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Global climate governance after 2012: architecture, agency and adaptation

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Summary

This chapter reports the core findings of the research group 'Post-2012 Climate Governance' of the ADAM project. The group has focused on three crucial aspects of future climate governance: (i) the relative performance of different *architectures* of global climate governance; (ii) the relative performance of new forms of *agency* (in particular, beyond the state), including the role of business and environmentalist organisations in governance arrangements; and (iii) policy options for the adaptation of regions, countries and international institutions to the consequences of climate change. Each research domain was assessed by three sets of methodologies, namely: qualitative policy analysis, formal modelling, and participatory forms of assessment. Policy recommendations concerning governance architecture include: (i) strengthening dialogues among environment, trade and development ministries; (ii) widening the scope of the EU Emissions Trading System and linking it with other schemes; (iii) initiating formal co-operation between the UN climate regime and the Asia–Pacific Partnership and other multilateral partnerships; (iv) agreeing on science-based sustainability criteria for removing trade barriers for climate-friendly goods and services; and (v) considering climate-related issue links and package deals in the World Trade Organisation Doha Round. Concerning the role of agency beyond the state and of market approaches, it seemed important to: (i) create or strengthen public funds to stimulate private research and development; (ii) differentiate among Clean Development Mechanism target countries, project types and technologies; (iii) establish reliable, uniform sectoral emissions registrations on a country level; and (iv) agree on science-based sustainability standards for CDM projects. For global adaptation governance, further institutionalisation appeared crucial. This could include a legally binding agreement on the recognition,

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protection and resettlement of climate refugees under the climate convention; a climate refugee protection and resettlement fund; or a legally binding agreement on adaptation and food security. The complete findings of this study programme are presented in a separate volume, *Global Climate Governance After 2012: Architecture, Agency and Adaptation* (Biermann, Pattberg and Zelli 2010).

10.1 Introduction

Many observers have hailed the entry into force of the 'Kyoto Protocol' to the United Nations Framework Convention on Climate Change in 2005 as a landmark achievement in combating global climate change. However, this treaty is but a first step, and its core commitments will expire in 2012. Even full compliance with the Kyoto agreement will not prevent 'dangerous anthropogenic interference with the climate system' – the overall objective of the climate convention. This situation has led to wide-ranging debates among policy makers, academics and environmentalists on the future of climate governance after 2012 (for overviews see Baumert *et al*. 2002; Bodansky, Chou and Jorge-Tresolini 2004; Aldy and Stavins 2007; Kuik *et al*. 2008).

This quest of finding stable, effective and equitable solutions for long-term climate governance stands at the centre of this chapter. It has also been the focus of the comprehensive research programme reported here: the research group 'Post-2012 Climate Governance' of the ADAM project. The complete findings of this study programme are presented in a separate volume, *Global Climate Governance After 2012: Architecture, Agency and Adaptation* (Biermann, Pattberg and Zelli 2010).

This assessment of options for long-term climate governance has been unique in its systematic and comprehensive integration of different disciplinary bodies of knowledge and of different methodological tools and approaches, from international law, political science and global governance studies, to place-based development research and computer-based scenarios and modelling exercises. While core elements of this research drew on local facts and findings, for example, in studies on vulnerabilities of the poorest of the poor, the focus remained at the global level and at the most important elements of an overarching governance architecture for mitigating, and adapting to, global climate change.

Our research has been academic in nature, yet policy-relevant in orientation. Most efforts were directed at scoping or developing policy options that could provide a basis for future climate governance, and at appraising these options through multi-disciplinary assessment methodologies. While many of these policy options are derived from current debates, their appraisal took a much broader, long-term perspective, in search of solutions that may be relevant and viable long after the current negotiations have been brought to an end.

The study programme has been organised around three research domains, each having one central research question, and each being assessed by three assessment methods. This approach also structures this chapter: we first introduce the three core research domains of our project, that is, the *architecture* of global climate governance; *agency* in climate governance that goes beyond the central nation state; and *adaptation* to climate change at the level of global institutions and organisations. Section 10.3 then establishes the three main sets of methodologies applied in the analysis of the three research domains, namely: qualitative policy assessment, formal modelling, and participatory forms of assessment. By analysing each research domain from three different methodological viewpoints, we conducted a comprehensive appraisal that included criteria of policy feasibility, effectiveness and equity. Section 10.4 presents our major findings from all three domains. The concluding section summarises the policy options and identifies commonalities that could facilitate integrated policies towards effective global climate governance beyond 2012.

10.2 Research domains: architecture, agency and adaptation

We have focused on three crucial aspects of future climate governance: (i) the relative performance of different *architectures* of global climate governance; (ii) the relative performance of new forms of *agency* (in particular beyond the state), including the role of business and environmentalist organisations in governance arrangements; and (iii) the relative performance of different possible global governance arrangements for *adaptation* to climate change.

Research on each of these domains centres on unique, clear-cut research questions.

10.2.1 Architecture

Which type of global governance architecture promises a higher degree of institutional performance in terms of social and environmental effectiveness? In particular, is almost universal, strongly integrated governance architecture likely to be more effective than heavily fragmented, heterogeneous governance architecture? How can the increasing fragmentation of global climate governance be addressed?

10.2.2 Agency (beyond the state)

What is the role and relevance of an increasing trend towards privatised and market-based governance mechanisms for climate change mitigation? How do the host of private actors, from non-governmental organisations to business actors, that

surrounds these new mechanisms in global climate governance relate? To what extent, and under what conditions, do private or public–private transnational governance mechanisms produce policy outcomes that are comparable, or even superior, to traditional forms of intergovernmental co-operation?

10.2.3 Adaptation

What are the policy options for the adaptation of regions, countries and international institutions to the impacts of climate change? To what extent do effective adaptation policies require global regulatory mechanisms, as opposed to local policy making? To what extent does effective adaptation governance require the integration of adaptation policies in the overall climate governance architecture, and/or in other policy domains?

These three domains are not mutually exclusive. Questions of architecture are also relevant when developing institutions for future adaptation governance, and non-state actors are important for adaptation. Rather than providing clear-cut distinctions, the three domains serve as different lenses that, together, advance understanding of the complexity of global climate governance. Furthermore, this link in our research with broader theoretical debates in the social sciences, such as on governance architectures or on the role of the state versus non-state actors, increases knowledge of contemporary climate governance while also contributing to theory consolidation within and across disciplines. In particular, the selection of the three themes has been influenced by current debates in international relations and international law on globalisation, transnationalisation, fragmentation and legitimacy (Ruggie 2001; Rosenau 2003; Hafner 2004; Börzel and Risse 2005). Last but not least, the three research domains reflect the Science and Implementation Plan of the Earth System Governance Project, a new long-term global research effort under the auspices of the International Human Dimensions Programme on Global Environmental Change, which will last from 2009 through 2018 (Biermann *et al*. 2009). This chapter is one of the first publications that respond to the science plan of this new global research programme.

