



UNITED NATIONS
UNIVERSITY

UNU-WIDER

World Institute for Development
Economics Research

Working Paper No. 2011/66

Foreign Assistance in a Climate- Constrained World

Channing Arndt¹ and Christian Friis Bach²

November 2011

Abstract

The emergence of climate finance has the potential to catalyze positive changes in the institutional architecture and distribution mechanisms for financial flows to lower income countries. The nature of the challenge of development in the context of climate change argues for recipient country leadership in the implementation of co-ordinated development, adaptation, and mitigation strategies based on predictable and long-term financial flows. Transparent and effective information systems in recipient countries should be a key prerequisite to the initiation and continuation of these flows. While some positive steps have been taken, there remains a very long way to go addressing the interlinked development, adaptation, and mitigation challenges of the twenty-first century.

Keywords: climate change, development assistance, mitigation, adaptation

JEL classification: O10, O19, Q56

Copyright © UNU-WIDER 2011

¹ University of Copenhagen, email: Channingarndt@gmail.com; ² University of Copenhagen, Faculty of Life Science, email: christian@friisbach.dk.

This working paper has been prepared within the UNU-WIDER project ‘Foreign Aid: Research and Communication (ReCom)’, directed by Tony Addison and Finn Tarp. UNU-WIDER gratefully acknowledges specific programme contributions from the governments of Denmark (Ministry of Foreign Affairs, Danida) and Sweden (Swedish International Development Cooperation Agency—Sida) for the Research and Communication (ReCom) programme. UNU-WIDER also acknowledges core financial support to UNU-WIDER’s work programme from the governments of Finland (Ministry for Foreign Affairs), the United Kingdom (Department for International Development), and the governments of Denmark and Sweden.

ISSN 1798-7237

ISBN 978-92-9230-433-1

The World Institute for Development Economics Research (WIDER) was established by the United Nations University (UNU) as its first research and training centre and started work in Helsinki, Finland in 1985. The Institute undertakes applied research and policy analysis on structural changes affecting the developing and transitional economies, provides a forum for the advocacy of policies leading to robust, equitable and environmentally sustainable growth, and promotes capacity strengthening and training in the field of economic and social policy making. Work is carried out by staff researchers and visiting scholars in Helsinki and through networks of collaborating scholars and institutions around the world.

www.wider.unu.edu

publications@wider.unu.edu

UNU World Institute for Development Economics Research (UNU-WIDER)
Katajanokanlaituri 6 B, 00160 Helsinki, Finland

Typescript prepared by Janis Vehmaan-Kreula at UNU-WIDER

The views expressed in this publication are those of the author(s). Publication does not imply endorsement by the Institute or the United Nations University, nor by the programme/project sponsors, of any of the views expressed.

Acknowledgements

Thanks to Tony Addison, Peter Heller, James Thurlow, Richard Manning, Valpy FitzGerald and to participants at the UNU-WIDER conference entitled 'Foreign Aid: Research and Communication' held in Helsinki, 30 September-1 October 2011. All errors and omissions are the responsibility of the authors.

1 Framing the context: climate change

Without effective mitigation policies, considerably more warming is expected by the end of the twenty-first century than was thought less than a decade ago. For example, Sokolov et al. (2009) predict, in the absence of mitigation policy, a median level of rise in the global average surface temperature of about five degrees centigrade over the course of the twenty-first century. Without mitigation policy, the probability of relatively mild rises in temperature has declined significantly while the probability of extreme warming has increased dramatically. The chances of less than two degrees of warming are practically nil. On the other hand, the chances of warming of greater than seven degrees centigrade are slightly less than one in ten (Sokolov et al. 2009). Even with much more aggressive mitigation policy than is likely to materialize within the next few years, restraining the global average temperature rise over the course of the twenty-first century to less than 1.5 degrees relative to pre-industrial levels is unlikely (Ranger et al. 2010).

While it may be too late for realistic mitigation policy scenarios to strictly confine overall warming to relatively low levels (two degrees centigrade or less), mitigation policy remains highly effective at truncating the right hand tail of the distribution of outcomes. For example, Sokolov et al. (2009) find that the probability of a temperature rise on the order of seven degrees centigrade is eliminated if atmospheric concentrations of CO₂ equivalents are maintained under 550 ppm.¹ As argued by Weitzman (2011), this is highly desirable as the implications of very high levels of warming are deeply uncertain and may turn out to be profoundly negative.

In sum, the best understanding of the climate system and downstream socio-economic implications of higher global average temperatures imply a strong need for policies to reduce emissions of greenhouse gases to sustainable levels (mitigation) and policies to cope with the levels of warming that are already built into the system (adaptation). These needs imply significant new challenges for international governance.

This paper focuses on the role of foreign assistance in the context of the climate change challenge. Climate change is in the process of transforming the environment of the planet over the course of the twenty-first century. With respect to foreign assistance, climate change is also potentially transformative. This is true for a number of reasons but may be divined simply from the financial magnitudes that are involved. As such, section 2 presents a discussion of the rough magnitudes of the estimates of financing needs for attaining the millennium development goals (MDGs) and the costs to developing countries of mitigation policies and climate change impacts. Notwithstanding the considerable deficiencies in all of these estimates, it is clear that the numbers associated with climate change are likely to be large-- on the order of current flows of official development assistance (ODA) and potentially much more. Next, in section 3, we look at the fundamental issues surrounding climate change and foreign assistance. Section 4 considers synergies between climate finance and development finance. Section 5 looks at differences between these two types of financial flows. Section 6 provides a brief summary of points from the earlier sections that are particularly relevant to the design of the financial flow architecture. Finally, Section 7 first considers recent developments in the aid architecture focused on climate

¹ Of course, the temperature distributions generated by Sokolov et al. (2009) are themselves uncertain.

change and then looks forward. Section 8 concludes that climate change will impact not only the need for foreign assistance in the decades to come but also the mechanisms for foreign assistance delivery. Whether this impact is positive or negative remains to be seen.

2 Projections of development and climate finance

Historically, the total level of development aid has, to a large extent, been determined by national priorities in donor countries and has only vaguely been guided by the somewhat arbitrary UN goal of reaching 0.7 per cent of GDP in development assistance. Donor country governments have typically set annual targets for their international aid commitment without prior negotiations. Over the past 40 years, these commitments have not always been rooted in an assessment of needs. This approach to development aid is slowly but steadily being replaced by an approach that builds more visibly on a global assessment of needs and rounds of negotiations and pledges to fulfil those needs. This is especially visible in the area of climate finance.

