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Development assistance and climate finance

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Abstract: The distinction between development assistance and climate finance is driven by an optic of compensation largely derived from the ‘polluter pays’ principle. For practical as well as conceptual reasons, this principle provides a weak basis for climate finance. The distinction also cuts against the need to holistically consider developmental, adaptation, and mitigation policies and naturally focuses on government-to-government flows despite the manifest need to catalyse non-official sources of finance. Beyond the ‘polluter pays’ principle, ample justifications, such as the conceptions of justice set forth by Sen, for an international architecture that addresses integrated climate and development challenges.

Keywords: climate change, development assistance, climate finance

JEL classification: O10, O19, Q56

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1 Introduction

A great deal of effort has been expended in generating a distinction between development assistance and climate finance. Recent Conference of the Parties (COP) decisions speak of nothing less than the ‘provision of scaled-up, new, additional, adequate, and predictable financial resources’ to address the adaptation and mitigation needs of developing countries (UNFCCC 2011). The idea that climate finance should be ‘new and additional’ to existing development finance has also been emphasized repeatedly in academic and advocacy literature (for some examples see, Ayers and Huq 2009; Oxfam 2009). The point is echoed by major development organizations. For example, the World Bank (2010b) *World Development Report* on Climate Change cites figures for financing needs for developing countries in about 2030 and then adds that ‘... this is additional funding beyond baseline development finance needs’ (World Bank 2010b: 278).

The roots of this distinction lie in the perceived fundamental motivation for the financial flow. Currently, development assistance can be reasonably viewed as an investment in the well-being of poor people and poor countries derived, at least in part, from an ethical responsibility to assist on the part of wealthier nations. Within the current assistance paradigm, the donor retains substantial control, particularly in terms of the sums involved but also in terms of their application. In contrast, with respect to climate finance, adaptation flows are frequently characterized as reparations or compensation for costs imposed by historical emissions (for relatively recent discussions see Farber 2008; Burkett 2009). As discussed in Paavola and Adger (2006), these views express themselves in international agreements as a ‘duty to provide assistance’ (Paavola and Adger 2006: 599). Mitigation payments, in turn, can be viewed as revenue sharing from a use fee on a global commons (Pearce 1991). In short, the flows associated with climate finance are frequently conceived of as payments owed (as opposed to given) that are distinct from, and logically additional to, traditional aid flows.

This article seeks to contribute to this discussion on the nature of development and climate finance. It is structured as follows. Section 2 summarizes very briefly the ethical motivations for climate finance and briefly compares current debates to those that took place at the beginnings of the development assistance era. Section 3 considers the ‘polluter pays’ principle, which appears to be the dominant principle underlying current conceptions of climate finance. I argue that this conception does not provide a firm basis for payments as a form of reparation/compensation. Section 4 discusses a series of implications. A final section concludes that anchoring the design of the international architecture in modern conceptions of justice as set forth by Sen (2009), who takes motivation from Rawls (1971), is more likely to advance shared objectives of rapid economic and human development in the context of a stabilizing climate.

2 Ethical and practical motivations

Manifold ethical issues underlie climate change policies. These include but are not limited to:

- Environmental damage: Unmitigated climate change is highly likely to inflict irreversible environmental damage. For example, choices made today may condemn all future generations to live on a substantially less biologically diverse planet due to mass extinctions (Rockström et al. 2009).
- Extreme outcomes: The likelihood of highly undesirable or even catastrophic outcomes for human societies is not known but certainly cannot be ruled out and is plausibly disturbingly high (Weitzman 2011).

- Equity: Equity issues arise along two axes. The first is distributional in that lower income people and societies are widely viewed as more vulnerable to the effects of climate change (IPCC 2014a). Very strong or catastrophic outcomes are much more likely in lower income than higher income contexts. The second axis, directly discernible from the first two bullets, is inter-generational. The costs imposed by climate change, broadly construed, will unfold over long periods of time (on human scales) and are likely to be higher, at least in absolute terms, on future generations than on current generations, particularly in the absence of effective mitigation policies (Stern 2007).