10.3 Methodologies: policy analysis, modelling and participatory assessment

These three research domains and their core research questions have been analysed from the perspective of three methodological approaches, each contributing to a comprehensive integrated examination.

10.3.1 Policy analysis

Firstly, we analysed each domain by means of policy analysis, including legal analysis. These methods advanced understanding of opportunities and barriers for

policymaking at different stages of the policy process, as well as of institutional interlinkages and barriers to rule-making. We covered criteria of inclusiveness and legitimacy (regarding the participation of different types of actors), social acceptability and political feasibility. These methods helped determine the viability and the legal and political effectiveness of policy strategies, that is, their chances to materialise as concrete legal provisions (for example new rules under a post-2012 climate regime) and to change the compliance incentives of actors. Theoretical approaches applied in our research include institutional theory and global governance research, bargaining and game theory, international law analysis, and economic analysis.

10.3.2 Modelling

The use of modelling tools helps to create a structured and quantitative framework for analysis. These methods focus less on political or legal implications but rather on criteria of long-term effectiveness and efficiency of policy options. They assist in determining the structural effects of selected strategies on both the global climate and social systems, for example, regarding long-term emission reductions or effects on national incomes. Methods applied in this research include the FAIR meta-model, developed by the Netherlands Environmental Assessment Agency (for further references, see Hof *et al*., 2010a). FAIR is a stylised multi-region formal model that integrates modelling of the climate system (the relation between greenhouse gas emissions, concentrations and temperature) with the social–economic system (costs of mitigation, emissions trading and effects of climate change on national income). A second model employed is REMIND, developed by the Potsdam Institute for Climate Impact Research (Potsdam Institute for Climate Impact Research 2007, 57–70). REMIND is a hybrid model that is designed to integrate macroeconomic, energy system and climate modules. It is a multi-region endogenous economic growth model, which can focus on regional interactions such as trade flows, foreign investments or technological spill-overs.

10.3.3 Participatory approaches

In addition, this research employed participatory assessment approaches. Such tools give voice to stakeholders' perspectives. They allow a critical examination of policy recommendations against the interests and concerns of key stakeholders, and can assist in refining recommendations into feasible and socially robust strategies. Participatory assessments hence complement the examination of political feasibility criteria provided by policy analysis. Participatory methods applied here include: (i) a series of structured international workshops with experts and policy makers; (ii) regular consultations with an advisory group of senior experts and policy makers;

Table 10.1. *Research domains and research methods*

	Architecture	Agency beyond the state	Adaptation
Policy analysis	Institutional fragmentation *(institutional theory, bargaining theory, international law)* UN climate regime and Asia-Pacific Partnership *(international law)* UN climate regime and biodiversity convention *(international law)* UN climate regime and world trade regime *(institutional theory, bargaining theory, international law)*	Transnational climate governance *(institutional theory)* CDM reform *(institutional theory)* Research and development, and technological change *(economic analysis)*	Climate refugees *(institutional theory, international law)* Food insecurity *(institutional theory)* Adaptation funding *(qualitative economic analysis)* Interests and perspectives of developing countries *(institutional theory, international law)* Vulnerability of the poorest of the poor *(socio-economic analysis)*
Modelling	Institutional fragmentation *(FAIR meta-model)* Linking of emission trading systems *(REMIND model)*	Sectoral mitigation *(FAIR meta-model)*	Cost-benefit interlinkages between adaptation and mitigation *(FAIR meta-model)*
Participatory approaches	Institutional fragmentation *(side-events at conferences of the parties, UNEP workshop, policy workshop in Brussels, developing country conference in Delhi, interviews, survey)* UN climate regime and world trade regime *(UNEP workshop, policy workshop in Brussels interviews)* Architecture and equity *(developing country conference in Delhi)*	Transnational climate governance *(interviews, survey)* Reform of CDM *(policy workshop in Lund, policy workshop in Brussels)* Market-based mechanisms and developing countries *(developing country conference in Delhi, survey)*	Climate refugees *(side-events at conferences of the parties, policy workshop in Brussels, interviews)* Food insecurity *(side-events at conferences of the parties, developing country conference in Delhi, policy workshop in Brussels, interviews)* Adaptation in developing countries *(developing country conference in Delhi)* Adaptation funding *(policy workshop in Brussels, interviews)*

and (iii) a major survey of Southern policy makers, academics and representatives of non-governmental organisations. The participatory appraisal exercises were held in: (i) New Delhi, India, on developing country perspectives; (ii) Geneva, Switzerland, jointly with the Economics and Trade Branch of the UN Environment Programme, on climate and trade policies; (iii) Lund, Sweden, on the reform of the Clean Development Mechanism (CDM); in Brussels, Belgium, on adaptation funding; (iv) Brussels, Belgium, jointly with the Centre for European Policy Studies, on the overall research results; and (v) a side event at the thirteenth conference of the parties in Bali.

Table 10.1 summarises the application of these different methods to the three research domains.

As Table 10.1 illustrates, our original research did not apply all the methods to the same degree in each research domain. In some cases, we also relied on additional literature. For instance, estimates of climate change-induced migration are not based on our own models, but are drawn on a meta-analysis of other modelling and scenario exercises.

10.4 Research findings

10.4.1 Architecture: analysing the increasing fragmentation of global climate governance

A core element of the quest for long-term stable and effective climate governance is the overall institutional architecture. The term 'global governance architecture' is now widely used in the literature. It has been employed to describe the broader institutional complex in areas such as international security, finance, trade and the protection of the environment. We define the term here as the overarching system of public and private institutions: that is, principles, norms, regulations, decision-making procedures and organisations that are valid or active in a given issue area of world politics. Architecture can thus be described as the *meta-level* of governance (Biermann *et al*. 2010).

In policy and academic debates, there is increasing concern for widespread fragmentation of such global governance architecture. This is especially the case for climate governance, which is marked by a plethora of institutions that are not always effectively related to the overarching climate convention (see also for example Haas, Kanie and Murphy 2004; Kanie 2008). Regarding intergovernmental institutions, there are four different spheres of fragmentation in international climate politics, which can be arranged concentrically from 'purely' climate-specific institutions towards regimes and organisations with universal or cross-cutting portfolios (see Fig. 10.1 for an overview). If private and public–private initiatives are also considered, the global climate architecture appears even more fragmented (see Section 10.4.2 on agency beyond the state in more detail).