2.1 Projections for development assistance

Within the traditional focus of foreign assistance for poverty reduction, the tendency towards foreign assistance based on needs assessments and negotiations has been driven by the Millennium Development Goals (MDGs). In 2001, the Zedillo report estimated a need for an additional US\$50 billion to reach the MDGs and recommended a reaffirmation of the 0.7 per cent target (Zedillo et al. 2001). While it is unclear how the Zedillo report reached this estimate and whether it has any robust basis, the report did link a set of development objectives with an overall level of finance. From this beginning, the UN Millennium Project in 2005 gathered together around 250 experts from all over the world and estimated that, to reach the MDGs, global assistance should roughly double from US\$69 billion in 2003 to US\$135 billion in 2006, rising thereafter to US\$195 billion by 2015 (UN Millennium Project 2005).²

At the Gleneagles G8 and Millennium +5 summits in 2005, donors in response made specific commitments to increase their aid. When quantified by the OECD Secretariat, the pledges implied lifting aid from around US\$80 billion in 2004 to nearly US\$130 billion in 2010, at constant 2004 prices, representing 0.36 per cent of estimated GNI in 2010. The overall expected ODA level for 2010 is estimated at US\$108 billion expressed in 2004 dollars, which is an increase of US\$28 billion over the 2004 baseline, with the ODA/GNI ratio rising over the same period from 0.26 per cent to an estimated 0.32 per cent. Against the 2005 commitments the shortfall is US\$18 billion (in 2004 dollars), but most donors will actually reach their commitments (OECD/DAC 2010).

Despite this somewhat varied progress, the MDGs have catalyzed an increase in commitments and obligations for international foreign assistance. Moreover, the goals have facilitated increased coordination and alignment between donor and recipient countries within the framework of the Paris and Accra declarations. Projections are still for increased donor flows, although reaching the estimated need of US\$195 billion by 2015 seems to be overly ambitious.

² This corresponds to 0.44 per cent of OECD countries' GNI in 2006 and 0.54 per cent in 2015 (compared with 0.23 in 2002 and 0.25 per cent in 2003).

Recognizing this and in an attempt to raise the needed revenue to reach the MDGs, a number of new and innovative funding sources have been proposed and considered ranging from global environmental taxes, a currency transaction tax, new Special Drawing Rights, the International Finance Facility, a global lottery and a global premium bond. These proposals could have the potential of raising the needed revenue and some could even have positive side effects (double dividends), but as of yet, none of them have gathered the necessary political support. Moreover, the double dividend argument should not be oversold, there would also be additional cost burdens and there is a risk that new sources will simply crowd-out existing aid flows (Atkinson 2005).

2.2 Projections for climate finance

Within climate finance, the trend towards building projections of future assistance on assessments of needs is even more evident. The principle that funding should be based on assessments of needs was stipulated in the Climate Convention which states that there shall be ‘adequacy and predictability in the flow of funds’ (article 4.3.) and that the amount of funding shall be determined in a ‘predictable and identifiable manner’ (United Nations 1992, article 11.d.). The financing needs for climate mitigation and adaptation in developing countries are, without doubt, difficult to assess. Nevertheless, a number of studies have produced estimates, which are summarized in Table 1.

Table 1: Annual financing needs for mitigation and adaptation in developing countries

Estimates	US\$ bn
Mitigation costs*	
UNFCCC	100–105
McKinsey and Company	175
Pacific Northwest National Laboratory	139
Adaptation costs	
UNFCCC	28–67
Project Catalyst	15–37
World Bank (Economics of Adaptation to Climate Change)	75–100

* The incremental annual costs of a low-carbon project over its lifetime.

Note: The UNFCCC estimates assume a 25 per cent reduction in global GHG emission from 2000 levels. All other studies estimate financial needs based on stabilizing atmospheric concentrations at 450 ppm by 2020.

Source: Pew Center on Global Climate Change (2010).

Estimates of total annual mitigation and adaptation costs range between US\$150-300 billion. Overall, these numbers are comparable, or even larger than, estimated financial needs to meet the Millennium Development Goals.

3 Some basic issues

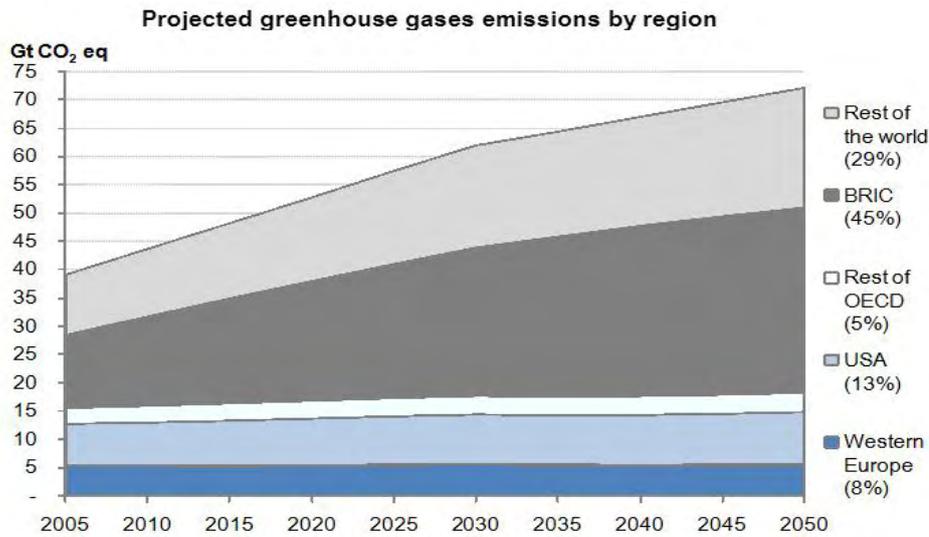
Before proceeding, it is helpful to consider some basic issues. Mitigation and adaptation differ in at least one important respect. By and large, individual countries have incentives to adapt to climate change. As such, individual countries can be expected to work to determine where their vulnerabilities lie and what they should do about these vulnerabilities. Coordination across countries is, in many respects, not required. There are important exceptions. For example, water use is frequently a trans-boundary issue. Co-operative adaptation strategies with respect to trans-boundary rivers are almost certain to yield outcomes preferable to an uncoordinated series of decisions by individual countries or, worse, rivalry. In addition, regional co-operation in areas such as agricultural research may also be highly desirable (these issues will be treated in more detail in subsequent sections). Nevertheless, adaptation incentives and country incentives are in large measure aligned.

The implication for climate related financial flows from developed to developing countries (perhaps called foreign assistance and perhaps not) is that, *assuming reasonable governance in the recipient country*, financial transfers buttressed by technical assistance have a good chance of contributing positively to adaptation. The very substantial overlaps between good adaptation policy and good development policy detailed in the next section further underline this point.

On the other hand, individual countries have little or no incentive to mitigate in the absence of co-operation across countries. Indeed, the optimal path for any individual country, if available, would be to have all other countries adopt strict mitigation policies while not pursuing significant mitigation policies itself. In this way, an individual country can ‘free ride’ on the mitigation policies of other countries. If ‘free ridership’ were a small problem, it could be ignored. Unfortunately, it is not.

Partly due to the free rider problem and partly to other factors, there is, at the moment, utter disarray in mitigation policy. The most prominent example of this disarray is that the world’s largest emitter, the United States, has taken few, if any, steps towards reducing its emissions of greenhouse gases and there appears to be little chance of any substantive progress until after the 2012 electoral cycle. Developing nations also play a part in the mitigation disarray. As Figure 1 illustrates, developing nations currently account for about half of all emissions of greenhouse gases (measured in CO₂ equivalents) and are projected to account for essentially all of the growth in emissions over the coming century. Basic math dictates that developing countries as a group must play a key role in any effective global mitigation strategy. While some developing countries, notably China, appear to be aware of the basic math, courageous proposals from either developed or developing countries are conspicuously lacking. At the moment, the Conference of the Parties (COP) negotiations focus on elements of climate change that, taken together, do not come close to addressing the global mitigation challenge.

