, deteriorating urban slum conditions may aggravate underlying risks of urban violence. Urban dwellers may respond to climate change by building less vulnerable

26. Data from PovcalNet. I would like to thank Tony Castleman for pointing out the China example. Note also that the migrants may arrive from environmentally stressed areas, such as those with growing water shortages.

27. An example is the chronic violence in the *favelas* of Brazilian cities.

housing and participating in informal insurance arrangements. Those who can afford to do so will typically move to higher ground that is less vulnerable to flooding (in areas that are also safer from mud slides), which will bid up the price of land and housing in safer areas. Perhaps paradoxically, low-income families may be more likely to move into environmentally degraded land and areas more vulnerable to storms in response to the increased costs of land and housing in safer areas. Unconstructive government responses (whether interest group motivated or just poorly thought out) can magnify these effects.<sup>28</sup>

Even if socially marginalized climate migrants are unable to organize themselves, they might still be induced to serve as the “troops” for opportunistic government opponents (or otherwise destabilizing criminal organizations). Given such unpredictability, a focus on the problems of urban extreme poverty, including the plight of recent migrants, may be the most effective way to deal with urban conflict.

Investment in urban resilience can mitigate environmental risks and may also reduce conflict risks. Governments may also respond—both to climate threats and to autonomous adaptations by citizens—with regulations on urban growth, land use, zoning, density, and building. Such regulations can be beneficial, correcting negative externalities; but they also can reduce availability of residential land, pushing up land and housing prices (Malik and Smith 2012). In turn, higher land and housing prices, along with stricter regulations, may further limit the ability of lower-income families to enter the formal housing market, potentially resulting in increased homelessness and poverty levels (Buckley and Kalarickal 2005, 2006). Unstable urban conditions will make it more difficult for recent poor rural migrants to adjust to the requirements of urban life. An additional likely result is heightened social tensions, if not violent conflict. Thus once again the quality of interactions between planned and autonomous adaptation is at center stage; in this case, it is likely to be a significant determinant of the risks of conflict in cities and of the rate of urban poverty reduction.

With these examples in mind, it becomes clear that an incremental, piecemeal, or overly compartmentalized approach by government to developing the various forms of urban infrastructure holds dangers of maladaptation. Urban infrastructure has long-term lock-in effects. It is understood that this is a problem for carbon mitigation. For example, if development takes the form of urban sprawl rather than well-planned, dense, city cores, a nation is likely to be locked into high transportation and other energy costs for possibly decades to come; it is in general far more difficult to retrofit buildings for energy efficiency than it is

28. For example, Irazabal (2009) notes that “more than one-third of the houses in La Paz, Bolivia, are not connected to the city water line because these low-income houses are located on the steep slopes of the bowl-shaped city, where landslides and floods are common.”

to incorporate energy efficiency into the original construction. Redevelopment is costly and often politically infeasible.

But in addition to problems for future climate change mitigation, there are likely to be specific adaptation and general resilience costs of urban maladaptation without systematic and anticipatory infrastructure planning. There is a tendency in the cities of many developing countries to allow settlement to happen and then attempt to address the lack of infrastructure. This is costly, and indeed it is sometimes impossible to build infrastructure later, for political as well as economic reasons.<sup>29</sup> The areas where the poor live are often the most vulnerable. Sound urban resilience planning has a benefit in reducing social tensions and conflict as well as protecting lives and public health. Note that in general adequate planning takes into account the existing urban ecosystem as a whole, not merely addressing shocks or planning for specific shocks. This includes how a city anticipates and addresses current or future water shortages. But the more immediate problem may be the growing incidence of floods.

—*Example 25: Vulnerability to flooding in Mumbai.* In Mumbai, poor slum dwellers live along riverbanks that are at high risk of flooding; after the 2005 flood the poorest residents lost the equivalent of their total savings (Hallegatte and others 2010; see also World Bank 2013).

—*Example 26: Vulnerability to floods and mud slides in Guatemala City.* In 1998 Hurricane Mitch killed at least 5,500 people and caused thousands more to migrate; flooding and mud slides had a severe impact on the poor (McLeman and Smit 2006).