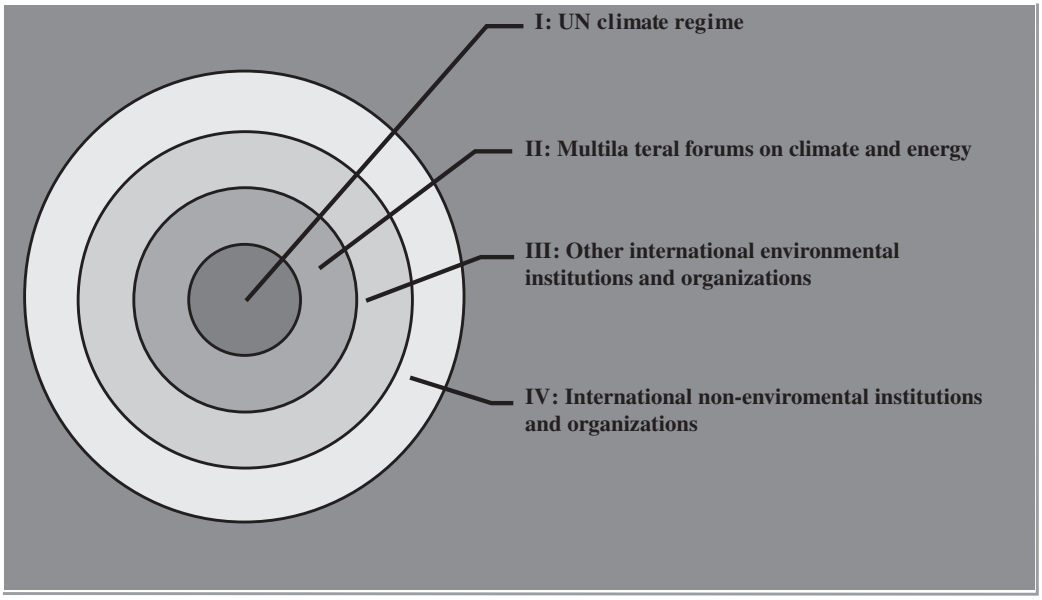

Fig. 10.1. Spheres of institutional fragmentation in global climate governance.

We examined this fragmentation and its implications by the three methodological approaches of policy analysis, modelling, and participatory assessment. Based on this research, we developed novel policy options for addressing fragmentation. This is occurring especially between the UN climate regime and new multilateral climate partnerships such as the Asia–Pacific Partnership on Clean Development and Climate; the Convention on Biological Diversity; and the world trade regime. It may also occur between different (future) emissions trading schemes.

One benefit of institutional fragmentation is that it may facilitate *getting laggards to the negotiation table*. For instance, internal fragmentation or duplication in the UN climate regime, with various parallel tracks for discussing a future regime, allows for the direct involvement of countries that have not ratified the Kyoto Protocol to participate in discussions about a successor agreement. Notably, the United States participated in the Convention Dialogue in 2006 and 2007 and afterwards in the *Ad Hoc* Working Group on Long-Term Co-operative Action under the Convention. A fragmented governance architecture may also provide more *platforms for including non-state and sub-state actors*. For instance, major businesses are involved in multilateral technology initiatives such as the International Partnership for the Hydrogen Economy. Another advantage of fragmentation is the potential for a *meaningful division of labour* among institutions. Instead of overburdening the UN climate regime, other institutions can take over certain functions. Fragmentation might also allow for *deeper or faster agreements* by circumventing deadlocks in larger forums. For instance, the 2007 meeting of the Group of Eight was the first multilateral arena where major developed country emitters made (soft) commitments to reduce

greenhouse gas emissions by at least 50% by 2050. This agreement also helped *reinvigorate debates in other institutions*, by providing a major impetus on the road to the conference of the parties 2007 in Bali.

Yet there are also many, and possibly severe costs involved with heavy fragmentation of governance architecture. Firstly, it gives room to many initiatives that s*erve only particular interests*. The bulk of multilateral partnerships on climate and energy do not include least developed countries or small island states. They largely focus on the interests of the participating industrialised or newly industrialising countries, while side-lining preferences of poorer countries. Notably, adaptation has marginal roles in the Asia–Pacific Partnership and in the first session of the United States-initiated Major Economies meeting. Moreover, fragmentation might increase *co-ordination gaps among institutions*. At present, co-ordination on adaptation is poor between the climate convention and other institutions, for example, the United Nations Food and Agriculture Organisation or the desertification convention. *Regulatory uncertainty* is another severe downside of fragmentation, especially where clear price signals and investment security are important. For example, the variety of unlinked emission trading schemes yields a patchwork of different conditions for the generation and transfer of emission credits and permits. Scholars have also pointed to the imminent danger of *'chill effects'* (Eckersley 2004). In light of the strong dispute settlement system under the World Trade Organization (WTO), parties might have been reluctant to include further trade-restrictive measures in the UN climate regime, let alone strengthening the regime's own dispute settlement system. Finally, institutional diversity implies *the risk of 'forum shopping'* (Raustiala and Victor 2004: 280). The Asia–Pacific Partnership for instance has provided a forum for the United States (and initially also Australia) to circumvent the UN climate regime. In the same vein, the success of such initiatives might reduce compliance incentives for parties of the Kyoto Protocol (van Asselt 2007: 23ff.).

Following this policy assessment of institutional fragmentation in global climate governance, the question arises how the mid and long-term emission-reducing effectiveness of different scenarios of institutional fragmentation can be determined. We have quantified this for the two inner spheres of Fig. 10.1 above; that is, for the UN climate regime and other institutions predominantly addressing climate change, based on the FAIR meta-model (Hof *et al*. 2010b). This research builds on earlier projections made with the meta-model for different levels of institutional co-operation among countries, with the preferred option being a 'Grand Coalition' (Boeters *et al*. 2007). As shown in Table 10.2, a joint 'broad-but-shallow' approach under the umbrella of a universal post-2012 regime appears far more effective than a patchwork of different approaches, notwithstanding incentives for free riding.