Figure 1: Projected greenhouse gas emissions by region



Source: OECD green growth strategy.

Transformation to a ‘green’ global economy is a serious challenge. Fortunately, the essential outline of efficient mitigation policy is known. A reasonably uniform price on greenhouse gases is widely viewed as a *sine qua non* of effective mitigation policy, and broad global coverage, including developing countries, is essential (Frankel 2009; Pearce 1991). Accompanying policies, such as research and development in ‘green’ technologies, product standards that reduce energy use and facilitation of the broad based diffusion of new technologies once developed, are highly desirable complements to a price on greenhouse gases but not a substitute.³

From this outline of mitigation policy, at least three implications for financial transfers designed to facilitate mitigation in developing countries can be derived. First, transfers should be designed in such a way that they lead towards a uniform global price on CO₂ and CO₂ equivalents. Currently, the Green Climate Fund does not envision a requirement to price greenhouse gas emissions in order to access the funding; however, this requirement, or something similar, is likely to appear when (if) developed countries begin to seriously implement carbon pricing policies. Second, in the interim period, when pricing on greenhouse gases in developing countries is lacking, finance for mitigation is likely to encounter potentially serious incentive incompatibilities. For example, recipient countries are likely to tout investments with large carbon contents as very low cost options in order to maximize ‘carbon savings’ and subsequent claims on the Fund. Dealing with this incentive incompatibility is a high priority for Fund governance in the (hopefully short) period prior to introduction of actual pricing of emissions.

Finally, it is hard to see how any system that seeks to limit emissions of greenhouse gases can function properly without actual monitoring of emissions. In principle, fossil fuel use is relatively simple to monitor as fuels come from (or pass through) a few easily distinguishable points. The other principal sources of emissions, agriculture and

³ Krugman (2010) provides an accessible overview to the economics of mitigation.

deforestation, pose greater, though certainly not insurmountable, challenges.⁴ This auditing task would appear to be indispensable, and it clearly sits within the domain of a specialized, independent, and technically competent institution.

4 Synergies between climate finance and development finance

The best adaptation to climate change is rapid development that leads to a more flexible and resilient society. Countries that reach the middle of the twenty-first century with large shares of their populations engaged in subsistence agriculture, substantial illiteracy, and lethargic institutions, may face grim prospects indeed. This is especially true if the global community fails to develop a fair and effective mitigation policy. As such, the adaptation agenda, in significant measure, reinforces the existing development agenda. In particular, the vast uncertainties associated with climate change underscore the importance of two already prominent items on the development agenda. The first of these is human capital accumulation. A more educated populace is more likely to be able to adapt to the challenges posed by climate change, whatever they turn out to be. The second issue is flexible and competent public and private institutions. Within any given country, a particular sector or a particular set of regions may be negatively affected, while other sectors or regions may be stimulated. A more educated populace, supported by flexible and competent public and private institutions, will be better able to react to these differential implications as they present themselves.

At the same time, while the bulk of good adaptation policy involves advancing and expanding the existing development agenda, there are some specific sectors that emerge as particularly important in the response to climate change. These include agriculture and forestry, water management, land use planning, and sustainable energy. These important sectors are considered individually below. An important message that emerges is that, even in these particularly sensitive sectors, the adaptation agenda and the development agenda tend to dovetail nicely.

4.1 Agriculture and forestry

By 2050, global food production must approximately double to meet demands from both an increased population and higher calorie intake due to economic growth, urbanization and changing diets (Foresight 2011). Thus, agriculture must adapt to the challenges posed by climate change while maintaining reasonably rapid average annual rates of productivity advance. At the same time, agriculture may be negatively affected both by long-term trends in mean temperature, precipitation and winds, and by increasing climate variability, associated with greater frequency and severity of extreme events such as droughts and floods. Debate persists on the extent of impacts on agriculture but estimates tend strongly to be negative (Foresight 2011) and are sometimes quite large (Lobell et al. 2008).

Agriculture is also one of the largest contributors to climate change being responsible for an estimated 10-12 per cent of total greenhouse gas emissions, or as much as 30 per cent when considering land-use change (including deforestation) driven by agricultural expansion for food, fibre, and fuel (Smith et al. 2007). Future needs for increased

⁴ Measurement and verification are equally salient for the preservation and/or expansion of greenhouse gas sinks as envisioned under payments for environmental services.

agricultural production could increase emissions significantly. On the positive side, world-wide agricultural production offers considerable mitigation possibilities, not least through carbon sequestration, with an estimated mitigation potential almost equal to its total direct annual emissions (Padgham 2009). To realize this potential and promote climate-smart development, farmers and foresters must change current production practices significantly.

There are also important indirect linkages between food security and climate change. The price of food is increasingly driven by global energy prices, notably through biofuels but also through channels such as fertilizers, transport, machinery, pesticides, herbicides, storage. Biofuel production (especially bioethanol and biodiesel) is taking up more land and has become an important driver of higher food prices (Abbott et al. 2011; Evans 2009). Here, it is critical that policies promoting the production of biofuels should not undermine long-term food security and the achievement of the MDGs.

The goals of climate change adaptation and mitigation come in addition to the existing goals of agricultural development, food security, biodiversity protection, and soil and water conservation. However, the practical modes of adaptation and mitigation are well known. They involve a combination of innovation (research, development, education), information (extension, markets, weather), more inputs (irrigation, seeds, fertilizer), infrastructure (roads, ports, markets), and institutions (farmers organizations, finance, insurance).

In agriculture, it makes no sense to pursue separate adaptation, mitigation and development policies. They overlap dramatically. Ideally, agricultural policies and foreign assistance will work together to simultaneously achieve these multiple goals. At the same time, while individual countries have considerable incentives to consider how climate change will affect agriculture and rural communities, they have, as discussed, few to no incentives to consider mitigation much less to trade some potential agricultural production for reduction in greenhouse gas emissions. Incentives for farmers to produce environmental services in agriculture are required. While some progress has been made in this direction in forestry (e.g., the REDD+ system), much remains to be done in agriculture,

4.2 Water management

As recent events in Pakistan, Australia, Japan, and the United States illustrate, water is a powerful force. Flooding events and coastal inundation due to cyclones given a head start as a consequence of sea level rise represent significant risk factors associated with climate change. At the same time lack of water caused by changes in precipitation and evaporation due to climate change can leave billions of people without adequate access to water for drinking, industry and irrigation.

For downstream countries, the implications of policy choices by upstream countries are potentially profound. As such, in terms of river flow, the reactions of upstream countries to the prospect of climate change could easily be more important to downstream countries than the implications of climate change themselves. It is well known that co-operative river basin management is vastly more efficient than non-co-operative behaviour or outright rivalry. Indeed, access to water is widely acknowledged as a potential flashpoint for regional conflict.

