

*Multiplying Displacement Impacts:  
Development as Usual in a Changing Global Climate*

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## Introduction

The International Accountability Project (hereafter IAP) is a San Francisco-based human rights organization. Much of our work focuses on challenging injustices of displacement carried out in the name of development, and I will begin by introducing one such project.<sup>1</sup> I then draw on vastly differing estimates of the number people this particular project would displace as a point of departure for looking at significant gaps in our estimates of the number of people worldwide who are uprooted by development-forced displacement. Uncertainty about the true scale of displacement impacts, I suggest, is even greater within the current context of global warming. In this context, the displacement impacts of development pursued through high greenhouse gas emitting projects are cumulative, multi-phase or open-ended, and multiplying. Lastly, I note that this raises critical questions regarding accountability and makes it imperative that we move toward more sustainable and just development models.

## The Phulbari Coal Project: An Emblematic Destructive Case

If implemented, the Phulbari Coal Project in Northwest Bangladesh would establish one of the largest open pit coalmines in the world. It is what IAP refers to as an ‘emblematic’ case of unjust development, meaning that it embodies and makes visible the most destructive elements of many large-scale projects financed under dominant development paradigms. In direct contradiction to development goals of reducing poverty, such projects have historically created new poverty among those they displace.

Among the features common to such projects are: excessive displacement, disproportionate impacts on indigenous peoples, strong opposition from affected communities, and human rights violations, including threats, extra-legal detentions, and violence employed in an effort to silence project opponents. As is true of Phulbari, many such projects also lack benefit-sharing mechanisms and land-for-land compensation, threaten protected environments and critical ecosystems, undermine food security, and contribute to global warming by generating high greenhouse gas (GHG) emissions or destroying forests that absorb and store these gases.<sup>2</sup>

Estimates of the number people who would be displaced by the Phulbari project are widely discrepant and contested. The financing company’s draft Resettlement Plan estimates that it would displace nearly 50,000 people (49,487 people and 11,247 households), including some 2,200 indigenous households. In contrast, an Expert Committee Report commissioned by the Bangladeshi government estimates that nearly 130,000 (129,417) people would be directly affected, and as many as 220,000 people would suffer reduced access to water for drinking and irrigation, with uncertain displacement impacts.<sup>3</sup> Undertaking an independent analysis of the draft RP, IAP (Kalafut 2008, pp. 18-22) concluded that it significantly understates the actual extent of displacement.<sup>4</sup>

The Phulbari project would acquire nearly 6,000 hectares, over 80 percent of which is agricultural land (Kalafut, pp. 22-26). The fact that affected households have land-based livelihoods yet would not receive land-for-land compensation raises grave concerns, given the scarcity of replacement land in one of the world’s most densely populated countries and research showing that reliance on cash compensation greatly increases impoverishment risks following displacement.<sup>5</sup> Moreover, these risks would be introduced in a country with the third largest economically poor population in the world.<sup>6</sup>

The loss of these agricultural lands also undermines efforts to overcome hunger in a country in which nearly half the population is food insecure (exists below the 'nutrition poverty line' of 2,122 kcal per day); Phulbari is a very fertile region, producing between two and four food crops per year, including rice, the staple crop.<sup>7</sup> Due to its elevation and location, Phulbari is also one of few agricultural regions in Bangladesh that is protected from flooding.

Environmental risks posed by the Phulbari project include potential acid mine contamination of soil and water.<sup>8</sup> Plans to transport coal through the Sundarbans, a UNESCO-protected mangrove Forest Reserve, (Moody 2008, pp. 85-92), also pose a threat to a wetlands habitat that serves as a vital protective barrier against cyclones, storms, and floods (Kinver 2008a) and supports many communities and endangered species. With coal accounting for roughly 20% of the world's greenhouse gas emissions, (<http://www.pewclimate.org/global-warming-basics/coalfacts.cfm>) carbon emissions from the project are also a serious concern.<sup>9</sup>

There is strong opposition to the Phulbari project within Bangladesh, and IAP has joined with dozens of NGOs in an international campaign to halt the project. On 26 August 2006, tens of thousands of people united in Phulbari to protest the project. Tragically, a government-backed paramilitary group opened fire on demonstrators, killing three people, including a 13 year old child, and wounding as many as 200.<sup>10</sup> Nationwide protests and a four-day general strike ensued and the project's financier, the Asia Energy Corporation (AEC, now Global Coal Management<sup>11</sup>), was forced to remove all employees and suspend its operations (Rahman 2006).<sup>12</sup>

Despite the enormous risks posed by the project, the Asian Development Bank was slated to approve \$300 million in project financing in June of 2008. Upon receiving written protests from over 40 community leaders and elected representatives of the Phulbari area and a letter of protest from over 60 international civil society organizations, the ADB determined that it was 'premature' to provide a political risk guarantee to Asia Energy Corporation and dropped the project from its funding pipeline in April of 2008.<sup>13</sup> The bank has not, however, closed the door on the project (Kalafut 2008, p. 16).