Table 10.2. *Emissions impact of different institutional scenarios by 2020*

Scenario:	Increase of fossil carbon dioxide emissions compared to 1990 levels	Increase of all greenhouse gas emissions compared to 1990 levels
'Grand coalition'	+28%	+22%
'Fragmented '	+45%	+43%
'Largest common denominator'	+48%	+45%
'Impasse'	+56%	+52%

Source: *Boeters et al*. 2007: 20.

Such model-based projections for the next hundred years even suggest that a fragmented scenario with small but stable coalitions is only slightly more effective than no coalition at all. On the other hand, emissions would be more than four times lower in a global coalition than in a set of smaller but more stable coalitions (Hof *et al*. 2010b).

In the light of our findings from both qualitative and quantitative research, strongly integrated climate architecture appears to be the most effective solution. However, in current climate governance, as well as in many other areas of world politics, such integrated architectures are not always realistic. The second best solution may thus be a well co-ordinated 'web of institutions' (see also Gupta *et al*. 2007: 791) that ensures an enhanced division of labour not only among climate-related institutions, but also with institutions from different issue areas, including the world trade regime.

Building on these findings, we have researched in detail specific institutional overlaps around the UN climate regime. We have selected one case study for each overlap of the UN climate regime with one of the four spheres identified in Fig. 10.1 above.

One case study analysed internal fragmentation within core climate institutions with regard to emissions trading and prospects for a global carbon market (Flachsland *et al*. 2010). Article 17 of the Kyoto Protocol as specified in the later Marrakesh Accords implies a top-down approach, by implementating emissions trading through multilateral negotiations. On the other hand, so-called bottom-up approaches that are considered by members to the International Carbon Action Partnership – including the EU Commission and several EU Member States, Australia, New Zealand, and some US states – emphasise the implementation and linking of domestic emissions trading schemes on the national or sub-national level. However, the latter approach implies a stepwise implementation of a global carbon market, as compared to the instantaneous implementation of a Kyoto-type trading system. Using the REMIND model, we analysed the economic costs of delaying the implementation of a

comprehensive global trading system and found that when a global carbon market is implemented by 2020 instead of 2010, global mitigation costs rise from 1.3% to 2.8% of global discounted Gross Domestic Product. While a global top-down trading approach is the best solution to control global emissions but not realistic in the short term, the second-best option is to combine elements of different carbon market architectures. For instance, governments could agree on a system where a group of countries that are willing to adopt binding economy-wide caps, continues the inter-governmental cap-and-trade system implemented by the Kyoto Protocol after 2012. By linking their domestic trading systems within this government-level framework, they can devolve the trading activity to the level of companies, which will enhance the efficiency of the international carbon market. This architecture could be designed as an open system that enables other countries to join later with some or all sectors of their economy. This approach could be environmentally and economically more effective than pure bottom-up approaches, and less prone to political stalemates and high transaction costs than the top-down approach (Flachsland *et al*. 2010).

A second case study addressed fragmentation between the UN climate regime and the Asia-Pacific Partnership on Clean Development and Climate (van Asselt 2007). Unlike the climate convention or the Kyoto Protocol, the Asia–Pacific Partnership does not differentiate between responsibilities of state parties and does not address adaptation or interlinkages with other regimes. Moreover, the Partnership has no systematic procedure for stakeholder participation. This example of governance fragmentation could thus undermine effective climate policies because actors receive different signals. There are several options for co-ordinating the two systems. These include (i) mutual support in treaty implementation, regarding data collection and capacity building; (ii) co-operation on flexible mechanisms, for example obtaining CDM credits for projects under the Partnership; and (iii) technology transfer, for example by using the Asia–Pacific Partnership as a testing ground for bridging diverging positions and practical barriers.

A third case study examined the relationship between the climate regime and another multilateral environmental agreement, the Convention on Biological Diversity (van Asselt, Sindico and Mehling 2008). Although both treaties are broadly compatible, some observers fear lack of respect for biodiversity protection owing to the prominent role of cost-effectiveness in the climate regime (van Asselt, Gupta and Biermann 2005: 259). Critics also argue that the CDM does not sufficiently protect biodiversity, since it allows for large-scale, monoculture plantations; lacks protection measures for old-growth forests; and fosters use of invasive alien species and genetically modified organisms (Meinshausen and Hare 2003). In response, governments agreed in 2003 on procedures for forestry projects under the CDM (UNFCCC 2004). However, this agreement does not alleviate all concerns (UNFCCC 2004: Annex, paragraph 12.c; see Sagemüller 2006: 221).

A fourth case study analysed fragmentation between the UN climate regime and a non-environmental institution, namely the world trade regime. There are various overlapping policies in both regimes (Biermann and Brohm 2005; van Asselt and Biermann 2007; Zelli 2007), including trade in emission allowances, unilateral policies and measures to level the playing field (for example, border tax adjustments, subsidies and technical standards), as well as the transfer of climate-friendly goods, services and technologies. We conducted a theory-guided policy analysis of overlaps, along with a major international stakeholder workshop jointly organised with the Economics and Trade Branch of the UN Environment Programme in Geneva (Zelli and van Asselt 2010). One policy option that emerged is to better integrate scientific expertise, for example in the Committee on Trade and Environment of the World Trade Organisation (WTO), the major forum where environment–trade overlaps are discussed. Another option to involve expertise is science-based sustainability criteria for the removal of trade barriers for climate-friendly goods and services. A third policy recommendation is to broaden co-ordination across institutions to overcome negotiation deadlocks in this committee. Such a dialogue could cut across ministries instead of continuing separate ministerial gathering. Moreover, at the governmental level, strategic issue-linkages could lead to package deals. One option would be to link positions on farm subsidies, trade barriers for environmental goods and services, and trade barriers for biofuels. Concessions on biofuels or environmental goods and services might help reinvigorate the larger debate on farm subsidies.

10.4.2 Agency beyond the state: analysing the increasing role of privatised and market-based climate governance

Climate governance is no longer the domain of governments and intergovernmental co-operation alone. Instead, scholars observe a growing relevance of non-state actors, such as industry and environmentalist groups, as well as public actors other than central governments, such as cities, local communities or international bureaucracies (Benecke *et al*. 2008; Kern and Bulkeley 2009; Kolk, Levy and Pinske 2008; Okereke, Bulkeley and Schroeder 2009). Increasingly, such actors also assume a role in rule-setting institutions that regulate certain sectors, or in market-based mechanisms, such as emissions trading. This emergence of 'transnational' and often 'privatised' climate governance required, firstly, a detailed conceptualisation of this new phenomenon (Pattberg and Stripple 2008; see also Jagers and Stripple 2003), which drew on political science and international relations studies of the public/private divide and different spheres of authority (for example Börzel and Risse 2005).

