Turning to life

Sustainable Development in the Context of Climate Change

A Memorandum of the Council of the Evangelical Church in Germany

EKD

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Foreword

Climate change poses tremendous challenges for the political world, the economy, society, governments and the church; for many, it is their survival that is at stake, but for everyone, it is a question of a dignified existence. Climate change hits the poor in developing countries hardest, that is, those least responsible for it, and thus further deepens the gap between rich and poor.

The current global economic crisis has made the consequences of climate change even more acute, bringing it to the top of the global policy agenda over the past years. Short-term interests are now, however, threatening to side-step measures to preserve the medium and long-term conditions for human life. A danger exists that effective measures are postponed, and that standards of sustainable utilization of resources, around which there had previously been an apparent consensus, are diluted. The poorest of the poor will once again shoulder the main cost of such policies. The most recent estimates show that nearly one billion people currently live under the absolute poverty line, people with scant means for adapting to climate change.

Global climate policy has thus come to a new crossroads. In order to make a new, sustainable way of living possible, Europe, and countries such as Germany in particular, must insist on the continuation and expansion of current climate policy efforts. Development in the future depends most crucially on how successful we will be in achieving a climate protection agreement that looks toward the future. No country can dissipate the dangers posed by climate change alone – not even the most powerful nations of the world. Economically and technologically advanced countries do, however, have comparatively greater capabilities to influence the evolution of the climate and are better able to adapt to changes. It is therefore the duty of these countries to lead the way in climate policy. This is not only about their material self-interests, but rather about their identity as nations and their willingness and ability to act responsibly toward the global community. The failure of global negotiations on climate would therefore be a disastrous signal, one that could have an impact on all other efforts aimed at strengthening the United Nations, further developing international law, and promoting international cooperation generally, as well as the peaceful resolution of conflicts.

The crux of the matter is: How can economic interests, the basic life necessities of an increasing number of people, the rights of future generations and the preservation of natural resources be reconciled? Dealing with this question involves many conflicting goals because it brings opposing interests of many sorts into play. Simple solutions in which everyone wins and no one loses are, therefore,

unrealistic. It is consequently all the more imperative that a broad public debate takes place on how to change the predominant use patterns of natural resources and on how to distribute the costs of mitigating climate change and of adapting to the unavoidable consequences of climate change.

The present document seeks to contribute to this debate. The EKD Council presents this memorandum to the public with the awareness that the churches have a direct responsibility with regard to this issue. As social institutions, they are indeed linked into the dominant economic structures. For this very reason, they must seek clarity about what is at stake as a consequence of climate change, and how they can contribute to viable solutions. The churches also appreciate their responsibility as defenders of the vital interests of those bargaining from a position of weakness in these broad global political debates.

Given the current financial and economic crisis, there is a broad consensus that new economic and political approaches are necessary. The danger, however, remains that the crisis would be used as a pretext by economically powerful players to drastically cut back their participation in a constructive climate policy, leaving others to bear the follow-up costs of the overexploitation of resources already committed. This is a danger that must be thwarted. In November 2008, the EKD Synod, both in its declaration on climate change and in its statement on the current financial crisis, indicated that there was an intimate connection between the financial crisis and climate change. Consequently, sustainable development models must be designed to take into account both climate change and the global economic crisis.

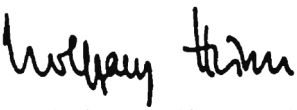
This memorandum is presented as a contribution to this discussion. It reinforces the fundamental statements made in the 1973 EKD memorandum *Der Entwicklungsdienst der Kirche: Ein Beitrag für Frieden und Gerechtigkeit in der Welt*, and the 2005 statement of the EKD Advisory Commission on Sustainable Development, translated into English as "Steps towards Sustainable Development: The Millennium Development Goals of the United Nations." The purpose of the present document is to reassert these positions and bring them up to date to take account of climate change and the fight to eradicate poverty. It is an appeal to respond to the economic crisis in a spirit of solidarity, support and sustainability. The opportunity to react positively can only be beneficial, however, if the multifaceted complexity of the problem is taken into account. This means bearing precisely this complexity in mind when rethinking the problem, allowing room for a new spirit and new rules. There is at present growing public interest in cultivating a lifestyle that responds to the imperative of sustainability and in a new framework for economic behavior that is compatible with such sustainability. This memorandum

is an invitation to reflect on sustainable living and sustainable economic practices at the global level, and to put it into practice. We are well aware of the immensity of the steps needed, as is reflected in the title of this memorandum: Repent and Live.

After an overview on climate change (Chapter 2) and the global spread of poverty (Chapter 3), the memorandum examines the extent to which climate change compromises the achievement of the United Nations Millennium Development Goals and hopes of long-term poverty reduction. Chapter 5 discusses why the church is called upon to stand up to this challenge, and proposes a biblical and theological perspective in identifying ways of repentance in politics and society. Chapter 6 explains why the concept of development based mainly on economic growth and on reproducing the development pathways of the OECD countries (catch-up development) is not viable, and defines the sustainable development model in greater detail. The final chapter describes the church's task of supporting environmentally compatible development in the global South and of repenting and returning to a life based on the values of justice and sustainability.

The EKD Council would like to thank the EKD Advisory Commission on Sustainable Development for its work on this memorandum, hoping for a broad and strong response to the text both within Germany and throughout the ecumenical world.

Berlin/Hanover, May 2009



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Main messages

Climate change is occurring at a much greater pace than even the most recent estimations predicted, so that very few people now doubt that our economic activities are mainly responsible. Greenhouse gas emissions are the main cause, carbon dioxide, in particular, which results from the burning of coal, oil and natural gas, whether for electricity production or transportation. Deforestation by burning, as well as methane emissions from livestock breeding and rice production, however, constitute further significant contributors. However, if provisions for adapting to the forthcoming inevitable environmental changes are to be effective, it is absolutely necessary that greenhouse emissions be reduced and that, as a result of this reduction, global average warming is limited to a maximum of 2°C with regard to pre-industrial temperature levels. (Chapter 2, p. 18)

Climate change has a wide variety of effects. Higher temperatures will change precipitation levels and patterns, and will lead to more frequent and more severe droughts, floods and storms. Tropical and subtropical countries will be particularly severely affected by these changes. Their agricultural yields will fall and their populations will increasingly suffer from water shortages. This will, in turn, make it much more difficult to reduce poverty in many countries, especially in sub-Saharan Africa, and to achieve the United Nations Millennium Development Goals. This even applies to countries such as China and India that have enjoyed considerable growth over the past ten years and where the absolute number of people on only minimal incomes or who do not have stable incomes has fallen. But the economic growth of these countries has severely strained their ecological systems, and climate change will strain them even further. (Chapter 3, p. 37)

The foreseeably more acute shortage of natural resources will lead to increased competition over the exploitation of these resources and more widespread conflict over their distribution. This affects the availability of fertile soil and fresh water as well as the habitats of endangered animal and plant species. This situation of increased scarcity and conflict must not, however, be used by industrialized countries as a pretext to adopt policies aimed at protecting their vested interests or at merely averting danger. There are already alternatives available to both industrialized and developing countries, for example, a more efficient use of energy, greater reliance on renewable energy sources, a radical change in urban design and transportation, and a decisive shift to sustainable agriculture. Such steps could lead to a global change of direction and less poverty.

Ocean warming and the melting of polar ice caps and glaciers in the polar regions and mountains because of climate change will also result in a rise of sea levels,

threatening the existence of some small island nations and forcing millions living in low-lying coastal areas to migrate. This situation, coupled with the fact that larger numbers of people because of climate change will no longer be able to make a living in their home regions, calls for a global approach to international migration policy. The displaced persons of the future need to be welcomed and provided with work and living opportunities in regions that are less hard-hit by climate change. (Chapter 4, p. 53)

Climate change poses immense challenges to governments, societies, families, and individuals. We will need hope and support to meet these challenges. In the Covenant with Noah, God, creator and sustainer of life, renewed God's merciful and life-sustaining affirmation of creation even in the face of human sin and wickedness. In Jesus Christ, the God of reconciliation sets us free to enjoy the beauty of creation, to honor the right of all people to live and to respect the intrinsic value of non-human nature, and to commit to ethics of justice and sustainability. (Chapter 5, p. 71)

The model of sustainable and just development upholds the right to live for all and the intrinsic value of all of God's creation. The concept of growth-oriented catch-up industrialization as a means of development can have no future. In the era of climate change, the term development itself needs to be reconsidered. We need a just climate policy in order to distribute the burdens of climate protection and of adapting to the impending changes. This should be carried out in accordance with the differing degrees of responsibility for the problem borne by industrial and developing countries. This must begin with equal emission rights for all, limited by the maximum amount of greenhouse gases that the earth's atmosphere can assimilate without the earth's average temperature rising above the currently established limit of 2°C. Using this as a mathematical basis, international emissions trading can be introduced to force reductions to be made by those who emit the most. The auctioning of emissions licenses in industrialized countries can raise funds that the countries of the South can use to take the necessary adaptation steps and to bring about sustainable development. (Chapter 6, p. 78)

Churches can do what is necessary in that they themselves repent and turn to a lifestyle that upholds the core values of justice and sustainability. We must address our call for justice to ourselves as well. Yet the churches, as an integral part of society, must also work to encourage other societal and political players to uphold these values. The churches must work rapidly to implement the resolutions passed at the 10th Synod of the Evangelical Church in Germany, which had as its theme "Changing Climate - Changing Waters - Changing Lives", including a 25-percent reduction in their climate-relevant emissions by 2015. The call for justice, however,

also holds individuals responsible to act in a way that supports an ecologically sound lifestyle. The churches must, therefore, support their partners in developing countries in their practical and political efforts to introduce sustainable development and in meeting the challenges of climate change. The churches should act in a way that can serve as a standard and as a motivation for other players to work toward a constructive approach to climate change. (Chapter 7, p. 98)

1 Introduction: climate policy, the global economic crisis, and sustainable development

In May 2008 Cyclone Nargis destroyed large parts of the Burmese coast. Over 100,000 people died and millions of others were left homeless. Ever greater numbers of weather-related catastrophes such as storms, droughts or floods can be expected in the future. Although nobody is safe from such calamities, it is the poorest of the poor in developing countries who are most threatened. They live in the most exposed regions and have the fewest means of protecting themselves.

Scientific modeling and the frequent occurrences of extreme weather in recent years make fears for the future warranted. Scientifically speaking, there is now little room for doubt that global climate change has been caused by human activity. The anticipated consequences for nature and the economies and societies of all countries have, in recent years, placed climate change at the top of the world's political agenda. This has fueled hopes for a long overdue change in direction with regard to the utilization of natural resources. The current global financial and economic crisis is threatening this very necessary change of direction. There is a widespread feeling among policy-makers in industrialized countries, especially, that economic stabilization and stimulation take precedence over the ecological reorientation of the economy and society. Recovery and growth of global economic demand has a key role in this regard, according to their view.

Economic rescue measures of this sort, however, promote a solution that only compounds the actual problem with which we are concerned, a type of economic behavior that undermines its own ecological foundations while attempting to pass the resultant, though unintended, consequences on to other, weaker persons.

On the contrary, what is important at present is to use the crisis affecting the old system to chart a course in a fundamentally new direction, to seize it as an opportunity to make long overdue changes in how we use natural resources. The Roosevelt Administration responded to the Great Depression of 1929 with the New Deal, which placed the economic and social development of the United States on an entirely new foundation. But the new principles were not applied to the global economy; instead part of the cost of domestic recovery was passed on to weaker trading partners by virtue of a trade policy based on economic nationalism. It is precisely this type of policy that needs to be avoided today. United Nations General Secretary Ban Ki-Moon has called for a global "New Deal" to ensure the well-being of the global society. This call will need to be implemented politically – simply "de-

globalizing" the economy[1] would not be a solution, as this would not correct any perverse developments to which the process of globalization has given rise.

The main question is how economic interests, the basic life necessities of a growing number of people and the preservation of natural resources for the current generation and for generations to come can all be reconciled. The phrase sustainable development was coined as early as the 1980s to describe this. Despite the critical discussion surrounding this concept, it is crucial that we take it seriously as a guiding principle and as an opportunity to critically examine current economic, political and social developments with an eye to their long-term significance for human welfare and the integrity of creation. The present memorandum seeks to contribute to this debate. It is meant to provide the seeds of a sustainable development policy and of an attitude on the part of churches and individuals faithful to this guiding principle. Accordingly, this memorandum takes up the following ideas and considerations:

When we speak of climate change, we are referring to *global* change. This change affects all people – but clearly it does not impact everyone equally, nor is everyone equally responsible for it. Those predominantly responsible for climate change are the traditional centers of the global economy, that is, what are referred today as the OECD countries. The consequences of climate change, however, are experienced first and most acutely by those who traditionally are on the periphery of the global economy and who are thus least responsible for climate change. They live in the ecologically most sensitive areas and, as mentioned above, have the fewest means for adapting to climate change.

It is thus only fitting and just that the main beneficiaries of the previous and current growth model bear the brunt of the burden of mitigating its unintended consequences. This principle was already established as a consensus of the international community at the 1992 United Nations Conference on Environment and Development in Rio de Janeiro. Today, however, the largest emerging economies, as the result of their rapid economic growth, have also begun to emit large amounts of greenhouse gases. The transition to sustainable development therefore also depends increasingly on the climate policy of developing countries themselves. While equity demands that these countries are allowed to catch-up on the utilization of environmental goods, it also calls for strategies initiating the transition toward sustainability. This in no way implies that industrialized countries are discharged of their responsibilities. They still have the task of transforming their economic systems to render them sustainable and to make their contribution to the

1 This term refers to the immediate interruption of existing international economic relations, which would lead to a considerable drop in prosperity.

establishment of a global economic framework that provides for the long-term use of environmental goods and natural resources rather than the squandering of resources that has prevailed until now.

Moreover, the industrialized countries need a fundamental change of outlook: Climate policy, especially in industrialized countries, is currently often viewed and justified as *averting danger*. This can, to be sure, turn the "soft" environmental topic into a "hard" security topic. While this helps in terms of raising public awareness of climate change issues, it can also spawn new risks, as worst-case scenarios increase the public willingness to accept high tech countermeasures (cf. geo-engineering [2]) – despite unpredictable consequences – or military solutions (and the preparations that they entail). Focusing on averting danger can, furthermore, lead to giving priority in the climate debate to the protection of vested interests over necessary changes.

Climate change leads to questions that go well beyond averting danger and minimizing risk. The churches began to take up these questions in the 1980s as part of their Conciliar Process on Justice, Peace, and the Integrity of Creation. [3] The dramatic situation that we face in climate change extends well beyond the current global economic crisis and constitutes not only a political and social challenge, but a theological one as well. The situation confronts Christian faith with urgent and deeply troubling questions: Can we feel secure in the thought that God will preserve us through future deluges? Or will this promise in the covenant with Noah be rescinded because of our continued insatiable pursuit of more. Will God abandon us to our fate? What is God saying to us today? What does God expect of us Christians at this most particular *kairos*? Can we still repent? And if so, how? What will give us the hope and strength to take the necessary steps of repentance?

As a church, these are the questions that we have to address. This memorandum is therefore not only focused on a profound analysis of the problems and situation, with special emphasis on the connection between climate change and poverty reduction in particular. It also takes up the question of the extent to which we, as

2 The term geo-engineering refers to proposals to deliberately manipulate the earth's climate to counteract the effects of global warming from greenhouse gas emissions or ocean acidification. The techniques themselves may cause significant foreseen or unforeseen harm with potentially catastrophic consequences.

3 At the 1983 Assembly of the World Council of Churches in Vancouver, the delegation of the Federation of Protestant Churches in the GDR (former East Germany) recommended the creation of an ecumenical peace council, inspired by Dietrich Bonhoeffer's original call for such a plan in 1934. Because church law precluded using the term "council" in the initiative, the representatives agreed to introduce a "conciliar process of mutual commitment to justice, peace and the integrity of creation," cf. D. Gill (ed.), *Gathered for Life* (Grand Rapids MI: Eerdmans, 1983) 72ff.

a church, are called upon to speak out about these problems and what should guide us in our search for steps toward political and social repentance. As the Protestant church, we do not claim to have greater expertise and credibility than others. We confess that the church, as part of society, is intimately connected to the economy and lifestyle that brought about climate change, and is itself therefore called upon to take concrete steps of repentance. We thus feel all the more compelled to contribute to the climate change discussion, out of a concern over the threat to creation and out of solidarity with the poor, to which we are called by the gospel of Jesus Christ. The present text is guided by God's biblical promise of life, as well as the biblical command that both the church as an institution and all who belong to it are responsible toward life. "Repent and live" [4] – that is both an obligation and a promise.

As the church and as individual Christians we want to take this call seriously and to be the advocates of a fundamental policy of sustainability that is geared toward the preservation of creation and food security for all people. Political change that follows these two principles must go hand-in-hand with the abandonment by each and every individual of a lifestyle that is based on ever-greater consumption. This memorandum therefore highlights the consequences for church and society, and promotes the ethical principles of proper living, the protection of this creation of which we are the stewards, and the well-being of everyone.

4 "Repent and live" or "Turn and live" (Ezek 18:32) was the slogan of the 1983 German Protestant *Kirchentag* meeting, accompanied by a new song composed by Christian Kröning, which has even now been adopted by the Protestant hymnal (no. 650) used in the Baden church.

2 Climate Change

Main message: Climate change is occurring at a much greater pace than even the most recent estimations predicted, so that very few people now doubt that our economic activities are mainly responsible. Greenhouse gas emissions are the main cause, carbon dioxide, in particular, which results from the burning of coal, petroleum and natural gas, whether for electricity production or transportation. Deforestation by burning, as well as methane emissions from livestock breeding and rice production, however, constitute further significant contributors. However, if provisions for adapting to the forthcoming inevitable environmental changes are be effective It is absolutely necessary that greenhouse emissions be reduced and that, as a result of this reduction, global average warming is limited to a maximum of 2°C.

2.1 Challenges

Over the past several years the climate debate has gained considerably in intensity around the world. This has been the result of extreme weather events (e.g. Hurricane Katrina in the U.S., 2005), the 2006 Stern Review on the Economics of Climate Change, central Europe's extremely mild winters of 2006-7 and 2007-8, Al Gore's popular film, *An Inconvenient Truth*, for which he received the 2007 Nobel Peace Prize, and the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) in 2007. Climate policy has since been recognized as a key area of environmental policy which also has a security dimension. [5]

There can no longer be any scientifically justifiable doubt concerning anthropogenic climate change, i.e. climate change due to human action. Climate change is already happening, spurred on by greenhouse gas emissions (especially carbon dioxide, CO_2) generated by human activity. Together, empirical data, theories, and models provide a coherent picture. The "zero hypothesis", which claims that no human influence on the climate can be proven, can now be ruled out based on all that we now know.

The IPCC has seen a significant improvement in our knowledge of world climate trends, even as a number of factors that influence the climatic system remain insufficiently explained. This includes, for example, the role of clouds and fine particulates (aerosols), of the dynamics of cold regions (the cryosphere), and of carbon sequestration in the oceans and the soil. The IPCC has classified the

5 Cf. Wissenschaftlicher Beirat der Bundesregierung Globale Umweltveränderungen (WBGU): Climate Change as a Security Risk, Berlin 2007; http://www.wbgu.de/wbgu_jg2007_engl.html. The IPCC provides regular up-to-date information: cf. Intergovernmental Panel on Climate Change (IPCC): Climate Change 2007, The Fourth Assessment Report; www.ipcc.ch

uncertainties according to levels of certainty. A comparison of the four IPCC assessment reports of the state of knowledge on climate change since 1990 reveals an impressive increase in confirmed knowledge, despite remaining uncertainties.
We now know that the climate system is more dynamic than originally thought. The view of a global climate system that is generally sluggish and slow to react no longer prevails. The IPCC has repeatedly emphasized the existence of mutually reinforcing interactions ("positive feedback") within the global climate system. The warming and acidification of the seas and the thawing of permafrost swamps as the result of climate change, for example, can in turn lead to further climate change through the release of the methane stored in the ocean floor and in swamps. While this can be regarded as a long-term process where the oceans are concerned, the release of methane from thawing swamps could occur more rapidly. However, plant growth on the previously frozen swamp land could, in turn, bind more CO_2.

Positive feedback also occurs when the thawing of large ice surfaces (the poles, glaciers) alters the ratio between reflected and incident sunlight (a ratio also known as the albedo). The loss of snow and ice covered areas (e.g. the Arctic sea ice) accelerates warming. Within the Arctic, for example, the melting of the comparatively low-mass ice of the Arctic ocean could change the albedo so as to accelerate the melting processes in Greenland (and smaller islands) in an until now unforeseen manner. It is of particular concern that the data reported in the Fourth Assessment Report of the IPCC on the rise of the sea level did not yet take into account possible major melting trends (Greenland, Antarctica). This, however, constitutes the real danger.

Rapid global warming could lead to a gradual reduction in the CO_2 absorption capacity of terrestrial ecological systems (e.g. forests, soil), even leading to a reversal of the process. It is of particular importance to recognize that soil can change from being (often quite permanent) CO_2 sinks to CO_2 sources. This positive feedback mechanism alone could contribute up to 1°C to global warming.

There is thus a danger of self-accelerating climate change. The high level of air pollution resulting from sulfur-based aerosols with a cooling effect in the second half of the 20th century, for example, served to "veil" the true dimensions of global warming. "Climate skeptics", who continue, despite all the evidence, to deny that there is any sizable human impact on climate change, have used the reduction in the average global temperature in the middle of the 20th century as a specious argument to support their claims. This short-term fall in temperature can indeed be explained quite plausibly by the air pollution that resulted from the sulfur-based aerosols at the time, that is, by a particularly drastic human influence on the climate.

The Fourth Assessment Report of the IPCC places the critical upper limit of climate change for the earth's current ecosystems (climate sensitivity) at 3°C. An increase in the mean global temperature of this magnitude would probably occur if the concentration of greenhouse gases in the atmosphere reached a level double that of the preindustrial era. It is now seen as unlikely that the mean temperature increase will be less than 1.5°C. For methodological reasons, the uncertainty at the upper end of this interval is greater. The Fourth Assessment Report of the IPCC does not even exclude rises of over 4.5°C.

Without counter-measures, increases in the average global temperature of the magnitude of 5-6°C by the end of the 21st century cannot be ruled out. If continued unchanged, the current high-emission economic activities and structures could result in concentrations of over 800 ppmv [6] (as measured in equivalent CO_2)[7] in the atmosphere by the end of the century. The consequent rise in temperature would be disproportionately high in the higher latitudes. "Business as usual" would therefore mean heading toward a world that would be completely different from the one we know.

If we adopt, as a hypothesis, 3°C as the climate sensitivity benchmark, and maintain the widely accepted goal of limiting the average temperature increase to 2°C above the preindustrial level (the "Two Degree Goal"), the concentration of greenhouse gases in the atmosphere may only rise to 450 ppmv (measured in equivalent CO_2–CO_2e). In view of the fact that a CO_2 concentration of 380 ppmv was already recorded in 2007, this means that an immediate and comprehensive change in energy policy at all decision-making levels is needed if a rapid (ideally not much later than 2020) *global* emission trends reversal is to be achieved. While these goals may now seem unrealistic, we should not relax the Two Degree Goal and rush to adapt to the inevitable ahead of time.

