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Regional Agreements to Address Climate Change: Scope, Promise, Funding, and Impacts

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Abstract

There is a large number of regional agreements concerning Greenhouse Gas (GHG) emissions, often linked to other regional integration agreements. The most successful one in making effort in reducing carbon emissions is the Emission Trading System by the European Union (EU ETS). Apart from this exceptional agreement there are many others, which either focus directly on reducing GHG emissions or were embedded in another agreement. There is little known about the origin, the design or funding of those agreements. Therefore, we point to the potential contribution of those agreements in order to reduce GHG emissions and give an overview on the nature of those agreements to evaluate their success. We classify 15 agreements by their subject (technology / R&D, trade and finance) and examine their record to date. We find that the impact on mitigating climate change has been negligible to date, but the potential to contribute to mitigation climate change at the regional level is substantial.

keywords: regional cooperation, climate change, mitigation

JEL Codes: Q54, Q58, Q55

1 Introduction

Current negotiations on a global agreement on climate change mitigation have not yielded concrete outcomes and currently prospects for an all-encompassing global agreement are remote. Commitment and burden sharing seem to be hard to negotiate on a global level due to systematic differences in interests between groups of countries. At the same time, regional initiatives have developed to cooperate on reducing GHG emissions. Those groups share common interests and in many cases common borders. In recent years several regional climate agreements have been founded such as the Global Climate Financing Mechanism (GCFM), or the Global Energy Efficiency and Renewable Energy Fund (GEEREF). Apart from those financial initiatives, which directly focus on the reduction of GHG emissions, there are trade and technology agreements, which reduce emissions as a secondary interest, such as the Common Market for Eastern and Southern Africa (COMESA) or the Methane to Markets (M2M), now called Global Methane Initiative (GMI). We differentiate the agreements between the context from which they did arise: trade, technology and R&D or financial agreement. We analyze the range of influence in terms of the designs of their program or initiative, e.g. members, size of funding and commitment to the agreement.

The European Union has gone further in developing mechanisms to address climate change at the regional level, including various binding directives on energy efficiency or biofuels as well a cap-and-trade system to control emissions, the EU-Emission Trading System. The EU is a special case as it is the only region where there has been a substantial transfer of sovereignty from nation states to regional institutions, including the EU Council, the EU Commission, and the EU parliament. In some sense these EU institutions operate like a nation state, including in areas of trade and the environment. For this reasons, we do not analyze these EU initiatives to combat climate change, which has been extensively covered in the literature (e.g. Convery, 2009; Lohmann, 2011). Instead, in this paper we try to fill the gap of missing literature concerning many *other* regional agreements on climate change apart from the initiatives in the European Union.

To our knowledge there are only few studies, which aim to categorize and evaluate *regional* agreements. Bäckstrand (2008) analyses the accountability of regional climate partnerships. She first divides the partnerships into trans-governmental or private networks as well as technology cooperations. A key question when analyzing partnerships such as the Asia Pacific Partnership on Clean Development and Climate (APPCDC) is they are complementary to, or

substituting global international climate agreements such as the Kyoto Protocol. The focus of the analysis is on the legal character of the agreements such as transparency, monitoring, representation of the stakeholders and the accountability mechanism. Bäckstrand (2008) concludes that those climate partnerships led to a transformation of the climate policy agenda towards a more complex multilateralism.

De Coninck et al. (2008) focus on 16 technology-oriented climate agreements such as the Methane to Markets Partnership (now called Global Methane Initiative) and the Carbon Sequestration Leadership Forum (CSLF). They analyze whether those agreements could make a contribution to address climate change. Therefore, De Coninck et al. (2008) choose a set of criteria such as environmental and technological effectiveness as well as economic efficiency and incentives for compliance. They find that all technology-oriented agreements are potentially valuable to address climate change, mainly in terms of mitigation. Apart from climate change, the agreements can contribute to long run development as they improve cost efficiency through higher technological effectiveness and they may reduce environmental damage.

Balsiger et al. (2012) give an overview on the nature and role of regional agreements in environmental politics. They classify agreements by their dimension and scope. Already in 2001 regional agreements made up for 70% of multilateral environmental agreements (UNEP 2001). Balsiger et al. (2012) perform an accounting of agreements and point to the difference between those, whose members are neighboring countries, and those agreements, whose member countries are not. They find that spatial proximity plays a major role in the development of regional agreements. Unfortunately, hardly any climate change agreement appears in the database Balsiger et al. (2012) use for their analysis, namely the International Environmental Agreements (IEA) Database Project (Mitchell 2013). We searched for keywords (climate, carbon, energy, CO2, emissions, methane, mitigation, adaptation, greenhouse gas and names of climate change agreements and found hardly any agreement related to climate change – besides the UNFCCC.)

Our analysis differs from the other three studies as we give a specific overview on current regional climate agreements concluded at the level of governments. Therefore, we analyze the origin and motivation as well as the nature of those agreements. To our knowledge we consider all agreements (identified by certain classifications in section 2), which currently exist. We set up certain evaluation criteria such as: (1) origin, dimension and age; (2) goals and compliance/reduction mechanisms; (3) incentives and funding. We are well aware that

regional agreements are only second best compared to global agreements due to carbon leakage. First best mitigation results can only be achieved through a global agreement, which sets obligations to all member countries. A regional can contribute to mitigation but countries outside the agreement can offset the reduced CO2 emissions. Nevertheless, regional agreements account for a large share of current GHG mitigation efforts and may be substantially easier to implement than the currently elusive global deal. Therefore, we analyze the potential of regional agreements as an intermediate solution on the way to a global agreement.