#### Development-Forced Displacement: Failures of Accountability

The fact that we cannot say with certainty how many people the Phulbari project would displace is far from exceptional. On the contrary, figures on development-forced displacement are known to be incomplete. This is largely due to the fact that vested interests, including governments, corporations, and financiers, are motivated to understate the actual scale of displacement in order to limit controversy generated by projects and minimize expenses entailed by resettlement and rehabilitation for project-affected people.

Both these development failings are well illustrated by research in India, which together with China has the largest number of people displaced in the name of development worldwide. Drawing on studies carried out since independence, Fernandes (2008a p. 182 and 2008b pp. 90-1) found that actual displacement was far greater than indicated by prior researchers or official figures. More than 60 million people, he concluded, have been directly displaced by development in India between 1946 and 2004. Of this, two-thirds or more cannot be considered resettled today.<sup>14</sup>

Even this revised figure, Fernandes cautions, significantly understates the actual number of people affected in India alone, due to the lack of data on the ‘enormous’ number of people who are forced to move as a consequence of environmental degradation and other project impacts, such as dust pollution and blasts in coal mines, and fly ash from thermal, cement, and aluminum plants.

Viewed in global terms, we are similarly unable to account for all those people who have been displaced by such project impacts or have been economically displaced and forced to move over time after losing access to vital resources that formerly sustained them such as forests, rivers, fresh water sources, and grazing lands.<sup>15</sup>

Despite the difficulties in obtaining precise numbers, it is clear that the scale is enormous: it is estimated that 15 million people worldwide are being uprooted and displaced in the name of development each year (Cernea, 2007, p. 2 and 2008, pp. 20 & 21), far more than the number of refugees fleeing armed conflicts and war.<sup>16</sup> Moreover, even this number is partial because it does not include those displaced when destructive development practices degrade the environment, leading to human-caused disasters such as landslides or floods.<sup>17</sup>

#### Development & Disaster in an Era of Climate Change

The challenges of accounting for all those displaced multiply exponentially within the current context of global warming, as development and disaster become increasingly intertwined and difficult to disentangle as causes of displacement. Recent increases in catastrophic events that devastate homes, lives, and livelihoods, disaster experts agree, are ‘a red light, a warning’ of unsustainable development practices and paradigms (Basher 2008, pp. 35-37).

The most fundamental scientific conclusion regarding climate change is unequivocal: global warming is occurring due to the atmospheric buildup of greenhouse gases, and human decisions and actions are the primary causes.<sup>18</sup> Most discussions of development-forced displacement take place independently of discussions of climate change. Yet, development-forced displacement is inextricably linked to climate change through a pernicious cycle. The plantations, dams,<sup>19</sup> transportation and energy sector projects that are displacing some 15 million people each year generate many of the greenhouse gases that are warming the planet, and also destroy forests that store these gases. The impacts of climate change, in turn, are making populated areas of the world newly uninhabitable, generating predictions of displacement on an unprecedented scale.

Nearly two decades have passed since the Intergovernmental Panel on Climate Change (IPCC) cautioned that the single greatest consequence of climate change could be the movement of people, with millions of people worldwide displaced by expanding deserts, droughts and heat waves of unprecedented severity and duration, sea level rise, coastal flooding and erosion, and an increase in extreme weather events such as tropical cyclones and hurricanes.<sup>20</sup>

Projecting the number of people who may be displaced by climate change effects in coming decades involves numerous methodological challenges, and estimates therefore vary.<sup>21</sup> The most widely cited figure, based on conservative assumptions, is that 150-200 million people may be displaced by the year 2050.<sup>22</sup> A recent UNDP report states that 200 million displaced by mid-century is “the accepted figure.”<sup>23</sup> If correct, the report notes, one in every forty-five people worldwide will be displaced by climate change during the next four decades (Brown 2007, p. 5).