The starting point has been the observation that 'An increasingly pertinent feature of the global public order in and beyond environmental protection and

Table 10.3. *Sites of global climate governance*

Authority mode of governance	Public	Hybrid	Private
Hierarchical	National policy; supra-national organisation		
Market	EU Emissions Trading System (shadow of hierarchy)	Compliance market in carbon (CDM)	Carbon neutrality; company- and industry-wide emission trading
Networks	C40; Cities for Climate Protection Campaign	Partnerships for Sustainable Development (for example Renewable Energy and Energy Efficiency Partnership)	Corporate social responsibility and business-NGO self-regulation (for example Carbon Disclosure Project)

Source: *Pattberg and Stripple* 2008.

sustainability is the dynamic mixing of the public and the private, with state-based public power being exercised by state institutions alongside and along with the exercise of private power by market and civil society institutions and other actors committed to the public interest and public weal' (Thynne 2008: 329). Especially in climate governance, a number of actors deliberately form social institutions to address the problem of climate change without being forced to, persuaded or funded by states or other public agencies. This transnational institutionalisation of climate governance is in line with what Ruggie (2004) has called the reconstitution of a global public domain. As a domain, it does not replace states but 'embed[s] systems of governance in broader global frameworks of social capacity and agency that did not previously exist' (Ruggie 2004: 519). The original claim about 'agency beyond the state' concerns the role and relevance of different actors. The power of individual and collective actors to change the course of events lies increasingly in sites beyond the state and its international organisations.

Based on this conceptualisation of the emergent transnational climate governance arena and agency beyond the state in climate governance, Pattberg and Stripple (2008) developed a typology that distinguishes different approaches. These range from governance through markets – including the Clean Development Mechanism (CDM) and voluntary offsets – to networked governance, which includes public non-state actors such as cities, along with transnational corporations and non-governmental organisations (see Table 10.3).

Research that is more detailed subsequently focussed on particular elements of the emergent transnational climate governance arena.

10.4.3 Public–private Climate Governance Partnerships

Firstly, we analysed *public-private climate governance partnerships* (Pattberg 2010). Public-private partnerships – that is, networks of different societal actors, including governments, international agencies, corporations, research institutions and civil society organisations – are cornerstones of current global environmental governance, both in discursive and material terms. Within the United Nations, partnerships have been endorsed through the establishment of the Global Compact, a voluntary partnership between corporations and the United Nations, as well as through the 'partnerships for sustainable development' (also known as 'type-2' outcomes) concluded by governments at the 2002 World Summit for Sustainable Development in Johannesburg. Both the 'partnerships for sustainable development' and the Global Compact have been criticised for privatising parts of the policy response to global change (Biermann *et al*. 2007; Rieth *et al*. 2007). We analysed public–private partnerships in the field of global climate governance based on three evaluation criteria: problem-solving capacity; participation and inclusiveness; and synergies or dysfunctional linkages with international climate governance.

Several obstacles prevent the realisation of the full potential of partnerships' problem-solving capacity. In particular, the geographical bias towards global partnerships instead of local or regional ones indicates that partnerships reflect pre-existing interest structures and therefore seldom deliver additional benefits that may not have been realised in more traditional multilateral or bilateral implementation arrangements. Regarding increased participation through public–private partnerships, our analysis highlights the overrepresentation of governments in climate partnerships as compared to the total sample of all partnerships for sustainable development registered with the United Nations. Climate partnerships are also largely dominated by states, both in terms of leadership and membership. This finding is in line with the expectation that politically contested areas such as climate politics remain overall under the control of governments. Finally, it appears that a stronger link with the UN climate regime may benefit both the 'partnerships for sustainable development' – by giving them guidance and a clear goal – and the climate regime, by assisting its implementation.

10.4.4 Clean development mechanism (CDM)

Secondly, this programme explored the CDM within the larger context of agency beyond the state. We first analysed the costs and benefits of its governance structure

and then reform options through a participatory appraisal exercise in Lund, Sweden. This exercise covered a wide range of issues relating to carbon offsetting on both the regulated market of the CDM as well as in the voluntary carbon market. Major problems of the CDM include (i) the unequal geographical distribution of projects, (ii) the lack of sustainable development benefits from many projects and (iii) complex bureaucratic processes. The market structure of the CDM and the resulting focus on cost-efficient emissions reductions are probably at the root of these problems. Reform options are many (Stripple and Falaleeva 2008; see also van Asselt and Gupta 2009). Firstly, the currently inequitable regional distribution of projects under the CDM requires institutional capacity building in many countries, including least developed countries and small island developing states. They could also be supported by further adapting the levies, discounting credits from richer developing countries or even through quotas for disadvantaged developing countries. To work better towards sustainable development within the CDM framework, increased differentiation between project types and technologies might be a way forward. One option is to favour projects with clear sustainable development co-benefits and to discount for projects with no or few sustainable development contributions.

A more radical option is to separate the two objectives of the CDM and to leave the achievement of sustainable development to other mechanisms. This option would focus on the CDM as an instrument for cost-effective emission reductions and create a fund for sustainable development outside of it. Such a fund could be specifically aimed at funding projects with high sustainable development benefits, but with high costs and questionable additionality, such as some renewable energy and energy efficiency projects. Regarding the third problem, sectoral approaches may promise to address some of the bureaucratic complexities of the CDM. Sectoral approaches would require the development of different methodologies for additionality and baseline emissions compared to the current project-based CDM. One could launch a pilot phase with discounted sectoral credits to examine further the potential for sectoral projects and programmes.

In addition to the appraisal of options for CDM reform, we analysed in more detail the processes that drive the current transformation of current carbon markets (Stripple and Lövbrand 2010). Rather than asking *who* or *which* entities govern the carbon market domain, this study addressed the question of *how* and by which procedures carbon markets are rendered thinkable and operational in the first place. To this end, the study analysed baseline and credit markets in particular, where a complex measurement of counterfactuals (current emissions *vis-à-vis* a business-as-usual scenario) enables reductions of carbon dioxide equivalents to be assigned market value and transformed into various offset currencies.