Climate change raises the already considerable stakes. Unfortunately, effective international river basin management has, to date, proven difficult to achieve. The onset of a shift in climate patterns may accentuate these difficulties, highlighting the need for the establishment of robust co-operative frameworks as soon as possible. The international community, including development assistance institutions, has an important role to play. For example, the Nile River Basin Initiative (NRBI) illustrates both the prospects and the difficulties. International co-operation has been helpful in establishing the principal of shared benefits as opposed to shared water. International expertise has also been helpful in establishing how alternative policies might actually function in practice. At the same time, the experience of NRBI dramatically illustrates the political sensitivities involved, including the potential for conflict between states.

4.3 Land use planning

Over the next forty years, the value of the capital stock that will be installed in developing countries is likely to be much greater than the value of capital currently installed. In addition, the value of the current capital stock will have significantly depreciated. Land use planning is thus a potentially powerful tool for dealing with rising probabilities of extreme events over the twenty-first century. The rule of thumb is simple: to the extent possible, install valuable new capital in safer locations and deal with the high level of uncertainty associated with climate change. This can be done by starting with ‘no regret’ investments, by favouring reversible and flexible options, building in ‘safety’ margins in new investments and promote long-term perspectives (Hallegatte 2009).

These conclusions are very similar to those arrived at by World Bank (2010) in their Economics of Adaptation to Climate Change study and by Arndt et al. (2011a) in a case study of Mozambique. Again, these are areas where development institutions can potentially play a valuable role. The need for deliberate and intelligent choices is highlighted with strong implications for institutional needs within developing countries. This emphasizes that appropriate planning, broadly defined and properly implemented, can be a highly cost effective approach to coping with climate change. Unfortunately, ‘soft’ measures, such as land use zoning, are often difficult to implement in developing country contexts. The policies often require technical skills to design and organization skills to implement. Climate change adaptation policies should be promoted in close coordination and synergy with existing initiatives furthered by development assistance.

4.4 Access to sustainable energy

Currently, around 1.5 billion people, one out of five global citizens, have no access to electricity, and 2.5 to 3 billion people, or two out of five, rely on biomass and transitional fuels, such as coal and kerosene for cooking and heating (AGECC 2010). The ‘energy-poor’ suffer the health consequences from indoor pollution, as well as the economic consequences of insufficient power for productive income-generating activities and for other basic services such as health and education (AEA/UNDP/UNIDO 2010). A World Bank study indicates that countries with underperforming energy systems may lose up to 1-2 per cent of growth potential annually (World Bank 2009).

Simultaneously, there is, as stated, an urgent need to curb greenhouse gas emissions and promote clean energy sources and increased energy efficiency. Ensuring access to clean, efficient, affordable and reliable energy services is not only a development challenge, it

is critical to future adaptation efforts and must go hand in hand with reaching global mitigation goals. Again, mitigation, adaptation, and development goals are clearly best pursued in synergy.

5 Key differences between climate finance and traditional development finance

Fundamentally, especially from an aid architecture standpoint, financial flows to developing countries for the purposes of climate mitigation and adaptation are uncomfortably categorized as ‘foreign aid’. Financial flows related to climate change are not pure charity. Adaptation payments are often characterized as reparations or compensation given that the developed world is largely responsible for imposing these costs in line with the ‘polluter pays’ principle. Mitigation payments can be viewed as revenue sharing from a tax on the global commons (Pearce 1991). This view is especially relevant if the recipient countries are engaged in mitigation policy.

Of course, distinguishing climate funds as a developed country liability and foreign aid as charity is not completely cut and dry for many reasons. We consider only two. First, while it is hard to argue that altruism does not underlie a portion of development assistance, it is also impossible to deny that development assistance has been provided for many reasons. These motivations include (but are not limited to) security concerns on the part of the donor, obtaining diplomatic leverage, and gaining a commercial foothold in growing markets. One could always just add financing for mitigation and adaptation to climate change to the already long list of motivations for the provision of assistance.

Second, even if the vast uncertainties and technical difficulties associated with estimating the expected costs of climate change could be resolved, the developed country liability for these costs would still be a matter of some debate. After all, human welfare is arguably as high as it has ever been and is, by many measures, advancing rapidly for a historically unprecedented number of people. The gains registered in many developing countries are clearly based, at least in some measure, on technical and institutional gains pioneered in developed countries. In sum, an argument exists that increased levels of greenhouse gases in the atmosphere, new information technologies (e.g., mobile phones), resource depletion, smallpox eradication, new seed varieties and all of the other gains and encumbrances of modern society come as a package. It is, in this view, inappropriate to ignore all gains, focus on the costs, tally up the total, and hand over a bill.

Despite the uncertainties and differences in viewpoints, the distinctions mentioned above provide powerful intellectual justifications to characterize financial flows to address climate change as distinct from development assistance. This is the genesis of the arguments that climate finance should be ‘new and additional’ to existing development finance that has been emphasized again and again in climate negotiations. The 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). This distinction between climate finance and development finance presents an apparent conundrum in light of the

powerful operational arguments for the operational mixing of financial flows at a country level advanced in Section 4.⁵

Climate assistance may also differ from traditional foreign assistance in terms of scope. If one accepts that climate assistance is, at least in considerable measure, not charity, then there exist strong arguments for continued international engagement in countries beyond the levels of development currently associated with a graduation from foreign aid. 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, in the eyes of many donors. 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. Trans-boundary water resource issues are also salient. With respect to mitigation, 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. Eventually, these systems will incorporate the complex tasks of monitoring emissions from non-fuel sources such as agriculture and land use. In short, there are very plausible claims for some concessionary assistance both for adaptation and mitigation even in middle income countries.

The prospect of large, long-term financial flows to a broad set of lower (but not necessarily low) income countries helps explain the enthusiasm of development institutions for climate finance. The World Bank is a useful case in point. The 2008 financial crisis, combined with the current debt crisis in Europe, appears to have established a firm twenty-first century *raison d'être* for the Bank's sister institution, the International Monetary Fund. Meanwhile, development assistance, at least as traditionally defined, is increasingly concentrated in countries that, for a variety of reasons, have failed to raise living standards (Collier 2007). Moreover, this group of countries is shrinking. In 2011, the World Bank classified 35 countries as low income, down from 63 in 2000. While raising living standards and future prospects for the 800 million inhabitants of these 35 low income countries as well as contributing to improvements in living standards for the larger number of poor people living in middle income economies is an amply challenging task, the role of the World Bank, as traditionally defined, would appear to be relatively more circumscribed in the twenty-first century compared with the second half of the twentieth. With climate change finance, it is possible (though not necessarily desirable) to envision a much broader and more active role for the World Bank, as well as other traditional development assistance institutions, in global affairs.

Finally, while the number of low income economies is decreasing, the number of countries providing official financial flows is increasing. China is perhaps the most prominent example, particularly with respect to activities in Africa. However, China is not the only newcomer. *The Economist* magazine reported that India is considering setting up its own aid agency even though India is the second largest recipient of concessional loans from the World Bank. Turkey already has a fairly large aid budget and is widely expected to play a prominent role in financing reconstruction in Libya. Overall, the increased economic and political weight of non-OECD countries is being reflected in the aid system on the donor side.

⁵ There are also distinctions between adaptation finance and mitigation finance with the broad category of climate finance.