2 Research Scope

Despite our best research efforts using literature and Internet searches, we cannot claim to have detected every regional climate change agreement, which currently exists. A growing interest in the need for an effective instrument to address climate change has led to the emergence of many programs, initiatives, and agreements related to the mitigation and adaptation of climate change. We have selected those agreements, which have been implemented since the turn in the millennium and focus on those, which fulfill the conditions we discuss here.

First, we distinguish between the geographical setting of the initiative, i.e. we only focus on regional agreements and initiatives. This refers to initiatives implemented by a group of countries, consisting of at least three partner countries in geographic proximity. Excluded are national, bilateral or global agreements. We focus on initiatives that address mitigation not adaptation as joint adaption initiatives at the regional level are only slowly emerging with increasing knowledge about regionally specific damages expected from climate change. In contrast, there is a longer history and track record of regional agreements on mitigation, also linked to a longer-standing international focus on mitigation. We separate climate change agreements from other environmental agreements (e.g. on air or water pollution, acid rain, and the like) to capture only initiatives with a clear climate-related focus. We distinguish between technology agreements that primarily range from research and development (R&D) platforms to technology transfer; financial agreements; and agreements that are borne out of trade agreements but put their emphasis on climate-related issues in an additional and separate initiative.

3 Evaluation Criteria

Within the literature on the evaluation of climate policies there are various criteria identified to evaluate current policies such as the Kyoto Protocol or potential future policies such as a global carbon tax (De Coninck et al. 2008; Aldy, Barrett, and Stavins 2003). We choose three criteria for our analysis: (1) origin, member size and age of the initiative; (2) goals and compliance/reduction mechanism; (3) incentives and funding.

We are only able to evaluate the charters, program outlines and a small number of papers, which discuss the initiatives, as reliable data on concrete impacts and evaluations of regional climate agreements is very scarce and sometimes non-existing.

We first classify the origin of the examined agreement, i.e. whether it arises from a trade agreement or if it is explicitly set up for dealing climate change issues. Technology oriented agreements could be classified by their levels of cooperation and stage of technology as Uneo (2006) does. We will discuss the purely research and development agreements first. Further, we identify the date when the program or initiative was launched and if it is still in force. We name the actual members and how the member size has changed and check whether the agreement is still in progress. The member size in terms of number of participating countries and "age" of the initiative give us insights about how well the initiative has been accepted and performed. A high member size gives us information about the relevance of the initiative although we are aware of the fact that a smaller member size does not necessarily reflect a lower interest in the initiative. It is also possible that a smaller member size is due to a more binding character or the regulatory framework and higher requirements for compliance. The stability of membership might give us information about entry conditions to the initiative and incentives for participation. If the agreement is designed with enough flexibility towards new information then additional information could be absorbed (De Coninck et al. 2008). This might seem welcoming to potential members. A high attrition rate might also give us some relevant information about the topicality of an initiative.

The reduction/compliance mechanisms and goals differ greatly among the initiatives. There could be clear reduction targets as in a cap and trade system or a carbon tax, which aim to reduce emissions directly. And there are indirect reductions from agreements, which focus on the transfer of climate friendly technology and knowledge as well as the provision of the financial means to invest in climate change mitigation and adaption projects. The overall GHG reducing effect of the agreements is hard to quantify as they are usually not binding or

the GHG reducing effect will occur in the long run (De Coninck et al. 2008). Still, this effect should not be underestimated as technology and knowledge transfers can create positive spillovers from one industry to another as they usually go in line with higher cost effectiveness due to lower energy intensity. We distinguish whether the agreement postulates a voluntary or a compulsory statement. This is even more of interest in cap-and-trade programs as herein specific goals are set and hence, members can be judged by the fulfillment of these goals. Since we consider regional initiatives (not national) the problem of compliance mechanisms arises, as there is no national law the members can refer to. Countries face the free rider problem because marginal mitigation costs are increasing – and each country can benefit only from a small fraction of the global mitigation benefit – therefore the incentive for countries to mitigate climate change is significantly reduced (Barrett and Stavins 2003). Thus, well established compliance mechanism and goals are of high importance.

Incentives and funding are an important evaluation criterion because we believe that the higher the funding of an initiative is, the more likely its goals can be potentially reached. The accessibility of funds is an incentive to participate itself. Apart from access to funds countries participate in climate agreements due to the nature of the agreements. Some of the agreements are borne out of already existing trade agreements and members enter the climate agreement automatically. Other agreements are based on the exchange of technology and the access to state of the art research. Finance climate agreements provide an incentive again through the access to funds.

As hardly any paper has evaluated the likely impact of a set of regional agreements/initiatives to estimate their chances of success, we – to our knowledge – are currently the first to give an overview of the chances and effectiveness of several regional agreements dealing with climate change. Papers by Bulkeley et al. (2012), Bäckstrand (2008), and Balsiger et al. (2012) have more of an overview character but no step-by-step examination of implicit characteristics of a certain initiative.

4 Evaluation of the Agreements

Table 1 gives an overview of the analyzed agreements. We divide the agreements by their origin as this is the major driver of different characteristics. Most of the agreements are technology and R&D agreements, some are finance mechanisms and very few were added or originated from regional trade agreements. This is not surprising as technology agreements

promise benefits of technological progress to all participating parties. But in terms of climate change mitigation there agreements are the least ambitious type of agreements we examine here. Technology and R&D agreements often only facilitate cooperation that might in future actively contribute to climate change mitigation. (De Coninck et al. 2008).