10.4.5 Other case studies

While sectoral approaches under the CDM focus on public–private mitigation in developing countries, another case study on agency beyond the state has modelled mitigation from sectors in both industrialised and developing countries (den Elzen *et al*. 2010). This study drew on the 'Triptych approach', a method for allocating future greenhouse gas emission reductions among countries under an international climate mitigation regime that may follow the Kyoto Protocol and be based on technological criteria at sector level. Targets are defined for the following sectors: industry (manufacturing and construction), domestic (including carbon dioxide emissions from the residential, commercial, agriculture and inland transport sectors), power production, fossil fuel production, non-carbon dioxide emissions in agriculture, and waste. Defining targets for separate sectors allows the linkage of real-world emission reduction strategies and can improve the account taken of diverse national circumstances of countries. The major advantage of this sectoral approach is that internationally competitive industries are put on the same level playing field. However, one of the major challenges is establishing reliable, uniform, sectoral emissions registrations for all countries, as this is lacking especially in developing countries.

A fourth case study analysed the role of non-state actors with regard to research and development and technological change (Alfsen, Eskeland and Linnerud 2010). The study argues that international agreements are best suited to boost research and development on climate friendly technologies. Such agreements and cap-and-trade systems are mutually supportive because research and development reduces future abatement costs and thus makes it feasible for politicians to agree on tighter caps.

10.4.6 Adaptation: analysing governance arrangements for adaptation to global climate change

It becomes increasingly clear that despite all mitigation efforts, some degree of global warming cannot be prevented, and impacts of climate change will become a reality of the twenty-first century. This poses the question of optimal adaptation governance. While a number of research programmes have addressed adaptation governance at local and national levels (see this volume Chapter 5 Hinkel *et al*., Chapter 8 Mechler *et al*.), this research group ventured into a largely unexplored research terrain: *global* adaptation governance. How can we build global governance systems over the course of the next decades that will cope with the adaptation for global impacts of climate change required? What institutions are in need of redesign and strengthening? To what extent, and in what areas, do we need to create new institutions and governance mechanisms from scratch?

Global adaptation governance will affect most areas of world politics, including many core institutions and organisations (Biermann and Boas 2010a). The need to adapt to climate change will influence many orgainisations: (i) the structure of global food regimes and the work of the UN Food and Agriculture Organisation; (ii) global health governance and the agenda of the World Health Organisation; (iii) global trade in goods, the production of which will be harmed or helped by climate change; (iv) the world economic system and the ability of the International Monetary Fund to address climate-related shocks to national and regional economies; (v) the World Bank and bilateral and national agencies in raising and distributing funds to support adaptation; and (vi) many other sectors from tourism to transportation or even international security.

In line with the research domains of architecture and agency, we first conceptualised 'global adaptation governance' and then focussed on specific cases and elements from the perspectives of international relations (regarding the institutional implications of global adaptation governance) and integrated assessment models (regarding global and regional damage and adaptation costs).

The quantitative research on adaptation costs (Hof *et al*. 2010a) underscored the urgency for multi-institutional international action (see Fig. 10.2). We combined here the FAIR meta-model and the AD-RICE model (de Bruin, Dellink and Agrawala 2009) for analysing the mitigation costs, adaptation costs and residual damages of climate change on a global as well as regional scale. For a Contraction

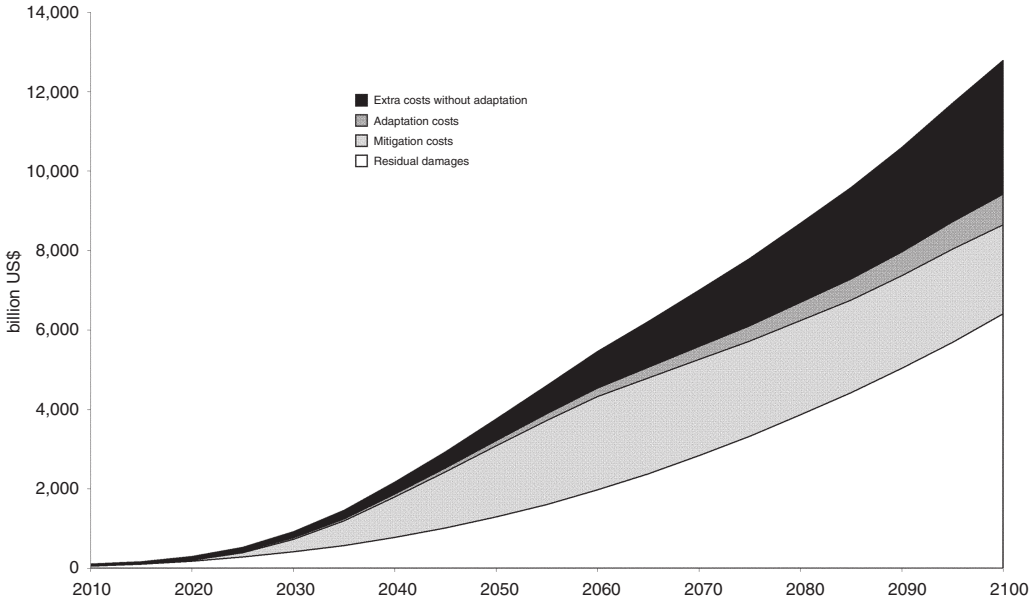

Fig. 10.2. Global mitigation costs, adaptation costs, residual damages and extra costs if no adaptation is undertaken. (Source: Hof *et al*., 2010a)

and Convergence emission allocation regime (with per capita emissions converging in 2050, a climate sensitivity of 3.0 degrees and the UK Green Book discounting method), the projected global adaptation costs are of the same order of magnitude as the recent adaptation cost estimates of the World Bank (2006) and UNFCCC (2007). Yet when looking at detailed predictions, the model's division of damages into residual damages and adaptation costs reveals an intriguing finding; adaptation costs could in fact amount to only a fraction compared to damages and mitigation costs, especially in the short to medium run (see also Chapter 3 van Vuuren *et al*.).

Even though the share of adaptation costs in the total climate change costs is relatively small, adaptation plays a major role by reducing potential damages. The extra costs if no adaptation measures are taken (defined as the increase in residual damages minus the decrease of adaptation costs) are projected to amount to US$ 30 billion globally in 2010 and increase sharply to US$ 3.4 trillion in 2100. Investment in adaptation is therefore very effective: residual damages are on average reduced by about five dollars for every dollar invested in adaptation. Furthermore, adaptation and mitigation cannot be regarded as substitutes, but rather complement each other. Adaptation can effectively reduce climate change damages in the shorter run, but is much less effective in the end since it does not reduce climate change itself. Mitigation is very effective in reducing climate change damages in the end. Implementing both adaptation and mitigation gives the best results according to the FAIR meta-model.