—*Example 27: Vulnerability to sea level rise and storm surges in Lagos.* Lagos, the largest city in Africa (with over 20 million people) is at risk for sea level rise, storm surges, and associated saltwater contamination of its water resources. Such conditions also can have serious public health implications, worsening urban poverty. Sea level rise could cause considerable population displacement both in the city and in the whole low-lying coastal region. Loss of land and water, along with a likely increase in natural disasters, present serious risks for a country that already has a history of serious violent conflicts.<sup>30</sup>

### *Attending to Containment of International Flashpoints*

Climate change impacts take place in ecological zones, not political zones; maps of different climate change effects overlap each other; and they cut through and across countries.<sup>31</sup> Thus attending to containment of international flashpoints will inevitably be part of the way the two fragilities are addressed.

29. I would like to thank Anthony Yezer for helpful discussions on this topic.

30. See the IPCC Nigeria report at [www.ipcc.ch/ipccreports/sres/regional/index.php?idp=31](http://www.ipcc.ch/ipccreports/sres/regional/index.php?idp=31). See also Guzman (2013, chap. 5) and Fashae and Onafeso (2011).

31. I would like to thank participants in the Brookings Last Mile workshop, January 2014, for helpful discussion on this topic.

There are growing risks of conflict between developing countries over water, such as the tension between China and India over Himalayan water and between Ethiopia and Egypt over water from the Nile. Facilitation of binational and regional water treaties by development partners may become a priority (De Stefano and others 2010). It cannot be assumed that the climate-conflict nexus in the developing world will be contained within national boundaries. Some international issues are analogous to disputes over natural resources across communities.<sup>32</sup> Analysis of interstate hostility is beyond the scope of this chapter, but it is worth pointing out the tendency of such hostilities to worsen poverty. Moreover, climate-driven migration across national borders is also likely to pose problems. The U.S. military has run simulations of floods in Bangladesh, of the resulting refugee movements into India, and of the predicted religious conflicts, spread of contagious disease, and damage to infrastructure.<sup>33</sup>

### **Aid: Regional Cooperation and International Development Assistance**

The United Nations Development Program (UNDP) played an important role in starting the policy adaptation assistance process, with its National Adaptation Programs of Action (NAPAs). These in turn grew out of global climate meetings.<sup>34</sup> The next step was financing, taken up variously by multilateral development banks and special financing initiatives (such as the Green Climate Fund, headquartered in South Korea). The International Development Association (IDA) and the Pilot Program for Climate Resilience (PPCR) are good cases in point.

#### *General IDA Programing*

Attention to climate adaptation and resilience has been slowly building in the IDA in recent years. IDA15 features analytic and advisory activities related to adaptation (IDA 2007). There is a special theme related to climate in IDA16 (along with themes on mainstreaming gender and FCACs), launching this area

32. Despite limited treaties, oceans largely function as international common property, driving the collapse of fish populations (among other problems). Where countries make specific territorial claims, these may overlap (as in the South China Sea) with competing claims for natural resources. Lack of established institutions also drive the intensity of these conflicts.

33. Werz and Conley (2012) cite a 2008 National Defense University exercise that explored the impact of a flood that sent hundreds of thousands of refugees from Bangladesh into neighboring India. See [www.boell.org/downloads/climate\\_migration.pdf](http://www.boell.org/downloads/climate_migration.pdf).

34. The National Adaptation Programs of Action (NAPA) is a formal UNFCCC process for the least developed countries "to identify priority activities that respond to their urgent and immediate needs to adapt to climate change—those for which further delay would increase vulnerability and/or costs at a later stage." See UNFCCC (2008).

as a thematic undertaking.<sup>35</sup> In “Special Themes for IDA17” (IDA 2013), climate resilience is featured as one of four themes. There appears to be a new emphasis on staking out an IDA comparative advantage in the area of climate resilience and in the related area of disaster risk management.

The special themes for IDA17, in common with IDA16, also include FCACs. The term *resilience* is used in a social governance context. But written evidence is hard to find, at least evidence that IDA is looking ahead systematically to the complementarities between its two themes, as environmental degradation worsens over time.

### *PPCR and the Green Climate Fund*

One development assistance initiative focused on climate adaptation is the Pilot Program for Climate Resilience (PPCR), one of four targeted programs under the multidonor climate investment funds.<sup>36</sup> The PPCR is designed to demonstrate ways to integrate climate risk and resilience into developing countries’ core development planning. It provides incentives for scaled-up action and transformational change and offers additional financial resources in the form of grants and concessional loans (with near-zero interest), to help fund public and private investments for climate-resilient development. One objective of the PPCR is to contribute to knowledge and best practices relating to integrated approaches for climate resilience; another is to reap lessons relating to adaptation financing. All eighteen PPCR countries, plus the Caribbean and Pacific regional programs, have endorsed investment plans, or strategic programs for climate resilience. These programs identify sixty-seven projects to be financed by the PPCR. There is generally little if any explicit connection made to conflict risks.<sup>37</sup>

35. The IDA16 Replenishment document (IDA 2010) states, “IDA will support climate resilience activities through financing as well as enhancing the effectiveness of investments by other development partners.”