Table 1 Overview of the Analyzed Agreements

Type	Name of the Agreement
Technology, R&D	1. Carbon Sequestration Leadership Forum (CSLF) 2. International Partnership for the Hydrogen Economy (IPHE) 3. Methane to Markets Partnership (M2M) 4. Mediterranean Climate Change Initiative (MCCI) 5. Arab Climate Resilience Initiative (ACRI) 6. Mekong River Commission Climate Change and Adaption Initiative (MRC-CCAI) 7. ASEAN Multi-Sectoral Framework on Climate Change (AFCC) 8. Asia Pacific Partnership on Clean Development and Climate (APPCDC) 9. Pacific Climate Change Science Program (PCCSP)
Finance	10. The Global Energy Efficiency and Renewable Energy Fund (GEEREF) 11. Global Climate Change Alliance (GCCA) 12. Global Climate Financing Mechanism (GCFM) 13. Regional REDD
Trade	14. Common Market for Eastern and Southern Africa (COMESA) Climate Initiative 15. North American Agreement on Environmental Cooperation (NAAEC) Commission for Environmental Cooperation (CEC)

Source: Authors.

Financial agreements, on the other hand, are either driven by international organizations such as the United Nations and the World Bank, or are of bilateral nature and thus not considered here. Different bodies of the United Nations (UN) apply different finance mechanisms such as Global Environmental Facility (GEF) or the UN- Reducing Emissions from Deforestation and Forest Degradation (REDD) program. The Green Climate Fund, which might be the biggest fund with a volume of $100 billion per year by 2020 is in a stage of being designed and is not operating yet. The World Bank administers various climate investment funds such as the Clean Technology Fund or the Strategic Climate Fund. Several countries such as Germany and the United Kingdom run national initiatives such as the International Climate Initiative (ICI) or the Environmental Transformation Fund, International Window (ETF-IW).

Regional financial agreements exist almost only between the European Union (EU) and other countries. The European Commission initiated three different types of climate funds. First, the

Global Climate Change Alliance (GCCA), which provides finance for climate change mitigation project in least developed countries. Second, the Global Energy Efficiency and Renewable Energy Fund (GEEREF), which is a public-private investment fund to improve energy efficiency in developing countries. And last but not least, the Global Climate Financing Mechanism (GCFM) raises money by selling bonds to the private sector (Bird and Brown 2010; Klein and Möhner 2011). There are more than seven funds for Reducing Emissions from Deforestation and forest Degradation (REDD) with approved projects worth $95.38 million in 2010 supporting projects located mostly in Guyana, Brazil, Indonesia or Mexico. There is only one regional REDD fund in South America under the Central American Commission on Environment and Development. All other REDD funds are bilateral between the donor and the recipient countries.

Trade agreements with additional climate agreements still relatively rare. The North American Free Trade Agreement (NAFTA) and the Common Market for Eastern and South Africa (COMESA) are currently the only free trade agreements, which have launched specific climate initiatives. Those initiatives focus mostly on the sharing of knowledge and could be exploited much more to protect the climate. At the same time, as shown by Baghdadi, Martinez-Zarzoso, and Zitouna (2013), a rising number of free trade agreements include environmental agreements. They show that those trade pacts with such environmental agreements lead to a conversion of emissions within the countries covered and to a lower absolute level than without the agreement. Building on this, existing initiatives could be enhanced to address mitigation using cap-and-trade such as the EU-ETS or coordinated carbon taxes within a trading bloc (Schott and Fickling 2010).

4.1 Origin, Member Size and Age

4.1.1 Technology and Research & Development Agreements

Most of the knowledge and technology-related agreements share a joint motivation. Countries group together as they are jointly affected by severe climate-related impacts like water scarcity, rising sea levels, floods, droughts, and desertification. Most of the knowledge agreements are implemented to address these questions jointly.

The Carbon Sequestration Leadership Forum (CSLF) is a framework for international cooperation for research in the areas of separation, capture and storage of CO_2 emissions. It

was launched in 2003 and counts currently 25 member countries.[1] Just the like the CSLF the International Partnership for the Hydrogen Economy (IPHE) is an international partnership for alternative fuels such as hydrogen. It was established in 2003 and the member countries[2] are committed to share information on hydrogen and fuel cell technologies as well as to cooperate in the early adaption of the technologies. The Global Methane Initiative (GMI), which originated under the name Methane to Markets (M2M) was founded in 2004. Currently the GMI compromises 40 partner countries.[3]

The Mediterranean Climate Change Initiative (MCCI) has been reviewed by several scientific articles (see Cantore et al. 2011; Brauch 2012; Ahmed & Dougherty 2012; Galeotti & Roson 2011). All these articles and several environmental-related websites refer to the launch event of the MCCI but afterwards there has been hardly any information about the initiative. It can be classified as a network that initiates, coordinates and distributes climate impact studies. The MCCI has 21 member countries and was launched in October 2010 in Athens, Greece. Brauch (2012b) refers to a second annual meeting to be held in late 2011 which might give hints on age of the initiative but unfortunately it was not possible for the author to find out more about the continuity of the initiative. Judging from recent information on the initiative, it appears that the network is no longer active.