Predictions of forced displacement occurring on an unprecedented scale are already being borne out today.<sup>24</sup> With climate change increasing the intensity and frequency of extreme weather events, large-scale humanitarian disasters have quadrupled in number over the past twenty years.<sup>25</sup> A recent UN report found that climate-related natural disasters forced 20 million people to flee their homes last year, nearly four times as many as those displaced by conflict.<sup>26</sup> As staggering as this figure is, it does not include people displaced by slow-onset disasters such as drought or sea level rise.<sup>27</sup>

### Development Loses & Equities

In light of the fact that so many high carbon-emitting projects are carried out in the name of development, it is a bitter paradox that climate change threatens to reverse development gains and undermine progress in meeting Millennium Development Goals.<sup>28</sup> In addition to increases in climate-related disasters, adverse effects include impacts on agricultural production and food security, water stress and insecurity, rising sea levels, and changes to ecosystems and biodiversity. Detailing these impacts, experts (Brown 2007, pp. 18, 19 & 27) predict that an additional 1.8 billion people could be suffering from water scarcity and 600 million people could be newly affected by malnutrition by the year 2080.<sup>29</sup>

Climate change, a United Nations report concludes, ‘may be the gravest threat ever to have faced humanity’ (Brown 2007, p. 27). It is also one of the most compelling equity challenges of our time. With few exceptions, the world’s most economically poor countries have historically been the smallest contributors to greenhouse gas emissions, yet they are the most immediately and profoundly threatened by global warming, and have fewer resources to mitigate the resulting risks.<sup>30</sup> Within countries and communities, climate change exacerbates existing inequalities: vulnerable groups, particularly ethnic minorities, women, children and the elderly, have historically been disproportionately displaced and otherwise harmed by extreme weather events.

Viewed in terms of historical responsibility, the U.S. is by far the largest single contributor to greenhouse gas emissions and our emission levels per capita are still rising. With only 5% of the world’s population, the US has produced one-quarter of its carbon emissions (Bruno, Karliner & Brotsky, 1999 p. 17; Knauer, 2007, p. 19.) According to one estimate, the average greenhouse gas emissions of a single U.S. citizen are equal to that of 125 Bangladeshi citizens (Bruno, Karliner & Brotsky 1999, p. 19).

With this in mind, let’s briefly refocus on Bangladesh, where vulnerability to the multiple risks posed by climate change make plans to develop one of the world’s largest open pit coal mines, while discounting its carbon emissions, appear ironic at best.

### Bangladesh: People in Peril

Bangladesh is one of the most vulnerable nations in the world to the harshest impacts of global warming.<sup>31</sup> It is also the single most vulnerable country in the world to tropical cyclones.<sup>32</sup> The threat to food sources posed by climate change, Oxfam states, may also be greater in Bangladesh than any other country worldwide.<sup>33</sup>

With low-lying lands, flood plains and coastline areas comprising 80 percent of the nation, Bangladesh already suffers annual floods that have inundated as much as two-thirds of the country in the worst years. If sea levels rise by one meter, a level that many scientists think possible by the end of this century,<sup>34</sup> more than one-fifth

of the entire nation may be permanently under water (Stern 2007, p.129). With millions of people in Bangladesh living less than one meter above sea level (Meyers 2001: p. 611), the loss of large coastal areas is predicted to affect one-quarter of all Bangladeshis by mid-century or even sooner (Stern, pp. 156 -7). Interviewed last year, the nation's Foreign Minister described the projected impacts of climate change in Bangladesh as 'devastating and 'unbearable', and called upon economically rich nations to open their borders and plan for the relocation of Bangladesh's climate change migrants.<sup>35</sup>

### Policy Implications: The Way Forward

Our look at Bangladesh and the Phulbari project raises a far broader set of issues. How has our growing understanding of the gravity and enormity of the consequences of global warming, affected development practices and financing? The short answer is, not nearly enough and not quickly enough. As previously noted, the Asian Development Bank remains open to the possibility of financing the Phulbari project. Moreover, despite two decades of scientific research alerting us to the perils of global warming, the Bank did not formally commit to shift its financing toward low carbon renewable energy until 2006. Despite this formal pledge, it has made inadequate and uneven reductions in its financing of greenhouse gas emissions since that time.<sup>36</sup>