Based on these observations, it is exceedingly difficult, in ethical terms, to simultaneously accept climate science and reject any actions to confront the problem. And, mitigation policies, which are under human control, have the potential to substantially ameliorate the problem, at least relative to a situation characterized by no or very weak mitigation policies (IPCC 2014b). As pointed out by UNU-WIDER (2014) amongst many others, developing countries are absolutely crucial to any effective global mitigation programme. As a result, solid ethical and practical foundations exist for some system of transfers from wealthier nations to poorer nations in the twenty-first century.

Before proceeding, it merits highlighting an interesting parallel between current debates on climate finance and debates with respect to the foundations of development assistance at the dawn of the foreign assistance era. Ruttan (1987) provides a useful review of those:

An argument frequently put forth during the ‘New Economic Order’ dialogue of the 1970s was that there should be compensation by the rich countries to poor countries for past injustices stemming from political domination and economic exploitation. (Ruttan 1987: 10)

This is similar to discussions with respect to climate change adaptation at least to the extent that a formalized system of payments is proposed to compensate for past behaviours. However, Ruttan dismisses the idea of compensation as impractical, largely as a consequence of extreme difficulties in determining the amounts that might be owed. Instead, he argues that Rawlsian contractarian theory provides a basis for development assistance, provided that the assistance given is effective in achieving its goals.

3 Climate finance and the ‘polluter pays’ principle

The attractiveness of the ‘polluter pays’ principle as a basis for financial flows from historically more developed to historically less developed countries as a consequence of climate change is undeniable. As noted, responsibility for the current stock of greenhouse gases (GHGs) in the atmosphere is skewed towards the traditional developed world (see IPCC 2014b: figure TS.2). This is particularly true if one considers emissions per capita. Even though poor people and poor regions have contributed least to the stock of GHGs in the atmosphere, they are widely regarded as most vulnerable to the negative effects of climate change (IPCC 2014a). These observations, combined with the ‘polluter pays’ principle, largely underpin the distinctions between development assistance and climate finance discussed in Section 1.

Intrinsic to the ‘polluter pays’ principle is a reasonably accurate estimate of the liability of the polluter. There have been numerous attempts to estimate the costs imposed by climate change and/or the incremental expenses required to achieve a given emissions target (IPCC 2014a; IPCC 2014b). To determine costs with respect to impacts and adaptations, the following thought experiment is generally conducted. One begins with an assessment of one or more economic and social futures with climate change impacts included. These futures are then compared to a without-

climate change scenario that serves as the counterfactual. The with-climate change scenarios are, at least conceptually, well defined as the best available estimate of the likely future climate given human knowledge of the climate system; however, there is no standard definition of the without-climate change counterfactual. It is often roughly the climate prevailing in the latter half of the twentieth century (see, for example, Chapter 7 of IPCC 2014a; World Bank 2010a; and World Bank 2010b).

Once impacts are established relative to the counterfactual, mechanisms (adaptations) for countering these impacts can be sought. Yet, these mechanisms are themselves costly, and it is frequently found to be impossible for the direct adaptation considered to offset the full costs of climate change. The costing exercise then focuses on the costs of these adaptation measures and the remaining welfare loss, relative to the no-climate change counterfactual and after economically rational adaptation measures are undertaken. The technical challenges in conducting these assessments are *immense*. The wide ranges of estimates of net impacts are indicative of the technical hurdles faced (Arndt and Bach 2011).

For many purposes, this type of thought experiment is valuable. Comparing a no climate change baseline scenario with likely scenarios for future climates is very useful for planning purposes. It highlights the likely divergences from recent historical experience that climate change might impose. For example, in a recent analysis, Chinowsky and Arndt (2012) find that the strong expectation of increased flood frequency or intensity should lead to a reconsideration of appropriate design standards for road infrastructure in many regions. The hypothetical without-climate change scenario is necessary for highlighting these departures from business as usual.

But, is this kind of thought experiment correct when considering the developed country liability under the polluter pays principle? A legitimate concern lies in the without-climate change baseline or counterfactual. The fundamental contention of climate science is that the late twentieth century climate will not persist into the twenty-first century due to a combination of past and future emissions. Hence, the thought experiment considered above employs a counterfactual that is a purely hypothetical construct. It does not correspond with the current best understanding of how the world works in physical terms. In particular, the purely hypothetical construct will only happen if the conclusions from climate science are wrong.