In 1995 the Mekong River Commission (MRC) was founded to "coordinate water resources planning and development across Southeast Asia's lower Mekong River basin" (Jacobs 2002). In March 2009 the MRC prepared the Climate Change and Adaptation Initiative (CCAI) as a regional initiative, which aims to build capacity for climate change adaptation for the member countries (Schmeier 2011). The MRC-CCAI was established in 2009 with the member countries Cambodia, Lao PDR, Thailand, and Vietnam. It is a long term initiative running over some 16 years to 2025 in three five-year phases.

The Arab Climate Resilience Initiative (ACRI) is an initiative within Arab countries[4], the implementing partner the UNOPS (United Nations Office for Project Services) and the responsible party the UNDP (United Nations Development Program). After three regional

[1] The partners are: Australia, Brazil, Canada, China, Colombia, European Union, France, Germany, Greece, India, Italy, Japan, Luxembourg, , Mexico, New Zealand, Norway, Poland, Russia, Saudi Arabia, South Africa, South Korea Uganda, United Arab Emirates, United Kingdom, United States.
[2] The members are: Australia, Austria, Brazil, Canada, China, European Commission, France, Germany, Iceland, India, Italy, Japan, Republic of Korea, Republic of South Africa, New Zealand, Norway, Russian Federation, United Kingdom, United States.
[3] The initial members are: Australia, Argentina, Brazil, Bulgaria, Chile, China, Colombia, Dominican Republic, Ecuador, Ethiopia, India, Italy, Japan, Mexico, Mongolia, Nicaragua, Nigeria, Pakistan, Peru, Philippines, Poland, Russia, Serbia, South Korea, Thailand, Turkey, Ukraine, United Kingdom, United States, Vietnam.
[4] The meetings take place in Syria, Egypt and Bahrain.

consultative events, lots of presentations, speeches, and background papers the program has recently started its activities. A fourth meeting in 2010 in Morocco brought together more than 150 stakeholders, experts and policymakers who agreed on an inter-country collaboration in the Arab region. The program period lasts for four years from 2012 to 2016, the project has been launched in 2010 but only recently been implemented (UNDP 2011). Oil-producing countries have not signed the ACRI project document yet because they feel they would lose out from any policy aimed at reducing oil consumption but nevertheless, they are also vulnerable to at least some aspects of climatic variations (UNDP 2013).

Ensuring long-term food security is one of the main goals of the ASEAN countries as it not only enables to improve farmers livelihoods (by sustainable food production) but also improves living conditions of all people living in the ASEAN countries (ASEAN 2011). Hence, in November 2009 the ASEAN Ministers of Agriculture and Forestry adopted the AFCC (ASEAN Multi-sectoral Framework on Climate Change). For the AFCC the focus still lies on food security but emphasizes the meaning of "sustainable and efficient use of land and water resources by minimizing the impacts of and the contributions to climate change"(Vichitlekarn 2010; FAO 2011). The AFCC is an initiative under AIFS framework (ASEAN Integrated Food Security, also implemented in 2009) and makes information available to ACCI (ASEAN Climate Change Initiative) which serves as a platform for coordination and cooperation (Vichitlekarn 2011). ACCI – approved in 2009 by ASEAN Environment Ministers- serves as a platform to address the particular vulnerability of the region to climate change. ACCI is planned to prepare "policy and strategy formulation", for "information sharing", and "capacity building and technology transfer" among the member countries (Letchumanan 2010). (Letchumanan 2010, 57–61) and Trevisan (2013) give a broad overview of established programs related to climate change of ASEAN members. Partnerships do exist with other countries (ASEAN Plus – Australia, USA, Korea, China, Japan) and development partners (e.g. GIZ, FAO, IDB) (Vichitlekarn 2011). In May 2013 representatives of the AFCC, GIZ, FAO, and SDC grouped together on a "Regional Expert Forum on Climate Change, Agriculture, and Food Security in ASEAN" in Bangkok, Thailand. They point out the necessity to develop guidelines and to design a concrete plan of action for the ASEAN member states (AFCC 2013).

The APPCDC (Asia-Pacific Partnership on Clean Development and Climate) has held its inaugural meeting in January 2006 in Sydney, Australia. Member countries are Australia, China, India, Japan, the Republic of Korea, and the USA (APPCDC 2006). In October 2007

Canada entered the partnership (Noriko Fujiwara 2007). The main goal of the APPCDC is to secure a reliable access to affordable and clean energy. This becomes even more apparent after having a closer look at the approved public-private sector task forces (covering Aluminum, Buildings and Appliances, Cement, Cleaner Fossil Energy, Coal Mining, Power Generation and Transmission, Renewable Energy and Distributed Generation, and Steel) (APPCDC 2013). So, the task forces refer predominantly to energy intensive sectors. The character of the partnership is non-legally binding and on a voluntary basis. It is organized by two main bodies (a Policy and Implementation Committee and an Administrative Support Group), but there does not exist a permanent secretariat. After establishing several task forces and flagship projects the APPCDC has formally concluded its joint work as of April 2011 (APPCDC 2013). Fujiwara (2007; 2012) gives a broad overview about projects of the APPCDC and its perception in the public. He finds that APPCDC activities could be considered as being successful and promised success to similar initiatives with a similar background (2012). The initiative was "build up on the foundation of bilateral and multilateral partnerships" and therefore found connecting factors that help achieve the UNFCCC objectives via progress in technological research (2007, 5).