Limiting the rise in global temperatures to the Two Degree Goal is also an essential precondition for the success of adaptation measures. An unchecked rise in the average global temperature would make successful mastering of climate change increasingly unlikely as the adaptation capacity of ecological, political, and cultural systems become increasingly over-challenged. The mitigation of emissions is therefore an essential condition for successful adaptation. [8]

6 Parts per million (10^{-6}) by volume (mixing ratio)

7 Equivalent CO_2 refers to the degree to which a certain amount of greenhouse gas contributes to the greenhouse effect, with carbon dioxide used as a standard of comparison.

8 Cf. K. Ott: Climate Change and the loss of biodiversity: An intertwined relationship and its ethical and political consequences. In: Climate Change and Biodiversity - Meeting the Challenge. Report of the 13th Conference of the European Environment and Sustainable Development Advisory Councils. Cambridge 2006.

The emissions of the 21st century will affect the climatic development of our planet for centuries to come. The worldwide emission of greenhouse gases has risen steadily over the past several decades with no change in the trend to be expected before 2020. Virtually unchanged high emission levels in most industrialized countries, the considerable increase in the United States since 1990, and soaring emissions in China and India, two major emerging economies, preclude any trend reversal in the short term. Instead of conventional oil reserves, which are slowly being consumed, in the future, emissions will be increasingly due to non-conventional oil resources (oil sands, oil shale) and coal reserves in particular. There is enough accessible carbon in the earth's crust to allow the concentration of greenhouse gases to sharply increase. The use of coal to produce electricity is a major problem in national and international climate policy. Whether the current global economic crisis at least allows for a short breathing spell, is also uncertain. The opposite could actually be the case if policymakers decide that climatic concerns need to be set aside precisely because of the economic crisis.

Table 1 shows the rise in emissions throughout the world. The reduction reported for Germany is primarily the result of the closure of emissions-intensive production sites following reunification.

Table 1: Emission trends in the United States, European Union, Germany, China, and India

	Emissions per capita			Emissions total		
	Tons of CO_2e*			Millions of tons of CO_2e		
	1990	2004	Change in percent	1990	2004	Change in percent
USA	19.7	20.1	+2.0	4,909.8	5,888.7	+19.9
EU-25	9.0	8.8	-2.6	3,954.1	4,017.1	+1.6
Germany	12.5	10.4	-16.7	989.8	856.6	-13.5
China	2.2	4.0	+83.5	2,483.9	5,204.8	+109.5
India	0.7	1.1	+48.9	633.5	1,199.0	+89.3

* Equivalent carbon dioxide
Source: Climate Analysis Indicators Tool (www.cait.wri.org)

The stabilization of the atmospheric concentration of greenhouse gases at approx. 450 ppmv presupposes that global emissions will reach their peak in the next ten years, followed by a fall of 5 percent per year to attain an emissions level 70 percent below their current level by 2050. These goals need to be achieved even if we assume that the global economy will grow up to the year 2050.

2.2 Impacts of Climate Change

A warmer climate changes the earth's energy balance, resulting in the acceleration of the global water cycle, changes in precipitation patterns, reduced local availability of water, and more frequent and more severe extreme weather events such as droughts, floods and storms. Polar cap melting and ocean warming lead to a rise in the sea level. This in turn results in more frequent flooding, the loss of land, and the salinization of soil, bodies of water and fresh water reserves.

The impacts of climate change are distributed unequally across the globe, affecting poor countries most strongly, sub-Saharan Africa in particular. Politically and economically, these countries in general have only a limited capacity to adapt to these impacts. Lack of, or inadequate, adaptation measures, however, have considerable political, economic and social consequences. Conflicts over the distribution of soil, water, and food could become more serious, and migration away from affected areas could increase. This, in turn, can lead to greater international tensions.[9]

Small island countries and low-lying coastal areas are now especially in danger: the very existence of many small island states in the Pacific and the Caribbean is threatened due to rising sea levels and more frequent hurricanes. The government of the Maldives has, in one response, introduced a public savings fund for the future purchase of large areas of land in countries such as Australia for the resettlement of the country's population should climate change force its people to relocate. This may provide for the physical security of the people, but what about their statehood? What of their culture and economy? Because of sea level rise, and the loss of land and salt water intrusion into groundwater that result, inhabitants of low-lying coastal areas are confronted with the question of when they will be forced to abandon their homeland. These areas are usually densely populated and large ports and important agricultural production areas are located there. Losing these regions would not only be a catastrophe for the local population, but also for the economy of the countries as a whole.

9 Cf. Wissenschaftlicher Beirat der Bundesregierung Globale Umweltveränderungen (WBGU): Climate Change as a Security Risk, Berlin 2007; http://www.wbgu.de/wbgu_jg2007_engl.html.

The problem of permanently and suitably resettling climate refugees who are driven from their homes because recurring droughts or floods threaten their livelihoods will require efforts that surpass the capacities of many countries of the South. We cannot accurately predict the potential number of refugees, but estimates range between 20 and over 200 million, depending on the definitions and the climate scenarios chosen. The causes of any necessary resettlements, including the concomitant social and cultural consequences, are, however, at least in part the responsibility of the industrialized countries. To describe the moral predicament bluntly: How can we prevent the people of the Maldives from ending up in the slums of Mumbai, or the inhabitants of Bangladesh's mangrove forests from ending up in the slums of Dhaka?

People in rural areas are at particularly great risk. The success of their economic strategies depends to a large degree on stable environmental factors (soil fertility, precipitation patterns, seasonal temperature changes, the hitherto prevailing range of climate variability). If these conditions change, peasants must have access to reliable data about these changes and alternative technologies in order to invest in the adaptation of their farming systems. New studies on food production using models that not only take an average temperature rise into account, but also short periods of extreme heat, have come to the conclusion that, under severe warming conditions, half of the world's population could be threatened by famine by 2100.[10]

New risks, however, threaten the urban poor as well, particularly in Asia's rapidly growing megacities: the often precarious living conditions of the poor can be worsened by extreme weather events. This can also often endanger sources of income in the informal sector. Heavy rains can lead to landslides in slums, accompanied by the interruption of electrical and water supplies that in turn endangers the health and the economic activities of the urban population. The rural exodus expected in a number of countries will, in any event, lead to a boom in the populations of many cities (urbanization of poverty). There will be tougher competition for sources of income and economic resources wherever few alternatives are available. [11]

We must also pay particular attention to the "tipping points" in climate change. [12] This term refers to certain thresholds of change that, when exceeded, can give rise to radical, uncontrollable effects. Areas of particular importance whose tipping

10 Cf. D. S. Battisti / R. L. Naylor: Historical Warnings of Future Food Insecurity with Unprecedented Seasonal Heat. *Science* 2009, 323, No. 5911, 240–4.

11 An impression of how climate change could affect urban poverty can be gleaned from the 2006 book *Planet of Slums* by M. Davis, and the chapter "Slum Ecology" in particular.

12 Tipping points are discussed at http://www.wired.com/wiredscience/2009/12/tipping-elements/.

points would be particularly threatening for the global climate system include the northeastern Atlantic and its currents ("Gulf stream"), the Amazon Basin, the monsoon regions of the Indian Subcontinent, the glacier regions of the Himalayas and Pamir Mountains, the Siberian permafrost and the South Pacific, which influences the climate in parts of South America, Africa and Asia through its regular warming pattern ("El Niño"). According to the IPCC, the ecological and social consequences of large-scale ecological transformations in these areas are no longer predictable. Once the tipping point is reached in these areas, the global results could completely neutralize all stabilization efforts. If we consider the effects of positive feedback and the consequences of tipping points to be powerful and dangerous, we must, pursuant to the precautionary principle and to Article 2 of the United Nations Framework Convention on Climate Change (UNFCCC),[13] also reconsider and possibly correct the stabilization goals. We must by all means work to prevent global warming from triggering too many tipping points at the same time.

The effects of climate change on the living world around us are quite dramatic as well. A rise in the average global temperature above the 1.5–2.5°C range could lead to radical changes in the structures and mechanisms of ecosystems. 20 to 30 percent of all known species would be faced with extinction; the Fourth Assessment Report of the IPCC described a wide spectrum of species loss for various biomes. Certain entire biomes would be affected, such as the tundra, forests in the Northern Hemisphere, mountains, mangrove forests, coral reefs, Mediterranean ecological systems and sea ice systems. A very high rise in temperature could also lead to the drying up of the Amazon region. The combination of climate change and intensive land use, moreover, undermines the goal of preserving global biodiversity.[14]

2.3 The state of climate policy

There is (as yet) no reason for resignation with regard to climate policy, or for a kind of "everybody for him/herself" fatalism. The Fourth Assessment Report of the IPCC maintains that achieving the 2°C-Goal is still within the scope of climate policy measures. Even though the past few decades have been characterized by delays and neglect, global awareness of the problem has grown. Technological options have also improved considerably (energy efficiency, renewable energy sources, low-emission energy production processes), and new political instruments are currently being tested, for example, the Clean Development Mechanism (CDM), Joint Implementation (JI) and International Emissions Trading (IET). The need for a new climate protocol, beginning in 2012, has been recognized all around the world

13 Cf. http://unfccc.int/resource/docs/convkp/conveng.pdf

14 Cf. C. Leuschner: Naturschutz vor dem Hintergrund von Klimaveränderungen und Landnutzungswandel. In: Land unter? Hamburger Gespräche für Naturschutz. Michael-Otto-Stiftung, 2005.

as well. Climate change can still be contained at a manageable level with the right political willpower on the part of the international community and it is still possible to prevent the worst from happening. This would, however, require the introduction of a determined and vigorous climate policy that reverses global emissions trends, and consistently pursuing that policy. Humankind now has the chance to act; not using this chance would constitute a lack of responsibility toward future generations. It would also be wrong to take the failure of climate negotiations as a reason to relax efforts toward mitigating greenhouse gases and to place all our hopes on adaptation strategies. While the latter are essential and ethically necessary – as is the establishment of a global adaptation fund currently under discussion – the development of a feasible strategy of adaption depends to a considerable degree on a pronounced reduction in emissions.

Only one of the emissions reduction scenarios described by the IPCC would make it at all possible to keep the average temperature from rising more than 2°C. This particular scenario calls for the rapid introduction of renewable energies throughout the world, global reliance on state-of-the-art technology for the efficient use of resources and greater energy efficiency. It also calls for action to curb greenhouse gas emissions resulting from the destruction of marshlands and forests. All the other scenarios envisaged by the IPCC involve a very high risk of not achieving the 2°C target. It is thus becoming increasingly clear that these political measures need to be included in comprehensive climate policy programs. [15]

The outcome of the 2007 Conference of the Parties to the Framework Convention on Climate Change and to the Kyoto Protocol [16] in Bali gives reason to hope, especially since the developing countries there agreed to traceable and measurable climate protection actions. [17] It remains possible, however, that the negotiations over the targets and instruments of the new protocol, which is to become effective in 2012, could fail. There is only one more round of negotiations [18] to go in order to

15 Cf. K. Ott / G. Klepper / D. Sprinz et al.: Reasoning Goals of Climate Protection. Specification of Article 2 UNFCCC. Environmental Protection Agency: Berlin 2004, esp. Ch. 15.

16 The Kyoto Protocol was adopted in 1997 but not ratified until 2005. The protocol established quantified emission reduction goals for the industrialized countries that have to be reached between 2008 and 2012. It also established regulations for the emission trade between industrialized countries and transitional and developing economies (Joint Implementation and Clean Development Mechanism). The length and scope of a second phase of obligatory reductions of greenhouse gases are under negotiation until the end of 2010. One controversial issue is whether larger developing countries should join the industrialized countries in this second phase.

17 S. B. Müller: On the road again! Impressions from the Thirteenth UN Climate Change Conference, Bali 2007; www.oxfordclimatepolicy.org/publications/mueller.html

18 The states that are party to the Framework Convention on Climate Change met in Poznań, Poland in December 2008, and in Copenhagen, Denmark in December 2009 and will meet for a final round of negotiations in December 2010 in Cancún, Mexico.

establish binding reduction targets for industrialized countries beginning in 2012. During 2009, all hopes had rested on the Obama Administration in the United States. The conference of the parties in Copenhagen showed that there is a glaring gap between global civil society's awareness of the problems and the willingness to act on the part of nation states that are still strongly focused on their own individual interests.

In addition to the concrete, substantive agreements on the above points of controversy, substantive financial agreements are also needed with the goal of supporting the developing countries with the highest levels of emissions to reduce their emissions, and of helping all developing countries in adapting to climate change. This could offer a crucial opportunity for non-governmental organizations (NGO) to bring more pressure to bear in negotiations by appealing to a more morally sensitive global public; no state (it is hoped) would like to be held responsible for the failure of negotiations in the eyes of this global public.

2.3.1 Climate policy in industrialized countries

There are three main protagonists in the climate policy issue. While the European Union has unquestionably played a pioneering role, the United States and Russia have acted, to differing degrees, as forces of opposition. Since the new administration came to power in Washington DC, however, the US has announced and, in part, implemented, constructive new initiatives for the further elaboration of global climate agreements. Even before 2001, when former President George W. Bush declared the Kyoto Protocol to be dead immediately after he took office, the EU had relentlessly campaigned for its ratification. The breakthrough came in 2004 when Russia adopted the protocol after the EU promised to endorse Russian membership in the WTO. At the same time, the EU also introduced an ambitious European climate protection program, the key feature of which is the European Emission Trading System (ETS).

Box 1: European Emission Trading

The European Union introduced its Emission Trading System (ETS) in 2005, with which it aims to achieve a systematic reduction of greenhouse gases. Until now, emission trading has applied to the generation of electricity and particularly energy-intensive industries such as cement and steel production. This accounts for roughly half of Europe's CO_2 emissions.

Each of the approximately 12,000 production sites and power plants is allocated emission allowances; those with greater emissions must acquire additional certificates. This takes place in exchange markets via brokers, or directly between the two parties. Emission

rights that are purchased as part of the Clean Development Mechanism (CDM) from developing countries can be taken into account within the ETS, but only up to a certain maximum, while rights from reforestation projects are not allowed. The maximum for CDM in Germany has been set at 22 percent of the certificates issued to each individual plant.

Too many emission rights were issued between 2005 and 2007, so that the credit price dropped to only a few euro cents. The price should, however, correct itself. Furthermore, 95 percent of the emission rights had to be issued at no cost. Each plant received enough free certificates to cover its previous level of emissions. The largest power providers went on to include the (fictive) costs of their emission rights into the price of their electricity, thus reaping large profits.

Between 2008 and 2012, up to 10 percent of emission rights were allowed to be auctioned off. While industrial plants in Germany still received their emissions rights at no cost, energy producers had to purchase 10 percent of theirs on market exchanges, generating approximately EUR 80 million a month in income for the state.

Plans to expand the Emission Trading System were implemented in late 2007 and 2008, with air travel to be included in the ETS as of 2012. All airlines, regardless of their country of origin, that take off or land in the EU, including intercontinental flights, will have to purchase emission rights. With this measure, it is hoped that air travel-related emissions, which since 1990 have risen by 87 percent, could be reduced. The certificates were distributed by the commission, with 15 percent sold by auction. Companies using the "best available technology" (BAT) qualify for free certificates. This anticipates numerous recommendations of the EU Commission for the next phase of ETS (2013-2020).

The directives for Phase 3 of the ETS are contained in the new climate package that was adopted in December 2008 after long negotiations between the European Council and the European Parliament. This will drastically change the way in which emission rights are issued. In the future, the European Commission will set an upper limit on CO_2 emissions for the entire EU; this limit will be reduced by 1.74 percent each year to reach 1.72 billion tons by 2020, or 79 percent of the 2005 emissions level.

In the future, the ETS will also cover other climate-damaging substances such as nitrous oxide and chlorofluorocarbons (CFC). The system will furthermore apply to all industrial enterprises whose annual carbon emissions exceed 10,000 tons, that is, 95 percent of Europe's industries. Significant exceptions will, however, be made for energy-intensive and export-oriented companies.

By 2013, 20 percent of certificates are to be auctioned, a figure that is to rise step by step to 70 percent by 2020 and to 100 percent by 2025. Electricity producers will already have to pay for all the certificates they need beginning in 2013, while power plants that use a considerable amount of coal will be exempted. These plants will continue to receive 70 percent of their certificates free of charge until 2019 at the latest, when they will have to purchase all their certificates.

In the future, free certificates will only be issued in accordance with the principle of Best Available Technology (BAT). The determinant element will no longer be how much a particular plant has emitted in the past but rather how much a modern efficient plant of the same size emits. Free certificates are issued to energy-intensive plants that rank among the top 10 percent of their industry in Europe in terms of environmental protection.

Free emission certificates are also distributed to export-oriented industrial enterprises whose production costs would rise more than five percent due to carbon fees, and who derive more than ten percent of their sales from export to countries outside the EU. This measure was introduced to avoid a competitive disadvantage with respect to operators in countries that do not participate in global climatic protection programs. The decision to determine which industries will benefit from this regulation is due by December 2009. Part of the revenue in the range of nearly EUR 100 billion from this scheme is to be paid to the member countries, and part is to be placed in a climate fund. Wealthier EU states will also have to relinquish 12 percent of their emission rights to poorer countries in order to help them with their emission trading costs.

Source: European Commission: http://ec.europa.eu/environment/climat/emission/index_en.htm; German Federal Ministry of the Environment: www.bmu.de/emissionshandel/aktuell/aktuell/1201.php

In early 2008, the European Commission proposed a climate and energy package, with individual measures to be negotiated in 2009 and 2010. Key components of the package include expanding the ETS and promoting renewable energies. After 2012, the ETS will focus on achieving a 21 percent reduction of emissions in the entire EU, while for the period 2008-2012 each member country has its individual reduction goal. The process is expected to lead to both greater ecological integrity and economic efficiency. Economic efficiency will also be improved by the auctioning of emission rights. While only 10 percent are currently auctioned, the energy sector will have to purchase all its emission credits on the market by 2013, compared to 60 percent all other sectors. The aviation industry is also slated to participate in the ETS beginning in 2013. Revenues from the auction will go toward the development and implementation of new technologies and for investment in climate adaptation both in the EU and in developing countries. The EU Commission will, for the time being, continue to support individual targets for its member states with regard to renewable energies, while also requiring them to submit plans of action containing individual measures related to electricity, heating and cooling, and transportation. Countries that do not reach their goals will be able to purchase renewable credits from other member states that have.

The European Union played a decisive role in the negotiations in late 2007 on the further development of the climate framework convention in Bali, even if it did not succeed in codifying the IPCC's recommendation for a reduction in global emissions of 25-40 percent by 2020. The EU committed itself to a 20-percent reduction of

greenhouse gases between 2012 and 2020, on the basis of 1990 figures. If the United States, China and other major emitters were also to decide to reduce their emissions, the EU proposes a 30-percent reduction goal by 2020. For Germany, as the EU's greatest emitter, this would imply a reduction goal of over 30 percent. It is, however, questionable as to whether the EU will be able to reach its Kyoto reduction goals by 2012. Failing to reach the Kyoto target would strongly weaken the EU's leadership role in climate protection. Also, the EU's reduction of emissions in the transportation sector, moreover, is being achieved, in part, by increased reliance on biofuels. This is not a particularly satisfying solution in light of rising food costs and the unfavorable energy balance of most biofuels.[19] The EU's climate goals were threatened by the global economic crisis in late 2008, and were only "rescued" with great difficulty. Much will depend on whether policymakers will have the force to eke political capital from the crisis to promote climate policy (as in a "Green New Deal"), or whether political forces will play climate protection against "rescuing" the economy.

In late January 2009, the European Commission published its recommendation for a comprehensive climate agreement to be brought before the Copenhagen Conference of the Parties (COP) in late 2009.[20] The recommendation's main points include a 30-percent reduction in greenhouse emissions of industrialized countries by 2020, on the basis of 1990 emission levels, while developing countries slow down the acceleration of their emissions by 15 to 30 percent. The countries of the OECD will have to support the developing countries financially in their efforts to reduce emissions and adapt, by means of innovative financing schemes such as international auctioning of emission rights. The recommendation stipulates that the polluter-pays principle and the size of the respective national economy should also play a role in determining how the burden is to be shared. All OECD nations should participate in emissions trading by 2015, and other major emitters such as China should join by 2020. Emissions from aviation and shipping would also be incorporated into the climate protection plan.

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19 *Ernährungssicherung vor Energieerzeugung – Kriterien für die nachhaltige Nutzung von Biomasse* (a position paper of the EKD Advisory Commission on Sustainable Development), EKD-Texte 95, Hanover 2008; www.ekd.de/download/ekd_texte_95.pdf. Cf. *Energie vom Acker. Wie viel Bioenergie verträgt die Erde?* Published by the Arbeitsgemeinschaft der Umweltbeauftragten der Gliedkirchen der EKD (AGU), the Ausschuss für den Dienst auf dem Lande (ADL), Brot für die Welt and the Church Development Service (EED), 2009; http://www.ekd.de/agu/themen/biomasse/energie_vom_acker.html. Of further relevance: German Advisory Council on Global Change (WBGU): *World in Transition – Future Bioenergy and Sustainable Land Use*, Berlin 2008; http://www.wbgu.de/wbgu_jg2008_engl.html

20 *Commission of the European Communities:* Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Towards a comprehensive climate change agreement in Copenhagen, Brussels, COM(2009)39/3.

For nearly a decade, the United States under President George W. Bush, did everything it could to block progress on climate protection at the international level. The US is, in absolute figures, the world's single largest emitter of greenhouse gases and one of the largest emitters per capita. Between 1990 – the base year used in the Kyoto Protocol – and 2004, CO_2 emissions rose in the US by just under 20 percent in absolute terms, and by 2 percent per capita. Since 2007, however, the US has come under increased pressure to reconsider its policy, not only on the part of the international community, but also from within the country. The governors of 20 US states in 2008 signed a climate policy declaration calling upon the US government to join in programs to reduce greenhouse gases. The mayors of over 800 cities also signed a declaration of support for the Kyoto goals, while representatives of major US corporations issued an appeal to the government to introduce mandatory reduction goals, energy efficiency improvement incentives and an intra-US emissions trading scheme. An unprecedented new awareness of the ecological vulnerability of individual regions has been emerging as well, and Evangelical organizations have also begun discovering the topic of climate change from a creation theology perspective. This very diverse learning process at regional and local levels of government and among a broad spectrum of social groups, coupled with the change of administration at the top, can pave the way for a change in US climate policy.

President Barack Obama also openly supports such a change and already introduced measures in late January 2009. The question remains, however, as to how quickly the necessary laws can be passed in the US Congress. It is indeed not the president, but the Senate that has the authority to adopt treaties that are binding in international law. The president can nevertheless set his own climate policy priorities, which is all the more significant since political leadership is what is most needed in the current crisis. This includes the introduction of a US-wide emissions trading scheme, the first attempt at which, in 2008, failed. A US commitment to follow the "old" Kyoto Protocol (reducing emissions by 5.2 percent as of 2012 compared to 1990) and an urgently needed, substantial tightening of reduction requirements after 2012, would require comprehensive measures. It, however, appears unlikely that these measures are achievable in the face of diverse industrial lobbies and an extremely energy-intensive American lifestyle, together with the current symptoms of economic crisis in the country. Of course, emissions in the United States will fall slightly in the course of the current recession, and yet, political acceptance for a long-term reduction – even to the level of the average EU emission rates (10 tons per year per capita) – is not in the offing, particularly given the fact that the current US government chief advisers views the global economic crisis as a global demand problem that can thus only be solved by stimulating global demand. Much will depend on how the US reacts to the lessons learned from the economic crisis: that it has lived above its economic means for a long time; that its neo-liberal economic model has failed; that its energy

infrastructure is in a shambles; and that its energy consumption does not meet even minimal sustainability standards, whether in economic or ecological terms.