Displacement occurring as a result of climate change has profound implications for those involved in development policy-making, planning, and financing. Given the cumulative impacts of greenhouse gas emissions generated by projects carried out in the name of development, the challenges inherent in fully accounting for and being accountable to people displaced by carbon intensive projects like Phulbari may be insurmountable. Yet, we know that a project should not move forward when its impacts are so complex that we cannot fully account for all the people it displaces, making it impossible to fulfill obligations to resettle them and thereby violating their human rights.<sup>37</sup>

To proceed without provisions for resettlement also violates the core tenets of resettlement policies at public institutions that finance development, including the Asian Development Bank and the World Bank,<sup>38</sup> as well as private sector companies that have incorporated social and environmental standards such as the Equator Principles.<sup>39</sup> Given the environmental impacts of climate change, development without regard for climate change impacts also violates the Rio Principles, adopted by the UN Conference on Environment and Development nearly two decades ago, which require that the right to development be fulfilled in an equitable way that meets the 'developmental and environmental needs of present and future generations'.<sup>40</sup>

At minimum, we need public and private sector banks and corporations that finance development to adopt safeguard policies that require them to undertake careful assessments of greenhouse gas emissions and any other global warming impacts prior to project approval, institute clear and binding limits restricting their financing of greenhouse gas emitting projects, and redirect more of their financing to promote clean renewable energy, energy efficiency, and protection of the world's forests.<sup>41</sup>

### Conclusion

To conclude, in the current context of global warming, the stakes of failing to closely and carefully attend to the relationship between unsustainable approaches to development, displacement, and human suffering have

never been greater. Recognizing this reality, those of us working on the issues of development and displacement have a critical role to play in ensuring that actual displacement impacts are fully considered and accounted for. We must also ensure that policymakers, lenders, and their clients understand that it is imperative to make fundamental changes in the ways in which development goals are pursued. Without such changes, it is now clear that we risk consigning millions of people worldwide to devastating losses and displacement on a scale never before seen.

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<sup>1</sup> In addition to advocating for international policies that respect and protect people's rights and livelihoods, IAP (<http://www.accountabilityproject.org/index.php>) works in solidarity with communities that are fighting to defend their homes and environments, through carefully selected advocacy campaigns that also serve to challenge unjust development practices and premises.

<sup>2</sup> Tropical forests store roughly one-quarter of the world's terrestrial carbon and are disappearing at an alarming rate of 5 percent per decade. Deforestation and other changes in land use account for roughly 20 percent of all annual global GHG emissions, more than all transport or industrial sector emissions. In Indonesia, home to the world's second largest forest reserves, oil palm plantations and pulp and paper industries are major drivers of deforestation. The resulting release of CO<sub>2</sub> has made Indonesia the third largest GHG emitter in the world. See Friedman (2009); Purvis & Meyers (2008: p. 2); (Rosenthal, 2009); & 'Are we on the brink of saving rainforests', viewed 4 May 2010, <http://news.mongabay.com/2009/0722-redd.html>. On forest destruction financed by the Asian Development Bank, see Lang (2008).

<sup>3</sup> Reduced access to water is due to 'dewatering', or the lowering of the water table, which would be undertaken to prevent water from entering the mine's pits.

<sup>4</sup> Among those excluded in the draft RP's estimates are households that may be displaced by changes in transportation infrastructure and associated facilities, including a terminal for exporting coal extracted from Phulbari's deposits, 800 households in 11 villages bisected by the project who will be impacted by mining disturbances, and nearly 1,500 (1,487) households classified as 'affected by loss of land but non-displaced'.

<sup>5</sup> See Cernea (2000 & 2009); Cernea & Mohan (eds. 2008); Downing (2002a & 2002b); Scudder 2009); & Robinson (2003). The lack of land-for-land compensation also violates the United Nations' Basic Principles and Guidelines on Development-based Evictions and Displacement (Kothari 2007, p. 13), which stipulate that 'Where land has been taken, the evicted should be compensated with land commensurate in quality, size and value, or better'.