For the purposes of assessing liability, this characteristic, present in all the adaptation costing exercises of which the author is aware, would appear to be problematic. The compensation numbers derived from this thought experiment amount to calculating the difference between plausible futures given our knowledge of the climate system and some stable climate baseline that directly contradicts this knowledge. The compensation thus derived amounts to a difference between the possible and the impossible. As it seems difficult to assess liability on the basis of failure to achieve the impossible, an alternative thought experiment would seem to be required. In particular, a baseline that lies within the set of conceivably possible outcomes would be desirable. Hence, even if the vast uncertainties and technical difficulties associated with the adaptation costing analyses undertaken to date could be resolved, the thought experiment itself is flawed as an approach for estimating developed country liability for climate change.

If developed countries are to be held responsible for cumulative emissions from the dawn of the industrial era (or some later historical point in time), then the thought experiment might compare the world of today, including plausible future projections, with a world in which steps had been taken from the dawn of the industrial era (or the point in time deemed appropriate) to limit concentrations of GHGs in the atmosphere and hence keep climate change to manageable levels.

Unfortunately, this baseline or counterfactual world is extraordinarily difficult to construct rigorously. One can speculate. At an extreme, one could imagine that pre-industrial life extended to the present day. Alternatively, one could consider an industrialization path that sought to limit emissions at some point along the way. In the former case, the substantial material, health, education and other benefits associated with industrialization would be forsaken. As Deaton (2013) shows in his book *The Great Escape: Health, Wealth, and the Origins of Inequality*, these gains are certainly not equally shared. However, very substantial and broad-based welfare gains have been experienced by an unprecedented share of the world's population. In sum, forsaking industrialization would have avoided climate change but at enormous human welfare cost in both developed and developing countries.

The latter case is more complex. Looking forward in time, there is broad-based agreement that future efforts to limit emissions will come at an economic growth and material welfare cost (IPCC 2014b). By extension, a counterfactual scenario wherein countries applied policies at some point in the past to limit emissions growth should also entail some economic growth and material welfare cost. The incidence of this cost is even more difficult to determine than its size; nevertheless, linkages across the global economy imply that any growth penalty could plausibly be spread broadly across richer and poorer countries (as opposed to concentrating only in richer countries) even if the limitations only applied to wealthier countries. In sum, while the magnitude and incidence of costs of counterfactual historical mitigation policies in terms of growth and welfare are almost surely impossible to estimate with any precision, the best available economic logic suggests that positive costs would exist and might not be uniquely concentrated in developed countries.

The economic implications of higher concentrations of GHGs on economic performance and welfare to date are also relevant. Tol (2013) is the only study in this domain of which this author is aware. He analyses the implications of GHGs on growth and welfare through the twentieth century and then forecasts into the twenty-first century using a standard integrated assessment model (IAM). While emphasizing wide ranges of uncertainty, his base findings indicate that both developed and developing countries experienced a non-trivial welfare boost throughout the twentieth and continuing into the twenty-first century as a consequence of the accumulation of GHGs in the atmosphere. Tol's counterfactual appears to be a purely hypothetical world where GHG emissions have no effects on climate. The observed welfare boost is largely attributable to the positive implications of carbon fertilization for crop growth. The boost is more pronounced in developing than developed countries mainly as a consequence of the higher share of agriculture in GDP in developing countries. According to Tol (2013), the implications of accumulation of GHGs remain net positive at a global level relative to the hypothetical counterfactual for lower income countries until about 2050 and for high income countries until about 2080.¹

In sum, huge, likely insurmountable, technical difficulties confront any rigorous assessment of current developed country liability under the 'polluter pays' principle. Based on an appropriate counterfactual and using consistent economic assumptions and models to look backwards in time, developing countries are plausibly better off today as a consequence of emissions to date. Venturing further into the compilation of past and future costs associated with application of a

¹ It is important to highlight that this analysis by Tol provides no grounds for delaying or ignoring mitigation policies. The marginal impacts of additional GHGs for GDP are currently negative in lower income countries and about zero in high income countries. After 2050, the slope of the benefits curve is profoundly negative pointing to large negative impacts in the latter half of the twenty-first century and beyond. In addition, the net positive outcomes are global outcome for the world at a point in time and for developing countries as a group. These aggregate outcomes do not imply that no countries are suffering net negative impacts.