6 A summary of the challenges

Before considering the financial architecture around climate change, it may be useful to consider the challenges facing such a system based on the contents of the previous sections.

1. A minimum of approximately two degrees centigrade of warming appears to be built into the climate system over the course of the next century. Adaptations to the implications of these temperature rises will be required.
2. Based on the existing science, implementation of mitigation policies would appear to be exceedingly wise. While even very ambitious mitigation policies may not succeed in keeping temperature rises to less than two degrees Celsius, they do appear to be highly successful in reducing the chances of extreme temperature rises. Eventually, some form of global mitigation policy appears to be likely. A uniform global price on carbon is, by far, the most efficient and effective mitigation option.
3. Nevertheless, mitigation policy is currently in deep disarray driven by (i) a failure to undertake mitigation policy in the United States and (ii) difficulties in coming to grips with the full scale of the mitigation challenge across the entire international community. The pivotal role that developing countries must play in any effective mitigation strategy is evident from Figure 1 and is particularly relevant to the issue of financial transfers.
4. In the absence of an effective global mitigation agreement, efforts to finance projects in developing countries that contribute to mitigation objectives are likely to encounter significant incentive compatibility problems. As outlined in section 4.4 on access to sustainable energy, there are considerable opportunities to simultaneously meet environmental and developmental objectives. However, overall, development almost invariably implies greater energy use. If the pricing system encourages use of least cost energy supplies and climate finance is out to support low carbon options, which are often higher cost, there will be attendant administrative challenges. At a minimum, the innovations associated with market based solutions are likely to be lost.
5. Incentive compatibility problems are much reduced with respect to adaptation. This is reinforced by the broad symmetry between adaptation objectives and development objectives discussed in Section 4.
6. Overall, there is a compelling case for jointly pursuing development, mitigation, and adaptation objectives. These objectives are, in reality, inseparable. Mitigation objectives are both much more easily achieved and much more likely to be integrated with overall development objectives in the presence of global CO₂ and CO₂ equivalent pricing; however, that system does not currently exist.
7. In contrast to the operational arguments for pursuing development, mitigation, and adaptation objectives jointly, there are credible reasons to differentiate between traditional aid flows, which are at least in part charity, and climate finance flows, which are at least in part, justified payments. Also, based on

similar foundations, justifications exist for climate finance flows to countries with higher per capita incomes than those targeted by traditional development assistance.

8. Finally, the arrival of climate finance is taking place within the context of a new development assistance environment. The number of low income countries is dwindling, the number of donors is increasing, and traditional development assistance is increasingly concentrated among a relatively small number of countries that have failed to grow and develop.

7 Foreign assistance in a climate-constrained world

7.1 The response to date

The challenges posed by climate change have catalyzed a large number of different new distribution mechanisms focused on climate finance.⁶ 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.⁷ 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 2011).

This situation is turning into the well-known international disease called ‘funditis’ with overlapping funding arrangements without clear governance and solid accountability structures. There is a high risk that the system will become burdensome, duplicative, and uncoordinated (Pew Center on Global Climate Change 2010). As indicated above, almost all existing international development institutions, not least the World Bank, are struggling to get a slice of the potentially large climate cake. In turn, each new arrangement quickly develops its own constituency making it difficult to change and simplify the system. This proliferation of new funds and funding mechanisms risks simultaneously running counter to the (compelling) arguments for joint pursuit of

⁶ See details, pledges etc. at <http://www.climatefundsupdate.org/>

⁷ *GEF Trust Fund - Climate Change focal area* (1991, operational 1994) channels funds for both mitigation and adaptation.

Least Developed Countries Fund (2001, operational 2002) supports national adaptation plans in the LDCs. It is administered by the GEF.

Special Climate Change Fund (2001, operational 2002) supports adaptation, mitigation and technology transfer. It is administered by the GEF.

The Kyoto Protocol Adaptation Fund (2001, operational 2009) supports adaptation projects and is financed primarily by a 2 per cent levy on projects of the Clean Development Mechanism (CDM).

Clean Technology Fund (2008) is a multi-donor trust fund supporting the rapid deployment of climate technology through the regional development banks and the World Bank (trustee).

Strategic Climate Fund (2008) is an umbrella vehicle for three multi-donor trust funds: The Pilot Program for Climate Resilience (PPCR), the Forest Investment Program (FIP) and the Scaling Up Renewable Energy in Low Income Countries Program (SREP). Implementation is via the regional development banks and the World Bank (trustee).

climate and development objectives and failing to distinguish between development charity and climate payments.

The situation reflects, at least in part, a lack of consensus on governing structures and distribution mechanisms. While developed countries have preferred using existing structures and most notably the World Bank/GEF structure, many developing countries have preferred creating new structures with a more balanced representation and more direct distribution mechanisms. These tensions are also evident in traditional development assistance. The world has seen a proliferation of new funds and partnerships in recent years with initiatives such as the Global Fund to Fight AIDS, Tuberculosis and Malaria,⁸ the Global Alliance for Vaccines and Immunization (GAVI)⁹ and the Education for All Fast Track Initiative.¹⁰ These Funds and initiatives seek to provide more direct access to finance developing country governments (as well as contain attempts to coordinate and align funding at a sector level). The general principle of direct access is in line with the Paris and Accra Declarations on aid efficiency. And, the creation of these funds is in line with the desire from developing countries for new structures mentioned above in the context of climate change finance; however, overall, they represent an increased fragmentation of development finance.

Attempts have been made to streamline international development finance through the creation of the United Nations Development Group and United Nations Development Assistance Framework though with limited success. In addition, the Spanish Government took an initiative in 2008 with the establishment of the MDG Achievement Fund although it has not become similarly rooted in an international agreement and structure.¹¹

Returning to climate finance, there are also ongoing attempts to deal with excessive fragmentation with some prospects for progress. Parties to the UNFCCC agreed at COP-16 in Cancun to establish a Green Climate Fund (GCF) to become the primary vehicle for delivering enhanced climate finance. The Fund will be accountable to the UNFCCC Conference of Parties, assisted by a permanent Standing Committee on Finance with respect to the mobilization, delivery and verification of long-term finance. The GCF will be governed by a Board of 24 members comprising an equal number of members from developing and developed countries. The World Bank will serve as the trustee (to be reviewed after three years), but the new Green Climate Fund will have its own secretariat.

The Green Climate Fund will be the primary vehicle for channelling resources to combating climate change. The developed countries have collectively committed to provide new and additional resources approaching US\$30 billion for the period 2010-12 and with a goal of mobilizing jointly US\$100 billion a year by 2020 to address the needs of developing countries (UNFCCC 2011). The report of the High Level Advisory Group on Climate Change Finance (2010) assesses the potential revenue sources in order to achieve the US\$100 billion target by 2020. Carbon taxes levied in developed

⁸ <http://www.theglobalfund.org/>

⁹ <http://www.gavialliance.org/>

¹⁰ <http://www.educationfasttrack.org/>

¹¹ <http://www.mdgfund.org/>

countries are highlighted as a chief source of finance to be channelled towards developing countries via the Green Climate Fund. Effectively, the Advisory Group also takes a first pass at revenue sharing. The Group indicates that, in 2020, 10 per cent of total revenues from carbon taxes in developed countries, or about US\$30 billion per year if the carbon tax is US\$20-25 per tonne, could be redirected towards developing countries. An additional US\$10 billion could be raised and channelled to LDCs if fuels used for international transportation were subjected to the same tax. Beyond the carbon taxes, the Group did not achieve broad agreement on the sources or composition of the remaining US\$60 billion though they mention that it would likely contain private flows, loans or grants from multilateral institutions, and perhaps some non-traditional revenue sources such as a financial transactions tax.