The failure of global climate negotiations would have a negative impact on all the efforts to reform the United Nations and international law and to make them effective instruments for balancing interests at the global level. At stake in these climate negotiations is the solution of a genuinely global problem that no country can solve within its own boundaries alone. If fair long-term solutions cannot be found for this generation and the generations to come, progress in other global arenas such as global trade negotiations is highly improbable.

Despite its adoption of the Kyoto Protocol, Russia is an example of the destructiveness of a purely national perspective.[21] Russia is the only large country in which large sections of the scientific and political leadership have unscrupulously underscored the advantages of climate change for their own country, without taking into consideration the consequences of global climate change for other countries. The only thing that matters, from this perspective, is that global warming could create more arable space in northern Russia and make it easier to exploit natural resources in Siberia. Such an outlook makes any form of constructive climate policy difficult to imagine. In light of the current energy dependency of the EU on Russian natural gas, this demands an even more intensive dialogue with persons in Russia who are open to global climate policy. The integration of Russia into a binding international system must remain the goal.[22]

2.3.2 Climate policy in developing countries

Although developing countries are divided by differing and at times opposing interest groups, they generally come to negotiations as a block known as the "Group of 77 and China." Hammering out common positions is, however, a very time-consuming process and is becoming increasingly difficult. Generally speaking, these countries can be divided into the following subgroups:[23]

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21 Cf. Müller-Kraenner: Bali changes the equation, 2008, FACET Commentary No. 5; www.aicgs.org/facet/.

22 On Russia's climate policy, see M. Rodi (ed.): *Implementing the Kyoto Protocol – Chances and Challenges for Transition Countries* (Berlin: Lexxion, 2007), especially Chapter 3: "International Climate Policy and the Russian Federation" and the concluding political recommendations in: "Message from Siberia: A Barrier Analysis," 185–195.

23 One could also categorize the countries in terms of economic growth, potential for emissions reductions, and per capita emissions. This type of categorization aims at the determination of standards of measure for the expected future emission obligations of developing countries in connection with their levels of poverty. Cf. H. Winkler / B. Brouns / S. Kartha: Future mitigation commitments: differentiating among non-Annex I countries, in: Climate Policy 5, 2006, 469–486.

- Large, rapidly growing greenhouse gas emitters. This includes China, India, Brazil, Indonesia and South Africa. The greatest absolute numbers of poor people live in China and India, although numerous upper and middle classes are now emerging in these countries.

- Developing countries with middle income levels and steady economic growth, with the associated increase in emissions.

- Oil-producing countries that normally have a high per-capita emission rate, but which view themselves as being hurt by an expected decrease in demand for fossil fuels and therefore demand temporary economic compensation.

- Countries whose emissions, both historically and in the foreseeable future, are insignificant because of their low level of development, but which will be severely affected by the effects of climate change. The African Group, of which the least developed countries (LDCs) are a part, forms the nucleus of this category.

- Small island developing states (SIDS) whose very existence is endangered by rising sea levels, some as soon as within this century. This group is organized as the Alliance of Small Island States (AOSIS).

Article 4 of the 1992 United Nations Framework Convention on Climate Change (UNFCCC) stipulates that all parties take "into account their common but differentiated responsibilities and their specific national and regional development priorities, objectives and circumstances." The preamble explicitly affirms that responses to climate change should be "coordinated with social and economic development in an integrated manner with a view to avoiding adverse impacts on the latter, taking into full account the legitimate priority needs of developing countries for the achievement of sustained economic growth and the eradication of poverty." [24]

In general terms, the position of developing countries with regard to climate policy is that the industrialized countries are historically responsible for climate change and therefore must take prior action to combat it. This also means that all developing countries initially refused to introduce measures to curb their emissions or to consider a commitment to reduce their emissions after 2012. This position is founded in the fear that their economic development could be hampered by giving priority to climate protection, which would make the current gap between industrialized and developing countries permanent. These fears are fed further by the currently predominant method of introducing reduction obligations based on current emissions

24 http://unfccc.int/resource/docs/convkp/conveng.pdf

levels rather than, for example, on emission rights that are distributed equally throughout the world. The developing countries' fears are fully warranted.

At the same time, the principle of historical responsibility and the related notion of ecological debt are problematical. Our common awareness of the problems of anthropogenic climate change goes back only a few years. Players in the past did not know that their emissions would have a long-term effect on the global climate. Developing countries, too, have only recently come to this realization. Even at the first global environmental conference, held in Stockholm in 1972, advocates of industrialization set aside environmental arguments, considering them to be an obstacle to the evolution of developing countries toward becoming industrial societies. While the industrialized countries bear a causal responsibility for historical climate change, going from causal to moral responsibility requires evidence. Moreover, approximately 50 percent of all greenhouse gases ever emitted were released into the atmosphere over the past 40 years, with the share resulting from economic activity outside of the "old" industrialized countries rapidly rising. The countries of the North have, nevertheless, profited from the previously cost-free emissions.

These countries are, therefore, morally (even if, according to the current understanding, they are not legally) obligated to take the lead in curbing emissions and to develop climate policy plans and institutions for the benefit of developing countries, and to provide financial and technological support for these plans (see Chapter 6). This obligation remains, even if the emissions of the developing countries are contributing more significantly to the global trend, and developing countries must for this very reason also take action. Even if the South's response to its role in contributing to climate change is inadequate, the North is not relieved of its responsibility to move forward on reducing emissions. If the North tackles its responsibility in earnest, the South will surely follow; the developing countries have in fact already begun to show a willingness to play a role in climate protection.

Projections published by the World Resources Institute show that developing countries will emit more greenhouse gases by 2025, in absolute figures, than industrialized countries, despite a lower per-capita rate. [25] In doing so, these countries are creating long-term risks for themselves (such as a change in monsoon patterns in India). [26] At the 2007 Conference of the Parties in Bali, the developing countries therefore agreed for the first time to take quantifiable, verifiable steps toward reducing their emissions. This self-imposed obligation on the part of

25 K. A. Baumert. / T. Herzog / J. Pershing: Navigating the numbers. Washington, DC: World Resources Institute, 2005, 17.

26 L. Rajamani: Indiens internationale Klimapolitik. Aus Politik und Zeitgeschichte 22/2008, 19–25.

Box 2: Climate policy in Brazil, China, India, Mexico and South Africa

These five countries play an important role in climate policy: As large, dynamic economies they are both major emitters and important partners of the industrialized countries in finding common solutions to global problems, whether they relate to climate change, the current financial crisis or financial market regulations. As political leaders for the developing countries, they play an important role in defining G77 policy. All five have adopted the Kyoto Protocol. Brazil, China, India and South Africa, at the June 2007 G8 Summit in Heiligendamm, Germany, committed themselves to closer cooperation with the G8 countries and Mexico in the area of energy efficiency and technology in order to reduce carbon emissions. They also wish to take a more active part in the revision of the Kyoto Protocol.

China, Brazil and Mexico, without the pressure of international obligations, have already taken national measures that could bring about a considerable reduction in their greenhouse gas emissions. The Center for Clean Air Policy (CCAP) in the United States has calculated that China, Brazil and Mexico could avoid more greenhouse gas emissions than all the industrialized countries that have signed the Kyoto Protocol together. These three countries have passed a series of laws whose implementation would lead to emissions reductions surpassing the obligations of the European Union through 2020.

All five of these countries introduced climate policy strategies and concrete programs and measures in 2008. Increased energy efficiency and a higher renewable energy ratio in the energy mix are the main features of these plans. China's strategy is based on its 11th five-year plan, which already featured an energy strategy with binding targets. Challenges such as decoupling growth from greenhouse gas emissions, reducing environmental consumption and adapting to climate change were explicitly addressed. India shares China's view that an international agreement on carbon emissions should be based on per-capita figures and not absolute numbers. In late 2008, Brazil committed itself to a 70-percent reduction in its deforestation rate by the year 2017. Between 2006 and 2009, this figure should fall to a level 50 percent lower than the average of the years between 1996 and 2005, and, in each of the next two four-year periods, by 30 percent in comparison with the preceding period (cf. Government of Brazil: National Plan on Climate Change, Executive Summary, Brasilia 2008). Roughly 70 percent of Brazilian emissions derive from the deforestation of the Amazon. Mexico, in its strategy, has made recommendations as to how developing countries can be progressively integrated into a global climate protection system. South Africa, meanwhile, has presented the measures it is taking because of its vested interest in sustainable development, the additional measures it has decided as simply a responsible member of the global community and other action it is prepared to take if given the necessary international support.

Sources: CCAP (Center for Clean Air Policy): January 2008/December 2007 Newsletter: Special Post-Bali Edition 2008; www.ccap.org/newsletter.htm; www.pewclimate.org/policy_center/international_policy

developing countries is not related to mandatory international emissions targets, but rather to national mitigation measures, and link the corresponding measures to concrete support from the industrialized countries. This could however constitute a first step toward breaking out of the logic of past negotiations where either side waited for the other to make concessions before making a move. As the South African chief negotiator stated during the closing plenary session in Bali in 2007: "Developing countries are saying voluntarily that we are willing to commit ourselves to measurable, reportable, and verifiable mitigation actions. It has never happened before. A year ago, it was totally unthinkable."[27] This change also reflects the understanding that developing countries can only secure their energy supply through improved efficiency and a shift to renewable energies.

The developing countries' reduction of energy-related emissions presupposes accelerating distribution of new technologies, particularly in China and India. The industrialized countries will need to support this process financially, since the "natural" dissemination process would take too much time. The increase in emissions in China and India must indeed be slowed as quickly as possible in order to stabilize the concentration of greenhouse gases in the atmosphere, and emissions in the two countries will need to decrease in absolute terms between 2020 and 2050. While the industrialized countries agreed to the request for this type of technology transfer in Bali, rapid progress in the creation of a technology transfer fund is not to be expected. The interest of industrialized countries in exploiting their technological advance to their economic advantage against precisely their new competitors in Asia appears to be a stumbling block.

For poorer developing countries, agreements to support their adaptation to climate change are vital. To ensure that the financial transfers for this do not come from funds earmarked for poverty reduction, i.e. from development aid, the developing countries have asked for additional funding. The 2007/2008 Human Development Report, under the auspices of the United Nations Development Programme (UNDP), calculated that a further 0.2 percent of the gross domestic product of the industrialized countries will be needed in order to ensure additionality. An Adaptation Fund was established in 2008 within the framework of the Kyoto Protocol, which is financed by a small levy on the emissions certificate trade within the Clean Development Mechanism (CDM). The CDM allows industrialized countries to cover a part of their reduction obligations by investing in the emissions reductions of developing countries. The CDM adaptation levy is thus a type of solidarity fund, to which the developing countries also contribute. There are now discussions on the creation of a comprehensive adaptation fund within the framework of the Copenhagen Agreement. This would be supported by the budgets

27 Cited in B. Müller: Bali 2007: On the road again! Impressions from the Thirteenth UN Climate Change Conference; 2007, 5; www.oxfordclimatepolicy.org/publications/mueller.html

of industrialized countries and/or through innovative financing schemes in accordance with the polluter-pays principle. This is expected to fall within the range of several billion US dollars.

Countries with tropical forests, meanwhile, place great hopes in an agreement on a financial mechanism that would be used to reduce emissions resulting from deforestation and forest degradation. The required funds are estimated at around USD 10 to 12 billion per year. It remains a point of controversy as to how these funds are to be raised, whether by issuing emission credits (on avoided deforestation and forest degradation) or through a fund that could be fed by income from emission trading among industrialized countries.

In the end, developing countries have much at stake when it comes to climate change negotiations. They need to avert dangerous climate change, while at the same time secure financial support for the transition to a climate-friendly development strategy that is as well protected as possible against climate risk. In both regards, the developing countries depend on the cooperation of industrialized countries – just as they need to begin to make use of the individual possibilities for climate-relevant measures in their own countries.

3 Poverty and Climate Change

Main message: Climate change has a wide variety of impacts. Higher temperatures will change precipitation levels and patterns, and will lead to more frequent and more severe droughts, floods and storms. Tropical and subtropical countries will be particularly severely affected by these impacts. Their agricultural yields will fall and their populations will increasingly suffer from water shortages. This will, in turn, make it much more difficult to reduce poverty in many countries, especially in sub-Saharan Africa, and to achieve the United Nations Millennium Development Goals. This even applies to countries such as China and India that have enjoyed considerable growth over the past ten years and where the absolute number of people on only minimal incomes or who do not have stable incomes has fallen. But the economic growth of these countries has severely strained their ecological systems, and climate change will strain them even further.

3.1 What is poverty?

Even after four decades of development and cooperation work, the economic disparity in the world continues to grow. Over 75 percent of global income goes to 25 percent of the world's population, while 60 percent of the world's population lives on only 6 percent of the world's income. Nearly half (2.8 billion) of the world's population lives on less than USD 2 a day, while 1.4 billion survive on less than USD 1.25. [28] This divide has been growing not only between countries (by 20 percent since 1980) but within countries as well. Processes of impoverishment and enrichment are often trans-border, and they include industrialized countries as well. Percentage-wise, the number of persons living in extreme poverty has declined since 1980, but it has grown slightly in absolute figures.

Poverty has many faces, most often that of women and girls. Poverty includes slum dwellers and the landless, peasants and street sellers, migrant workers, AIDS orphans and child workers. What they all have in common is inadequate access to the basic resources of land and energy, lack of money and of power, and their exclusion from education and healthcare.

Despite the growth of cities, around 80 percent of poverty remains a rural problem. Rural poverty is concentrated primarily in South and Southeast Asia, Central China, sub-Saharan Africa and inland Latin America, while urban poverty is also on the rise in the world's metropolises and megacities. The number of persons faced with famine (923 million in 2008) has been approaching the number of those living in

28 As per purchasing power parity.

absolute poverty (approx. 1 billion). Only around 10 percent of famine is the result of natural disaster or war, meaning that 90 percent of hunger problems arise from structural conditions.

Across regional and cultural borders, rural poverty consistently involves certain recurrent elements: the available land is usually too small and/or peasants do not have legal land titles; farms are in ecologically adverse locations such as steep slopes or in areas threatened by drought or floods; access to loans and seeds is difficult or denied; expert advice is not available; the absence of transportation facilities and infrastructure makes access to markets and to basic services such as education and healthcare impossible; the population is highly vulnerable to increasingly frequent and extreme weather events related to climate change, and to other new trends such as higher import pressure and a liberalized market.

Poverty always spells economic, social and political marginalization or exclusion. Poor people generally depend directly and to a high degree on natural resources, and are particularly vulnerable to natural and other disasters. In order to live a life of dignity, it is of paramount importance that groups living in poverty free themselves of these constraints.

This memorandum adopts the main points of a new multidimensional definition of poverty influenced particularly by the work of Nobel laureate Amartya Sen.[29] Sen defines poverty from the individual's perspective as the expression of a lack of basic opportunities for fulfillment. Material destitution exacerbates this want, but is not its sole cause. Others include obstacles due to gender, ethnicity or social identity, and lack of access to education, healthcare and employment. From this point of view, economic growth and higher real incomes are not sufficient to reduce poverty. The German national poverty report[30] also uses this definition. The EKD Council's 2006 memorandum on poverty in Germany, "Just Participation: Empowerment for Personal Responsibility and Solidarity," also took over significant aspects of this definition. The memorandum argues that poverty is not only a matter of a person or household's absolute income or of income distribution, i.e. the income that individuals have in comparison with the average income of the society in which they live (just distribution). Rather, poverty must also be viewed from the perspective of just participation, i.e. the complete integration of all members of society into social, political, cultural and economic life: "No one may be excluded from access to the basic necessities of life, either materially or in terms

29 A. Sen, *Development as Freedom*, New York 1999.

30 www.bmas.de/coremedia/generator/26896/lebenslagen_in_deutschland_der_3_armuts_und_reichtumsbericht_der_bundesregierung.html

of organising how they choose to live."[31] Just distribution and participation are the conditions necessary for the empowerment of individuals to take responsibility for their own actions and to make use of the opportunities offered to them by society, while assuming the associated risks.

3.2 Poverty reduction in the context of climate change

Poverty reduction strategies today must take climate change into account, both in terms of economic and energy policy and of adapting to the likely impacts of global warming. The goal of poverty reduction is to enable (extremely) poor and disadvantaged women, men and adolescents, who are excluded from processes of growth, to contribute to these processes and to benefit from them.[32] This not only means promoting economic development, but also – in line with Amartya Sen's five dimensions of freedom[33] – better access to healthcare, education, energy and water, and pro-poor agricultural and transportation policies, that is, changes in sectors that are factors of economic exclusion for the poor. Good governance and strengthening the political rights of the poor are also crucial for sustainable poverty alleviation. All these sectors are relevant for strategies and measures aiming at mitigating the negative impacts of climate change for the poor and helping them not just to cope with climate change in the short term, but to invest in long-term changes, thereby improving their chances of sustainably overcoming poverty.

From the climate policy perspective, it is necessary that strategies to fight poverty do not contribute to global warming. This means that pro-poor, large-scale economic growth should contribute to:

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31 Just Participation: Empowerment for Personal Responsibility and Solidarity. A Memorandum of the Council of the Evangelical Church in Germany on Poverty in Germany, 2006.

32 Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung: Pro-Poor Growth. Das entwicklungspolitische Thema Breitenwirksames Wachstum, Bonn 2007: *BMZ Spezial* 142; 3.

33 Amartya Sen explains that long-term success in the reduction of poverty can only be achieved if both the state of the overall economy and the opportunities available to each individual are improved. This in turn necessitates five complementary freedoms (Cf. A. Sen: *Development as Freedom*, New York: Knopf, 1999):
- Political freedoms tied to institutions, rules, and processes of democracy, freedom of opinion and the rule of law;
- Economic freedom tied to institutions that ensure unimpeded free access to markets and job opportunities;
- Social freedom, tied to institutions that ensure that people can participate in economic growth;
- Transparency guarantees anchored in a certain level of trust in societal institutions and rules that act to prevent corruption and the abuse of power. Political and economic freedoms are strongly impacted by transparency guarantees;
- social security as both goal and means of development. Social security systems prevent extreme poverty and protect against risks that arise from illness, old age, unemployment, and from extraordinary events such as natural disasters.

- climate-friendly and ideally climate-neutral economic growth in developing countries;

- investment in social and other areas that reduce risk and improve adaptive capacity;

- economic growth that does not over-exploit other environmental services or natural resources.

It is obvious that the pursuit of these objectives can involve numerous conflicting goals. At the turn of the millennium, it became dramatically evident, moreover, that the development promises of the second half of the 20th century were unattainable for most countries. It was in this context that the United Nations in 2000 adopted the Millennium Declaration in the four policy areas of peace and security, development and poverty eradication, the protection of our common environment, and human rights, democracy and good governance.[34] Underpinning the UN declaration is the clear realization that the global problem of poverty as defined above, not only goes hand in hand with a whole range of policy failures but also hampers and even prevents reforms and progress in other areas. These failures were partly due to decisions made at the national level, and partly the result of international regimes and imbalances of political economic power.

In order to achieve concrete improvements, the United Nations at the same time set eight specific poverty eradication objectives known as the Millennium Development Goals (MDG) based on elementary life situations: extreme poverty and hunger, primary education, gender equality, child mortality, maternal health, epidemic diseases, environmental sustainability, and a global partnership for development.[35] In 2000, the MDGs represented the broadest possible consensus for medium-term developmental goals through 2015. The MDGs were also accompanied by indicators as a yardstick of progress or failure in order to oblige countries to take concrete steps.

Between the Millennium Declaration and the quantitative MDG indicators, however, the multidimensional nature of poverty got lost. The focus was again placed on quantitative goals such as halving the number of people that survive on less than one US dollar a day, the growth of the gross domestic product per worker and the illiteracy rate. Global quantitative goals have the advantage of being concrete. On the

34 See http://www.un.org/millennium/declaration/ares552e.pdf and the EKD's position statement: Schritte zu einer nachhaltigen Entwicklung. Die Millenniumsentwicklungsziele der Vereinten Nationen. Eine Stellungnahme der Kammer für nachhaltige Entwicklung der EKD zur Sondervollversammlung der Vereinten Nationen im September 2005, EKD-Texte 81, Hannover 2005; www.ekd.de/EKD-Texte/44611.html

35 http://www.un.org/millenniumgoals/

other hand, they have the distinct disadvantage of dissociating the visible manifestations of poverty from their causes. The development model ceases to be an explicit issue, and the inter-relatedness of poverty and other major global problems such as climate change are included only indirectly. Eradicating poverty becomes once again a specific social policy matter rather than being taken into account in the numerous relevant policy areas, and especially, in the definition of a joint strategy by industrial and developing countries.

The first MDG report in 2005 reported sobering results.[36] While the goal of lowering the percentage of those living in absolute poverty and hunger has been met, this is solely due to changes in China and India; in sub-Saharan Africa, on the other hand, no improvements were reported. The absolute number of people suffering from hunger did not therefore fall, but rather rose from 840 million in 1996 to 923 million in 2008.[37] The least progress was seen in those places that needed it most, the poorest countries, mainly in sub-Saharan Africa. Nearly all other MDGs are in danger of failing as well.

Box 3: Sustainable development – the Seventh Millennium Development Goal

From the perspective of climate change and sustainable development, the seventh Millennium Goal, "ensuring environmental sustainability" is of particular importance. This goal includes four individual targets: a) integrating the principles of sustainable development into country policies and programs; b) reversing the loss of environmental resources; c) halving, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation; and d) achieving, by 2020, a significant improvement in the lives of at least 100 million slum dwellers. No indicators were established for the first target, while the indicators for the second target involve figures such as forested areas, environmentally protected areas and greenhouse gas emissions. In the first years of the 21st century, however, the developmental policy discussion focused solely on quantifiable indicators related to the third target, i.e. safe drinking water and basic sanitation. Only recently has the second target been emphasized in reports on the state of the MDGs, with figures on greenhouse gas emissions and on deforestation clearly indicating that no progress has been made.

The difficulties with MDG 7 are related to the basic dysfunctioning of the world economy in the context of global liberalization. Over the past few decades international trade, the creation of internationally integrated production chains and the opening and interlinking of financial markets were promoted in the name of globalization. The international expansion of the crisis on the OECD countries' financial markets in late 2008 has brought to light a dangerous absence of regulation. The difficulties involved in taking internationally effective measures against climate change have also demonstrated the

36 Investing in Development, A Practical Plan to Achieve the Millennium Development Goals, January 2005; www.unmillenniumproject.org/reports/index.htm

37 www.welthungerhilfe.de/hunger_spezial.html

limitations of a global economic system that considers regulation to be, above all, an obstacle to growth rather than a guarantor of sustainable development. Economic liberalization has, in many developing countries, been seen as an open invitation to plunder natural resources. Efforts so far to stop this through voluntary codes of conduct or appeals to corporate social responsibility (CSR) have been inadequate, in part because the profit interests of the companies are linked to the economic interests of the state. These state interests consist of higher tax revenue from the economy – which can in some cases service clientelistic networks – as well as the creation of jobs, especially through the influx of foreign capital. With liberalization, the introduction of stricter environmental laws and effective state controls has been seen, especially in developing countries, to be a competitive disadvantage compared to countries in which such regulations do not exist. Further obstacles include the cost of implementing these measures and the loss of income when, for example, the protection of forested areas makes them unavailable for the expansion of export-oriented agriculture. It has become particularly clear in precisely this sector that poverty often is alleviated at the expense of the environment on the one hand, while being increased on the other. The few jobs that are created in the agribusiness are indeed outweighed by a larger number of uprooted people, who had been living on subsistence agriculture in the areas now exploited by commercial agriculture. These people are often forced to leave for marginal areas that are particularly vulnerable ecologically. This results in a double threat to the environment while poverty remains constant or is even worsened.