<sup>6</sup> Approximately half of Bangladesh's population of 155 million people currently lives in poverty (WFP) and nearly one-third live in extreme poverty (GOB & UNDP Bangladesh: p. 21). Nearly one quarter (23.9 percent) of Bangladesh's population is severely food insecure (consuming less than 1 805 kcals/person/day). Although the country has made important gains, reducing the number of people living in hardcore from 28.0 million in 1990 to 19.3 million in 2007, demographic changes in upcoming years are likely to have adverse effects on poverty and hunger (GHF 2009, p. 18 and World Food Programme or WFP, no date). The Bangladesh Bureau of Statistics employs both the direct calorie intake (DCI) and cost of basic needs (CBN) approaches in measuring poverty, both of which are detailed in the WFP document cited here.

<sup>7</sup> WFP (no date) 'Food security at a glance: Bangladesh poverty map 2005,' viewed 21 August, 2010, <http://foodsecurityatlas.org/bgd/country/food-security-at-a-glance>. Bangladesh has one of the highest rates of child malnutrition in the world and nearly half the country's children are underweight (GOPRB & UNDP Bangladesh, 2005, p. 21).

<sup>8</sup> Moody (2008, pp. 76-68 & 85-92) notes that it is 'extremely costly to adequately prevent and mitigate acid mine drainage in a mine of this size' and adds that GCM has failed to provide a viable plan for preventing such contamination.

<sup>9</sup> Moody (2008: pp. 57, 66 & 67) remarks that GHG emissions produced during construction, extraction, transport, and burning of coal from the project are minimized as 'not significant' in the project's Environmental and Social Impact Assessment (ESIA), despite the fact that the mine is expected to produce up to 16 million tons of coal per year and have a lifespan of at least 36 years. According to Moody, the ESIA 'barely considered' GHG emissions and explicitly excludes potential impacts associated with use of the product coal, as well as those associated with transporting it to overseas markets.

<sup>10</sup> Kalafut (2008: p. 15) & 'Fourth Fulbari {sic} Day being observed', posted & viewed 26 August, 2010, <http://www.bdnews24.com/details.php?id=171743&cid=2>.

<sup>11</sup> The project sponsor, Global Coal Management (GCM) Resources, is based in the UK and was formerly known as Asia Energy Corporation (AEC). It subsequently changed its name to Global Coal Management after the August 2006 killings in Phulbari, and to GCM Resources Plc in December 2007. Major shareholders are the British hedge fund RAB Capital, UBS, the US-based mutual funds manager Fidelity Group, Barclays (UK), Credit Suisse (Switzerland), LR Global, Ospraie Management, Capital Group and Argos Greater Europe Fund. See 'A foreign direct investment ("FDI") in Bangladesh: Stock swindling and murder', *Analytical Monthly Review*, posted 15 November 2006, viewed 14 August, 2010', <http://mrzine.monthlyreview.org/2006/amr151006.html>; Kalafut (2008, p. 15); & Moody (2008, p. 61).

<sup>12</sup> Following four days of negotiations, the Government of Bangladesh yielded to striker's demands and signed a 'Memorandum of Understanding' on August 30 2006, which stipulated that the government would stop all AEC operations in Bangladesh. The agreement also calls for compensation to the families of those killed, the trial of those responsible for the killings, and the withdrawal of all cases against the protesters. Despite this agreement, AEC/GMC remains determined to move the project forward, and has since resumed negotiations with a new administration elected into office in 2008. See 'A foreign direct investment ("FDI") in

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Bangladesh: Stock swindling and murder'; Kalafut (2008); Rahman (2006); & project documents related to IAP's Phulbari Coal Mine Initiative at <http://www.accountabilityproject.org/article.php?list=type&type=43>.

<sup>13</sup> Mathiason (2008); 'ADB pulls loan to UK mine project in Phulbari', posted 6 April 2008, viewed 6 September, 2010, <http://64.150.182.63/details.php?id=99654&cid=4>; & 'Protracted struggle forces ADB to pull out of Phulbari', posted 8 April 2008, viewed 6 September, 2010, <http://southasia.oneworld.net/Article/protracted-struggle-forces-ADB-to-pull-out-of-phulbari>. ADB financing was comprised of a US\$100 million loan and US\$200 million political risk guarantee.