7.2 Looking forward

There remains a great deal to accomplish in development assistance, in mitigation and in adaptation. It is beyond the scope of this paper to set forth a detailed prescription for the international financial architecture necessary to undertake these tasks. Nonetheless, a few essential points that can act as guideposts can be propounded.

A useful place to start is with the aforementioned conundrum between the logic of tackling developmental, adaptation, and mitigation objectives jointly and the logic of financing developmental, adaptation, and mitigation objectives separately. In cases where adequate governance is in place, a key role for recipient country governments provides a solution.

Placing recipient governments at the operational centre is consistent with the intellectual foundations behind budget support and sector wide programmes. Proponents of implementing directly via national institutions with local legitimacy argue that the approach has the advantage of strengthening national ownership, allowing for stronger accountability and enhancing local participation. It also adds, they argue, to organizational viability and sustainability and can produce more efficient results. There is some evidence to support this view. An evaluation by the European Commission (2010a) of the use of budget support concluded that there are positive effects on harmonization and alignment, and on strengthening government ownership and accountability. It also had positive effects on the efficiency of public expenditure, and on government capacity, with no clear evidence of increased corruption. Moreover, budget support seems to have improved access to services and enabled the implementation of larger national programmes. A separate study found that countries that have received large amounts of general budget support performed better against selected MDG indicators than those who have received little or no budget support (Beynon and Dusu 2010).

It is difficult to distinguish cause and effect in such studies. As an example, academic debate persists as to whether aid stimulates economic growth (a fundamental objective) on average and over long periods of time. While scepticism characterized this literature up to about 2009 (see Rajan and Subramanian 2009), more recent contributions find that aid contributes to growth in a manner consistent with modern growth theory (Arndt et al. 2011b). Moreover, returning to budget support, there are genuine concerns that budget support, as currently designed/implemented, empowers the executive branch of government and the political party in power at the expense of the legislative branch (in

particular) and opposition political parties (Resnick 2011).¹² Nevertheless, the principle of placing legitimate representatives of the people of recipient countries in the chief coordinating role would appear to be a good one. (Cases where this legitimate representative is lacking or dubious are taken up in a later section.) If the scope of climate finance extends to higher income countries, then the arguments for direct access would tend to be reinforced.

Climate finance, including the Green Climate Fund, is similar to budget support in that the recipient country is able to access financial resources directly from a fund or can assign an implementing entity of its own choosing (Brown et al. 2010). This principle was first established within climate finance by the Adaptation Fund. As with budget support, it is expected that direct access can help ensure proper reliance on and harmonization with national systems, plans and priorities; can help increase the speed of delivery of desired outcomes; cut transaction costs by ‘domesticating’ core activities; and potentially achieve better targeting of local priorities (Adaptation Fund 2009). There have been a number of obstacles and difficulties in implementing the principle but the basic direction is clear.

This key role accorded to recipient governments comes along with a series of corollaries and caveats. We begin with the corollaries. The caveats centre on the treatment of states where governance concerns overshadow the benefits of direct access.

Mobilization and allocation procedures

Development, adaptation, and mitigation objectives are long term in nature. In order to address these issues efficiently and effectively, a stable funding base is required. Consequently, a critical challenge for climate finance, especially in the context of the Green Climate Fund, is that both the mobilization and distribution of funds will need to develop formal contribution and allocation processes to ensure a dependable and transparent criteria-based distribution of funds between countries (Bird et al. 2011). This is likely to lead to, if not automatic allocations, at least allocations of funds based on transparent principles and procedures. If this is done successfully, climate financing has the potential to pave the way for more predictable distribution mechanisms within development finance.

More transparent and predictable sources of finance also likely imply new distribution mechanisms. At least part of the funds from the Green Climate Fund will most likely be allocated directly to national institutions in developing countries rather than via traditional third party intermediaries and multilateral implementing agencies. The potential exists to substantially alter existing relationships between recipient countries and development partners. A relatively predictable and sizeable financing base directed to governments has the potential to create a market for implementation services. Even relatively high income countries lack the full array of technical expertise required to effectively tackle the complex challenges that face them. Indeed, this is the reason that

¹² These concerns are not necessarily immutable features of direct access funding. For example, rather than eclipse the legislature through the creation of numerous donor - government working groups, budget support could reinforce the oversight role of the legislative branch by placing the onus of evaluating budget support (and by extension the whole budget) on the legislature. Assuming the legislature had more than one party among its representatives, this would involve both the party in power and the opposition.

the World Bank and other development agencies bill themselves as knowledge-based institutions. Mechanisms that allow recipient governments to obtain these services from preferred providers might be a salutary step forward in both climate and development finance. Development assistance, including climate finance, would, in this view, increasingly shift from a supply- to a demand-driven modality with recipient countries being in charge.

Monitoring and evaluation

For any direct distribution mechanism to work there must, however, be clear national priorities and programmes, a strong focus on results and *the ability to credibly assess progress*. Within development finance, the Millennium Development Goals have become a mechanism to address and agree on national priorities in development finance and a broad range of countries have developed MDG Action Plans that have helped in bringing all actors together in joint strategies (UNDP 2010). The MDG reports and indicators issued nationally make it possible, in principle, to assess progress and focus on results. The European Commission has taken it a step further and has signed MDG-contracts with eight developing countries where a clear results-based framework is combined with increased budget support (European Commission 2011). The increased implementation of broad based social protection programmes in a range of countries, also in sub-Saharan Africa,¹³ are also examples of broad based programmes with clear goals and results (European Commission 2010b).

The same approaches apply to the delivery of climate finance. A national framework to work in this manner already exists in National Adaptation Programmes of Action, soon to be complemented by Nationally Appropriate Mitigation Actions (NAMAs) and national climate change strategies. The COP agreement on a new registry of developing country NAMAs provides an opportunity to match funding from the Green Climate Fund with developing countries' emission reduction needs and coordinate existing and new financing channels in a systematic way (Bird et al. 2011). Internationally there are new discussions to revise and expand the Millennium Development Goals beyond 2015 into a new set of Sustainable Development Goals including goals on access to energy, energy efficiency and renewable energy. This could provide a joint global set of priorities and indicators for sustainable development (Hedegaard and Bach 2011).

While the need to monitor and evaluate progress is broadly recognized, the full implications have yet to seep into operational practice as required both on the parts of donors and recipients. Despite substantial rhetoric and substantial allocations to budget support and sector wide programmes, national statistics programmes frequently function far below the levels required for adequate monitoring at a national level, particularly, but certainly not exclusively, in low income countries. Credible information on the quality of public financial management is also frequently lacking. In our experience, donors continue to direct the bulk of their attention to noisy policy debates while accepting disconcertingly shabby information systems.¹⁴ There are challenges in the

¹³ Examples are Bolsa Familia in Brazil, Progres-a-Oportunidades in Mexico, Plan Jefes y Jefas in Argentina, Child Support Grant and Old Age Pension in South Africa, Productive Safety Net Programme in Ethiopia, National Health Insurance Scheme in Ghana, and National Rural Employment Guarantee Act in India (European Commission 2010b).