36. The pilot program for climate resilience is supported by the Strategic Climate Fund, which also supports the Forest Investment Program and the Scaling Up Renewable Energy Program. The Strategic Climate Fund is intended to provide experience and lessons through learning by doing, to channel financing for climate mitigation and adaptation/resilience, to provide incentives for “scaled-up and transformational action,” and to provide incentives to restore and enhance natural ecosystems that can maintain or absorb carbon. These efforts fall under the rubric of sustainable development. In contrast, the Clean Technology Fund provides developing countries with incentives to implement technologies with potential savings from controlling greenhouse gas emissions. In climate investment fund documents, the term *contributor* is used, rather than *donor*. Much of the following section draws directly on program websites; see [www.climateinvestmentfunds.org/cif/node/4](http://www.climateinvestmentfunds.org/cif/node/4).

37. However, an exception is the project appraisal document for the World Bank (2011a) which sponsored part of the Niger PPCR funding, which notes that one of the risks faced by “Nigerian individual households and communities” is “conflicts over access to and use of shrinking natural resources.”

The launch of the Green Climate Fund, attached to the UNFCCC (2013) and based in Seoul, is opening up a new chapter, with a storyline that is still unfolding.<sup>38</sup>

### *Financing to Jointly Address the Two Fragilities*

Policy analysis, development assistance, and practical governance will clearly benefit from moving away from evaluating resilience in a compartmentalized manner, rather than in an integrated way. Both conflict and environmental stressors affect the same social and economic system, and the negative effects of managing one risk inadequately can result in other risks being magnified and tipping over into crisis. Thus effective domestic policy and development planning will be more effective if it can be formulated in a scaled-up and “non-siloed” manner to address not only resilience from climate change and resilience from conflict but perhaps other forms of needed societal and economic resilience (such as financial sector resilience).

More systematic consideration of co-benefits of investments across resilience types would be beneficial. For example, community-driven development (CDD) is often considered helpful with poverty reduction through building conflict resilience.<sup>39</sup> But in addressing specific climate stressors (as has been done in local ecological zones), CDD may also be well suited as a programmatic approach for climate resilience. A CDD project designed and implemented to explicitly address both climate and conflict problems and risks, and to build general resilience, may yield better results, at least as a possibility to be evaluated rigorously.

—*Example 28: CDD in the Niger delta: Rivers State, Nigeria.* In the Niger delta region of Nigeria, fishing and farming livelihoods in delta communities were severely damaged by repeated oil spills. One consequence was antigovernment violence. CDD projects in Rivers State are reported to have had positive impacts on participants’ perceptions about these livelihoods and may have led to environmental improvement (via community volunteering) and, potentially, to decreased conflict (Kimenyi and others 2014a, 2014b).

## **Key Investments: Climate Proofing and Climate Resilience**

Enhancing the climate resilience of investments in low-income countries is broadly estimated to increase overall costs by at least 25 percent, with the

38. For details, see [http://unfccc.int/cooperation\\_and\\_support/financial\\_mechanism/green\\_climate\\_fund/items/5869.php](http://unfccc.int/cooperation_and_support/financial_mechanism/green_climate_fund/items/5869.php).

39. There is mixed evidence; see for example, Mansuri and Rao (2004). Niger has a major community-driven component in its strategic program for climate resilience and in some of its pilot programs. The same is found, although to a lesser extent, in Zambia.

largest proportional increases experienced in sub-Saharan Africa and small island developing states.

As a general matter, climate proofing investments has recently become a theme of aid. The term has a project-specific connotation, centering on physical investments, including raising dam height and building roads to withstand greater storms and flooding. The term is used in contrast with building climate resilience; the latter is a more systemic concept and addresses wider-scale investments, including capacity building, to respond to shocks, the details or even direction of which may not be predicted in advance.

More explicit prioritizing of investments in adaptation and resilience using criteria that account for co-benefits is needed. Co-benefits of approaches may include investments that provide general risk reduction while simultaneously increasing productivity and resilience and curtailing maladaptation, including conflict risks. Thus project appraisals of climate change investments can at least weigh potential conflict implications explicitly, thereby encouraging active attention to the issues and extending the do-no-harm foundations of development assistance. Similarly, aid for projects in postconflict areas can more carefully appraise and monitor potential environmental impact, since simply checking off the environment boxes in project appraisals does not suffice.