Source: http://www.bmz.de/de/themen/MDG/Downloads/BMZ-Presse_MDG-7-RZ.pdf (7 January 2009)

Reducing poverty is thus not only a question of the political will of industrialized and developing countries to finance and carry out effective poverty alleviation strategies. The EKD Advisory Board for Development and Environment published a position paper on this topic in 2005.[38] The question remains as to how poverty in all of its forms can be fought effectively, and how undesired global developments such as climate change and the exploitation of natural resources can be avoided in the process.

3.3 Regional aspects of poverty and climate change

The impacts of climate change will affect developing countries most of all. If anticipatory adaptation measures are not taken in time, rising temperatures, irregular and heavier precipitation, droughts, storms and higher sea levels can lead to permanent hunger and to a wide range of frequently recurring emergencies.

38 Schritte zu einer nachhaltigen Entwicklung. Die Millenniumsentwicklungsziele der Vereinten Nationen. Eine Stellungnahme der Kammer für nachhaltige Entwicklung der EKD zur Sondervollversammlung der Vereinten Nationen im September 2005, EKD-Texte 81, Hannover 2005; www.ekd.de/EKD-Texte/44611.html

Whether this in fact comes to pass does not depend only on how successfully we can keep global warming to a somewhat controllable level and on whether the industrialized countries invest enough in mitigation and in adaptation schemes in developing countries. It will also be crucial for future living conditions in developing countries that local people – the government, local authorities, business, decision-makers, farmers, scientists, meteorological services and the media – recognize the significance of climate change for their future and take meaningful mitigation and adaptation measures.

The capacities in this regard vary widely among developing countries, showing that, just as the gap between North and South has grown, the countries of the South have also evolved very differently over the past 50 years.

Following the independence movement in the 1960s that brought an end to colonialism nearly everywhere, the political situation in these new countries was characterized by a sense of new opportunities to be seized and great hopes for development.

The conflict between East and West at the time seemed to favor this progress at first, as the South provided a stage where the superiority of either the market economy or planned economy models could be demonstrated. Soon, however, power politics came to dominate the relationship between "the" South and "the" West or "the" South and "the" East. Political loyalty soon became more important than actual progress in economic, social, scientific and technological development. The loyalties were rewarded through better access for friendly countries and their companies to the abundant resources in many of the countries of the South. Numerous third-world dictatorships would receive international support in this way. The end of the Cold War in 1990 gave way to great hopes with regard to development policy in the South. There were hopes for a kind of peace dividend, but also for the opportunity for development-oriented national governments to have the necessary freedom, regardless of ideology or political priorities, to implement their strategies. This hope, however, went unfulfilled.

Two tendencies currently characterize the situation in the South: an increasing differentiation among developing countries and regions (see Table 2); and the increasing economic and political dominance of a number of rapidly developing countries, including China, India and Brazil, in particular. Most of the world's poor people still live in China and India, despite the fact that their national economies have grown very rapidly over the past ten years, which has helped to alleviate poverty to some extent.

Table 2: Trends toward the Differentiation in Developing Countries by Regions and Indicators

	Sub Saharan Africa	Latin America and the Caribbean	North Africa and the Middle East	East Asia	South Asia
Human Development Index (2007)[a]	0.493	0.803	0.699	0.771	0.611
GDP per capita (2005, in USD PPP)[a]	1,998	8,417	6,716	6,604	3,416
Share in world trade (2007, in percent)[b]	1.5	4.0	5.0	23.0 China: 9.0 India: 1.0	
Per capita electricity consumption (kWh 2004)[a]	478	2,043	1,841	1,599	628

a: UNDP: Human Development Report 2007/2008, New York 2007. The Human Development Index is composed of statistics on life expectancy, education and the GDP.

b: WTO: World Trade Report, Geneva 2008. The WTO uses other regional groupings than the World Bank and the UNDP so that the statistics are not directly comparable. Figures for sub-Saharan Africa are from World Bank: African Development Indicators 2005, Washington 2005.

The following provides a brief overview of poverty and the impacts of climate change in each continent, as reported in the Fourth Assessment Report of the IPCC.

⇨ **Sub-Saharan Africa** includes most of the world's poorest countries, and its average standard of living has dropped even further over the past few decades. Between 1981 and 2001, the number of poor people in the region rose from 164 to 314 million,[39] and 72 percent of the population there now lives on less than USD 2 per day.

The countries of sub-Saharan Africa only gained independence in the 1960s. Their economies are mainly agricultural, with a large number of subsistence farmers. The infrastructure there is underdeveloped. The road network mainly serves coastal areas and cities, with few roads inland. This makes the distribution of agricultural products very difficult and limits the delivery of needed goods. Electricity is also in very limited supply. Numerous civil wars escalated or began in the region following the end of the Cold War. Several

39 World Bank: Africa Development Indicators 2005, Washington 2005.

lengthy dictatorships ended in the process, which led to further instability in the area. However, this trend led to a process of democratization as well in a number of countries. Some African countries have also benefited from the rise in the Asian demand for metal ores, oil and natural gas. These sectors are not labor-intensive, so redistribution measures are required in order to put the resulting income to use in fighting poverty. Botswana has been following this course since the 1960s, but political decisions of this kind have yet to be seen in other countries.

The IPCC expects that the impacts of climate change will be the most severe in Africa, where it will combine with and exacerbate other stressors such as a food insecurity and poor healthcare. Agricultural conditions will worsen as well; it is expected that arid zones will increase by 5 to 8 percent (60 to 90 million hectares). Drought and soil degradation will lead to lower yields in marginal areas as well, affecting both rain-fed agriculture in the Sahel and rain-fed farming and agroforestry at the higher altitudes of East Africa's Great Lake region. The fish stock of the Great Lakes will continue to diminish with climate change (by an expected 30 percent in Lake Tanganyika), considerably reducing the supply of animal protein to the local population there.

Water scarcity will increase in many parts of Africa as the result of climatic variability and climate change. Around the middle of the century, the risk of drought in southern Africa will rise, while more frequent floods are likely to hit the eastern part of the continent. Water scarcity is currently to a large degree the result of weak and inefficient water administrations and the poor management of water catchment areas. More needs to be invested in these areas so that the challenge of future changes can be met. The state of the mangroves and coral reefs along the coasts will also worsen, with a negative impact on both the fishing and tourism sectors.

Sea level rise will have a particularly dramatic effect on densely populated low-lying coastal areas such as the Nile Delta and the port city of Lagos, Nigeria.

⇨ **Asia** is in every respect a very heterogeneous continent. **East Asia**, as a region, includes very poor countries such as Laos, Cambodia and Mongolia, but also countries whose development has been most successful over the past twenty years, both the newly industrialized economies of Hong Kong, South Korea, Singapore and Taiwan, and the emerging economies of China, Malaysia, Thailand, Indonesia and Vietnam. This "Asian miracle" has been explained as the result of a number of structural (agrarian and educational) reforms, together with the successful expansion of export-oriented industries with the help of state support. The first financial crisis, since overcome, hit some of these

countries in 1997-1998. These countries now have high growth rates, and most of them have high currency reserves and stable banks, with financial leeway in their public budgets.[40] Some 45 percent of the region's population – but, for example, just under 78 percent of the population of Cambodia – still lives on less than USD 2 a day. In China, this figure still lies at 35 percent, or roughly 460 million people in total.

⇨ **South Asia** comprises different countries such as Bangladesh, India, Pakistan, Sri Lanka, Bhutan, Nepal and the Maldives. An average 54 percent of the population there lives on less than USD 2 a day – over 80 percent in India. India and Bangladesh have, nevertheless, had an average annual growth rate of over five percent since the mid-1990s. Despite the continued inequality of income distribution there, they have been able to lower their poverty rates by 7 percent (India) and 9 percent (Bangladesh).[41]

The effects of climate change will be exacerbated in Asia both by widespread poverty and by the region's large population. The densely populated and economically crucial coastal areas are particularly concerned. More frequent and more severe storms will hit these areas, and they will be threatened by a rising sea level. A rise of merely one meter could lead to the flooding of 5000 km^2 of China's Red River and 15-20,000 km^2 of the Mekong Delta. This would mean the resettlement of 7.5 million people.

According to current data, water scarcity will also increase, and in some areas at an alarming rate. India will see a particularly strong fall in the amount of water available per capita, not only as the result of population growth, but also due to heavy rainfalls and sudden floods that lead to a higher rate of surface runoff and lower groundwater reserves. Climate change also threatens the existence of the glaciers that feed into many major Asian rivers. Agricultural conditions in the region are also changing. While agricultural output could rise by up to 20 percent by the end of the century in East and Southeast Asia, output in Central and South Asia could fall by up to 30 percent, meaning that there will continue to be a very high risk of hunger in a number of countries.

⇨ Although **Latin America and the Caribbean** have the greatest income disparity, the region also has the fewest people living in poverty, with just under 30 percent of the population there living on less than two US dollars a day. Some countries have a markedly higher poverty rate, however, as is the case in Nicaragua (80 percent) and Haiti. The countries of Latin America gained their

40 World Bank: East Asia: Testing Times Ahead, Washington 2008.

41 World Bank: South Asian Region Regional Strategy Update, Washington 2007.

independence in the early 19th century and developed democratic structures early on. These were, however, not accompanied by a social modernization process. Instead generally export-oriented political and economic structures based on mining and agriculture remained in place. The indigenous population in particular was excluded from political and economic life, even in the countries in which they made up a large portion of the population, as were the descendants of African slaves. Numerous Latin American countries attained a considerable degree of development in the 20th century, following a strategy of import-substitution industrialization. This led to the emergence of a middle class of educated industrial workers, public servants, and a service sector. Only a few companies founded in this period, however, were able to survive in the globalized economy. In recent years, Latin America benefited like Africa from the rising prices of raw materials and agricultural commodities.

Agriculture in Latin America will especially be hurt by the impacts of climate change, with water scarcity playing a major role. This will affect both modern export-oriented enterprises as well as a poor, mostly rural population. The glaciers in Bolivia, Peru, Colombia and Ecuador are likely to disappear over the next 15 years, thus reducing access to water and hydropower. Reduced precipitation in the arid areas of Argentina, Chile and Brazil will probably lead to serious water scarcity. By 2020, between 7 and 77 million people will suffer from reduced access to water, a figure that could rise to between 60 and 150 million by the second half of the century due to a further tightening of water availability and a growing population.

The impacts on agriculture can, however, vary. Rice production is likely to fall after 2020, while soybean production in southeastern South America could increase due to rising temperatures and precipitation. In all, the number of people facing hunger could rise to 5 million by 2020, and as many as 85 million by 2080.

The warming of the sea surface off the coast of Peru and Chile can negatively impact fish stocks for these two countries in which fishing is an important economic sector. Coral reefs are also under threat in Mexico, Belize and Panama. The future of Latin America's tropical forests is particularly precarious. A temperature rise of only 2°C along with a reduced water content in the soil would be enough to replace the tropical forests of the eastern Amazon and central and southern Mexico with savannas. Parts of northeastern Brazil and central and northern Mexico could then even turn into desert. The Caribbean is especially at risk of a likely increase in the frequency and intensity of hurricanes.

What can we learn from this? Anticipatory adaptation to the probable impacts of climate change is of particularly great importance for the lives and safety of people everywhere. Countries with dynamic economies and hence a rising demand for energy, however, need to take mitigation measures in order to decouple economic growth from rising emissions of greenhouse gases. Meeting the challenges of climate change will mean integrating these climate-related matters more and more strongly into their respective policy areas in the years to come. Investment schemes, for example, and agricultural planning will need to take into account the projected impacts of climate change. This means that plans, such as those for infrastructural expansion, need to be vetted for climate risk. Dams, for example, need to be evaluated with regard to any future changes in water volume in order to take other competing water uses into account.

Development strategies need to avoid exacerbating or creating new sources of vulnerability with regard to climate change. This means that rural development must focus less on promoting the specialization on globally competitive agricultural products and shift toward highly diversified livelihood strategies at household level that contain a mix of economic activities in both rural and urban areas. This will make it possible to move from one failing source of income to others if climate change should make this necessary. In many parts of Africa, for example, smallholder agriculture can use resources more sparingly through the use of methods from organic agriculture. [42]

Socioeconomic development strategies need to be reoriented toward a development approach that is climate friendly. This includes the introduction of renewable energies and support for new forms of urban development and transportation policies. Another important medium-term alternative would involve a reorientation away from the global market and toward regional economic channels.

These considerations point toward a more fundamental change of direction, comprising two new factors that influence human welfare. Firstly, we must assume that there will be an increased level of risk, as the magnitude, speed and impacts of climate change cannot be anticipated exactly. This does not only hold for developing countries; changes in precipitation patterns cannot be determined in advance for Europe either. Secondly, environmental protection and economic growth need to be viewed in a different relationship than until now. The protection of ecosystems and their functions that are of fundamental importance to human life and which cannot be replaced by technology, can no longer be subordinated to economic growth.

42 International Assessment of Agricultural Knowledge, Science and Technology for Development, IAASTD 2008; Agriculture at a Crossroads. Global Report; www.agassessmentwatch.org/report/Global%20Report%20(English).pdf

3.4 The failure of catch-up development: the examples of China and India

The fight against poverty in the sense of more just distribution and participation has, historically-speaking, been closely connected with economic growth – hence the strong focus on economic growth in most poverty strategies, and even in those that emphasize the integration of economic and social approaches. Most development strategies are based on the idea that one can imitate the development of successful countries and can follow the steps necessary for this in a short period of time in order to, effectively, catch up. The term "catch-up development" refers to the structural shift from an agrarian to an industrialized society and the related processes of economic growth, urbanization and the simultaneous fall in population growth and improvement of living conditions for the majority of the population.

Quantitative economic growth has hitherto included the increasingly comprehensive economic exploitation of natural resources and ecosystems. Since the 1960s, however, there has been an emerging understanding that there are limits to the subjugation of nature to the needs of the economy. The increased contamination of soils and the food chain with poisons such as DDT, along with the resultant health hazards for both people and animals, were a first indication of this problem. Global warming and the unavoidable, complex impacts of climate change have now again brought the troubled relationship between humanity and nature under public scrutiny.

Due to these changes, catch-up development was called into serious question beginning in the 1980s, and the new sustainable development model began to gain acceptance – at least in the area of policy planning (see also Section 6.1). While this term is currently built into most of the national strategies of developing countries and in the programs of development banks and other organizations, it has been mostly ineffective with regard to implementation. In practice, the concept of catch-up development continues to predominate.

This is particularly clear in the cases of China and India. Economic growth in both countries, continues to be tied to a large extent to the exploitation of nature and the further strengthening of patterns of social inequality. This can lead, in both countries, to serious obstacles for sustainable development in the years to come.

⇨ The people and economy of **China** have already begun to suffer from major ecological problems that are bound to be exacerbated by the impacts of climate change. Rising average temperatures will result in more severe droughts and periods of heavy precipitation, leading in turn to desertification in the north and water scarcity for large portions of the country.

The poorest and least developed rural arid regions have already been hit hardest by the consequences of resource exploitation. The inhabitants of those areas have been directly confronted with the problems of advancing soil degradation, more frequent storms and periods of drought, and an ever scarcer drinking water supply. Rural exodus has become a common means of coping. It is very likely that domestic migration will continue to rise and will become a major challenge for the Chinese government. The population along the east coast, the hub of Chinese industrial production, will not be spared either. Seal level rise and stronger and more frequent tropical storms and floods would not only endanger the industrial plants and their supply infrastructure, but also would hit the millions of migrant workers who live in the country's large cities.[43]

The impacts of climate change will thus reinforce existing major environmental problems, ranging from soil degradation and increasing water pollution and dwindling supplies, to air pollution at levels that pose a serious public health hazard. Greenhouse gas emissions have also increased considerably in the country, with China now leading the world at 17.3 percent of the world's total CO_2 emissions. China's energy consumption also rose an average of 13 percent over the past three years, thus outpacing the country's GDP. An average of one coal power plant goes into operation in China each week. Although the country has one of the world's largest renewable energies programs, it still only covers a small portion of the rise in annual energy use.

The awareness of the Chinese central government for environmental and climate problems has increased considerably over the past several years. The China Council for International Cooperation on Environment and Development (CCICED) has, for example, had an advisory role in the government since 1992, and its recommendations have helped shape the country's development planning. The government also published a white paper in 2008 that summarizes the government's climate policy measures without, however, giving clear indicators or deadlines. The Ministry of the Environment (MEPA) was strengthened as an institution although it has had – just like other central government agencies – serious difficulties in effectively overruling local and provincial administrations. The rise in health and other problems as the result of air and water pollution, especially affecting poor rural and urban populations, has even led China – one of the first countries in the world to do

43 Cf. Bauer / C. Richerzhagen: Nachholende Entwicklung und Klimawandel. In: Aus Politik und Zeitgeschichte 47, 2007.

so – to calculate the costs of its environmental problems into its total economic figures. This new "green" national income figure, introduced in 2004, is considerably lower than the standard Chinese GDP figure.[44]

The Chinese government is relying increasingly on international assistance, in particular, advice with regard to sewage and waste treatment in its major Yangtze, Yellow River and Songhua water catchment areas, which has been followed by major investment projects. In 2006, the Chinese State Council determined that, by 2010, at least 70 percent of the sewage of China's large and middle-sized cities will need to be treated. Water treatment in rural areas will also need to follow.

⇨ **India** has also been experiencing the consequences of climate change in many ways. The country will most likely be hit hardest by changes in the monsoon pattern since Indian agricultural production and food security depends heavily on monsoon precipitation. The melting of the Himalayan glaciers is threatening the water supply, while more frequent, heavy rainfalls and tropical storms also threaten coastal cities and cause repeated major flood disasters. India's poor, whether peasants who depend on rain-fed farming or inhabitants of the sprawling slums of India's major cities, will likely suffer the most.[45]

India already now suffers from the consequences of a high demographic rate and the nearly unchecked exploitation of its natural resources, which has in turn had a considerable impact on biodiversity.

The Indian government – partly due to pressure from court decisions – has introduced steps to improve air and water quality, to protect biodiversity including that of animal species, and to prevent worsening of soil quality. Better management of soil and water will be of great importance in maintaining food supplies in the future.

Increasing urbanization creates additional problems with regard to the supply of drinking water, sewage disposal and guaranteeing a minimal standard of air quality. In New Delhi, sustainable improvements in air quality have already been achieved since the Indian Supreme Court forced public transportation to operate only on liquid gas, a practice that is now being followed voluntarily by

44 Economic costs have soared due to a lack of investment in sewage disposal systems, with both surface and groundwater heavily polluted. In one example, the government, with international support, has spent USD 1 billion on the clean-up of Shanghai's Suzhou Creek, which has posed a major health risk to the local population. The program also worked to move industrial sites to the margins of the city with all necessary regulations for environmental protection.

45 See fn. 43.

an increasing number of private vehicle owners as well. Rural areas are most in need of an improvement in their water supply and water quality, which still leads to high maternal and under-five child mortality rates.

Poverty has also led to increasing social tensions in India. Since neighboring Bangladesh and Pakistan will also suffer under the considerable consequences of climate change, emigration to India is expected to rise. Especially immigration from densely-populated Bangladesh has in the past led to violent conflicts in adjacent Indian states. An increase in migration pressure caused by "climate refugees," together with continued population growth in India, will undoubtedly exacerbate social tensions further in a region that already is one of the world's most conflict-prone. [46]

Climate change is now demonstrating on global level that the old scheme of catch-up industrialization has failed. Environmental and climate protection needs to be integrated into economic strategies from the very beginning. Poverty alleviation, moreover, cannot be achieved by traditional economic growth and industrialized countries can no longer be used as a model for attaining sustainable development. Meeting this challenge requires a nearly revolutionary change towards a climate-friendly approach to development.

46 See fn. 9.

4 Conflict Situations and Areas of Intervention

Main message: The foreseeably more acute scarcity of natural resources will lead to increased competition over the use of these resources and more widespread conflict over their distribution. This affects the availability of fertile soil and freshwater as well as the habitats of endangered animal and plant species. This situation of increased scarcity and conflict must not, however, be used by industrialized countries as a pretext to adopt policies aimed at protecting their vested interests or at merely averting danger. There are already alternatives available to both industrialized and developing countries, for example, a more efficient use of energy, greater reliance on renewable energy sources, a radical change in urban design and transportation, and a shift to sustainable agriculture. Such steps could lead to a global change of direction and less poverty.

Ocean warming and the melting of polar ice caps and glaciers in the polar regions and mountains because of climate change will result in sea level rise, threatening the existence of some small island nations and forcing millions living in low-lying coastal areas to migrate. This situation, coupled with the fact that larger numbers of people, because of climate change, will no longer be able to make a living in their home regions, calls for a global approach to international migration policy. The displaced persons of the future need to be welcomed and provided with work and living opportunities in regions that are less hard-hit by climate change.

4.1 Interests, Interdependencies and Potential Conflicts

In the age of globalization, especially, the world economy does not develop uniformly, but is instead characterized by a multitude of growing inequalities both between and within different societies. This inequality arises to some extent from deep-rooted, conflicting political interests at both the national and international levels. At the international level, the industrialized countries are particularly interested in preserving their (global) vested interests, while other countries – especially rapidly growing emerging economies – are primarily concerned with rapid catch-up development, and the redistribution of global economic power. From the viewpoint of industrialized countries, the ecological conditions needed to protect their own long-term economic interests are endangered by both the lack of sustainability of their own economies and by the catch-up development efforts of less developed countries.

Within this context, there is particular concern over the growing demand for raw materials and the steep rise in greenhouse gas emissions in China, India, Brazil and other rapidly growing economies. From the point of view of the developing

countries, the climate policies demanded from them by the industrialized countries are perceived as unacceptable arrogance on their part and would call into question the right of countries of the South to their own development; the industrial countries in their development did not respect natural limits and are to a large extent responsible for today's climate problems. Furthermore, the credibility of the industrialized countries in the area of climate policy has suffered: They have not, as a group, been able to show that countries with broad technological and financial capabilities are able to reconcile the maintenance of their wealth with reductions in greenhouse gas emissions. How can developing countries then be convinced that they can attain wealth while reducing their emissions?

A closer look at the various interest groups and their lines of conflict shows, however, that they are far more complex. Western companies, for example, play a major role in the industrial development of large and fast growing developing countries and are thus themselves partly responsible for resource use and for rising emissions there. The rapid economic growth of these countries – China in particular – is due to a large degree to the export of consumer goods to the industrialized countries of the West.