The Pacific Climate Change Science Program (PCCSP) counts as a knowledge program, it is part of the much larger International Climate Change Adaptation Initiative (ICCAI) program, which is funded by the Australian government. The Australian Agency for International Development and the Australian Department of Climate Change and Energy Efficiency conduct research in collaboration with the Commonwealth Scientific and Industrial Research Organization (CSIRO). More than 60 research scientists help decision makers and planners in 15 countries to better comprehend how climate change affects their countries and oceans and how they manage several possible perspectives (Australian Bureau of Meteorology and CSIRO 2009). The PCCSP includes14 Pacific island countries and East Timor to conduct research in order to be able to advise the policymakers of their countries on climate change mitigation and adaption (Australian Bureau of Meteorology and CSIRO 2009). The ICCAI has been launched in 2008. The first Annual Report 2009 for the PCCSP summarizes progress over the period July 2009 to June 2010. The program is still ongoing.

4.1.2 Climate Finance Agreements

There are only few regional agreements concerning climate finance. We analyze three different funds, which were issued by the EU and serve developing countries and one fund,

which was issued by Germany. Generally, these funds were catalyzed by the UNFCCC climate negotiations.

The Global Climate Change Alliance (GCCA) originated from an initiative by the European Commission as "an answer to the development dimension of climate change" in 2008 (Bird & Brown 2010, 11). The GCCA did not set up an administrative body and uses the existing channels of official development assistance by the member countries. The funds are reserved for the most vulnerable countries, which are categorized as least developed countries and the small island developing states (Klein and Möhner 2011). The Global Energy Efficiency and Renewable Energy Fund (GEEREF) is a risk capital fund, which is managed by the European Investment Bank and was set up in 2008. It aims to transfer energy efficient techniques to developing countries. Therefore, it contributes to climate change mitigation by providing equity finance for small projects of up to €10 million. Behrens (2009) states that the first two projects which were financed are located in Africa and have a volume of 22 million Euros. The Global Climate Financing Mechanism (GCFM) is an international finance facility, which is financed by the private sector through the purchase of bonds. It is supposed to bridge the period until an international financial architecture such as the Green Climate Fund has emerged from international climate negotiations (Bird and Brown 2010). These three agreements on climate finance by the European Commission were predominantly established in 2008 and are arranged between the member countries of the EU and developing countries such as Guyana, Mauritius, Rwanda and Seychelles. The GCCA was extended by the Declaration on Climate Change between the Pacific Islands Forum and the EU in 2008.

Yet another financial tool is represented by the Reducing Emissions from Deforestation and forest Degradation (REDD) funds. The Kyoto Protocol did not recognize emission reductions from REDD but at the Conference of the Parties in Copenhagen in 2009 it was accepted after several forest rich developing countries made their voice heard. Industrialized countries invest in projects against deforestation and forest degradation in developing countries and can buy the certified emission reductions to fulfill their own commitments. Therefore, REDD represents a mechanism to reduce emissions from deforestation by providing financial incentives to preserve rather than harvest forests. There is one regional REDD project in Central America, which has a regional character and shall be discussed here. This Regional REDD project evolved between Germany and Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panamá and the Dominican Republic. It was originated in 2010 and will last for six years. The advantage in regional REDD programs is that participating

countries share forests and can implement joint strategies against deforestation. The Congo Basin is another potential regional REDD area but the current projects are not transboundry ones.

4.1.3 Trade Agreements

The two climate agreements arising from trade agreements are the Council for Environmental Cooperation (CEC), which was created in 1994 under the North American Agreement on Environmental Cooperation (NAAEC) as a side agreement to NAFTA. The CEC addresses regional environmental concerns and aims to prevent trade and environmental conflicts between the NAFTA partner countries.. The CEC was founded in the same year when the adjunct trade agreement the NAFTA was signed in 1994. The members are Canada, Mexico and the United States. Since 2009 climate change was incorporated stronger in the agenda of the NAFTA.

The Common Market for Eastern and Southern Africa (COMESA) Climate Initiative consists currently of a roundtable process to share knowledge in order to promote sustainable landscapes and livelihoods. The COMESA Climate Initiative has no specific date for its foundation. The members are 19 East and South African Countries.[5]

4.2 Goals and Compliance/Reduction Mechanism

4.2.1 Technology and Research & Development Agreements

The Carbon Sequestration Leadership Forum (CSLF) is a climate initiative, which meets at ministerial level, with the goal to facilitate new technologies for the capture and storage of CO_2 emissions. In particular it aims to identify obstacles in achieving improved technologies and identifies areas of multilateral cooperation on carbon separation and fosters research in the participating countries. Hence, the CSLF does not reduce emissions directly and does not set any reductions target. The CSLF meets in workshops and aims to disseminate new technologies. The International Partnership for the Hydrogen Economy (IPHE) has very similar goals in order to facilitate research and the use of fuel cells and hydrogen among the member countries. It also aims to establish a conducive policy and regulatory environment for the application of the technology. Again we cannot find a defined mechanism to reduce CO_2

[5] COMESA has 19 members: Burundi, Comoros, Democratic Republic of Congo (DRC), Djibouti, Egypt, Eritrea, Ethiopia, Kenya, Libya, Madagascar, Malawi, Mauritius, Rwanda, Seychelles, Sudan, Swaziland, Uganda, Zambia and Zimbabwe.

emissions; still the IPHE can contribute to reduce CO_2 emissions indirectly through the replacement of fossil fuel technologies. The Global Methane Initiative (GMI) is more action oriented than the CSLF and the IPHE. The goal of GMI is to reduce global methane emissions while enhancing economic growth and promoting energy security. GMI targets three major sources of methane emissions such as landfills, coalmines and natural gas systems. Just like CLSF and IPHE the GMI does not have a clear reduction target. Member countries are required to develop and share national actions plans to coordinate methane reduction efforts.