### *Hydromet: Reducing Both Types of Risks while Improving Productivity*

The establishment, expansion, and improvement of hydrometeorological services exemplify an investment that reduces environmental vulnerability (and thus potentially reduces conflict risks). Hydromet includes standard weather services and early warning systems to anticipate environmental emergencies and prevent disasters (which preserves funds for other development efforts).

—*Example 29: Bangladesh preparedness and warning systems.* In Bangladesh, the cost of reinforcing and raising the height of embankments and coastal dykes appears modest in relation to the projected damage. Of equal importance, the impact of cyclones and other extreme weather can be reduced with better early warning systems and government emergency preparedness (Brouwer and others 2007). This may in turn reduce risks of maladaptation.

—*Example 30: Nepal's hydromet development program.* Nepal's program for building resilience to climate-related hazards has been supported financially by PPCR, IFC, and other programs. Its general focus is on hydrometeorological systems, particularly in their relationship to agriculture. It includes both durable assets in modern hydromet systems and "soft" capacity building. The program includes the diverse components needed for short-term and long-term weather forecasting and alerts. In a country still recovering from a long civil conflict and with continued political tensions, hydromet services may reduce conflict risks.

### *Hydropower, Irrigation, and Flood Control*

Hydropower is an example of investments with potential for not only mitigation but also for adaptation and resilience. But poorly planned and located dams also have a history of negative environmental impacts. Dam placement has also led to tensions, especially with involuntary relocations or loss of resources, such as experienced in India. Investments in this area are important and growing. However, attention is needed to preventing conflict both internal and across national borders. Given climate change predictions, another priority is to build storm shelters, flood barriers, and protected roads, bridges, and canals serving areas where the poor live.

—*Example 31: Bolivia's water management programs.* In the face of melting glaciers, Bolivia is planning new and expanded dams to reduce flooding, capture water, and regulate water runoff (UN Habitat 2009).

—*Example 32: Mozambique's hydropower programs.* Mozambique is examining how to adapt its hydropower capacity to likely reduced flows resulting from climate change (Chambal 2010).

—*Example 33: Zambia's rehabilitation of traditional canals.* Zambia's program for "strengthening climate resilience in Zambia and the Barotse sub-basin" in its strategic program for climate resilience includes strengthened adaptive capacity of vulnerable rural communities, specifically rehabilitation, and strengthened management of traditional navigation and irrigation canals.

### *Awareness Campaigns*

Explaining risks to people in vulnerable areas (and helping them to take actions that reduce their risks) can have concrete benefits for reducing poverty and vulnerability.

—*Example 34: Disaster risk management in Odisha State, India.* An awareness campaign addressing improved responses to heat wave conditions (as part of a disaster risk management program) is estimated to have reduced mortality and likely also resulted in other health benefits (Das and Smith 2012).

—*Example 35: Maldives preparedness.* The Maldives has developed an awareness campaign centering on tsunamis; the UNEP finds that the risks are now understood. The approach could be applicable to specifically weather/climate disaster risk management.

## **Concluding Observations: From Two Fragilities to Combined Resilience**

This chapter highlights the need to identify and further investigate the links between two types of fragility, environmental and governmental, and their



impacts on poverty—and to orient policy and investments accordingly. Going forward, it will be important for governments and international development partners to take account of the complementarities between the two fragilities.

Some general if preliminary conclusions emerge from the framework, the broad patterns, and the case examples.<sup>40</sup> Among the most important is the interaction between planned policy adaptation and autonomous adaptation. Each of the following six implications readily generates hypotheses for further study.

First, *in FCACs, greater reliance on well-formulated planned adaptation is called for in the mix of autonomous and planned adaptation*, at least as a rule of thumb. But in these situations, implementing sound and transparent approaches to managing interactions between government policy and autonomous adaptation is all the more crucial, with a voice and redress for those affected; reasonable flexibility is required in its application to differing circumstances.

Second, *adaptive responses can worsen social tensions* and thus need early attention. While adaptation often reduces conflict risks by moderating the impacts of climate change, conflict risks can increase when adaptation leads to resource-related externalities in neighboring areas, such as lowered water tables, deforestation, crop damage, worsened sanitation, and reduced opportunities for foraging. A better understanding of how these externalities operate in practice will help in designing policies to contain these spillovers—and thus the conflict and environmental risks they give rise to.