On the other hand, the destruction of the environment is increasingly becoming an economic cost factor in the emerging economies, so that as these economies grow, the economic interest in a more environmentally friendly manner of using resources also increases. The resulting increased importance of environmental policy clashes with powerful corporate interests (e.g. agriculture, mining, industry) in the developing countries themselves. These interests seek to minimize their costs, shifting the burden of necessary environmental measures as much as possible onto others such as the state, other countries, or the poor population of their own countries.

As a result, even if they suffer most from the impacts of environmental destruction, the poorer segments of the population themselves may reject environment policy because they see it as an additional burden. They often see a strong national environmental policy as an obstacle to their way out of poverty.

There is therefore a very complex mixture of interests that conflict with sustainability policies. The amount of conflict that could arise over the use of natural resources therefore does not only depend on the climate-related scarcity of resources per se; it also depends on clusters of interest, the context and the institutional framework. Resource scarcity is thus not only a natural problem, but rather a socioeconomic and political one as well. Of course there are situations of absolute scarcity, but how scarcity affects people's lives cannot be understood entirely based on the scarcity alone, but also on how scarcity is dealt with in the

interplay of local, regional, national and global interests. We will examine these correlations, using the examples of energy, food and water.

There has been growing concern that the climate-related scarcity of resources at the national and international levels could lead to a more intense competition for their use, which escalate into violent struggles over resource distribution. Developing countries have grown anxious about having sufficient land and water, and industrialized countries and emerging economies have become particularly concerned about reliable sources of energy. The fact that agricultural production and drinking water supplies on the one hand, and the management of both fossil and renewable resources, on the other, compete directly, has already created an explosive situation at local, regional and global levels, and this will worsen in the future.

For the developing countries, the main problems are:

- the scarcity of freshwater supplies;

- a climate-related decrease in food production along with soil and sea exhaustion;

- acute supply problems caused by extreme weather events, which are expected to become more frequent due to climate change.

We must bear in mind that the impacts of climate change are not due to climate change alone, but also depend on the political, economic and social situation in which they occur. Climate change forces us to adapt, but the ability to adapt varies greatly around the world, as, in turn, does the risk of conflict. We can therefore expect the risk of violent conflict to be particularly severe in the vulnerable and unstable countries of the world. The impacts of global climate change, moreover, vary greatly from region to region. The worst impacts are, unfortunately, to be expected in those parts of the globe that are already severely affected by poverty and hunger: sub-Saharan Africa, South and Southeast Asia, and parts of the Caribbean and the Andes. The combination of high risks and a limited adaptive capacity can lead to conflicts that go well beyond the crisis regions and affect other regions that are less directly impacted by climate change and which have a greater adaptive capacity, i.e. industrialized countries. This is based on the following expectations:

- first, that social conflict in the countries worst hit by climate change will be exported to industrialized countries;

– second, that social conflict in the affected developing countries could lead to a disruption of the supplies of important economic resources to industrialized countries;

– and third, that the social conflict in the countries worst hit by climate change could create breeding grounds for global terrorism.

The industrialized countries could respond to these crisis scenarios with a wide range of strategies:

– First, they could support the most vulnerable countries to adapt to unavoidable climate change.

– Second, the industrialized countries, given that they are responsible for most of the climate change, could introduce focused and globally effective measures to mitigate climate change.

– Third, the industrialized countries can join with developing countries in a partnership to expand the basis for the *international* management of crises and catastrophes (within the United Nations and regional organizations).

– Fourth, the industrialized countries could, either in an alliance or as individual states, focus their military policy on more frequent intervention in crisis regions, and on their domestic security needs with regard to climate-related external threats.

In the fourth strategy, the reaction of industrialized countries to climate-related crises and conflicts in developing countries would itself plainly lead to further conflict. We must, therefore, concentrate on expanding the first three approaches (boosting the adaptive capacity of developing countries, mitigating climate change and expanding crisis management partnerships). This, however, will require a sober, reasonable analysis of the potential conflicts. Certainly, resource wars are a distinct possibility, but they are not the most likely reaction to resource scarcity. The history of the shared use of water especially shows that there have always been alternatives to violent confrontation, and that these alternatives are also routinely used among parties in matters such as river basin management, whether within states or across borders. The threat of resource wars can serve to raise the willingness to negotiate on the part of all those involved and thus serve as a strategic instrument toward implementing a non-military solution.

If used as a *prediction*, however, it could also become a self-fulfilling prophecy and lead to an actual rise in the threat of war if all parties prepare themselves for such

a scenario. This is a main point of criticism that is raised with regard to arms races that will also need to be considered when it comes to dealing with any expectations of climate-related conflict. This means that there are two good reasons to find alternatives to military contingency planning with regard to issues such as access to resources: First, this type of planning can itself ultimately raise the likelihood of military intervention, and second, such a situation would undoubtedly be the least favorable for a just climate policy.

4.2 Food Security and Access to Drinking Water

The Food and Agriculture Organization of the United Nations (FAO) defines food security as "existing when all people at all times have physical or economic access to sufficient safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life." This security requires that four components be satisfied: food availability, food accessibility, food utilization and food system stability. [47]

In accordance with this definition, recognized scientifically, politically and by international law, food security requires more than just producing enough food at the global, national and local levels. The physical presence of nutrition is a necessary, but not sufficient condition for achieving food security. People – inasmuch as they do not produce their own food – require purchasing power to feed themselves and their families. If they do not have this and are not provided access to food through social security transfers, they will ultimately face starvation due to a lack of economic access.

By emphasizing other criteria such as the significance of "safe" food that meets the people's nutritional needs and (cultural) food preferences, the FAO definition goes beyond previous concepts of food safety. All three of these components now play an important role in the implementation of food aid. In one particularly controversial case, the government of Zambia rejected genetically modified maize from the United States in 2003 for being insufficiently safe. [48]

The days are now long gone when food security was calculated only in terms of calories needed to feed the people of a region, country or the world. The international discussion on food security strategies has been enshrined in the recognition of the fundamental human right to food since 2004, at the very latest,

47 FAO: Climate Change and Food Security: A Framework Document. Rome: FAO 2007.

48 Cf. O. Manda: Africa Recovery, vol.16 no. 4, February 2003, Controversy rages over 'GM' food aid, Zambia, citing health concerns, bars genetically modified grain; www.un.org/ecosocdev/geninfo/afrec/vol16no4/164food2.htm

when the 191 FAO member states unanimously adopted the Voluntary Guidelines on the Implementation of the Right to Adequate Food. [49] According to the document, all people have the inalienable right to be free of hunger, and states are obliged to do all that they can to respect, protect and fulfill this right.

This type of approach, first of all, provides support to the hungry in their interaction with state institutions in that they promote them from being mere "recipients" to people with fundamental individual rights. This approach, secondly, obliges each state to make the fight against hunger a top priority and to make use of as many resources as possible to this end. This also involves a detailed analysis, beginning with a study of the most vulnerable population groups to a microanalysis of individual households. It will indeed take such an approach to fulfill the rights of people to live free of hunger. The right to food was also recognized in 1966 in the ratification of the International Covenant on Economic, Cultural and Social Rights.[50] This agreement has defined the standards relevant to the rights of individuals and to the corresponding obligations of the signatory states. It must be stressed, however, that states remain free to meet these obligations in the manner of their choice. [51] The right to food is therefore not some sort of "blueprint" or political program that describes how to attain food security.

The right to food is thus also connected to the concept of food sovereignty, which originated in smallholder movements and their international networks such as Via Campesina, but which has now been receiving increased support from governments critical of globalization, NGOs and social movements. Food sovereignty emphasizes the right to self-determination in the production and consumption of food, including the right of communities and governments to remain sovereign in deciding how much to open their markets and how to coordinate their trade relations independently of free trade doctrines. Even if the word "rights" appears in these discussions, political goals and not rights as defined in international law are what is actually meant.

The view that climate change will have a negative impact on future food security gained general acceptance during the hunger crisis of 2008, which hit tropical and subtropical developing countries particularly strongly. This is expected to affect food access at the international, regional and household levels. Without

49 FAO: Voluntary Guidelines on the Implementation of the Right to Adequate Food in the Context of National Food Security. Rome: FAO 2004.

50 www2.ohchr.org/english/law/cescr.htm (as of 26 January 2009)

51 On the international legal interpretation of the right to food, see United Nations General Comment no. 12/1999: www.unhchr.ch/tbs/doc.nsf/0/3d02758c707031d58025677f003b73b9?Opendocument (as of 26 January 2009)

preventative measures, climate change will lead to a reduction in agricultural output both globally and in a majority of regions. This corresponds, at the local level, to an increased threat to food access for particularly vulnerable communities, households and individuals. The potential and the capacity of peasant associations and even entire states to make sovereign decisions on what food they produce and how they produce will also be increasingly threatened.

Climate change has also begun to affect the map of agricultural production and famine-prone regions and the geographical distribution of risks and vulnerabilities. While some countries, especially in the (cooler) temperate zones (e.g. in Western and Northern Europe, East Asia and Patagonia), could expect an improvement of their agricultural conditions in certain scenarios with a maximum increase of 2.5°C, most tropical and subtropical countries can expect only worsened conditions and, in some cases, sheer disaster. Once again food security threatens developing countries in particular. For especially vulnerable population groups, the rural and urban poor for example, these new climate risks only stand to further exacerbate many existing, deeply rooted poverty-related problems. Two climate-related trends now threaten to dominate global agriculture and, with it, the world's food security for decades to come:

1. Unabated population growth and increases in purchasing power and associated changes in consumption patterns – especially in emerging Asian economies (China and India in particular) – will continue to strongly elevate the demand for agricultural products, especially grains, oilseeds, animal products and animal feed. The surging demand for meat and dairy products has particularly led to rising prices in the global grain and feed markets. Even as the historically high prices of summer 2008 have since declined due to good harvests and the global financial crisis, the price of wheat still remains well above its 2006 level and well above the average price for the past five years. A continued rise in demand and high prices are to be expected in the middle to long term.

2. The importance of agroenergy and renewable resources has also grown as ostensibly climate-friendly substitutes for fossil fuels, including oil in the chemical industry and in the production of bioethanol and biodiesel. The gradually increased and often legally mandated addition of ethanol and biodiesel to fuels in numerous countries, especially the United States, the European Union and emerging economies such as Brazil, China and India, will have an even greater impact on agricultural markets and food prices in the future. The booming demand for cost-efficient agricultural commodities will go far to aggravate the ecological strain on soil, soil fertility, water supplies, biodiversity, etc.[52]

52 See fn. 19.

The world's grain reserves fell in 2007 for the seventh consecutive year to their lowest level in 25 years. This particularly reflects the world's growing population and rising meat production, as well as a shift in agricultural use from nutrition to agrofuels. The medium-term trend is not encouraging: While most analysts predict a continued rise in food production through 2015, growth is expected to slow down due to a number of factors. This includes higher energy prices alongside limits to the expansion of arable land, soil and water scarcity and degradation, and a slowing growth of yields resulting from the limitations of current technology. [53]

The overuse of finite natural resources well beyond the sustainability limits is quite striking in the case of the fishing industry. Over a third of fishing waters are close to complete exhaustion and a further third could be in serious danger by 2025. The situation has become particularly dramatic in Africa, according to recent IPCC figures. [54] In sub-Saharan Africa, where a vast majority of agriculture is rain-fed, the IPCC projects a fall in yield due to increased aridity by up to 50 percent through 2050. According to FAO calculations, there will have to be a 60 percent increase in food production by 2030 in order to ensure food security in Africa. The situation is also particularly difficult in broad sections of South and Southeast Asia and the Pacific. In Bangladesh, for example, 22,000 km^2 or 15 percent of the surface area could be under the sea by the end of the century at the currently projected sea level rise. At least 34 million people would then lose the basis for their living, mostly in agriculture, shrimp and other fishery. This would consequently pose new challenges to development cooperation and humanitarian aid. [55]

Any reliable analysis of the situation and development of solutions would have to take into account the synergistic effect of structural problems and the challenges of climate change. Price rises and supply shortages for crucial agricultural products are the result of a global crisis caused by a failed policy that is neither sustainable nor future-looking, especially in the rural and agricultural sectors. This crisis will worsen with the increased impacts of climate change, meaning a change in course is urgently needed in both industrialized and developing countries. The current global food crisis can be viewed as the result of negative effects of economic globalization in the agricultural sector, a form of globalization that is geared more toward the needs of industrialized countries than toward the reduction of hunger.

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53 S. M. Brüntrup: Rising food prices - causes, implications, and challenges for development policy, DIE, briefing paper 4, Bonn 2008.

54 IPCC: Summary for Policy-Makers. In: M. L. Parry et al (eds.): Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the IPCC. Cambridge 2007.

55 C. Bals, / S. Harmeling / M. Windfuhr: Climate Change, Food Security and the Right to Food. Published by *Brot für die Welt*, in: Analysen 2, Stuttgart 2008.

Many had been counting on global market and trade liberalization, and an affordable supply of goods to increase wealth and reduce hunger in developing countries. But this type of agricultural policy only exacerbated the marginalization of small-scale producers, and increased the number of those facing hunger. Effective strategies to overcome hunger and malnutrition in the era of climate change will therefore need to focus on adaptation measures that improve the access of the marginalized poor and the implementation of their right to food. It is no coincidence that agricultural policy has generally overlooked these groups. For much too long, international and national agriculture studies have focused solely on advantageous regions where success is more readily attainable using high-quality soil and irrigation techniques or by planting a few main export products such as bananas, coffee, or cocoa beans. Since, at the same time, the financial resources available for rural development have fallen by more than half over the past ten years, marginal regions have generally received insufficient support, if any. The agriculture budget has been shrinking for years in most developing countries. It is all the more regrettable that small agricultural producers have once again been marginalized at the FAO conference on world food security in summer 2008. Instead, the conference generally supported conventional strategies such as the opening of markets and the use of more conventional and genetically modified seeds and mineral fertilizers. Approaches such as these have especially benefited industrial farmers while contributing to the agricultural price crisis and to hunger revolts in over 30 countries.

Box 4: Water – a vital and vulnerable resource for life and development

Water scarcity and a lack of sanitation currently threaten the health and even the survival of over 2.4 billion people. Six thousand people die every day due to a lack of water (cf. United Nations World Water Development Report: Water for People, Water for Life. UNESCO, Paris 2003). Insufficient access to water leads to conflicts among and within communities, regions and countries. Biodiversity is also threatened by the exhaustion and pollution of freshwater reserves. Intact and balanced ecosystems are major necessities in safeguarding water security. Forests must also be protected for the vital function they play in the water ecosystem.

Climate change has made crisis symptoms already observed even more visible. A warmer climate can lead to the acceleration of the global water cycle and thus to a change in precipitation patterns, a reduction in the amount of water available and to more frequent and intense extreme weather events such as droughts, floods and storms. The melting of the polar caps and ocean warming, at the same time, are leading to sea level rise. This in turn results in more frequent flooding, a loss of land and the salinization of soils, bodies of water and groundwater reserves. In the absence of adaptation measures, these changes could have considerable political, economic and social consequences. Conflicts over the distribution of land, water and food could gain in intensity, as could waves of

migration away from affected areas, and the probability of climate-related conflicts among and within states.

The impacts of climate change affect poor countries with particular intensity, especially in sub-Saharan Africa. Rural populations are at particularly great risk as the success of their economic strategies depends to a large degree on stable environmental factors such as precipitation patterns and seasonal temperature changes. When these conditions change, farmers require a sound understanding of the changes and of alternative technologies if they are to invest in the long-term adaptation of their production systems. New risks, however, threaten the urban poor as well: Their frequently precarious living situations in cities can also be worsened by extreme weather events, which in turn often endanger sources of income in the informal sector. Heavy rains can lead to landslides in slums, while the breakdown of electricity and water supplies pose a danger to the health and thus to the economic activities of the urban population. The rural exodus expected in a number of countries will undoubtedly lead to population explosions in many cities (urbanization of poverty).

It is troubling that in such a risk-riddled and changeable situation, Europe and development cooperation continue to look to liberalized markets and major economic interests as a means of finding solutions to water supply problems. Water is, it must be emphasized, a vital and irreplaceable foundation of life and it requires ecological and social protections to be guaranteed at the highest level, both locally and internationally. While this does not preclude fees for water use, such fees should only be introduced to make use more efficient and for maintenance purposes, and not to reap profits for companies or "rents" for the bureaucracies in charge. An agreement will be needed on the common use of international bodies of water in order to ensure that water scarcity does not turn into a source of conflict. Understandings concerning the use of transboundary river basins need to be concluded in more specific terms, and must include both enforcement measures and detailed conflict solution mechanisms. This should all occur under the protection of international law and within the framework of the human rights system.

4.3 Migration and Migration policy

Migration has received increased recognition as an important developmental phenomenon with a strong impact on individual households and on the economy as a whole. This includes two types of human movement: migration within national borders and migration from one country to another. While internal migration statistics are difficult to determine, estimates have shown that, in 2005, at least 190 million people lived and worked outside of their countries of origin worldwide, although the actual figures are likely to be much higher. In 1990, the IPCC already warned that the impacts of climate change could be a main determinant of migration movements as millions of people flee from flooded coastal areas and major river deltas, from shoreline erosion and from the climate-related disruptions of agricultural production.

The dimensions of climate-related migration will rise globally in the years to come, especially in the Asia-Pacific region. The effects of this trend on people and their livelihoods cannot, however, be predicted with accuracy. Estimates for "environmental refugees" range between 25 and 200 million by the year 2020, and up to a billion by 2050.

As was emphasized in the *Stern Review on the Economics of Climate Change*, migration has the potential of becoming a common response to the impacts of climate change on the part of particularly vulnerable population groups. These migration estimates must, however, be treated with caution due to a lack of reliable empirical studies. It is also difficult to separate the impacts of climate change from other factors that drive migration. It is, however, impossible to overlook the fact that current migration trends in developing countries are to some degree driven by climate change. This can serve as a basis for conclusions on migration patterns both within countries and across international borders.

There has been little research on environmentally induced migration. If we, however, take the official UNHCR figure of 19.2 million refugees in 2005 and compare it with an estimated 200 million climate refugees in 2050, this would indeed point to a ten-fold increase.

International donors and relevant decision-makers are now faced with the following challenges:

a) While climate-related migration has received more attention in political science circles,[56] there is an alarming lack of empirical data and statistics available in the field. This is one of the reasons for the lack of strategic thought on the matter at the different political levels.

56 N. Myers: Environmental Refugees: A Growing Phenomenon of the 21. Century, Biological Sciences 2002/357, no. 140, F. Biermann / I. Boas: Protecting Climate Refugees; www.Environment-magazine.org, Nov./Dec. 2008, 10 -16 with further literature.

b) There are currently no basic data on migration movements and no mechanisms at the local, regional, national, or international levels to carry out research on national or international (climate-induced) migration. Political recommendations on how to deal with climate-related migration have therefore little scientific basis. [57]

c) There will continue to be limitations on effective approaches to adaptation and the ability to carry them out in the countries of the Asia-Pacific region and in other developing countries. This is the result of ecological, social and economic factors, including uncertainties with regard to the timeframe and areas involved, and a lack of knowledge on the part of decision-makers concerning the local and regional effects of climate change. There have also not been enough national projections and accompanying measures and a lack of the flexibility that will be needed to react appropriately to – or even mitigate – the wide range of migration-related phenomena.

d) Decision-makers thus lack much of what they need to be prepared for climate-related migration and to find necessary responses to the situation.

Decision-makers will need to take numerous steps in order to come to terms with these migration phenomena. This includes the research needed to assemble the wide range of data that will be necessary to understand climate-related migration, its magnitude and what needs to be done about it. Only international recognition of this problem, a better understanding of its various dimensions and the willingness to implement the necessary adaptation schemes and steps to reduce emissions will make it possible to find solutions. Governments, international organizations, global civil society and the private sector will all have to come together to find a common response to these problems. Climate-related migration will not stop at national boundaries. Proactive policies at the national and subnational levels will need the additional support of collective international and regional actions, including the adoption of international regulations. Only this will make it possible to meet the challenges of international climate-related migration.

57 Responding to this lack of data, the Asian Development Bank is currently conducting a study at all levels to help provide a basis for political decisions. The study aims at: a) expanding knowledge of the risks and protection needs of environmental refugees in numerous scenarios involving the Asia-Pacific region; b) analyzing how environmental migration influences the socioeconomic structures in both emigration and immigration areas; and c) determining the main problems connected to migration both within and across international borders, and how the region can cope under certain circumstances. This needs to highlight, in particular, the role of regional cooperation in the face of climate change and migration. Transnational migration movements can indeed become particularly significant in the region.

4.4 Energy Sources and Energy Policy

A large portion of climate policy is essentially energy policy. Fifty-five percent of global greenhouse gas emissions derive from energy production, including energy for electricity production and heating. This is more than all other sectors including transportation, industrial production, agriculture and deforestation.

A high percentage of the energy produced worldwide is derived from fossil fuels.[58] In 2007, this included oil (35 percent), natural gas (21 percent) and coal (25 percent) as the world's largest sources. The current model of development thus depends to a great degree on these fuels, following the example set by the Western industrialized countries. Such a model is, however, by no means a sustainable one, both due to the unacceptable effects on the global climate, but also due to the impending depletion of the fossil fuels themselves. There is no longer any doubt that oil production has either already peaked or will do so in the next few years. Even if energy efficiency were increased significantly in the industrialized countries, the rapidly growing demand for oil in developing countries, whose economies are modeled on the industrialized countries, would further widen the gap between the falling supply of, and increasing demand for oil. The data show with a high level of certainty that the planet's oil and gas reserves, which have developed over many millions of years, will be irrevocably exhausted by 2070 at the latest. Coal reserves, however, may last until the next century. We cannot wait until then to work toward a sufficient supply of electricity and fuels from renewable energy sources. The current greenhouse gas emissions that result from energy use make this necessary already today.

So far, most governments have used the projections and scenarios of the International Energy Agency (IEA). These scenarios are based on the continuation of development trends in the production and use of fossil fuels (oil, natural gas and coal) over a period of 20 to 50 years. The IEA scenarios are based on the assumption that there will be no major technological, economic, or political changes or upheavals during this period. Based on this assumption, the IEA expects that global economic growth and the increase in the world's population together will result in a 30-percent increase in global energy use by 2015 (using 2000 as a point of comparison), and a 50-percent increase by 2025. The IEA predicts a further rise of 50 percent for the subsequent 25 years through 2050.

58 Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (BMU) (eds.): Erneuerbare Energien in Zahlen – nationale und internationale Entwicklung, Stand Juni 2007, Berlin 2007.

The greatest rises are projected for the world's two largest countries in terms of population, China and India. India, whose energy consumption tripled between 1970 and 2000, is now the world's fourth-largest consumer of energy (in absolute figures, not per capita) following the United States, China and Russia. Indian consumption is expected to double again by 2030.

The IEA also expects that most of the additional energy required worldwide through 2030 will continue to be serviced by fossil fuels, due to "cost factors". This is based on the assumption that the percentage of energy production covered by renewables will not increase significantly in most or even all of the world's countries through 2030. This assumption is particularly questionable since, as a projection, it could lead to the wrong sort of political decision. That these projections are also influenced by particular interests becomes clear when we compare the amounts invested in the energy sector. Ten times more is still put into the expansion of the particularly hazardous production of electricity from coal than the amount put into the entire range of renewable energies, even if all parties agree on how important it will be to enter the solar age and move rapidly away from carbon-based energy.