Building on these insights, we analysed three challenges for future global adaptation governance: climate change-induced migration; climate change-induced food insecurity; and the need for co-ordinated adaptation funding. We further added two specific analyses, one from the perspective of developing countries as a group of nations, and from the perspective of the poorest of the poor.

10.4.7 Climate change-induced migration

It is likely that climate change will fundamentally affect the lives of millions of people who may be forced over the next decades to leave their villages and cities to seek refuge in other areas. We define these people as 'climate refugees'. They are people who have to leave their habitats, immediately or in the near future, because of sudden or gradual alterations in their natural environment related to at least one of three impacts of climate change: sea-level rise, extreme weather events, and drought and water scarcity (see Biermann and Boas 2008, 2010b on the details and operationalisation of this definition). The exact numbers of such future climate refugees are unknowable and vary from assessment to assessment depending on underlying methods, scenarios, time frames and assumptions, and we agree with Renaud *et al*. (2007: 16–17) and many other scholars that estimation methods and underlying

assumptions are complex and controversial. Yet despite these remaining uncertainties, a meta-analysis of all available studies indicated that the climate change-induced refugee crisis is most likely to surpass all known refugee crises in terms of the number of people affected (Biermann and Boas 2008, 2010b).

The current refugee protection regime of the United Nations is poorly prepared, and does not cover climate refugees in its mandate. At a meeting in the Maldives in 2006, delegates therefore proposed an amendment to the 1951 Geneva Convention Relating to the Status of Refugees that would extend the mandate of the UN refugee regime to cover also climate refugees. We argue, however, that such an amendment leads in the wrong direction. Firstly, the political feasibility of this proposal is highly uncertain. The UN refugee regime is already under constant pressure from industrialised countries seeking restrictive interpretations of its provisions. It is unrealistic for governments to extend the same level of protection to potentially twenty-times more climate refugees. More importantly, the proposal of an extension of the UN refugee regime misses the core characteristics of the climate refugee crisis. The protection of climate refugees is essentially a development issue. It requires large-scale, long-term planned resettlement programmes for groups of affected people, mostly within their country. Often, this will be in concert with adaptation programmes for other people who are not evacuated but can be protected, for instance through strengthened coastal defences. It is therefore not the UN High Commissioner for Refugees but other international agencies such as the UN Development Programme or the World Bank that are called upon to deal with the emerging problem.

We therefore argue for a separate regime: a legally binding agreement on the recognition, protection and resettlement of climate refugees under the climate convention. This could be a separate protocol under the convention ('climate refugee protocol'), but also an integral part of a larger legal instrument, such as a protocol on adaptation, or even a single undertaking that regulates all future measures on climate governance (see Biermann and Boas 2008, 2010b in more detail on this proposal). Importantly, the protection of climate refugees must be seen as a global problem and a global responsibility. In most cases, climate refugees will be poor, and their own responsibility for the past accumulation of greenhouse gases will be small. By a large measure, the rich industrialised countries have caused most emissions in the past and present, and it is thus these countries that have most moral, if not legal, responsibility for the victims of global warming. Industrialised countries should therefore do their share in financing, supporting, and facilitating the protection and the voluntary resettlement of climate refugees.

A second case study focused on a related challenge – food security (Massey 2008). A changing climate will significantly affect many communities that today face hunger and malnutrition. Key impacts on agriculture are a depletion of ground water, reduced precipitation and changes, primarily a shortening, of the growing

season. These may all reduce yields. For example, the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report suggests that a 2 to 3 degree range of warming by 2020 could decrease agricultural yields in Africa by as much as fifty percent (Boko *et al*. 2007: 447–448). Therefore, some form of adaptation must occur to ensure greater food security in the most vulnerable regions. Our research indicates that there needs to be a mechanism that allows for adaptation at the local level to help farmers and communities. At the same time, there needs to be a well functioning global institutional system that supports the financing and implementation of adaptive measures, including improved farming techniques and technologies.

One potential means of adaptation to meet this challenge could be improved access of farmers in developing countries to state-of-the-art research on farming technologies. Developing countries are at a competitive disadvantage as a result of the allocation of funding for agricultural research in general, including the protection offered to more adaptive crop seeds due to international intellectual property rights. Developed countries and the private sector may thus have a special role in aiding the farming sector in developing countries to adapt. This support could come in the form of an adaptation levy to fund agricultural research in developing countries as well as a renegotiation of international intellectual property rights in the domain of agriculture. The overall institutional context could be strengthened through a legally binding agreement on adaptation and food security under the climate convention (Massey 2008). This could be a single agreement – such as a protocol to the climate convention – but could also be integrated (possibly with the agreement on climate refugees outlined above) into a larger legal instrument, such as an adaptation protocol to the climate convention. In addition, as discussed earlier under the 'architecture' domain, discussions on farm subsidies and transfer of technologies could be coupled with adaptation-related concerns, for example, through sustainability criteria for trade barrier removals.

Adaptation is clearly a key priority for most developing countries, many of which have contributed only marginally to the build-up of greenhouse gases in the atmosphere but which will be especially affected by climatic change. Alam, Ayers and Huq (2010) thus examined the current discourses and negotiations on adaptation to climate change from the perspective of developing countries. Their analysis also took into account debates on a major workshop on Southern perspectives that the ADAM project organised in 2008 in New Delhi, India. Alam, *et al*. (2010) concluded that, although significant progress has been made on empowering the adaptation agenda within the climate governance architecture, this resulted in a framing of adaptation that is inappropriate for addressing the many developing country concerns. First they argue that, under existing frameworks, adaptation remains, an undervalued policy option relative to mitigation. Secondly, they see

the type of adaptation favoured by the climate convention as not conducive to building the broader resilience that is necessary to reduce the vulnerability of developing countries. Thirdly, they view the adaptation discourse under the climate convention as largely technical and not open to alternative types of expertise that are locally generated and non-technical. In summary, Alam, *et al*. (2010) suggest that it is both necessary and possible to refine the adaptation agenda under the climate convention. According to them, more deliberative policy making processes must be created for adaptation that are better able to engage with vulnerable communities and citizens to create bottom-up, locally meaningful adaptation strategies. This would require a reframing of the adaptation discourse that is more open to non-technical expertise generated from indigenous and locally based knowledge.