The Mediterranean Climate Change Initiative (MCCI) aims to initiate, coordinate, and distribute climate change impact studies across the Mediterranean region and also provides the underlying data. There is no information about timelines for the presentation of results. The administrative bodies can act as a mechanism that ensures compliance. In the case of the MCCI there are three administrative bodies: a central facility, which produces operational climate projections, a science steering committee, which promotes multi-national, interdisciplinary collaboration and a governing body with representatives of all participating countries. Schmeier (2011) gives a detailed overview of activities the MRC-CCAI is currently undertaking and planning to implement. Heikkila et al. (2013) analyze the capacity outcomes of several MRC programs in terms of institutional, technical, and social capacity. The initiative produced several studies, which we interpret as 'achievements' of the initiative since the goal was to address climate change impacts and adaptation planning for the Lower Mekong Basin. The CCAI is managed by a steering committee (since 2010), also joined by representatives from development partners funding the CCAI, the everyday work is coordinated and assisted by the "MRC office of climate change and adaptation, which provides secretarial and administrative services as well as technical assistance related to the implementation" (Schmeier 2011, p.35). There are several other bodies that are related with the planning, implementation, coordination, and evaluation of the CCAI, which we interpret as a valuable precondition for the success of a such a complex research partnership (MRC 2011; Schmeier 2011).

For the Arab Climate Resilience Initiative (ACRI) the expected outcome is very similar compared to all other initiatives we categorize to be technology as well as research & development related projects. An extensive consultative process has led to a well prepared project document, which points out the following output goals: building institutional capacity to address climate change adaptation and mitigation; creating opportunities to improve the production and use of sustainable energy; and strengthening knowledge management,

advocacy, and awareness in the Arab countries (UNDP 2011; UNDP 2013). A Technical Support Group (TSG) will provide technical support and guidance in accessing and analyzing available data on climate variability and impacts to key ministries and stakeholders involved in the implementation of ACRI activities (UNDP 2011). The UNDP Regional Bureau for Arab States evaluated several programs in the area. To the evaluators the ACRI project appears "too ambitious technically". Therefore, they recommend to ask the UNDP Bureau for Development Policy and/or the UNDP Global Environment Facility for "structured, periodic technical assistance" (UNDP 2013, 36).

The AFCC "covers the agriculture, fisheries, livestock and forestry sectors and will coordinate with the environment, health and energy sectors" (ASEAN AFCC no date). The concept note for the AFCC considers following objectives: to coordinate "on the development of adaptation and mitigation strategies", and to cooperate "on the implementation of integrated adaptation and mitigation measures" (p. 4). By means of 4 main goals subdivided into several "strategic thrusts" the ASEAN members try to address the special needs for their countries to encounter the consequences of climate change (ASEAN AFCC no date).

Member countries explicitly emphasized that the APPCDC should "complement but not replace the Kyoto Protocol" (APPCDC Charter). The APPCDC does neither include any caps, nor detailed target setting. It was supposed to serve as a platform for information sharing and exchange, implementation of bilateral and multilateral cooperative activities, among others (APPCDC Charter). Public-private partnerships exist on the regional scale and predominantly imply that private companies and governmental bodies rely on the knowledge of researchers regarding climate change adaptation and mitigation strategies (Fujiwara 2007). By knowledge sharing the established task forces try to improve the used technologies to reduce emissions. In some task forces, as Fujiwara (2007) points out, mandatory indices of CO2 emission intensities are used to control emissions in some sectors.

The Pacific Climate Change Science Program (PCCSP) names the objectives: "to provide meteorological, climatological, and oceanographic information (…), to build the capacity of partner country scientific organizations (…), and [the] dissemination of the climate science information to partner countries and other stakeholders (…)" (Australian Bureau of Meteorology and CSIRO 2009). In 2011 the program published a 560 page report on its scientific assessment and research results, which includes a regional overview as well as several country reports (Australian Bureau of Meteorology and CSIRO 2011). We interpret the report as a successful achievement of the above-mentioned objectives as it points out that

members are engaged in making progress. The PCCSP consists of five components. The first four are closely related to research questions regarding causes and effects of climate change in the region and the last one is related knowledge distribution (Australian Bureau of Meteorology and CSIRO 2009).

To conclude our findings on knowledge and research agreements as well as technology agreements we see that none of the investigated agreements has a binding character in terms of compliance mechanisms. After several official meetings and conferences, the responsibility in making progress in designing climate mitigation and adaptation measures seems to end up at the national level again.

4.2.2 Climate Finance Agreements

The compliance and reduction mechanisms of financial agreements differ but the goal is common. All the agreements have the goal to reduce green house gas emissions and support low-income countries in their mitigation and adaption efforts.