<sup>14</sup> Also see Mathur (2008). Cernea (1998, p. 44) makes note of earlier studies on displacement in India by Fernandes and his colleagues which found that 'as many as 75 percent of the 20 million people displaced by development programmes over roughly four decades have been only physically relocated but have NOT been "rehabilitated" in a socio-economic sense'. Such findings raise a concern about the terminology of 'development-induced displacement and resettlement' or DIDR. Although I have used this term recently (Hoshour & Kalafut 2010), I have avoided it in this paper and will continue to do so because it falsely implies that displacement and resettlement are intrinsically coupled. Yet, as figures cited here show, this has not historically been the case and it is often not the case today. Routine inclusion of the term "resettlement" when speaking about development-forced displacement obscures the fact that many of those displaced are never resettled. For this reason, I think it useful for researchers and human rights advocates to de-couple these terms, hold the term resettlement in reserve, and apply it only in those exceptional instances in which we are able to fully account for all those displaced, and obligations to adequately resettle them are actually fulfilled. With this goal in mind, Clark (2009: pp. 196 & 196) recommends instituting policies requiring that resettlement and rehabilitation of project-affected people be completed *prior to* project implementation.

<sup>15</sup> As Scudder (1996) has noted, people impoverished or otherwise adversely impacted by a particular development intervention are typically far more numerous than those undergoing immediate relocation. This point is well-illustrated by Kedia's (2009) analysis of the health consequences of dams for communities living in proximity to dam sites, as well as those displaced by these projects.

<sup>16</sup> Until recently, the most widely cited figure on development-forced displacement worldwide was based on a World Bank study (1994/96) which determined that roughly 10 million people each year were displaced by dams, roads and highways, and urban development projects during the last two decades of the 20<sup>th</sup> century. However, as Cernea (1996, p. 18 & 2008, p. 20) points out, this figure understates the actual magnitude of displacement because it is limited to three public economic sectors. When all private sector projects and other economic sectors such as mining, thermal power plants, forests, and reserve parks are included, estimates of development-forced displacement rise to 15 million people annually. All told, experts estimate that over a quarter of a billion people have been uprooted by development-forced displacement in the past twenty years alone. See Cernea (1999, p. 34) and the United Nations Refugee Agency (2006)

<sup>17</sup> While there are methodological difficulties inherent in conclusively establishing causality in catastrophic events with multiple causes, it is nonetheless important that we recognize instances in which development may be a contributing factor and explicitly recognize this area of uncertainty in our estimates of development-forced displacement. To offer one recent example, China's deadliest landslide in six decades killed at least 1, 471 people, with nearly 300 still missing as of early September this year, and displaced thousands of survivors in Northwest China's Zhouqu province. Attempts to frame this as a 'natural disaster' have been challenged by geologists and environmentalists, who describe it as a 'disaster in the making', and note that repeated warnings of severe consequences resulting from efforts to develop the region without sufficient attention to environmental impacts or land management were ignored. Specific factors they cite include the rapid construction of 41 dams in the tiny province during a four-year period, large-scale deforestation, and extensive road and rail construction. See Drew (2010); Oster & McMahon (2010); Zhicheng (2010); & 'China landslide raises fear of dam bursting', *Reuters*, viewed 18 August, 2010, <http://www.guardian.co.uk/world/2010/aug/10/china-landslide-dam-burst#history-link-box>; 'Death toll from NW China mudslide rises to 1,471, 294 still missing', *People's Daily* posted 2 September 2010, viewed 9 September, 2010, <http://www.bernama.com/bernama/v5/bm/newsworld.php?id=525879>; & 'Dozens killed in landslides in China's Gangsu province', *BBC News*, posted 8/8/2010, viewed 18 August, 2010, <http://www.bbc.co.uk/news/world-asia-pacific-10905399>. Scientists are closely examining potential seismic risks posed by the reservoirs created by large dams. See Jauhari (1999, p. 18); La Franriere (2009); McCully (2001: pp. 112-115) & *International Rivers*, 'Sichuan earthquake damages, dams, may be dam-induced', viewed 18 August, 2010, <http://www.internationalrivers.org/en/node/2806>.

<sup>18</sup> Conclusion reached by the Intergovernmental Panel on Climate Change, as summarized in 'Intergovernmental Panel on Climate Change Receives Results of Independent Review of its Processes and Procedures', IPCC, posted 30 August, 2010, viewed 9 September, 2010, [http://www.ipcc.ch/press\\_information/press\\_information.htm#11](http://www.ipcc.ch/press_information/press_information.htm#11). Also see United Nations Development Program (2007).