¹⁴ The fact that there exists little systematic information on the quality of recipient countries' information systems simply underlines the point.

construction of information systems, and there will be debates into the implications of the information provided as seen even under well functioning systems in the developed world. Nevertheless, there is no excuse for the desultory state of affairs that characterize many countries' information systems, particularly those that receive budget support.

Given trends in both development assistance and climate assistance, the profile of national level information systems needs to rise to top priority status. In the upcoming assistance environment, countries that lack adequate information systems and/or are not on track in the development of adequate information cannot expect to get access to direct funding. This applies both to traditional performance indicators and to monitoring of greenhouse gas emissions.

With respect to monitoring GHG emissions, it has already been mentioned that this task lies within the province of a dedicated, independent institution. It would be possible to ask the same institution to set clear standards and evaluate recipient information systems overall. This corrects a clear failure in the current system where donors, who (i) are not disinterested parties, (ii) are under pressure to disburse funds and (iii) surprisingly frequently lack the expertise to adequately monitor the quality of information produced by government, currently undertake this role.

Provision of public goods

While the bulk of transfers in current development assistance and in climate finance will occur between countries, it is also important to support regional and global public goods. Prime examples include:

- information provision and analysis (not every country needs its own general circulation model),
- agricultural research,
- regional river basin co-operation,
- regional electric grids, and
- technology development and dissemination with respect to clean energy.

These activities bring potentially very high returns. While examples of initiatives in these areas exist (e.g., the Consultative Group for International Agricultural Research, the Nile River Basin Initiative, and the Southern Africa Power Pool), care must be taken to ensure that regional and global public goods are adequately financed. For example, the Energy and Environment Group of the United Nations Development Group administers very considerable funds aimed at adaptation and green development paths. However, the vast majority of funds are wired to country recipients. This restriction makes it more difficult to generate and disseminate ideas throughout the system even though this information is likely of exceedingly high value.

Governance issues

While country led programmes are desirable in many cases, they are not desirable in others. Cases like Zimbabwe and Burma (Myanmar) demand a different approach. There is little logic in providing additional resources to governments that cannot manage existing resources or fail to act in a manner consistent with the aspirations of their peoples. This is true even if the object of the international transfer is being faithfully implemented. For example, few would support direct access transfers to

Zimbabwe and Burma even if their governments passed and faithfully applied a greenhouse gas tax consistent with an agreed upon global price of carbon.

The above example notwithstanding, a genuine insistence on effective and transparent information systems would go a long way to achieving a categorization between states that merit direct transfers and those that do not. Zimbabwe and Burma, for example, would be unlikely to deliver transparent and accurate data on emissions and social and economic trends. They would thus select themselves out of a system of international transfers. Nevertheless, in order to deliver dependable finance, processes that yield responses to inherently controversial questions such as when is a government behaving in a manner that is counter to the interests of its citizens, its neighbours, and the global community will likely have to be developed.¹⁵

All of the above is not to argue for disengagement. It is to say that the form of engagement needs to be appropriate to individual country circumstances. In cases like the two mentioned above, direct support is out of the question. Beyond these extreme cases, there will then inevitably be a continuum where the exact mix of modalities, including direct access support, and interventions need to be determined on an *ad hoc* basis.

8 Conclusion: foreign assistance in a climate-constrained world

Projections show that climate finance has the potential to substantially increase total official assistance to developing countries over the next decade. Climate change will impact not only the need for foreign assistance in the decades to come but also the financial mechanisms, modalities, agreements, and distribution channels for foreign assistance. If done properly, there are good options for the emergence of climate finance to catalyze positive changes in the institutional architecture and distribution mechanisms for financial flows to less developed countries that build upon the most promising mechanisms within traditional development finance.

The adaptation agenda is largely consistent with the development agenda, and mitigation is too large and cross cutting to proceed in isolation. Consequently, it would be a fundamental mistake to see development, adaptation, and mitigation efforts as separate silos in national implementation. Rather they should be seen in synergy, and contribute to a joint strategy towards poverty reduction and climate action. These synergies notwithstanding, there are areas that merit greater attention in the light of climate change. These include access to sustainable energy, agriculture including payments for environmental services in agriculture and forestry, water management and land use planning.

While integrated plans and actions are called for at the level of implementation, it must be recognized that different motivations and justifications underlie provision of finance for development, adaptation, and mitigation. Simplistically, one could characterize traditional development assistance as charity, adaptation assistance as compensation for

¹⁵ A model could be considered where allocated financial assistance flows were set-aside and accumulated until improvements were seen in governance and policy performance. This could provide new (and stronger) incentives for reforms and good governance and much needed financial flows to stabilize progress whenever seen.

costs borne by developing countries due principally to historical pollution from developed countries, and mitigation flows as payments for participation in a global mitigation scheme. These differences are likely to result in continued calls for separate accounting of flows across these three categories.

Assuming adequate governance, a strong recipient country role represents a viable mechanism for resolving the tension between separate accounting at the level of the source of financing and an integrated framework at the level of implementation. The nature of the challenges being addressed also argues for predictable (rules-based) and long-term flows. As such, climate finance has the potential to strengthen the long-run trend towards a central role for recipient country governments that is inherent in budget support and sector wide programmes. Similarly, given the rationales behind adaptation and mitigation flows and the critical role of developing countries in achieving mitigation objectives, climate finance can pave the way for an institutional framework with a more balanced representation of developed and developing countries.

A key prerequisite to the initiation and continuation of substantial, country-led, predictable, rules-based and long term financial flows must be that recipient countries develop accountable and transparent information systems. Independent auditing of recipient country information systems would appear to be indispensable. This task clearly sits within the domain of a specialized, independent, and technically competent institution. While the auditing task could be limited to an assessment of the quality of information produced on greenhouse gas emissions, a broader remit to cover the quality of standard statistics and public financial management indicators would both encompass the adaptation agenda and correct the current failure within development assistance to set adequate standards for information provision. The existence of objective transparency and quality of information standards would also provide an automatic ‘first cut’ mechanism for dealing with states with serious governance issues as most of these could be expected to refuse to comply and thus would not qualify for the more automatic transfers envisioned.

In sum, climate finance has the potential to significantly alter the future of foreign assistance and speed the transition to an official flows architecture based on binding agreements, global goals and priorities, international carbon pricing, transparent allocation rules, direct access and country led implementation. Unfortunately, these outcomes are not guaranteed. Climate change mitigation and adaptation finance could also lead to a more fragmented and likely less effective aid environment. The creation of the Green Climate Fund likely represents an important step forward; however, there remains a very long way to go addressing the development, adaptation, and mitigation challenges of the twenty-first century.