'polluter pays' type approach is certainly possible. For example, as hinted above, one could argue that developed countries should only be considered responsible for emissions after some date by which the science of climate change was sufficiently advanced to merit a policy response. However, the difficulties associated in calculating these losses (or potentially gains) would appear to be only slightly less daunting than the ones faced by the advocates of payments to correct historical injustices at the initiation of the era of development assistance. Overall, the application of the 'polluter pays' principle to climate finance is a disconcertingly murky enterprise that is highly unlikely to yield solid conclusions. As such, similar to the reparations arguments put forth at the beginning of the era of development assistance, it provides a weak basis for climate finance.

4 Implications

Removing the perspective of the 'polluter pays' principle does nothing to alter the fundamental challenge of achieving rapid economic and social development in the context of a stabilizing climate. It alters neither the accentuated vulnerability of poor countries and poor people to climate change impacts nor their historically low levels of emissions. Developing country needs for stable and predictable finance in order to confront these challenges also remain.

Correspondingly, and as already noted, ample well-founded justifications for international efforts to combat climate change, both adaptation and mitigation, exist. To begin, self-interest motivations amongst wealthier countries, which were also invoked to justify foreign assistance four or five decades ago, are perhaps more relevant in the climate change context, particularly with respect to mitigation. Because developing country participation is absolutely crucial to any successful global mitigation effort, developed country interests in avoiding runaway climate change are inextricably tied to actions in developing countries.

In addition, climate change clearly further weakens the Rawlsian focus on justice within nation states (see Sen 2009 for other concerns). Nevertheless, the Rawlsian construct of evaluating institutional arrangements behind a 'veil of ignorance', traditionally applied within nation states, aptly applies to the climate challenge. If one were designing international institutional arrangements without knowing in which country in the world one would end up, it is highly likely that one would prefer some international system designed to cope with climate change (alongside other challenges). Furthermore, one would be likely to design an international system that took special account of particularly vulnerable populations, such as those living in small island states whose very existence is threatened by sea level rise.

These ideas alone provide solid rationales for provision of finance, technology, skills, and ideas to developing countries in order to confront climate change (alongside other challenges). The critiques, revisions, and enhancements to the Rawlsian constructs of justice set forth by Sen (2009) provide further guideposts for the future of the international institutional architecture. In the current context, Sen's emphasis on continual improvement of institutional systems as opposed to a one-off leap to a system judged to be best by some ex ante reasoning is particularly pertinent.

Within this framework, the logic of differential responsibilities between developed and developing countries, based on variations in capabilities, remains intact. And, rationales for expanding the scope of international transfers in response to the climate challenge also exist. For example, Vietnam is now classified as a middle income country, meaning that it is graduating from concessional assistance, which is targeted at low income countries. However, Vietnam, with its long coastline and large river deltas may be at particular risk to the combination of sea level rise and large cyclone strike (CIEM 2012). Trans-boundary water resource issues are also salient. Similar arguments exist with respect to finance of mitigation activities in middle income countries.

More generally, there are, at a minimum, public roles for technology and knowledge dissemination and for the development of statistical systems to credibly monitor and report emission levels (UNU-WIDER 2014). Eventually, these systems will have to incorporate the complex tasks of monitoring emissions from non-fuel sources such as agriculture and land use. In short, there are very plausible justifications for some concessionary assistance (not necessarily grant) both for adaptation and mitigation extending to middle income countries.

Moving away from the ‘polluter pays’ principle has at least two other important advantages. First, it eliminates the perceived conundrum, highlighted by Arndt and Bach (2011) and Ayers and Huq (2009), between the logic of tackling development, adaptation, and mitigation objectives jointly and the logic of financing development, adaptation, and mitigation objectives separately. Hence, moving away from the ‘polluter pays’ provides further impetus to question the ongoing proliferation of new distribution mechanisms focused on climate finance with attendant high risks that the system will become burdensome, duplicative, and uncoordinated (Pew Center on Global Climate Change 2010).²

As noted by Arndt and Bach (2011), the proliferation of funding mechanisms reflects, at least in part, a lack of consensus on governing structures and distribution mechanisms. Developed countries have preferred using existing structures and most notably the World Bank/GEF structure. Consistent with the notion of compensation, many developing countries have preferred creating new structures with a more balanced representation and more direct distribution mechanisms.