<sup>19</sup> When a big dam is built, the reservoir it creates submerges vegetation and soils that contain carbon. As organic matter rots underwater, it creates and releases GHGs including carbon dioxide, methane and, in some cases, nitrous oxide. McCully (2006) suggests that large dams in the tropics 'can actually emit more greenhouse gases per kilowatt-hour than fossil fuels, including dirty coal'. Also see McDonald, & Hanley (2009); Revkin & Krauss (2009) & Switkes (2009).

<sup>20</sup> Cited by Brown (2007, p. 2); GHF (2009, 11) & Warner & Laczko (2008, p. 235). The International Organization for Migration (2007: pp. 1 & 2) offers a useful working definition of environmental migrants, defined as 'persons or groups of persons who, for compelling reasons of sudden or progressive changes in the environment that adversely affect their lives or living conditions, are obliged to leave their habitual homes, or choose to do so, either temporarily or permanently, and who move either within their country or abroad'. There is considerable controversy regarding use of the terms environmental or climate 'migrant' versus 'refugee'. Brown (2007, Box 1, pp. 7 & 8) provides a useful overview, including the consequences for obligations under international law. Also see Biermann & Boas (2009), Warner et al (2008, p. 2) and 'Forum on climate refugees', *The Global Governance Project*, viewed 9 September, 2010, <http://www.glogov.org/?pageid=80>.

<sup>21</sup> At the high end, Christian Aid (2007: 1 & 5), a UK-based development organization, estimates that climate change effects will displace one billion people by 2050.

<sup>22</sup> This estimate comes from Norman Meyer of Oxford University. Citing a March 14, 2007 interview with Myers, Christian Aid (note 10, p. 48) reports that he 'now believes the true figure will be closer to 250 million'.

<sup>23</sup> This estimate is also cited by a number of leading bodies, organizations, and researchers, including: the International Organization for Migration; the Intergovernmental Panel on Climate Change, Care International (cited by Warner et al, 2008, p. 13); Brown (2008); & Stern (2007, pp. 91 & 92).

<sup>24</sup> A recent CARE report (Warner et al, 2008, p. iv) concludes that climate change impacts 'are already causing migration and displacement' and will displace tens of million of people within the next few years. By the middle of this century, the report predicts, 'the prospects for the scope and scale could vastly exceed anything that has occurred before'.

<sup>25</sup> The United Nations Office for the Coordination of Humanitarian Affairs states that "it is now established that climate change is increasing the intensity and frequency of extreme weather events". See: <http://ochaonline.un.org/News/InFocus/InternallyDisplacedPeopleIDPs/DisplacedbyNaturalDisasters/tabid/5134/language/en-US/Default.aspx>

<sup>26</sup> This study entitled 'Monitoring disaster displacement in the context of climate change', was jointly conducted by the Norwegian Refugee Council and the United Nations Office for the Coordination of Humanitarian Affairs (OCHA). Key findings are summarized in: 'Natural disasters displacing millions: U.N. study', viewed 26 August, 2010, <http://uk.reuters.com/article/idUKTRE58L4AX20090922> and 'Aid agencies seek action on forced displacement due to climate change', posted 6 September, 2009, viewed 26 August, 2010, <http://www.afriquejet.com/news/afrique-news/aid-agencies-seek-action-on-forced-displacement-due-to-climate-change-2009060929311.html>

<sup>27</sup> While there are methodological difficulties inherent in determining when migration is driven by environmental factors, estimates do point to the magnitude of the problem and the fact that it is on the rise. In the 1960s, an estimated 28 million people were affected by extreme environmental events. By the 1980s, that number had risen to 64 million (IOM, 1992, cited by Warner & Laczko, 2008: p. 240). Over two decades ago, Jacobson (1988) suggested that 'environmental refugees had become the single largest category of displaced persons in the world', and estimated that their numbers may have risen to 10 million in the late 1980s. More recent estimates suggest that the number may now be as high as 25 million (cited by Warner & Laczko, 2008: 239)

<sup>28</sup> IPCC (2007: p. 20), Oxfam (2009), Parry, Canziani, & Palutikof (2007, pp. 75 & 76) & the World Bank (2008: p. 3). Without action, a recent Oxfam (Renton, 2009) study cautions, 'most of the gains that the world's poorest countries have made in development and ameliorating the harmful effects of poverty in the past 50 years will be lost, irrecoverable in the foreseeable future'.