The Global Climate Change Alliance (GCCA) is designed to particularly help least developed countries and small-island developing states to improve their capacity to adapt to the negative effects of climate change and develop sustainable development strategies. Bird and Brown (2010) criticize the compliance of the GCCA as the recipient country selection did not follow climate finance principles but internal decisions of the European Commission. Klein and Möhner (2011) describe the selection process category approach to vulnerability. In this approach only the least developed countries and the small island developing states are eligible for funding. Meanwhile the GCCA focuses on adaption, especially for small island developing states, the Global Energy Efficiency and Renewable Energy Fund (GEEREF) focuses clearly more on mitigation through improving energy efficiency and therewith lowering energy intensity in emerging countries. It focuses on the promotion of energy efficiency and renewable energy through equity finance not dept in emerging countries. For the period of 2007-2011 a volume of €113 million was achieved (Behrens 2009). The Global Climate Financing Mechanism (GCFM) is a tool to fund to urgent climate change actions.

The regional Reducing Emissions from Deforestation and forest Degradation (REDD) fund aims to support the dialog between different sectors, to develop national REDD strategies and compensation instruments, which include the indigenous population.

4.2.3 Trade Agreements

The two climate programs from trade agreements did not install a specific mechanism to mitigate climate change. The goal of the Council for Environmental Cooperation (CEC) "is to promote policies and actions that provide mutual benefits for the environment, trade and the economy" (CEC 2012). This goal is realized by projects in different areas such as information and decision-making, trade and the environment and specifically like the renewable energy expert committee, which analyses the feasibility of small-scale renewable energy projects. The CEC consists of a council of cabinet level environmental officials from the three member countries. A fifteen member joint public advisory committee represents an independent advisor to the council. The CEC secretariat has two offices, one in Montreal and one in Mexico City and is headed by an executive director (CEC 2012).

The Common Market for Eastern and Southern Africa (COMESA) Climate Initiative targets knowledge and capacity building for climate change mitigation. The frameworks and tools pillar aims to build institutions to monitor and measure climate change. The best practice toolbox aims to collect knowledge and experience on sustainable land use and carbon sequestration to support climate change mitigation and adaption. The COMESA Climate Initiative has two pillars, the first is directed to frameworks and tools and the second to applications and learning. It consists of the secretariat of the New Partnership for Africa's Development and the heads of the member states. A country based round table process was initiated.

4.3 Incentives and Funding

4.3.1 Technology and Research & Development Agreements

The Carbon Sequestration Leadership Forum (CSLF) supports projects concerned with research in the capture and storage of CO_2 emissions. Currently it recognized 32 projects. The technical group proposes projects for recognition regarding their information exchange, collaboration, road mapping and research and development potential. Once the policy group approves the proposed projects, they become recognized. The International Partnership for the Hydrogen Economy (IPHE) in 2010 has had a research budget of over 1 billion USD for research and development financed by all members (IPHE 2011, 10). Incentives are very much in line with the incentives of the CSLF. Both agreements provide access to information on state of the art research in the field of fuel cells and hydrogen and aim to disseminate this

information among the member countries. Those who participate could become market leaders for fuel cells and hydrogen. Again, the incentives to join the Global Methane Initiative (GMI) are similar to the ones to join CSLF and IPHE. Each member country gets access to the methane mitigation strategies of the other member countries. Therefor there is an incentive to get access to new technologies. Funding of the initiative is voluntary, each member country can provide funding. Last but not least all the costs have to be incurred by the country to which they arise.

The Mediterranean Climate Change Initiative (MCCI) gives the incentive to participate because of the benefits that knowledge about climate change projections could have for member countries. Member countries are able to take action after analyzing the information they get from the initiative. We have no information regarding the funding of MCCI.

The countries in the Mekong River Commission (MRC) work through their governments and some implementing partners in the Climate Change and Adaptation Initiative (CCAI). They also build on already existing program activities of the MRC concerning climate change. The MRC-CCAI's budget is targeting an overall amount of US$15 million until 2025 (Schmeier 2011).

The Arab Climate Resilience Initiative (ACRI) project has declared the United Nations Office for Project Services responsible for the use of project funds. For projects like the 'Nile coastal adaptation project in Egypt' or 'Resilience building of the rain fed farmers and pastoral communities in Sudan' the budgets have already been allocated through the Special Climate Change Fund (SCCF) or the Least Developed Countries Fund (LDCF), respectively. The total resources required are 9.3 m. USD with total allocated resources of 2.5m USD. For the missing amount of 6.8 USD donors have yet to be found (Owaygen 2012; UNDP 2013).

In March 2011 the AFCC held a workshop in Beijing and discussed among several other mechanisms for regional cooperation the topic of financing the framework. The idea was to get funding from GEF and CDM but also a regional fund to finance research on climate adaptation and mitigation strategies has been discussed (FAO 2011).

The charter of the APPCDC (2006) stresses the voluntary basis of the partnership. As there does not exist any common fund the partners agreed on that the partner that has induced them carries any costs. Fujiwara (2007) names the total amount of around 170 Mio. USD committed by Australia and the USA to several projects operating under Task Forces.

The definition of member countries in the Pacific Climate Change Science Program (PCCSP), namely the Pacific island countries, lies in its name. Therefore there will not be any strong incentive for other countries to join the program. It is a voluntary initiative and has no binding character. But the knowledge gain for the member countries seems to be high as the science program holds workshops and training events on a regular basis (Power et al. 2011). The PCCSP has a budget of $20.5 million; it is part of the larger ICCAI ($ 150 million program).

4.3.2 Climate Finance Agreements

The incentives of the regional finance agreements are manifold but all focus on the development of adaption and mitigation potential in the recipient countries. By providing climate change adaption measures with the GCCA or energy efficiency with the GEEREF or alternative income sources to deforestation with the Regional REDD there are positive side effects generated. One of these effects can be the transfer of new technologies or job creation. There are no sanctions in those finance mechanisms.