However, a ‘polluter pays’ optic generating a principle of compensation is not necessary to catalyse reform. The foundations to international financial flows suggested above most certainly do not imply continued reliance on the same institutions that have dominated development finance for the past 50 years. Rather, the ethos of improvement highlighted by Sen (2009) demands a rethink in the context of new challenges. As such, dropping the ‘polluter pays’ principle as a guidepost in the design of the system inter-governmental financial flows could help to shift the focus from spawning new funds and disbursement mechanisms to a more holistic attempt to design an architecture for managing financial flows between wealthier and poorer nations that is better suited for the twenty-first century.

Second, shifting the focus away from the ‘polluter pays’ principle has the welcome side benefit of naturally broadening perspectives beyond public financial flows. As noted by Vandeweerd et al. (2012) and UNU-WIDER (2014), private flows must form a significant part of future climate finance with an increasing use of innovative finance mechanisms that can leverage public flows. While perhaps not impossible in theory, it is difficult to see how a system focused on compensation could be designed in such a way as to simultaneously help catalyse the necessary private sector financial flows.

² The most prominent examples are the Global Environment Facility (GEF) Trust Fund, the Least Developed Countries Fund, the Special Climate Change Fund, the Kyoto Protocol Adaptation Fund, the Clean Technology Fund and the Strategic Climate Fund. Apart from these distribution mechanisms, there are close to 20 additional bilateral and multilateral funds and distribution mechanisms for funding related to climate change and the international climate agreements (Climate Funds Update 2014). For more details, see <http://www.climatefundsupdate.org/>.

5 Summary and conclusions

Debates concerning the size and nature of climate finance appear to have been substantially driven by an optic of compensation largely derived from the ‘polluter pays’ principle. The complexities of assessing the implications of climate change relative to a standard business as usual (without climate change) counterfactual derived from late twentieth century climate are widely recognized. Less well recognized are the additional complexities of properly calculating liability under the ‘polluter pays’ principle.³ These additional complexities arise from the need to consider a thought experiment with a counterfactual world in which emissions reductions had been imposed historically. This counterfactual is both wildly difficult to construct and plausibly leads to a negative liability on the part of developed countries to date and potentially extending for decades into the future. On their own, these complexities and potentials for perverse outcomes make the ‘polluter pays’ principle an unworkable and undesirable basis for international efforts to combat climate change.

The compensation optic of the ‘polluter pays’ principle has at least two other undesirable characteristics. First, climate finance as compensation owed generates a need to account for climate finance separately from other financial flows. This separate financing requirement cuts directly against the by now well-recognized need to holistically consider developmental, adaptation, and mitigation policies. In addition, the separate financing ideal provides impetus (alongside the generalized desire amongst developing countries for revised international institutional arrangements) for the proliferation of new funding vehicles and mechanisms focused on climate finance. The complexities arising from this proliferation are essentially universally deplored. Second, even if enacted, government-to-government compensation schemes sit at least somewhat uncomfortably with the manifest need to catalyse private finance to achieve linked developmental, adaptation, and mitigation.⁴

Fortunately, ample justifications for an international architecture that addresses integrated climate and development challenges exist. The climate challenge does provide considerable further support for extending the Rawlsian conception of institutional design under a ‘veil of ignorance’ into the international arena. The emphasis on continually improved systems, based on assessments of actual progress towards shared goals, set forth by Sen (2009) is also very well suited to the design of international systems of resource transfers from wealthier to poorer nations. While these exhortations are extremely general and leave a great deal to be worked out, they do lead us away from a long set of discussions that have, as yet, borne little fruit and appear unlikely to do so in future.

References

- Arndt, Channing, and Christian Friis Bach (2011). ‘Foreign Assistance in a Climate-Constrained World’. WIDER Working Paper 2011/66. Helsinki: UNU-WIDER.
- Ayers, Jessica M., and Saleemul Huq (2009). ‘Supporting Adaptation to Climate Change: What Role for Official Development Assistance?’, *Development Policy Review, Special Issue: Development Futures in a Changing Climate*, 27(6): 675–92.