<sup>29</sup> Climate change is also expected to affect the health of untold millions of people through increases in diarrhea, malnutrition, and related disorders that imperil child growth and development. Increases in cardio-respiratory diseases are predicted due to higher concentrations of ground level ozone. Hundreds of millions of people could be newly exposed to deadly insect-borne diseases such as malaria and dengue fever as temperatures rise and insects are able to thrive in new places (Carballo, Smith, & Pettersson, 2008, pp. 32 & 33; The IPCC (2007) & the UNDP (2007/2008, p. 14).

<sup>30</sup> The World Bank (2008, pp. xi, 2 & 80) notes that it is the world's economically poorest countries and communities that will suffer the earliest and the most due to geographical location, low incomes, limited institutional capacity, and greater reliance on climate-sensitive sectors such as agriculture.

<sup>31</sup> Adamo (2008); Bierman & Boas (2008); Cruz, et al (2007, pp. 469-506); Global Humanitarian Forum (2009, pp.17); Myers (2002, p. 611); Pender (2008); & Warner et al (2008).

<sup>32</sup> Global Humanitarian Forum (2009, p. 17). The report also states that one-fifth of the country is flooded annually. From 1980 to 2000, 60 percent of all deaths worldwide from cyclones reportedly occurred in Bangladesh (Doyle, 2009).

<sup>33</sup> Renton (2009, p. 6). Development in Bangladesh is already severely hampered by floods, cyclones and droughts. According to one estimate (GHF, p. 17) the country has suffered more than 70 major disasters during the past ten years. In 2007 alone, floods killed over 400 people, affected over 9 million, and destroyed 1.22 million acres of cropland. Cyclone Sidr, which struck the coast of Bangladesh at 150 mph on November 15, 2007, killed over 3,360 people, and left millions homeless (UNICEF, p.6).

<sup>34</sup> Projections of sea level rise by the end of the century vary. The IPCC's 2007 report estimates a likely rise of between 28 and 43 cm (17 in) by the end of the century (cited by Kinver (2008b)). However, other researchers regard this as overly conservative, predicting rises as high as 163 cm (64 in) this century. Differing estimates are summarized in: Kinver (2008b); Rincon (2006); & "Rising seas 'to beat predictions,'" *BBC World News America*, posted 17 December, 2007, viewed 22 August, 2008, <http://news.bbc.co.uk/2/hi/science/nature/7148137.stm>).

<sup>35</sup> Cited in 'Bangladesh fears rising seas "devastating",' in *Planet Ark*, posted 30 April, 2009, viewed 8 August, 2010.

<sup>36</sup> Greenhouse Gas Implications of ADB's Energy Sector Operations (July 2010), Independent Evaluation ADB, Learning Curves, viewed 8 September, 2010, [www.adb.org/Documents/Evaluation/Learning.../EKB/LC-ghg-emission.pdf](http://www.adb.org/Documents/Evaluation/Learning.../EKB/LC-ghg-emission.pdf).

<sup>37</sup> For example, Article 11 of the 1966 International Covenant on Economic, Social and Cultural Rights (ICESR) recognizes the right to 'an adequate standard of living {...} including adequate food, clothing, and housing, and to the continuous improvement of living conditions', while Article 12 of the 1966 International Covenant of Civil and Political Rights (ICCPR) states that 'Everyone lawfully in the territory of the State shall, within that territory, have the right to liberty of movement and freedom to choose his residence'. Cited in Barutciski (2006: pp. 75 & 76). Other legal and normative frameworks relevant to forced displacement, including the 1998 Guiding Principles on Internal Displacement and the 1948 Universal Declaration of Human Rights, are summarized in Zetter (2008: pp. 62 & 63).

<sup>38</sup> The World Bank's Operational Policy on Involuntary Resettlement (2001) requires planned resettlement, compensation, and rehabilitation when displacement cannot be avoided. Oxfam International (2008) offers a useful discussion of how climate change undermines human rights.

<sup>39</sup> The Equator Principles (EP) is a set of standards adopted by private sector financial institutions, which is based on the Performance Standards of the International Finance Corporation (IFC) of the World Bank.

<sup>40</sup> The World Commission on Dams (2000: p. 391).

<sup>41</sup> With the aim of reducing emissions to ensure that the average increase in global temperature does not exceed 2 degrees Celsius above pre-industrial levels. In the public sector, IFIs can lead the way in phasing out support for fossil fuels according to a set timetable, financing non-carbon based energy technologies, and providing countries like Brazil and Indonesia with financial incentives to preserve their forests.

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