It has in fact been countries with rapidly growing economies with a high energy demand such as China and India that have presented economic reasons for the continued construction of new coal energy plants, particularly in light of the current financial crisis. Each megawatt-hour of energy costs roughly EUR 11 if produced using Australian black coal, EUR 26 using natural gas, and EUR 50 using oil.[59] Even the Gulf States with their still vast oil and gas reserves have now begun to produce their own electricity using imported coal because it is much more lucrative for them to sell their oil and gas. This trend is, however, a climate policy disaster: Even the latest state-of-the-art coal plants continue to emit 750 grams of CO_2, twice the amount that gas power plants emit.[60]

A simple comparison suffices to demonstrate that the fossil fuel-based industrialization model of the classical industrialized countries cannot be extrapolated to the world as a whole since it would severely overtax the resources of our planet. The United States is, by a considerable margin, the world's largest oil consumer, at a constant 25 percent of global demand. The amount of oil used by China, in contrast, doubled between 2002 and 2006 from 5 million barrels to 10 million barrels a day. In pro-capita terms, China, with its 1.37 billion inhabitants, does not, however, immediately follow the US (with well over 300 million inhabitants), but is in fact slightly below average among the 192 United Nations members. In 2003, the average inhabitant of the United States consumed 26

59 W. Reuter: Kohle in den Sand gesetzt, in: Der Spiegel 27/2008.

60 Ibid.

barrels of oil, compared with 11.7 barrels in Germany, 1.7 in China, 0.8 in India, and a mere 0.2 barrels in Bangladesh.

The debate on the pros and cons of an increased use of nuclear energy has resurged in view of the finite nature of fossil fuels and the soaring price of crude oil. The supporters of atomic energy especially like to make reference to the lack of carbon emissions in nuclear power plants in order to paint a picture of an environmentally friendly source of energy. There is however a reason why nuclear energy has only provided a small portion of the energy supply so far, making up only 16 percent of electricity use globally, in comparison with 65 percent from fossil fuels. If we were to replace all fossil fuels with nuclear power, the number of reactors on-line would have to be increased from the current 445 to 1,770. And yet, this would only serve to reduce greenhouse gas emissions by 10 percent.[61] The number of nuclear power plants would indeed have to rise from the current 50 GW of installed power capacity to well over 50,000 GW, or a thousand-fold increase, if we wanted to increase the energy production of the Global South (including China) to match that of the North, while adopting the European mix of electrical production.[62] This would not only entail fully uncontrollable safety risks throughout the entire atomic fuel cycle all the way through to the as yet unsolved problem of the permanent disposal of nuclear waste; but uranium is itself a non-renewable and thus finite resource. At the current rate of use and today's extraction costs, the world's uranium reserves will last only another 35 to 40 years. Without reprocessing, nuclear energy is thus a very limited transition technology that, due to its particular risks, is viewed as particularly problematical even in most of the countries that currently produce it. Each new plant indeed shortens the period of time in which we will have enough uranium to power the plants we already have.[63]

Nuclear energy is, moreover, not at all climate-neutral, since carbon is emitted in the process of extracting the nuclear fuel, in the building and later dismantling of power plants, and the building and operations of final storage sites for nuclear waste (which has yet to be achieved). Studies assume that nuclear energy requires a minimum level of carbon emissions that roughly corresponds to the level of emissions resulting from wind power, another technology considered to be "carbon-free", but one that does not involve pre- and post-production processes. If we, however, add to the equation the final storage of highly radioactive waste, the carbon emissions from nuclear power can be seen to be much greater, depending on the figures used in the calculation. In conclusion, we are able to conclude that

61 C. Eisenbart / D. von Ehrenstein: Nichtverbreitung von Nuklearwaffen - Krise eines Konzepts, Heidelberg 1990.

62 S. H. Diefenbacher: Kernenergie und Klimaschutz, 2008; www.ekd.de/aktuell/59095.html

63 Ibid.

nuclear power is much more destructive to the environment than renewable energies. [64]

The best way out of future climate *and* energy crises, will lie in transitioning away from both fossil and nuclear energy. Numerous studies show that this can be achieved in full by 2050 at the latest, even in highly developed industrialized countries such as Germany, and even at the current state of technological development. Per-capita energy use can also be reduced by a third through the thorough implementation of a sound energy conservation policy. The remaining energy needs can be covered by a mixture of renewable energies. In the transition phase, particular importance will have to be placed on highly efficient and generally decentralized cogeneration plants using natural gas. [65]

For a great many developing countries this means that they should, from the very beginning, avoid the construction of large fossil – not to mention nuclear – power plants as there is very little future for these facilities in view of the coming end to fossil fuel availability, in addition to impending climate change.

This, of course, does not mean that we should deny developing countries their legitimate interests, especially when it comes to the rights of the poor there to overcome their energy poverty and improve what are often precarious living situations. Having insufficient or unreliable access to energy for cooking, heating and basic electrical needs are among the most serious causes and effects of absolute poverty. While 1.6 billion people lack access to electrical power and light, 2.5 billion are relegated to cooking and heating with wood or charcoal, including 600 million in India and over half the population of China. [66] In sub-Saharan Africa, 80 percent of the population cook and warm themselves with biomass alone. Only

64 U. R. Fritsche: Treibhausgasemissionen und Vermeidungskosten der nuklearen, fossilen und erneuerbaren Strombereitstellung, Darmstadt 2007; cf. W. Storm van Leeuwen, / P. Smith: Nuclear power – the energy balance, 2005; www.stormsmith.nl; M. Bilek / C. Hardy / M. Lenzen: Life-Cycle Energy Balance and Greenhouse Gas Emissions of Nuclear Energy in Australia, 2006; www.dpmc.gov.au/umpner/docs/commissioned/ISA_report.pdf

65 For studies on electrical power gaps provided by the *German Federal Environmental Agency* (UBA), *Greenpeace*, and the *Bund für Naturschutz Deutschland* (BUND): www.umweltbundesamt.de/uba-info-presse/hintergrund/atomausstieg.pdf; www.greenpeace.de/fileadmin/gpd/user_upload/themen/energie/Deckungsluecke.pdf; www.bund.net/fileadmin/bundnet/publikationen/klima/20080327_klima_keine_stromluecke_klimafakten.pdf. Cf. Zukunftsfähiges Deutschland in einer globalisierten Welt. Ein Anstoß zur gesellschaftlichen Debatte. Eine Studie des Wuppertal Instituts für Klima, Umwelt, Energie, published by the *Bund für Umwelt und Naturschutz Deutschland* (BUND), *Brot für die Welt*, and the *Evangelischen Entwicklungsdienst* (EED), Frankfurt am Main 2008.

66 UNDP / World Bank: Energy Services for the Millennium Development Goals, Washington 2006, 46. Cf. *Brot für die Welt*: Entwicklungspolitische Folgen des Welthandels mit Agroenergie. Stuttgart 2008, 48.

20 percent of Africa's population has electrical power, and a mere 33 percent in Asia.[67] Energy poverty hits people in rural areas with particular force: While 70 percent of Africa's urban population does in fact have access to electrical power, this figure falls to only 1 to 3 percent in the rural areas of sub-Saharan Africa.[68]

Even in places, however, where energy is available, there are frequently serious difficulties due to poverty, a trend that is only increasing due to the economic crisis. Poor households need to use a much larger portion of their income in order to meet their energy needs. Food security, furthermore, depends entirely on stable and adequate access to energy, as 95 percent of basic foodstuffs require energy in their preparation, as of course does boiling water.

Many developing countries are thus faced with a double challenge: reducing their dependence on expensive imported energy, on the one hand, and overcoming the serious energy poverty that affects large parts of their populations, on the other. Since a large percentage of those living in energy poverty inhabit rural areas with poor infrastructures, there is much to be said for local solutions involving energy sources in close proximity to those who need them. These states indeed often lack the financial means for the creation of comprehensive centralized energy networks.

As the EU has stressed, the expanded reliance on renewable energies, with all their unused potential, is of great importance, whether solar energy, wind power, hydropower, or biomass.[69] Many developing countries, if supported sufficiently, could practically skip the fossil fuel age to advance to a sustainable climate-friendly economy anchored in a solar power network. This will of course require much more than well-meaning individual solutions and projects. Long-term national energy plans will instead have to be equipped to analyze the potential of different renewable energies and to integrate various individual solution types into a strategic framework. Industrialized countries and international organizations will then bear the responsibility for supporting the emergence of the political conditions required for this trend, including significant financial support, the transfer of the necessary technologies and providing policy advice. The founding of the International Renewable Energy Agency (IRENA)[70] in January 2009 with the long-term support of the German government is an important step toward this goal. This must, however, then be followed by numerous other steps that must not be thwarted by continuing support of increased fossil energy use on the part of development agencies such as the World Bank.

67 European Union Joint Commission / Czech Presidency Issue Paper: Access to Sustainable Energy Sources at the Local Level, 2009.

68 Ibid.

69 Ibid.

70 www.irena.org

Any energy strategy for the future that is based in climate protection and sustainable development will require the following:

1. Ranking the mostly untapped potential for an increase in energy productivity (output per energy input) as a technological and political priority;

2. Significantly reducing per-capita energy use in industrialized countries;

3. Most importantly, transitioning to renewable, climate-friendly energy sources (hydropower, solar, wind, biomass and geothermal power) as a replacement for a major portion of the oil and other fossil fuels in use without, however, repeating the errors made with regard to agrofuels; [71]

4. Modifying the ways of life as well as the production and consumption patterns of all societies to embrace sustainable energy use;

5. Providing, on the part of the industrialized countries, the technologies and financial funds necessary to sustain a long-term energy supply to developing countries.

This shift in energy policy is no longer a matter of technical capability but exclusively one of political will. [72]

71 See fn. 19

72 Wissenschaftlicher Beirat der Bundesregierung Globale Umweltveränderungen (WBGU): World in Transition. Towards Sustainable Energy Systems. Berlin 2003; http://www.wbgu.de/wbgu_jg2003_engl.html

5 A Theological Orientation

Main message: Climate change poses immense challenges to governments, societies, families, and individuals. We will need hope and support to meet these challenges. In the Covenant with Noah, God, creator and sustainer of life, renewed God's merciful and life-sustaining affirmation of creation even in the face of human sin and wickedness. In Jesus Christ, the God of reconciliation sets us free to enjoy the beauty of creation, to honor the right of all people to live and to respect the intrinsic value of non-human nature, and to commit to ethics of justice and sustainability.

5.1 Creation Faith, Justice, and Repentance

Global climate change is destroying the natural foundations of life, creating poverty, undermining development, and multiplying injustice. It challenges our responsibility for God's creation and a life in dignity and just participation for all people. "The earth is the Lord's and all that is in it, the world, and those who live in it" (Ps. 24:1) – this psalm verse acknowledges God as the creator of all life. Belief in God the creator leads to an attitude of thanks and humility, enjoying the beauties of creation, and living in a way that is respectful to it. This belief ties us into a living community together with all other creatures, and instructs us to show reverence for the world and to form it into a livable place. Creation faith also includes the belief that people were created in God's image, as attested in Gen 1:26f. This is the foundation for an inviolable human dignity, and hence for the right of each individual to live a life of dignity, which includes the right to use the gifts of creation.

In the Covenant with Noah, God renewed the merciful and life-sustaining affirmation of creation even in the face of human sin and wickedness (Gen 8:21f. and 9:8-17). As life on earth remains endangered by natural disasters, we may recall that this is a basic human experience that has been treated in the "great flood" traditions of many different religions. The great rains and the ark of salvation are images that have remained firmly ensconced in the collective human memory. The great flood provides a foundation for viewing the relationship between humankind and nature in Christianity as well.

God's affirmation of the reliability and continuity of life rhythms lies at the core of this, expressed in the promise never to destroy the earth again: "As long as the earth endures, seedtime and harvest, cold and heat, summer and winter, day and night, shall not cease" (Gen 8:22). While the flood did nothing to change that "the inclination of the human heart is evil from youth" (Gen 8:21), God no longer wishes to respond to this wickedness with destruction, having instead established a new

everlasting convent with all people under the sign of the rainbow (Gen 9:12-17). God's affirmation is as valid as ever, and we continue to place our trust in it today. It provides us with the courage to make an effort to protect God's creation even in the face of all developments that would destroy life. We are called, as creatures in the image of God, to till the earth and keep it habitable (Gen 2:15). "We are regarded as proxies and communicative representatives of the constant caring reign of God. We are allocated a position of co-responsibility in the sustainable use and beneficial management of the living space created by God, with the responsibility before God of carrying this out." [73]

People have, time and again, failed in this regard, and have thus rendered themselves culpable before God and creation. The Bible provides many accounts of such failings, but also stories of God's patience and the goodness in bringing those who had been lost to repentance and back to the right path. This is borne out in the Old Testament and by the witness of the Prophets in particular, but also in the accounts of the New Testament, where we are promised God's everlasting love and goodness in Jesus Christ.

As a Protestant church we are convinced that a clear-cut change of mentality in politics, the business world, and society is necessary to mitigate the consequences of climate change and to maintain the foundations of life for generations to come. Such a shift to a sustainable form of production and living requires a form of repentance known in the Bible as *metanoia*: a radical and all-encompassing turnabout.

We confess that, as part of the predominant lifestyle in the industrialized countries and an economic system focused on growth alone, we have not lived up to our responsibility for God's creation. Our lifestyle and our economic behavior contribute to the irresponsible exploitation of the resources of creation, with people deprived of their basic necessities and life opportunities. This makes us culpable before God, the creation, and other people. As a first step toward repentance we must therefore admit our failure, and stop denying it, playing it down, or shifting our focus to matters of lesser importance. [74]

This confession can have a liberating effect as we trust that God will have mercy on us, and give us the strength we need to truly turn around and start again. God's grace and power to bring about change are revealed to us in a unique manner in

73 It is not too late to respond to climate change: An Appeal by the Chair of the Evangelical Church in Germany, Bishop Wolfgang Huber. EKD-Text 89, Hanover 2007, 13.

74 This occurs, for example, when climate change is only discussed as a security problem, thus confusing the cause and effect. See Chapter 4.1.

the life and death of God's son Jesus Christ. God overcame the forces of sin and death in Christ, so that we do not need to remain entangled in our culpability. Our faith in Jesus Christ, in whom God showed us unconditional love despite of all our sin, liberates us to embrace a new life in gratitude, to serve justice and to care for God's creation.

God's creation is itself integrated into God's renewing and liberating acts of salvation, as it too is promised liberation from its bondage and oppression (Rom. 8:21). God's acts of salvation in Jesus Christ, encompassing all of creation, provide the foundation and source of a radical form of repentance and turning around that is entailed in the biblical word *metanoia*.

This "turning around", however, does not mean turning back to ostensibly better days of yore, but biblically speaking to a radical new focus on God's commandments and affirmations of salvation. It refers to a renewal of our thinking and action through our faith in the gospel of Jesus Christ. "Do not be conformed to this world, but be transformed by the renewing of your minds, so that you may discern what is the will of God" (Rom 12:2).

Repentance is also born of our marvel at God's creation and enjoyment of its beauty. We could in fact translate the first creation account to read: "And behold, it was very beautiful" (Gen 1:31). This loving gaze at creation mitigates and limits the way we look at it to meet our daily needs. We do not only live in an economy based in creation but also in a spiritual relationship with creation.

Our joy and amazement at God's good creation are described in many psalms. [75] "Bless the Lord, O my soul. O Lord my God, you are very great. You are clothed with honor and majesty, wrapped in light as with a garment. You stretch out the heavens like a tent ..." (Ps. 104:1-2). This attitude of praise for the creator and a grateful amazement at the divine work reminds us that we have received an abundance of gifts from God. This is a strong and positive motivation to protect God's good creation, to treat it with care, and to share the wealth of creation in a fair manner.

"We must conduct ourselves in a way that bears responsibility before God for the protection of our common natural foundations of life. We must conduct ourselves in accordance with the idea of justice, in a manner that reflects the consequences of our own way of living." [76]

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75 E.g. Psalms 8, 64, and 104.

76 Klimawandel – Wasserwandel – Lebenswandel [Changing Climate - Changing Waters - Changing Lives] 7th Meeting of the 10th Synod of the Evangelical Church in Germany, 2-5 November 2008 – Bremen: Kundgebung, epd-Dokumentation 52/2008, 7.

The concept of justice is of particular importance in this memorandum for two reasons. For one, climate change severely reduces the life opportunities of many people in developing countries, and thus exacerbates global social economic injustices while threatening an already fragile peace. If each individual is to enjoy the same dignity before God, this snowballing global injustice cannot be accepted by Christians, and serves as a reason for them to fight for greater justice and for the rights of the disadvantaged groups. Secondly, sharing the burden of climate protection is another element of justice. In the future, every country will be forced to decouple the securing and/or improvement of its wealth from emissions growth. In the process, every individual, whether poor or rich, will have to have the same right to use the earth's atmosphere, a common good, but this right must be limited. This will place the developing countries under a high degree of pressure to innovate, and they will have to be supported by the industrialized countries, acting from a spirit of ethical responsibility.

Justice, in its biblical sense, is first and foremost a gift of God that renders us just and righteous, while granting us a particular dignity – despite our failures. God's gift of righteousness in the life and death of his son Jesus Christ makes it possible for people to live with each other in justice, and in respect for the intrinsic value of non-human nature. God's good creation and human dignity are points of reference for understanding this justice. What is just and righteous from this point of view? That which serves people – whom God loves – is just, as is that which respects human dignity and protects God's creation. This leads to an understanding of righteousness that provides a foundation for economic action as well; an understanding that encompasses both enabling justice [77] and participatory justice [78] for all the people of the world, as well as a concern for future generations and for the respectful treatment of God's creation.

Climate change challenges us particularly as Christians to repent and turn to a new way of life. Christ liberates us from the old ways of thinking and living and grants us the ability to repent. "Turning to life" [79] – as Christians with our trust in Christ we can answer this prophetic call and follow him.

77 A. Sen: Development as Freedom, New York 1999; M. Nussbaum: Gerechtigkeit oder das gute Leben, Frankfurt 1999.

78 Just Participation: Empowerment for Personal Responsibility and Solidarity. A Memorandum of the Council of the Evangelical Church in Germany on Poverty in Germany, 2006.

79 See fn. 4.

5.2 The Conciliar Process and the Option for the Poor

We are following the vision developed in the "conciliar process for justice, peace, and the integrity of creation" (JPIC) as an ethical guide for radical social, political, and economic change.

The "conciliar process" began in the 1980s as the response of the churches and groups represented in the World Council of Churches (WCC) to the global political, social, and economic challenges that jeopardize a life in peace and justice and the integrity of creation. In 1983, the delegation of the Federation of Protestant Churches in the German Democratic Republic (East Germany) introduced a motion at the assembly of the World Council of Churches in Vancouver for the creation of an ecumenical peace council, anchored in Dietrich Bonhoeffer's original call for such a plan in 1934. For reasons related to church law, it was not possible to use the term "council" in the initiative, while the churches of the South explained that the issues of justice and the environment were inseparable from the question of peace. In the end, the representatives of the WCC churches agreed to begin a "conciliar process of mutual commitment (covenant) to justice, peace and the integrity of creation".[80]

In 1985, Carl Friedrich von Weizsäcker supported this movement at the German Düsseldorf Kirchentag (a huge biennial gathering of church laypeople in the Federal Republic of Germany), thus calling more attention to the Vancouver agreement. This was followed by a number of ecumenical gatherings in East Germany (1988/89 in Magdeburg and Dresden), West Germany (1988 in Königstein and Stuttgart), and at the European level (1989 in Basel), that were strongly influenced by grassroots church groups. These meetings discussed the intrinsic theological and political connections of questions of justice, peace, and the integrity of creation, leading to demands for concrete steps of change and repentance.[81]

At the 1990 World Convocation in Seoul, the churches represented there confessed: "We are accountable to one another and need one another to learn who we are before God. A global communion of mutual solidarity will only grow when we have learned to listen to one another, to see ourselves through the eyes of the other. ... Jesus' call to life took many forms – for the rich, it meant to get free from Mammon; ... for the privileged, it meant to share wealth and power; for the downtrodden it meant to overcome despair; for the weak it meant to gain self-confidence."[82]

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80 W. Müller-Römheld (ed.): Bericht aus Vancouver 1983, Frankfurt 1983, 99.

81 U. Schmitthenner (ed.): Der konziliare Prozess. Gemeinsam für Gerechtigkeit, Frieden und Bewahrung der Schöpfung, Frankfurt 1998, 38-48.

82 http://oikoumene.net/eng.home/eng.global/eng.seoul90/eng.seoul.2.1/index.html

The impulse leading to the "option for the poor" also emerged from the ecumenical context. This was also adopted in Germany, as evident in the 1997 joint statement of the EKD Council and the German Bishops' Conference on the economic and social situation, and has remained a guiding principle for Christian responsibility to the world ever since. The paper states: "From the standpoint of a Christian ethic, all social, political and economic action and decision-making should be gauged by the extent to which it concerns, benefits and empowers the poor. The biblical option for the poor is aimed at overcoming exclusion and involving everyone in the life of society. It commits one to see things from the angle of people living in the shadow of affluence..." [83] It is in this spirit that we must advocate for an understanding of justice in which all of the world's nations have the same right to make use of the goods of creation. Climate change poses the question "Who is my neighbor?" with a new poignancy.

Our lives are as finite as the riches of the earth. We must therefore treat them with care. God asks us to remember our limitations, and we are reminded of them by biblical traditions such as the God-given day of rest, which represents a healthful interruption of our working lives, and the tradition of the jubilee year, which regularly reorders ownership relations and limits extreme wealth and extreme poverty alike. Biblical accounts bear witness to the limitations set by God. We need only think of the Tower of Babel or the Parable of the Rich Fool, in which God warns of the folly of an infinite greed for wealth and power. An economy and lifestyle built on continual growth is not only dangerous and irresponsible but also denies any human limitations, limitations that God established for our own good. In the end, this means that we people must find the right balance in a new ethic of sufficiency.

For a long time – not only during the latest financial crisis – the churches have therefore called for a new model based on an "economy of enough". [84] The 2008 EKD Synod added this appeal to its statement on the financial crisis, establishing that just as a lack of balance led to the crisis to begin with, the economic and climate crises prove to us that we need to change our lifestyles and economy. [85] The 2008 EKD Synod's declaration on climate change expressed its expectation that this change of lifestyle derive from an attitude of gratitude for the beauty of creation and of humility before the limits that God sets for us: "The question of the limits

83 For a Future Founded on Solidarity and Justice: A Statement of the Evangelical Church in Germany and the German Bishops' Confe-rence on the Economic and Social Situation in Germany, Joint Texts 9, Hanover/Bonn 1997, http://www.ekd.de/english/1729.html

84 Alternative Globalisation Addressing People and Earth (AGAPE) WCC, 2005.

85 EKD Synod 2008: Verbindliche Regeln für die globalen Finanzmärkte; www.ekd.de/synode2008/beschluesse/beschluss_kapitalmarkt.html

to my capabilities is with me every day as the creator asks me 'Who do you think you are?' ... For much too long, we have all acted according to the idea that we can do anything, make use of anything. Now I am ... faced with the challenge of setting limits, learning to do without."[86] In the church, we have also been driven, for much too long, by the illusion of unlimited growth, and have thus been a part of the problematic developments that we so lament today.