³ In fact, these have been ignored entirely to the knowledge of this author.

⁴ A third undesirable characteristic of the compensation principle is that it is negative and backward looking rather than aspirational and forward looking as would seem to be required.

- Burkett, Maxine (2009). 'Climate Reparations', *Melbourne Journal of International Law*, 10.
- CIEM (2012). *Implications of Climate Change for Economic Growth and Development in Vietnam to 2050*. Central Institute for Economic Management, Ministry of Planning and Investment. Hanoi, Vietnam. http://www.wider.unu.edu/publications/miscellaneous/en_GB/report-2012-ducc/
- Chinowsky, P., and C. Arndt (2012). 'Climate Change and Roads: A Dynamic Stressor-Response Model.' *Review of Development Economics*, 16(3): 448–462.
- Climate Funds Update (2014). Available at: <http://www.climatefundsupdate.org/> (accessed May 2014).
- Deaton, Angus (2013). *The Great Escape: Health, Wealth, and the Origins of Inequality*. Princeton University Press.
- Farber, Daniel A. (2008). The Case for Climate Compensation: Justice for Climate Change Victims in a Complex World, *Utah Law Review*. Available at: <http://scholarship.law.berkeley.edu/facpubs/434>.
- IPCC (2014a). *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. C.B. Field, V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds). Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
- IPCC (2014b). *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. O. Edenhofer, R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds). Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
- Oxfam (2009). 'Poor Countries Won't be Fooled by Old Cash to Get Rich Countries' Climate Debt Paid'. Oxfam International Climate Change Media Brief.
- Paavola, Jouni, and W. Neil Adger (2006). 'Fair Adaptation to Climate Change'. *Ecological Economics*, 56: 594–609.
- Pearce, D. (1991). 'The Role of Carbon Taxes in Adjusting to Global Warming'. *The Economic Journal*, 101(407): 938–48.
- Pew Center on Global Climate Change (2010). 'Strengthening International Climate Finance. Post-2012 Climate Policy'. Available at: <http://www.pewclimate.org/docUploads/strengthening-international-climate-finance.pdf>.
- Rawls, John (1971). *A Theory of Justice*. Cambridge, MA: Harvard University Press.
- Rockström, J., W. Steffen, K. Noone, Å. Persson, F.S. Chapin, E.F. Lambin, T.M. Lenton, M. Scheffer, C. Folke, and H.J. Schellnhuber (2009). 'A Safe Operating Space for Humanity'. *Nature*, 461(7263): 472-475.
- Ruttan, Vernon (1987). 'Why Foreign Economic Assistance?' Bulletin 87-2. Minneapolis, MN; Economic Development Center, University of Minnesota.
- Sen, Amartya (2009). *The Idea of Justice*. Cambridge, MA: Harvard University Press.
- Stern, Nicholas (2007). *The Economics of Climate Change*, The Stern Review. Cambridge: Cambridge University Press.

- Tol, Richard S. J. (2013). 'The Economic Impact of Climate Change in the 20th and 21st Centuries'. *Climatic Change*, 117:795–808 DOI 10.1007/s10584-012-0613-3.
- UNFCCC (2011). 'The Cancun Agreements: Outcome of the Work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention'. Decision /CP.1. Available at: <http://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf#page=2>
- UNU-WIDER (2014). 'Aid, Environment and Climate Change'. ReCom Position Paper. Available at: http://www.wider.unu.edu/publications/position-papers/en_GB/recom-position-papers/
- Vandeweerd, V., Y. Glemarec, and S. Billett (2012). 'Readiness for Climate Finance: A Framework for Understanding what it Means to be Ready to Use Climate Finance'. New York: United Nations Development Programme.
- Weitzman, M.L. (2011). 'Fat-tailed Uncertainty in the Economics of Catastrophic Climate Change.' *Review of Environmental Economics and Policy*, 5(2): 275-92.
- World Bank (2010a). 'Economics of Adaptation to Climate Change: Synthesis Report'. Washington, DC: World Bank.
- World Bank (2010b). World Development Report 2010: Development and Climate Change. Washington, DC: World Bank.