References

- Abbott, P.C., C. Hurt, and W.E. Tyner (2011). 'What's Driving Food Prices in 2011?' Farm Foundation Issue Report.
- AGECC (2010). 'Energy for a Sustainable Future'. Report from the UN Secretary-General's Advisory Group on Energy and Climate Change, 28 April, New York.
- Arndt, C., K. Strzepek, F. Tarp, J. Thurlow, C. Fant, and L. Wright (2011a). 'Adapting to Climate Change: An Integrated Biophysical and Economic Assessment for Mozambique'. *Sustainability Science*, 6 (1): 7-20.
- Arndt, C., E.S. Jones, and F. Tarp (2011b). 'Aid and Growth: Have We Come Full Circle?' *Globalization and Development*, 1 (5).
- Atkinson, A.B. (ed.) (2005). *New Sources of Development Finance*. Oxford University Press and United Nations University, World Institute for Development.
- Adaptation Fund Board (2009). 'Report on Fiduciary Standards for Implementing Entities'. AF Board Meeting, Bonn, 15-17 June, AFB/B.6/4. http://www.adaptationfund.org/system/files/AFB.B.6.4_Fiduciary_Standards.pdf
- Beynon, J., and A. Dusu (2010). Budget Support and MDG Performance. Development Paper No. 2010/01. European Commission. Brussels. http://ec.europa.eu/development/icenter/files/europa_only/budget_support_MDG_performance_development_paper_en.pdf
- Bird, N., J. Brown, and L. Schalate (2011). 'Design Challenges for the Green Climate Fund'. Climate Finance Policy Brief No. 4. Heinrich Böll Foundation North America and Overseas Development Institute. <http://www.odi.org.uk/resources/download/5256.pdf>
- Brown, J., N. Bird, and L. Schalatek (2010). 'Direct Access to the Adaptation Fund: Realising the Potential of National Implementing Entities'. Heinrich Böll Foundation North America and Overseas Development Institute. <http://www.odi.org.uk/resources/download/5175.pdf>
- Collier, P. (2007). *The Bottom Billion: Why the Poorest Countries are Failing and What Can Be Done About It*. Oxford: Oxford University Press.
- Evans, A. (2009). *The Feeding of the Nine Billion: Global Food Security in the 21st Century*. London: Chatham House.
- European Commission (2010a). 'The Future of EU Budget Support to Third Countries'. Green Paper. COM (2010) 586 final. Brussels. http://ec.europa.eu/development/icenter/repository/green_paper_budget_support_third_countries_en.pdf
- European Commission (2010b). Report on Development, Social Protection for Inclusive Development: A New Perspective in EU Co-operation with Africa.
- European Commission (2011). The EU and the Millennium Development Goals. Website information, June, http://ec.europa.eu/europeaid/what/millennium-development-goals/index_en.htm

- Foresight (2011). 'The Future of Food and Farming'. Final Project Report. The Government Office for Science, London.
- Frankel, J. (2009). 'An Elaborated Proposal for a Global Climate Policy Architecture: Specific Formulas and Emission Targets for All Countries in All Decades'. Harvard Project on International Climate Agreements.
- Hedegaard, C., and C.F. Bach (2011). Chronicle in Information (Danish).
- IEA/UNDP/UNIDO (2010). 'Energy Poverty: How to Make Modern Energy Access Universal'. Special early excerpt of the World Energy Outlook 2010 for the UN General Assembly on the Millennium Development Goals. September.
- Krugman, P. (2010). 'Building a Green Economy'. The New York Times Magazine, 7 April. New York.
- Lobell, D. M. B. Burke, C. Tabaldi, M.D. Mastrandrea, W.P. Falcon, and R.L. Naylor (2008). 'Prioritizing Climate Change Adaptation Needs for Food Security in 2030'. *Science*, 319 (5863): 607-10.
- OECD/DAC (2010). Development Aid Rose in 2009 and Most Donors will Meet 2010 Aid Targets.
http://www.oecd.org/document/11/0,3343,en_2649_34487_44981579_1_1_1_1,00.html
- Padgham, J. (2009). 'Agricultural Development Under Climate Change: Opportunities and Challenges for Adaptation'. World Bank, Washington D.C.; Smith, Op.Cit.
- 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.
<http://www.pewclimate.org/docUploads/strengthening-international-climate-finance.pdf>
- Rajan, R.G., and A. Subramanian (2008). 'Aid and Growth: What Does the Cross-Country Evidence Really Show? *The Review of Economics and Statistics*, 90(4): 643-65.
- Ranger, N., L. Gohar, J. Lowe, A. Bowen, and R. Ward (2010). 'Mitigating Climate Change Through Reductions in Greenhouse Gas Emissions: Is it Possible to Limit Global Warming to no More Than 1.5°C?' Grantham Research Institute on Climate Change and the Environment, London School of Economics and Political Science.
- Resnick, D. (2011). 'Foreign Aid in Africa: Tracing Channels of Influence on Democratic Transitions and Consolidation'. Paper presented at UNU-WIDER ReCom conference, Helsinki.
- Smith, P., D. Martino, Z. Cai, D. Gwary, H.H. Janzen, P. Kumar, B. McCarl, S. Ogle, F. O'Mara, C. Rice, B. Scholes, and O. Sirotenko (2007). *Agriculture*. In Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (eds), B. Metz, O.R. Davidson, P.R. Bosch, R. Dave, L.A. Meyer. Cambridge, UK: Cambridge University Press.

- Sokolov, A.P., P.H. Stone, C.E. Forest, R. Prinn, M.C. Sarofim, M. Webster, S. Paltsev, C.A. Schlosser, D. Kicklighter, S. Dutkiewicz, J. Reilly, C. Wang, B. Felzer, J.M. Melillo, and H.D. Jacoby (2009). 'Probabilistic Forecast for Twenty-First-Century Climate Based on Uncertainties in Emissions (Without Policy) and Climate Parameters'. *Journal of Climate*, 22: 5175-5204.
- The Economist* (2011). 'Aid 2.0'. 13 August, web edition.
- UN Millennium Project (2005). Investing in Development. A Practical Plan to Achieve the Millennium Development Goals. Earthscan, London. <http://www.unmillenniumproject.org/documents/MainReportComplete-lowres.pdf>
- UNDP (2010). Unlocking Progress: MDG Acceleration on the Road to 2015. New York.
- United Nations (1992). United Nations Framework Convention on Climate Change. <http://unfccc.int/resource/docs/convkp/conveng.pdf>
- UNFCCC (2011). The Cancun Agreements: Outcome of the Work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention, Decision 1/CP.1. <http://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf#page=2>
- Weitzman, M.L. (2011). 'Fat-Tailed Uncertainty in the Economics of Catastrophic Climate Change'. REEP Symposium on Fat Tails.
- World Bank (2009). 'Africa's Infrastructure, A Time for Transformation'. World Bank, Africa Infrastructure Country Diagnostic.
- World Bank (2010). 'Economics of Adaptation to Climate Change: Synthesis Report'. Washington DC.
- Zedillo, E., A.Y. Al-Hamad, D. Bryer, M. Chinery-Hesse, J. Delors, R. Grynspan, A.Y. Livshits, A.M. Osman, R. Rubin, M. Singh, and M. Son (2001). 'Recommendations of the High-level Panel on Financing for Development'. United Nations, Office of the Secretary General.