Is the call to repentance just as ill-advised as the continuation of the path that we have previously taken? God's own actions to create justice, remind us that hope for justice is not just a utopian idea, but is something to be achieved in our own world. Peace on earth is a promise valid in our own times. We render ourselves culpable before God and the world and deny God's power to liberate and change when we, as Christians, despite all we now know, do not oppose the global and local injustices, inhumane wars, and an exploitation of creation born of excess.

"Repent and live" – we must listen to, accept, and live by this prophetic call – beginning with ourselves as church(es). Then can raise a united voice in the discussion of new political and economic models, a voice to be heard by all other social, political, and economic actors.

86 Klimawandel – Wasserwandel – Lebenswandel [Changing Climate - Changing Waters - Changing Lives] 7th Meeting of the 10th Synod of the Evangelical Church in Germany, 2-5 November 2008 – Bremen: Kundgebung, epd-Dokumentation 52/2008, 8.

6 Political and economic guidelines for a just, sustainable policy on climate and development

Main message: The model of sustainable and just development upholds the right to live for all and the intrinsic value of all of God's creation. The concept of growth-oriented catch-up industrialization as a means of development can have no future. In the era of climate change, the term development itself needs to be reconsidered. We need a just climate policy in order to distribute the burdens of climate protection and of adapting to the impending changes. This should be carried out in accordance with the differing degrees of responsibility for the problem borne by industrial and developing countries. This must begin with equal emission rights for all, limited by the maximum amount of greenhouse gases that the earth's atmosphere can assimilate without the earth's average temperature rising above the currently established limit of 2°C. Using this as a mathematical basis, international emissions trading can be introduced to force reductions to be made by those who emit the most. The auctioning of emissions licenses in industrialized countries can raise funds that the countries of the South can use to take the necessary adaptation steps and to bring about sustainable development.

6.1 Economic growth and sustainable development

Economic growth, measured in terms of the real growth of the gross domestic product (GDP) adjusted for price changes, that has become the primary goal of economic policy and industry, is unsuitable as a model for a sustainable future society, and can even be a hindrance to such a development.[87] Criticism of the GDP goes back to the 1970s and remains relevant today. The GDP is neither a measure of a society's welfare nor of its quality of life. Recent happiness research has revealed strong indications that above a certain per-capita income, GDP growth no longer entails any additional quality of life.[88] Using the GDP as a measure of welfare and of policy success no longer has any objective basis. The negative aspects of GDP growth, including greenhouse gas emissions, are now most predominant in this regard.

In late 2008, in the midst of the global financial crisis, Achim Steiner, Executive Director of the United Nations Environment Programme, called for the situation to

87 Cf. H. Diefenbacher: Wirtschaftswachstum als Statistik-Phantom – Anmerkungen zu Versuchen der Neudefinition des Begriffs, in: S. Rudolph (ed.): Wachstum, Wachstum über alles? Marburg 2007, 30–47.

88 M. A. Cohen / M. P. Vandenberg: Consumption, Happiness, and Climate Change, Resources for the Future, Washington, October 2008. Recent "happiness research" and "happiness economics" have supported a rigorous climate policy.

be used to introduce new real economic guidelines that link growth with a sustainable use of nature and climate protection.[89] At the World Economic Forum in Davos, Ban Ki-Moon, General Secretary of the United Nations, spoke in similar terms: "Over the past few months, momentum has grown for what I call a global 'Green New Deal'". With the "New Deal", Ban Ki-Moon alluded to the programs instituted by President Roosevelt in the 1930s in response to the Great Depression in the United States. We are now once again faced with the need for a new type of economy, one which takes into account the global fight against poverty in addition to ecological concerns. This type of Green New Deal is thus of particular relevance to the subject of this paper.

Any initial step in this direction is certain to entail further work on increasing our energy and resource efficiency. A great deal of progress has been made in many industrialized countries over the past few decades toward decoupling economic growth from the use of energy and resources. Developing countries continue to use energy with relative inefficiency, i.e. they achieve too little wealth at energy and emission rates that are much too high. While there have been many – quite reasonable – calls to increase the energy efficiency of developing countries, the industrialized countries must first move to increase their own energy and resource efficiency. An increase in efficiency in developing countries must not, in this way, serve as a substitute for actions that need to be taken in the industrialized world. There are still numerous obstacles on the way to attaining efficiency levels in developing countries, levels that are already technologically feasible. These obstacles include low energy and water prices in the developing countries themselves, a system that is cemented in social policy and which thus needs to be treated with great sensitivity, as well as the globally unequal distribution of scientific and technological expertise. International patent law makes it more difficult to transfer knowledge to developing countries even when the knowledge in question is in fact already available. This is linked to issues involving international governance that have a direct effect on the potential for climate policy in developing countries.

Improving efficiency alone will not, however, be enough to reduce emissions if we do nothing to change our fixation on growth. Only an intelligent mixture of improved efficiency, changes in lifestyle and production as well as consumption patterns, along with new climate policy institutions can lead us to success in terms of the 2°C goal. We therefore need to develop new models that support a mixture of innovative technology, intelligent adaptation, and new lifestyles. A number of new approaches and policies have already been developed to this end.

89 A. Böhm / C. Grefe / P. Pinzler: Der große Umbruch. Drei Krisen mit einer Klappe, in: DIE ZEIT, 16 October 2008, no. 43.

The goals and ideas that came with the old growth-based approach need to be changed at a fundamental level. Considerations involving qualitative growth that go back to the late 1970s can, however, be combined with the concept of sustainable development.[90] The very idea of sustainability raises basic questions about which areas and capacities should grow (and which should not). It is now well recognized that sustainability is an important criterion for the ability of economies and societies to prosper in the future. However, it remains a matter of debate as to how exactly define this term.[91] The establishment of "management rules" has now gained considerable acceptance as a means of enabling the practical implementation of the concept. These rules can involve both renewable and non-renewable resources in addition to the capacity of the environment for assimilating hazardous materials.[92] The German Bundestag's Enquete Commission on the Protection of Humankind and the Environment built on the sustainability assumptions of Daly and El Sarafy and advanced five "management rules" for sustainable development:[93]

1. The usage rate of renewable resources should not exceed their regeneration rate. This rule supports the maintenance of ecological capacity.

2. Non-renewable resources should only be used to an extent to which a physically and functionally equivalent substitute is developed in the form of renewable resources or to which the use productivity is increased.

3. The rates of pollution emissions should not exceed the full assimilative capacity of the environment, taking into account all relevant factors.

4. The timeframe of the anthropogenic impact on the environment must roughly correspond with the time it takes for environmentally relevant natural processes to react to this impact.

5. Dangers and unjustifiable risks to human health that result from anthropogenic activities must be avoided.

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90 H. Diefenbacher: Gerechtigkeit und Nachhaltigkeit, Darmstadt 2001, Chapters 4 and 6.

91 On the ethical background: K. Ott / R. Döring: Theorie und Praxis starker Nachhaltigkeit, Marburg 2nd ed. 2008.

92 For one of the oldest and most frequently cited variants: H. Daly: Sustainable Growth – an Impossible Theorem, in: Development, 1990, No. 3/4, 45–47; and quite similar to this: El Sarafy: Sustainability, Income Measurement and Growth, in: R. Goodland et al. (eds.): Environmentally Sustainable Economic Development: Building on Brundtland, Paris 1991, 69 ff.; the rules listed there correspond with those cited in the following (fn. 93).

93 Deutscher Bundestag (ed.): Abschlussbericht der Enquête-Kommission "Schutz des Menschen und der Umwelt – Ziele und Rahmenbedingungen einer nachhaltig zukunftsverträglichen Entwicklung", Bonn 1998.

While these rules provide for rough evaluations of certain activities, they often do not provide clear guidelines, especially in the case of the fifth rule. Whether, for example, the planting of genetically altered plants or the peaceful use of atomic energy are "justifiable" risks or not, cannot be decided solely on the basis of these rules. With relevance to climate change, however, the rapid exploitation of fossil fuels and the unmitigated emissions of greenhouse gases most certainly violate rules two through five, as well as rule one if we take their massive effects on global biodiversity into account. Climate change thus violates (nearly) all the rules of sustainable development. Any commitment to the concept of sustainability that is not just to remain lip service necessitates a fundamental change of course.

Climate change thus requires a number of changes on the part of industrialized countries, especially in their economic and energy policies, but also in their transportation policy, urban planning, and agriculture. This pressure to innovate, however, also entails opportunities for new developments. Environmentally friendly production methods that replace energy-intensive inputs and methods with human work are set to become more competitive in agriculture, industry, and the service sector in the future, and this will be reflected in new research and innovation. Countries that are fast to recognize the dangers of climate change will thus also be able to have a competitive advantage by strengthening their innovative capacities in their embrace of sustainable technological options. One central challenge of our time is how to make use of this reform process as a means of improving the environmental impact of industry while, at the same time, reducing poverty around the world. However, we must also take into account the fear among developing countries that the constraints of climate policy will make it impossible to liberate the half of humanity now living on USD 2 or less a day from poverty (as calculated in terms of purchasing power parity). This challenge requires more than just a moral appeal to the behavior of each individual, and indeed demands new models and institutions. In the following we will submit a proposal to this end.

6.2 Guidelines for a Just Climate Policy

The necessary change of direction must not result in making the current distribution of wealth and resources even more rigid. We will also need to take into account the future welfare of developing countries and national and global questions of justice. Four closely related problems must be solved in this connection: *First*, global emissions must be kept so low that there is a good chance of keeping the average global rise in temperature to only 2°C. This implies that the atmosphere must be viewed as a greenhouse gas sink with a strongly limited capacity. Use of the sink's limited capacity must no longer be free of charge. The economic valorization of a limited natural resource (in this case, the greenhouse gas sink) is legitimate in principle. If the shortage of the resource is recognized, and

more precisely defined in line with the 2°C goal, this will lead, *secondly*, to a global distribution problem with regard to the emissions that are still permitted. This distribution problem cannot ultimately be solved in economic terms and is ultimately an ethical issue. *Thirdly*, even mitigating the effects of climate change makes adaptation efforts necessary at a variety of levels. Here, the question is how much support the industrialized countries are obliged to give to others. And *fourthly*, the solution of the first three problems should not seal off ways out of absolute poverty but should serve to open them up further.

To solve these problems, the industrialized countries need to implement a comprehensive strategy that combines several points:

- First, an integrated climate and energy policy that (a) ensures drastic reductions in greenhouse gas emissions in all industrialized countries, (b) supports developing countries in their introduction of institutions and technologies that slow and eventually reduce their emissions, and (c) supports developing countries in their adaptation to climate change;

- Second, support for a climate-friendly economic development that helps the poor – a matter that interacts with both development policy and other political areas such as trade and financial policy;

- And third, support for the implementation of environmental policy programs in developing countries that improve the protection and sustainable use of natural resources and ecosystems.

Aubrey Meyer of the Global Commons Institute [94] developed the idea of contraction and convergence (C&C) of per-capita greenhouse gas emissions in response to the first two problems (limiting emissions, distribution of emission rights). This has now attracted a large following, both in the political arena and in civil society. The climate requirements established in this chapter derive from the basic tenets of this model. We must also expressly welcome Chancellor Merkel's positive support for its central ethical elements. This vision has now undergone a remarkable development: At first viewed as utopian and unrealistic, it is now supported by leading groups of experts and by politicians alike. [95] The model includes two main components:

94 www.gci.org.uk

95 The environmental council of the German Ministry of the Environment (Sachverständigenrat für Umweltfragen des Bundesministeriums für Umwelt – SRU) pursued this idea in its 2002 report, entitled "Für eine neue Vorreiterrolle" (pp. 252 ff; www.umweltrat.de/02gutach/downlo02/umweltg/UG_2002.pdf). The German Advisory Council on Global Change also supports it.

– *Contraction* refers to the reduction of greenhouse gas emissions as a means of stabilizing the concentration of these gases in the atmosphere to achieve the 2°C goal.

– *Convergence* refers to the eventual arrival at an equal level of per-capita emissions for all countries, rich and poor, at an overall average that is compatible with achieving the 2°C goal. In other words, the remaining pieces of the "emissions pie" should be distributed equally among the world's population in per-capita terms.

C&C provides a basis for the calculation of how large the "piece of the emissions pie" should be for each country. This allows each person in the world to emit a maximum of two tons of carbon emissions a year. If we recognize this responsibility while also recognizing the right of developing countries to a (moderate and well controlled) rise in their emissions, the industrialized countries, according to all calculation models, will need to reduce their emissions through 2050 by some 80 percent in comparison with 1990. This provides, as a target, a range of goals for the positions of Germany and the EU in the Copenhagen negotiations of late 2009. We need to reduce global emissions by roughly 50 percent through 2050, in comparison with 1990, with the industrialized countries taking on a disproportionate amount of this burden. The average inhabitant of United States will need to reduce his or her emissions by roughly 90 percent, and residents of the European Union by around 80 percent. Even the people of China will need to reduce their emissions by an average of 40 percent, while Indians and nearly all Africans can afford to increase their per-capita emissions.

The primary difficulty with C&C is that it (at least at first glance) does not provide the developing countries with enough leeway for their economic development. We must also take into account that the emissions rates of the major emerging economies vary greatly. Segments of the population of India and China, for example, are now responsible for very high emission rates, even as the overall per-capita figure remains relatively low. C&C thus seems unsuitable for the needs of developing countries.

One alternative to C&C is the Greenhouse Development Rights (GDR) approach, as commissioned by *Christian Aid*.[96] In contrast with C&C, GDR does not provide for the distribution of emission rights, but instead distributes the responsibility of bearing the costs of climate change. This is based on the understanding that the "global upper class" (annual income of over USD 7,500 in accordance with purchasing power parity) needs to bear the responsibility for causing and hence for

96 www.ecoequity.org/GDRs/

cutting greenhouse gas emissions. To follow this approach, every country would be involved in the future reduction of global greenhouse gas emissions to the degree corresponding with their part in the global upper class. Below this income level, however, nobody would be obliged to take part in sharing the costs of adapting to or mitigating climate change on global level. The burden therefore must be borne by only those few countries that qualify[97] even though it would not suffice even if these countries were to reduce their emissions by a full 100 percent. Countries with very low energy efficiency, i.e. countries that generate little income while using large amounts of energy, would bear no responsibility in this regard. The advantages and disadvantages of both systems (C&C, GDR) are currently under discussion. C&C would clearly seem to be gaining more political acceptance.

C&C must, however, be expanded to include matters of adaptation, i.e. action for immediate protection against the longer-term consequences of climate change, and conversion of agricultural and mobility systems. In the early 1990s, the consensus still called for anthropogenic climate change to be halted as much as possible. Most now believe, however, that climate change can only be slowed down, and not stopped in full. This means, according to all that we now know, that there is bound to be – and indeed already is – anthropogenic climate change. This will make not only contraction and convergence, but also adaptation absolutely essential in a changing global climate. The impacts of climate change, even once it is slowed down, will still need to be dealt with (and only they can be dealt with at all). Even if the goal of limiting global average warming to 2°C is achieved, adaptation must still follow.[98] In the Framework Convention on Climate Change, the industrialized countries agreed to support developing countries in their adaptation to climate change. Preventative measures can also serve to lower adaptation costs. This includes a decisive climate protection policy and measures to reduce the vulnerability of developing countries to the consequences of climate change, including investment in education and healthcare, better use and protection of natural resources, and the creation of new sources of income that reduce dependency on endangered resources and threatened environmental areas. International measures for the slowing and reduction of climate change must not impede the economic development of developing countries. Support for development strategies that exacerbate vulnerability to climate change must, however, be prevented, as must investments in infrastructure and other projects that do not take sufficient account of future climate change risks. Adaptation to climate change thus requires a mainstreaming process within the area of developmental cooperation.

97 T. Baer et al.: The Greenhouse Development Rights Framework, Berlin 2008.

98 For a meaningful differentiation between adaptation strategies: B. Smit / I. Burton / R. Klein: An Anatomy of Adaptation to Climate Change and Variability, Climate Change, 2000, Vol. 45, 223-251.

6.3 Fighting Poverty and Adapting to Climate Change: Auctioning, Distributing, and Using Emission Rights for Sustainable Development

There have been repeated calls to stop distributing emission licenses free of charge to industrialized countries for the emissions that are permitted on the pathway towards reductions (minus 80 percent by 2050) and instead to auction all such licenses, if possible.[99] Free distribution has led, in Germany and the EU, to emissions trading being weighed down with various industrial and political goals, while preventing any real market from emerging due to the issuing of too many licenses. The EU has been gradually moving toward an auction model despite considerable opposition. One proposed directive now calls for auctioning to be considered the primary allocation mechanism for the distribution of emissions licenses. From 2013, around two thirds of emission rights are expected to be sold at auction, with exceptions involving free distribution soon being discontinued. The income from the auction goes to the EU member states while part of it is to be spent on climate protection measures. EU-internal negotiations are already underway on the precise conditions, as a lead-up to the Copenhagen Conference. Politically speaking, it is a better idea to continue to favor this mostly positive development, through to the auction of emission rights, than to favor another, entirely different approach.[100]

The auction solution means that, in accordance with a defined schedule (based on an 80 percent reduction by 2050), an ever decreasing amount of greenhouse gas emission licenses has to be purchased at auction by companies that produce energy or that supply fuels. The licenses can then be traded between the scheduled auctions. The companies will include the price of the licenses in their own sales prices, thus leading to a rise in prices for all goods and services in accordance with the amount of energy they require. Against these price rises, however, there will be the proceeds received in the auctioning process. This revenue should not be used for purposes forwarded by big industry and finance ministries but equally for a) climate protection measures taken by EU countries, b) measures in developing countries (e.g. food security, adaptation, renaturation, climate-friendly energy systems), and c) on national level for the introduction of an income for all citizens. These proceeds should thus not be returned indirectly to the companies, nor should they enter into the general state budgets. The system should instead be both legitimate and transparent to all citizens in Europe.

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99 For further details, see the 2008 report of the environmental council of the German Ministry of the Environment (Sachverständigenrat für Umweltfragen des Bundesministeriums für Umwelt – SRU), entitled "Umweltschutz im Zeichen des Klimawandels", Berlin 2008, 142 ff; www.umweltrat.de/02gutach/downlo02/umweltg/UG_2008.pdf

100 A global cap-and-share model would be an alternative approach in which emissions licenses are allocated directly to each citizen of the world, who could then resell them to emitters. Cf. www.feasta.org

At the national level, part of the funds raised in each round of auctioning should be paid out to each adult citizen. The recipients will therefore be reimbursed for the rising energy prices, and can use their payments in different ways. This provides a motivation to purchase more efficient appliances, invest in thermal insulation and solar energy systems, and the like, all the while making it possible for each individual to use this sum in other ways or for special projects. Those with particular ethical aspirations may like to donate the money to particular causes as well. The other portion of the proceeds will be used for a new fund to finance efforts in developing countries for a climate-friendly development and for adaptation to climate change. The industrialized countries can thus bear their historical responsibility in this way.

Especially when it comes to adaptation, the countries that pay into the fund will be eager to see what criteria are used in the fund's distribution. Since the concept of adaptation to climate change can be expanded considerably, there is practically no limit to the amount of money that can be allocated to it. The fund will however never be able to contain enough money for everything, which means that criteria of form and substance will be needed to decide how it is used. When it comes to substance, vulnerability is the most prominent criterion. At first glance, it would seem morally correct to decide how much to make available based on how vulnerable the individual population groups in question are – or seem to be. If vulnerability, however, were to be the only criterion of substance, this would mean that the countries of the South would compete with each other in this regard; a poor solution, however, as this would force these countries to present themselves to be as vulnerable and as helpless as possible. Other criteria must therefore also be taken into consideration. One central issue should be the ability of the recipients to use the funds for adaptation strategies that also contribute to emissions-free energy supplies, the reduction of poverty, improving food security and sovereignty, and the protection of soils, forests, waters, and the like.

This relates to the five dimensions of freedom postulated by Amartya Sen [101] in Chapter 3, involving improved access to healthcare, education, energy, and water, and the introduction of agricultural and transport policies that are oriented toward the needs of the poor, i.e. involving positive changes in areas of particular relevance to them. Good governance and empowerment of the poor are also necessary for fighting poverty effectively. Action in these fields is needed in order to limit the negative consequences of climate change for the poor, and to support them in addressing climate change, not only in the short term but also in the form of investment in long-term changes to overcome poverty, thereby improving their chances of success. The adaptation fund must therefore not be viewed as a source

101 See fn. 34.

of emergency aid, but instead as investment funding for comprehensive sustainable development. This will of course require good governance to succeed. This is borne out in the great overlap between measures to reduce vulnerability and efforts to fight poverty. Such an adaptation fund, which does not force the countries of the South into the passive role of supplicants, but which builds on their strengths, expertise, and abilities, would play an integral part in a global Green New Deal.

This means that economic growth that is to have a broad impact and is to address poverty should focus on:

- Steering economic growth in developing countries toward climate-friendly, and ideally climate-neutral avenues;

- Investing in social and other areas that reduce risk and improve adaptive capacity;

- Designing economic growth so that, in addition to the climate, other environmental factors and natural resources are not overused; instead the productivity of such resources should be raised (e.g. through renaturation efforts).

6.3.1 Food Security and Sovereignty

Poverty reduction and food security require that ecological sustainability be secured in a comprehensive sense as well, i.e. the sustainable use of water and soils and the protection of threatened ecosystems. The revitalization of a peasant economy based on agriculture, livestock breeding and forestry (organic agriculture, permaculture, collective land uses, ecologically adapted forest uses, etc.) constitutes a primary alternative to an agriculture featuring the intensive use of capital, energy, and pesticides. Ecological agriculture based on small individual holdings requires institutional protection in order to secure land titles and access to seeds and water. Support should be given for, among other things, community-based forestry (e.g. in Nepal), the community-based management of water catchment areas in landscapes, [102] ecological agroforestry systems, the extensive production of biomass for local needs, a diversification of agricultural production structures and the improvement of storage conditions for food and seeds in order to reduce vulnerability to droughts.

A continued focus of research and development efforts on capital-intensive technologies such as green genetic engineering does not, however, contribute to reducing poverty. Support must be ended for the addition of agrofuels to fossil fuels

102 See the recommendation of M. Kravcik: Water for People, Skoll Social Forum March 2009.

in Europe, [103] which led to two major difficulties arising from the import of agricultural commodities from the South. For one, the large European market for these commodities led to problems such as increased deforestation in Indonesia to make way for palm oil plantations and in the Amazon region where cattle ranches relocated from southern Brazil to make room for sugarcane plantations in the south. This process, moreover, intensified the competition between fuel and food production for land, and thus aggravated the problems of famine and hunger. International social and ecological standards are therefore urgently needed for the production and trade of biomass. Germany's Advisory Council on the Environment has published a special report, calling for multilateral standards for biomass production and, if the relevant negotiations should fail, for unilateral standards on the part of the EU. [104] The German government's Advisory Council on Global Change has, furthermore, called for international guidelines for land-use planning as another means of addressing these problems. [105]

More than anything else, however, a new way of thinking will be needed that does not view local, environmentally friendly, and communitarian forms of land use as "inefficient" by definition. We must therefore support new land-use models and the protection of natural resources, as proposed by the International Assessment of Agricultural Knowledge, Science and Technology for Development in its 2008 report "Agriculture at a Crossroads". [106] This includes the rigorous implementation of the goals of the Convention on Biological Diversity.