The funding of the regional finance agreements differs. The GCCA is financed through the channels of official development assistance of the member states. By 2011 one regional group and 17 countries have received support from the GCCA (Klein and Möhner 2011). The GEEREF has a volume of €113 million in equity finance for the period of 2007 to 2011 and is not limited to developing countries (Behrens 2009). The Regional REDD received €12 million from the German Federal Ministry of Economic Cooperation and Development.

4.3.3 Trade Agreements

Trade agreements provide incentives through harmonized product and the option to receive funding for projects as well as the knowledge exchange. The climate initiative from COMESA receives funding through the Global Environmental Facility (GEF) and World Bank for projects providing sustainable land use and carbon sequestration.

5 Summary Assessment

Based on our evaluation criteria we come to the conclusion that most agreements originate in the field of technology and R&D. This is likely to be the case because the exchange of technology and R&D offers immediate returns in terms of knowledge exchange and no country wants to be left behind. Those agreements are also the largest in terms of member size. Trade based climate agreements are born out of existing trade agreements. Therefore the

member countries are pre-determined. Finance based climate agreements originate mostly between a donor country and a group of countries, which apply for funding of climate projects. The oldest agreement is the Council of Environmental Cooperation, which is a side agreement of the North American Free Trade Agreement (NAFTA) and which was created in 1994. Technology and R&D agreements are on average much younger and were mostly created around 2010.

The goals are of course different between the types of agreements and none of the investigated agreements names any specific goal of CO_2 emission reductions. The technology and R&D agreements make clear statements on the goals the aim to achieve. There is the dissemination of new low carbon technologies and enforcement of research cooperation in the center of attention. Financial agreements aim to support low-income countries in their climate mitigation and adaption efforts. Climate agreements from trade do not mention clear goals; in fact agreements from trade aim to support environmental friendly policies. All agreements lack a clear compliance mechanism. There is no evidence of a mechanism to punish member countries, which do not fulfill their goals. Last but not least, the goals are defined so vague that it is hard to measure performance against these goals.

Concerning the incentives to join an agreement there is a strong incentive for neighboring countries to join the same agreement as countries face the similar risks from climate change. Further there is an incentive to join technology and R&D agreements in order to not be left behind when other countries introduce new technologies. Finance agreements are a lucrative option since they provide funding for mitigation and adaption projects and countries do not have to raise funds on their own. Clearly technology and R&D agreements inherit the biggest funds followed by finance agreements, which might play a bigger role in the near future.

Overall when taking all our criteria together and evaluating the success of the agreements, then it is clear that none of the agreements have had much impact as most lack clear goals, quantifiable and stringent compliance mechanisms, and associated financial resources. Within this rather sobering assessment, the ones from technology and R&D seem to be the most successful ones to date. Climate agreements from trade agreements are hard to evaluate, as they do not have clear commitments or progress reports. In fact they can contribute to set common environmental standards among the member countries but their contribution to climate change mitigation or adaption cannot be quantified. Finance agreements such as the Regional REDD on the other hand have a clear project goal, which could even lead to quantifiable reduction in CO_2 emissions.

At the same time, the climate change mitigation potential of those agreements, especially the finance agreements, is much larger than realized to date. Nevertheless, the effect of the agreements could be much higher if they would be equipped with stringed compliance mechanisms, which make sure that countries fulfill their goals. Last but not least the goals of all the agreements have to be outlined more clearly. Climate change mitigation and adaption could move to the center of those agreements and do not have to be a side effect of these agreements.

6 Conclusion

Most of the investigated agreements are based on voluntary commitments and are of a legally non-binding character. The agreements and programs have been established with lofty motivations but few clear targets, compliance mechanisms, or funding. Monitoring and rigorous evaluation is largely absent. For some, there is the potential access to information and new technologies and the access to financial funds, which are potential benefits. For others they build on existing treaties such as trade agreements. Currently we observe more agreements on a regional level than on an international level since all members share another important motivation to join an agreement.

Many of the member countries in the above-described agreements face similar risks that climate change carries along since they are neighboring countries. In particular those risks are rising sea levels, flooding, water scarcity and sustainable and reliable access to energy. Climate change has trans boundary impacts; therefore neighbored countries share a joint motivation to confront similar challenges together. On the global level, there is a lot of information about the effects of climate change, but even less on the regional level. This is one reason why many nations group together to identify joined efforts, which could mitigate the harmful consequences of climate change.

Neighboring countries or countries, which border on the same sea, profit from grouping together in order to gain and share information and knowledge about effects from climate change. Since they share the similar needs, they are willing to make commitments, which allow them to share the burden of identifying appropriate measures. The expected outcome or goal of most regional agreements is a better knowledge about mitigation and adaptation strategies.

Nevertheless, the impact so far of these agreements is negligible. While their main success is in the field of information sharing, they have achieved little else to date. To increase their impact would necessitate a stronger commitment to clear and quantifiable goals, compliance mechanisms and funding. Ultimately, this would involve a transfer of sovereignty to achieve real impact. Outside the EU, such a transfer of sovereignty has, however, proven rather difficult. Thus while the potential for regional agreements on climate change is substantial, the existing record suggests that that fundamental changes are required to ensure that they play a significant role in the global architecture on climate change mitigation.

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