Third, it is essential that *planned adaptation, and other government policies, should not risk further conflict by thwarting or reducing opportunities for efforts at autonomous adaptation*. Many developing countries have promulgated adaptation plans, such as NAPAs; and more plans are being formulated and modified, in addition to conventional government policy formulation that increasingly spans climate adaptation policy. While these are excellent and essential steps, attention is needed to ensure that policies and administrative actions do not unduly restrict migration, undermine viable informal agreements on resource allocation, or divert resources away from affected areas. A crucial step is to help government gain better information about what citizens are already doing in their attempts to adapt autonomously. Governments in many countries solicit input from those who may be especially affected by regulatory and administrative changes.<sup>41</sup> Again, in this case successful policy will provide a voice to autonomously adapting citizens concerning any initiatives that will affect their efforts.

Fourth, *autonomous adaptation has the potential to generate positive externalities that can be encouraged*. The most important example may be social learning

40. I would like to thank Arun Malik for helpful discussions.

41. A recent U.S. example are the 2014 state-level rules promulgated by the United States Environmental Protection Agency to implement reductions in carbon emissions.

across neighboring communities. Encouraging and augmenting this learning process has potential to be a productive part of planned adaptation. Governments can engage in a continuous process of learning what individuals and communities are doing to adapt, their effectiveness and external impacts, and implications for policy adaptation, while facilitating the sharing of lessons. For another example, when communities can (be helped to) solve collective action problems to accomplish locally beneficial reforestation and erosion control, these improvements also provide positive benefits downstream.

Fifth, *domestic policy and development partner assistance will require more integrated attention between climate change and domestic environmental problems.* There is an even narrower tendency—to focus on climate impacts independently from endogenous domestic environmental deterioration. Some of the priority responses need to differ somewhat when environmental problems are considered jointly. It is understandable that development partners have focused on climate change impacts, probably in large part out of a sense of special responsibility. But environmentally sustainable development—which is increasingly foundational to successful economic development—requires a balanced and integrated approach to environmental problems and their potential interactions. This should also help extend benefits to conflict prevention and poverty alleviation and their overlapping challenges.

Sixth, *for FCACs it is challenging but essential to maintain a balance in governance reform between achieving stronger state capacity and improving citizen protections.* Military and other state capabilities must be strong enough to bring violence to a halt and to deter future violence; yet effective institutions must be in place to provide checks and balances to ensure that state power is not abused at the expense of citizens, in particular, people living in poverty. More broadly, the state must be sufficiently resilient and effective to establish and maintain institutions conducive to economic development and to carry out other key functions—and at the same time to govern in a responsive and transparent manner.

Is improved governance sufficient to solve such complex and interrelated problems? Undoubtedly basic reforms would be beneficial, notably attacking corruption, enhancing transparency, strengthening checks and balances, and providing multiple channels for citizen voice. In addition, needed reforms for addressing conflict and environmental distress extend to addressing social exclusion and codifying and enforcing protection of minorities. Another basic component is appropriate and enforced environmental regulation. In countries with diverse identity groups, good regional governance is also needed; but reforms cannot be mandated easily by the central government; nor does central government easily let go of some of its crucial elements, such as regional taxation authority. Attention to informal and localized norms and institutions is also needed—again, very difficult to orchestrate from above. The problems are

complex and will require careful policy analysis in the local context to address. While these are all governance-related concerns, this scope stretches the definition and understandings of the meaning of improved governance beyond that of most conventional uses.

Moreover, environmental problems that fuel political conflict (even if usually not violent) are themselves impediments to progress on local governance. This is one reason that attempting governance reform in isolation is unlikely to succeed. In coming years, as climate change impacts and other environmental stressors are magnified, likely with resulting competition over basic resources, governance reforms may become increasingly constrained. More generally, of course, local political conditions make achieving the full gamut of needed institutional reform complex and difficult. In many countries in question, international aid will be needed even with substantive improvements in governance. Aid must be well monitored and well managed, with ongoing attention to governance deficiencies in this broader sense. At the same time, directly strengthening the poor and their communities also helps generate pressure for progress on governance deficiencies. And much aid can directly address localized conflict and environmental problems without requiring a complete overhaul of governance.

The need to account for complementarities between vulnerability to conflict and vulnerability to environmental stress—the two fragilities—becomes very clear when one considers that these are after all stresses on the same system: the failure to manage conflict risks will magnify environment risks, and vice versa. Thus rather than treating resilience in “silo” terms, it makes more sense to plan responses to the full set of risks, taken in combination.

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