In addition to a comprehensive analysis of the perspectives of the developing countries, this research programme explored also the special situation of the poorest people in these countries (Jerneck and Olsson 2010). In the context of the poorest of the poor, mitigation is not a priority because their contribution to the global emission of greenhouse gases is minuscule and their capacity to reduce emissions is low. This makes adaptation their main priority. Today, there are 923 million hungry people worldwide, who are, in general, also extremely vulnerable to climate change impacts. This large number of poor people is expected to increase further and remain large for a long time while people exposed to climate change are expected to become even more vulnerable due to increasing incidence of extreme climate events. In relation to the poorest of the poor, adaptation to climate change should thus be seen as a process of profound social change away from livelihoods threatened at their roots by climate change.

Several policy options were considered to increase the adaptive capacities of the poorest of the poor. These include mainstreaming climate change into development assistance (see also Chapter 12 Gupta *et al*.); identifying synergies with other mechanisms, such as climate change mitigation, biodiversity or desertification; as well as a number of stand-alone adaptation policies, such as special support for climate refugees (see Jerneck and Olsson 2010). Regarding new norms and institutions, the study argued to rethink development from a sustainability perspective rather than mainstreaming climate change and adaptation into the narrower paradigm of development, even though mainstreaming may be the only option for the medium term.

The integrated assessment modelling of adaptation costs and our studies on climate refugees, food insecurity, the perspectives of developing countries and the needs of the poorest among the poor signal the need for an enhanced and targeted set of funding mechanisms for adaptation. It is thus not only important to better endow existing funds and to add new funds, but to co-ordinate the various financial mechanisms in order to reach a meaningful division of labour. We therefore also

studied adaptation funding, including a participatory appraisal exercise with stakeholders and experts from developing and developed countries in Brussels (Klein and Persson 2008).

10.5 Conclusions: mapping of policy options

This chapter has summarised a 3-year research effort, carried out by seven research institutions in Europe and India, on policy options for stable, long-term climate governance. The research focussed on three areas of rapid political development which are also areas of increasing concern: the increasing fragmentation of the overall architecture of global climate governance; the increasing privatisation and marketisation of global climate governance; and the research problem of developing new mechanisms for global adaptation governance. Despite this organisation into three research domains, all domains are interlinked. For instance, most options discussed under agency and adaptation include elements of a future climate architecture, for example reform of the CDM, or protocols on climate refugees and food security. Options discussed under the 'architecture' theme involve non-state actors, for example the linking of emissions trading schemes, or may be relevant for adaptation to climate change, for example technology transfer.

This concluding section highlights connections between the various policy options. Table 10.4 re-structures the options in terms of the international institutional environment where they could be pursued: the UN climate regime, in other international organisations and forums, or in cross-institutional collaboration. Moreover, the table distinguishes options according to their political and legal dimension; either they suggest new political 'hardware', that is, new norms, treaties or institutions, or they propose specific policies, measures or standards. These two dimensions take into account two crucial aspects to be considered when feeding recommendations into the negotiation process: *where?* (institutional setting) and *what?* (nature of proposal, level of ambition). These criteria are more suitable to structure policy-relevant findings, while the three domains have helped structuring and guiding research.

Through these two dimensions, Table 10.4 highlights commonalities among policy options that were analysed under the three research domains. The columns show to what extent some options can be pursued in the same institutional arena and might hence be linked in a comprehensive negotiation approach (for example protocols on climate refugees and food security). Most suggestions fall under the UN umbrella or in the middle column that at least involves the UN regime. This is in line with our general finding that, in spite of some benefits of institutional fragmentation, it is pivotal to strengthen the UN regime as the chief institution to address global climate change.

All policies, measures, and standards listed in Table 10.4 relate to different institutional settings (inside and outside the UN system), with some sharing features, such as

Table 10.4. *Overview of policy options*

	UN climate regime	Other international institutions and forums	Cross-institutional collaboration (between UN climate regime and others)
Norms and institutions	Legally binding agreement on the recognition, protection and resettlement of climate refugees under the climate convention Climate refugee protection and resettlement fund Legally binding agreement on adaptation and food security under the climate convention	Cross-ministerial dialogue among environment, trade and development ministries Opening WTO Committee on Trade and Environment for regular scientific inputs on climate-trade overlaps Public funds to stimulate private research and development Multilateral agreements on research and development of climate-friendly technologies	Open EU Emissions Trading System and link emissions trading schemes bottom-up and top-down Co-operation agreement or Memorandum of Understanding with Asia-Pacific Partnership and other multilateral partnerships for mutual support in treaty implementation, technology transfer, and so on
Policies, measures and standards	Explicit reference to biodiversity convention and biodiversity-standards for forestry projects under CDM Differentiation among CDM target countries, project types and technologies Sectoral CDM pilot phase with discounted sectoral credits Sectoral mitigation targets Science-based sustainability standards for CDM projects	Science-based sustainability criteria for removal of trade barriers for climate-friendly goods and services Issue-linking and package deals on related discussions in the WTO Doha Round (for example farm subsidies, transfer of environmental goods and services, biofuels) Deliberative adaptation policy-making processes	Dovetailing climate-related funds within and outside the UN climate regime Focused national, regional and local policies targeting the poorest of the poor – incentivised by international framework

sustainability criteria based on scientific advice for both the CDM and trade barrier removals. There is an obvious potential to link issues; a scientific body as the IPCC could for instance provide broad expertise to develop criteria across different topics. The distinction between institutional and policy-based options also points to the variant political feasibility of options. All things being equal, agreement on new policies could be expected to be easier than on new institutional instruments, for example an open emissions trading scheme or a food security protocol.

One could also combine the dimensions according to technical or material commonalities, in the attempt to advance options in parallel during negotiations. Examples are (i) issues of funding: climate refugees funds, public research and development funds, dovetailing climate-related funds; (ii) scientific advice, for sustainability criteria for the CDM and technology transfer and for the World Trade Organisation Committee on Trade and Environment; (iii) trade (linkage of emissions trading schemes, issue-linking in the Doha Round); (iv) technology (research and development funding, CDM reform proposals, adaptation food security protocol, technology transfer); and (v) sectoral approaches (a sectoral CDM, sectoral mitigation targets or sector-based emissions trading schemes as part of an open trading system).

In the final analysis, and in light of the complexity of climate negotiations and the multitude of players involved, it will be important, however, not to 'over-integrate' options before communicating them in the policy process. 'Optimal' yet highly complex and demanding combinations might overburden negotiations. The potential for concrete combinations of options in the governance process will depend on political bargaining as well as on ad hoc opportunities of daily politics. Future climate policy does not only need well-designed strategies for long-term effective, equitable and efficient governance architectures, but also a high degree of flexibility in actual utilisation and implementation. For better or for worse, climate governance, as with most areas of policy-making, will always combine long-term vision with short-term incremental application.

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