Just as important, however, is redefining agricultural subsidy policy in industrialized countries to prevent harmful market disorders in developing countries and to provide fair opportunities for farmers in North and South alike. This would entail an end to the pressure to liberalize that has been exerted on the agricultural markets of the South, in order to stop the inequitable competition between smallholder production and capital-intensive agriculture. The European agricultural markets will also have to open up to products from developing countries that are able to produce sustainable surpluses.

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103 See fn. 19.

104 Sachverständigenrat für Umweltfragen des Bundesministeriums für Umwelt (Environmental Council of the German Ministry of the Environment): Klimaschutz durch Biomasse. Sondergutachten 2007, Berlin 2007, esp. 72-78; www.umweltrat.de/02gutach/downlo02/sonderg/SG_Biomasse_2007_Buchlayout.pdf

105 Wissenschaftlicher Beirat der Bundesregierung Globale Umweltveränderungen (The German Advisory Council on Global Change – WBGU): World in Transition. Future Bioenergy and Sustainable Land Use, Berlin 2008; http://www.wbgu.de/wbgu_jg2008_engl.html

106 See fn. 42.

6.3.2 Support for Adaptation to Climate Change

It is difficult, in practice, to draw a clear line between investment in sensible measures to support economic and social development and investment required by climate policy. It is very important to make this clear when it comes to the organization of financial instruments for a future climate regime. Climate change and its consequences as well as the current lack of capacities in the least developed countries (LDC) are both expected to entail considerable costs for the international community. Until now, financial support for adaptation in developing countries has been limited to USD 26 million from the various funds of the UN Framework Convention on Climate Change, a sum that corresponds roughly to the weekly cost of flood control in the United Kingdom.[107] This figure thus needs to be increased considerably.

Most developing countries are located in regions with a high level of climate risk. This will require an investment in adaptation that well surpasses the financial resources of developing countries and the current development cooperation budgets of donor countries. The United Nations Development Programme thus proposes that climate-related support be additional to development cooperation in order to safeguard the Millennium Development Goals without undercutting support for adaptation measures and investment in climate protection. This means that the industrialized countries can no longer consider their climate-related support of developing countries to be part of their Official Development Assistance (ODA) and to count toward their 0.7 percent development aid goals.[108] This would constitute a shift from the current practice of many major donor countries such as Germany. The EUR 120 million from the sale of emission rights used by the German Ministry of the Environment for international climate cooperation in 2008 were also calculated into German ODA figures. The interrelation between ODA and the financial effects of climate policy will need to be generally reconsidered.

Adaptation to climate change will require a number of additional expenditures in developing countries. This will not only take into account additional climate-related risks for investment projects and the like, but will also require greater resilience and adaptive capacity at the local level, especially among poor and high-risk population groups. This will include the expansion of disaster risk management

107 Human Development Report 2007/2008. Fighting climate change: Human solidarity in a divided world, New York: Human Development Report Office, published for UNDP, 189; http://hdr.undp.org/en/media/hdr_20072008_summary_english.pdf

108 Official Development Assistance (ODA) involves the provision of financial, technical, and staff support as part of official developmental cooperation in accordance with the definition of the Development Assistance Committee (DAC), part of the Organization for Economic Co-operation and Development (OECD).

systems, the integration of climate change considerations into urban and land use planning, as well as new approaches to the insurance of smallholders against climate-related harvest failures. Particularly in developing countries with a weaker central administration, approaches will be needed that provide direct financial help to those hit the hardest so that they can act of their own accord in emergency situations.

Adaptation strategies must not focus solely on technological approaches (e.g. dike construction, cold storage, genetic engineering), but also need to boost and support the resilience of land use systems. This has to make use of local knowledge and abilities in adapting to new climate realities. Of particular importance are efforts toward maintaining soil moisture, using water harvesting as a response to seasonal changes in precipitation, maintaining native forests, protecting mangroves with extreme care as an important defense against storms and flooding, and establishing corridors for migratory animal and plant species. New synergies between climate protection and adaptation are of particular importance for land-use planning, as the maintenance and expansion of carbon sinks (in the form of forests, peatswamps, soils) can help improving the resilience of land use systems. A new agricultural ethic is thus needed for the era of climate change, taking rural areas more strongly into account in development cooperation.

Box 5: Measures to Reduce Emissions from Deforestation

Old-growth forests in developing countries are now being cut down for the sake of profit margins lower than the profit from protecting these forests would be if forests were integrated into emissions trading. The 2007/2008 Human Development Report indicated a profit of roughly USD 114 per hectare for Indonesia's palm oil plantations. When rainforest areas are cleared for these plantations, however, this leads to some 500 tons in carbon emissions per hectare. At a price of 20 to 30 USD per ton of carbon dioxide emissions this would yield 10-15,000 USD per hectare. In other words, this means that Indonesia is destroying its rainforest for 2 percent of its potential value.*

The current climate regime precludes payments for forest protection in developing countries through emissions trading. Since the carbon mass of tropical forests, fertile soil, peatswamp, and savannas is very high, a number of developing countries have proposed including into the negotiations for the new agreement beginning in 2012 that compensation be paid to them for the opportunity costs of protecting these carbon sinks. It, however, remains controversial as to whether forest protection should be directly integrated into the emissions trade or whether a separate fund, financed by industrialized countries, should be established. This fund would not allow industrialized countries to off-set their emissions reduction obligations against financing forest protection. Any such "offsetting" of emissions in the industrialized countries with avoided land-use change in the countries of the South is bound to be an extremely complex matter that can be easily abused, and should therefore be avoided. Fund-based solutions provide a better approach in this regard.

Transfer payments for the protection of forests must focus on the elimination of underlying causes of deforestation. Deforestation is generally connected with an understanding of development that is to be rejected in this study. This point of view regards the conversion of natural biotopes as a type of development, e.g. when forests are converted into grazing pastures or soybean fields as a means of making a profit, as well as the exploitation of metal ore, oil, and natural gas resources, and the construction of dams and hydroelectric systems, often to the detriment of local indigenous peoples. This also leads to the destruction of major carbon sinks (forests, peatswamps), which in turn exacerbates the greenhouse gas effect. The destruction of peatswamps and old-growth forests in Indonesia alone is leading to the emission of vast amounts of CO2 into the atmosphere each year. This means that a new relationship between economic and environmental goals is needed for countries with tropical forests. The expansion of these countries' infrastructures and agricultural sectors must therefore be restrained, while extant forestry laws need to be enforced, and land ownership monitored and secured with respect to the rights of indigenous peoples and other smallholders. The rights of local populations to self-determination and co-determination (shared decision-making) also need to be strengthened. Deforestation will otherwise be unavoidable in the long term.

* Human Development Report 2007/2008. Fighting climate change: Human solidarity in a divided world, New York: Human Development Report Office, published for UNDP, 158; http://hdr.undp.org/en/media/hdr_20072008_summary_english.pdf

Source: L. Schmidt / I. Scholz: Reduzierung entwaldungsbedingter Emissionen in Entwicklungsländern, Bonn, DIE, Analysen und Stellungnahmen 6/2008.

Lastly, development policy must be greenhouse gas-neutral. The roughly USD 100 billion in global ODA in 2007 should, ideally, now already entail a substantial contribution to climate protection. This form of development policy will need to make inroads into all areas of cooperation and external financing that are relevant to carbon emissions. Such a policy, together with other areas of policy, must also change the industrialized countries' research and development strategies and trade policies. And such a policy must ultimately, and with great urgency, demand for justice as has been explained in this study: In a world with environmental constraints and with a limited emissions budget, the right to development can only mean that all people have the same *limited* right to use the environment for their own development. It will be easier for development NGOs, church agencies, and political foundations than it will be for government agencies to discuss with partners in developing countries on this urgent question. The long overdue debate on a redefinition of the term development will have a necessary impact on current mainstream development policies.

6.3.3 New Settlement Solutions for Climate Refugees

It is difficult to project the number of future climate refugees as it is difficult to separate climate-related factors from other reasons for migration. We can, however, be certain that climate refugees, especially those who are escaping from drowning island nations, will generally be poor and will not have contributed to climate change themselves. They are victims with a justified claim to assistance in times of trouble, and as such they are our "far-off neighbors". In contrast with political refugees, climate refugees lose their homes and often their ways of life and livelihoods on a permanent basis, and need to begin again anew elsewhere. We must prevent the inhabitants of the Maldives or of Bangladesh's mangrove forests from ending up in the slums of Asian megacities. This entails financial, cultural, political, and planning challenges that exceed the capacities of many countries of the South. We know from historical experience that the integration of refugees into preexisting settlement structures can lead to a wide range of tensions, even when this occurs within the borders of a single country. Resettlement to new cultural areas can, furthermore, serve to aggravate existing xenophobic tendencies. The creation of new and suitable opportunities for climate refugees to start new lives is therefore a task that must fall to the international community. This means that countries hit directly by this problem need to be supported in facing all related challenges, while industrialized countries also need to be prepared to adapt their immigration policies to the consequences of climate change. [109]

109 F. Biermann / I. Boas: Protecting Climate Refugees, Environment Magazine, 2008 Vol. 50, No. 6.

6.3.4 Climate-Friendly Energy Networks

Approximately 1.6 billion inhabitants of developing countries do not have access to electricity. This "modern" form of energy, one that we consume each and every day, should not be denied to anyone. The expansion of the required energy networks will, however, need to follow the principles of climate protection. The transition to a climate-friendly economy requires both improvement on energy efficiency and expansion of renewable energies, as fast as possible. High-growth economies such as China and India, will have to aim for maximum decoupling of electricity production from the generation of more emissions. Both countries primarily use coal power plants that emit, on average, around 20 percent more carbon per energy unit than the plants used in the countries of the OECD. The increased global use of conventional coal power only serves to counteract the efforts made to reduce carbon emissions. The combination of power and heat production (co-generation), which can be quite useful in countries such as Germany, is clearly less relevant in warmer parts of the world. Whether carbon capture and storage (CCS) makes good economic and energy sense, and whether it is in fact a technically practicable option, is at best highly questionable at this point. The best strategy for the countries of the South instead involves "leapfrogging" the fossil fuel phase altogether. Inasmuch as it is still possible to do this, we must urgently prevent the countries of the South from building up their energy infrastructure on the basis of the same fossil fuels as in the industrialized countries. The critique of the model of catch-up industrialization and dynamic climate change stipulates that the countries of the South cannot simply emulate the path of energy development taken in the North. Following a course of catch-up development would only lead to disaster. It thus becomes rapidly clear that it is the responsibility of the industrialized countries of the North to finance this leapfrog scheme. The new climate policy to begin in 2012 will have to include additional financial support for developing countries to meet these challenges.

The most important financial challenges in this regard include: closing the gap of between USD 25 and 50 billion a year that results when new technology is introduced to improve energy efficiency or to make use of renewable energies; support for the new technological expertise necessary in the expansion of renewable energies; and generally improving access to renewable, climate-friendly energies. Private financing options must also be fully explored in this process. One option would be to link the conditions for funding to the income of the recipient countries. This would make it possible, in one such scheme, for the poorest developing countries to be subsidized while developing countries with moderate to strong economies receive loans under favorable conditions.

In sum, our responsibility to future generations dictates that we must limit climate change as much as possible (2°C goal). The fairest method to allocate the remaining emission rights lies in the introduction of an equitable per-capita standard, as there is no justifiable moral reason why any one particular person should have a greater right to use the atmospheric sink than any other. The proposed model (auctioning and allocation) has the advantage of being geared toward an attitude of sufficiency without moralizing about individual actions (whether taking a hot bath or driving a car). Christian churches and congregations are, of course, still more than welcome to work on activities that uphold a particularly strong climate ethic. Payments that congregations receive from emission sales could, for example, be collected for special ecumenical projects.

6.4 Political and Social Consequences

A new political, economic, and social course must be set in order to make a new, sustainable and effective way of living possible in the future. In addition to the political reforms to be carried out in Germany and the EU, it is now important that the Copenhagen negotiations in late 2009 succeed in producing a climate protection agreement aimed at a better future. To achieve this, the industrialized countries, especially those of the EU, need to:

- agree, not only on clear goals for the reduction of greenhouse gases by 2050, but also on setting high and quantifiable reduction goals of not under 40 percent (in comparison with 1990 emissions levels) to be reached by 2020;

- make clear commitments to developing countries on the financing of additional costs emerging from climate protection efforts, to be shared by non-state actors as well, and on the financing of adaptation measures to the unavoidable impacts of climate change. These funds must be provided in addition to ODA in accordance with the 0.7 percent goal.

At the national political level, a legal framework and economic incentives will need to be introduced in order to change the consumption and mobility habits of each member of society. This will require new policies for energy, industry, mobility, agriculture, and urban planning, involving a reduction in the use of fossil fuels, and a transition to renewable energies. The conservation of nature and the sustainable use of natural resources also need to be reinforced in order to improve ecosystem resilience.

There will have to be fundamental changes with regard to lifestyle and consumption patterns in view of the challenges that climate change now poses to the world community. This particularly applies to those who affect the climate

most through their lifestyles, including, without a doubt, the vast majority of the German population. This is more easily said than done. Especially in light of the current economic crisis, political leaders have been looking for answers in the stimulation of the domestic market. There seem to be good reasons for doing this in an export-dependent economy such as Germany's, due to the collapse in international demand. In our view, however, the crisis affecting the old model should not be answered with mere crisis management schemes, but should be used as a point of departure for the ecological reorganization of the economy. Increasing consumption can only lead to economic demise as this would undermine the ecological conditions necessary for a functioning economy in the medium term.

The rich North of our planet, with its often oversaturated markets, continues unabated to put its hopes in increased consumption. It is, however, very clear that this cannot last for long. Resource consumption needs to be reduced systematically in all areas of life, not only through increased efficiency but also through necessary changes in lifestyle.

Ten years ago, a study [110] of the Wuppertal Institute for Climate, Environment, and Energy commissioned by the Misereor aid agency and by BUND, the German section of Friends of the Earth International, called for a sustainable lifestyle ("living well while having less") and described concrete scenarios for economic and social changes to that end. A new study, published by Bread for the World, the Church Development Service (EED), and BUND in autumn 2008, built on the first study and brought it up to date. It provided an outline, with specific points of implementation, for a sustainable Germany in a globalized world. [111]

The study was anchored in a number of focal points: a reappraisal of global commons (environmental policy as the starting point for global public policy); the regionalization of the global economy; a new global trade system based on fairness; the creation of a new political-legal framework for the environmentally friendly regulation of the market; the advancement of renewable energy production together with greater efficiency in energy and resource use; and a reappraisal and just distribution of work, including the decoupling of paid work and social security.

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110 Zukunftsfähiges Deutschland. Ein Beitrag zu einer global nachhaltigen Entwicklung. Studie des Wuppertal Instituts für Klima, Umwelt, Energie, published by *Bund für Umwelt und Naturschutz Deutschland* (BUND) and *Misereor*, Basel-Boston-Berlin 1996.

111 Zukunftsfähiges Deutschland in einer globalisierten Welt. Ein Anstoß zur gesellschaftlichen Debatte. Eine Studie des Wuppertal Instituts für Klima, Umwelt, Energie, published by *Bund für Umwelt und Naturschutz Deutschland* (BUND), *Brot für die Welt* and *Evangelischer Entwicklungsdienst* (EED), Frankfurt am Main 2008.

Wide sections of the population already support much of what was called for in the first study. It is no longer seen as particularly unusual to purchase energy-efficient household appliances, to move toward solar energy, to insulate buildings to save on heating costs, or to participate in car-sharing schemes. These trends and others have indeed found their way into the mainstream of today's society. Studies conducted by consumer initiatives show that 35 percent of the population think that it is a good idea to purchase fairly traded products, while 22 percent purchase such products occasionally, and 3 percent do so on a regular basis.[112] There has also been a heightened awareness for healthy nutrition, partly as the result of a better understanding of production conditions and the manufacturing chain with all of its social and ecological effects, and partly as the result of recent food scandals. This is, however, not the case for all segments of the population. Not everyone has the time, energy, motivation, or indeed the money to purchase organic food.

We will not be able to reduce the anthropogenic influence on the climate without a fundamental shift of awareness. Setting limits to hitherto boundless individual mobility is of great symbolic significance here. Just under 14 percent of global greenhouse gas emissions are caused by transportation in addition to the emissions resulting from the automotive industry itself. Larger, heavier, and faster cars require an increasing amount of fuel and in turn emit large amounts of carbon dioxide into the atmosphere. Small, light, and energy-efficient vehicles would represent a better choice. People can also walk or take a bicycle to cover short distances. A climate-friendly attitude to mobility also involves a more careful consideration of recreation and vacation habits. Do we have to take planes on weekend trips? Can we go to places on holiday that can be easily reached without air travel?

Changing the awareness of society as a whole will require setting priorities for action that will need to be established and implemented rapidly by the relevant social and political institutions. This will have to involve as great as possible a shift to environmentally friendly transportation options. The production and use of fuel-efficient vehicles of all kinds and environmentally friendly behavior in traffic are also crucial to this end. This can, in part, be achieved through educational campaigns on improving this behavior, through the sale of energy-efficient vehicles, and through car-sharing schemes.

We have already discussed many of the political and economic measures that will be needed to support an ecological lifestyle. The political reality, however, often evolves in an entirely different direction, as we have seen during the current financial crisis in particular. China and other emerging economies have, for example, followed a conventional path of development over the past years, which

112 See the "Fair feels good" consumer initiative and campaign: www.fair-feels-good.de

has presented a great burden to the global climate. This has also been supported by private investment from industrialized countries, including investment by automotive companies. State development aid has also supported this approach to date, doing too little to oppose it in terms of energy and environmental policy. One further example can be found in the use of agrofuels to bolster the world's fuel supply. In its present form, this trend has come at the expense of the environment and the food security of many. Securing fuel supplies in countries such as Germany must not come at the expense of the food security of people in other parts of the world.

Continuing current agrofuel policies would mean the destruction of large segments of Brazil's ecosystems, which are not only of regional but indeed of global importance. This applies in particular to the Amazon rainforest, which is already in great danger, and the Pantanal wetlands, which would be endangered as well by the production of agrofuels. This holds equally for ecosystems that are still intact in both Africa and Southeast Asia.

A change of course will, however, only be possible if there is sufficient political will to implement the drastic measures needed to secure the future of our planet. The churches, together with civil society, must therefore take up a clear position and demand sustainable global development. This can take the form of advocacy for fairer world trade conditions, for tax relief and state support for environmentally friendly technologies, or advocacy for increased taxation rates for environmentally destructive activities.

This will ultimately require a shift in political and economic priorities on the part of civil society and political leadership alike. There will have to be a consensus with regard to the priorities given, for example, to the short-term profit interests of certain economic actors in relation to the long-term survival interests of communities throughout our One World. In the end, this entails the question of how we wish to live, and how all people can live in harmony with all that we ourselves hold dear. This is an immense task, one that requires both sweeping decisions that affect everyone while still demanding the small steps that each of us must take as individuals.

7 Consequences for the Churches

Main message: Churches can do what is necessary in that they themselves repent and turn to a lifestyle that upholds the core values of justice and sustainability. We must address our call for justice to ourselves as well. Yet the churches, as an integral part of society, must also work to encourage other societal and political players to uphold these values. The churches must work rapidly to implement the resolutions passed at the 10th Synod of the Evangelical Church in Germany, which had as its theme "Changing Climate - Changing Waters - Changing Lives", including a 25-percent reduction in their greenhouse gas emissions by 2015. The call for justice, however, also holds each individual responsible to act in a way that supports an ecologically sound lifestyle. The churches must, furthermore, support their partners in developing countries in their practical and political efforts to introduce sustainable development, and in meeting the challenges of climate change. The churches should act in a way that can serve as a standard and as motivation for other players to work toward a constructive approach to climate change.

With trust in God and with faith in God's justice, we hold fast to a life of respect for our fellow people now and in future generations. We cannot just wait for others to come to this better understanding, but must ourselves bear witness to a faith in God's justice. We must recognize that this call to justice is addressed to us as well, demanding of us to act ourselves and to adjust and redesign our lifestyles accordingly. If we are not ourselves prepared to change our lifestyles and to follow the call for drastic reductions in the energy we use, our call for greater justice will remain empty and shallow. We must make an effort to learn from others as well, especially with regard to cooperation with our partners. Solutions do not lie only in extending our knowledge and technical expertise to others, but also in our openness for what others can tell us about how to take care of vital natural resources, about an economy of sufficiency, and about having a fulfilled life.

As an integral part of society, the churches must also work to promote these values in the social and political arenas. Changing our own behavior does not constitute an alternative to an appeal for global change, but only underscores the credibility of such an appeal. The churches must not only act from a stance of superior understanding, but must also change their behavior as a reaction to stimuli from a broader society, and to create an even more ambitious motivation for change within the church. This thus entails an interaction between the changes in our own behavior and changes in the political, economic, and legal framework in which we act.

7.1 A Just Climate Policy within the Church

It is up to the churches in affluent parts of the world to take credible steps to allow the justice to be visible that is both granted and called for by God – justice for our neighbours, especially our disadvantaged neighbours, justice for all of God's creation, and justice for future generations. We must, however, serve as role models if our witness to our faith in justice is to be a credible one. Our call for justice requires our own participation as well,.. We must act to adjust our lifestyles, and this can only succeed if we are willing to lower, to a degree, our material expectations in life. It will all be too late if we are not ready to adjust our Western lifestyle to a much lower rate of energy use to lower carbon emissions. The 2008 EKD Synod therefore set clear and ambitious goals when it recommended that its member churches reduce their carbon emissions by 25 percent (in comparison with emissions in 2005) by 2015. [113]

Translating this into reality will require a greater effort at all levels of church life, whether church-wide or within individual congregations, and whether by means of educating people and raising their awareness or through specific church environment management programs. The 10th Synod of the Evangelical Church in Germany, which was dedicated to "Changing Climate – Changing Waters – Changing Lives", recommended 10 steps toward acting in a manner conducive to the integrity of creation:

1. **Advocating on behalf of God's creation:** As a church, we need to view climate protection as a challenge that cuts across all areas of endeavor. Whether at the local, national, or international level, we need to ensure that the climate is protected in a comprehensive manner. This, in particular, means a reduction in greenhouse gas emissions.

2. **Practicing responsibility for the protection of creation:** The member churches are encouraged to introduce educational and youth programs in congregations and church institutions that are focused on advancing a rethinking of our views on energy and climate. The study "Sustainable Germany in a globalized world"[114] can help in this process. As a church with numerous agencies and institutions, we take an active role in the debate in society on the connection between climate change and justice.

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113 Klimawandel – Wasserwandel – Lebenswandel. [Changing Climate - Changing Waters - Changing Lives] 7th Meeting of the 10th Synod of the Evangelical Church in Germany, 2-5 November 2008 – Bremen, "Kundgebung", epd-Dokumentation 52/2008, 10.

114 See fn. 112.

3. **Supporting an internationally equitable climate policy:** Together with our ecumenical partners, we need to introduce and provide increased financial support for programs for a just climate policy, for the sustainable use of resources, for adaptation measures, and for the efforts needed in preparing for disasters.

4. **Equipping church environmental work well:** The churches are called upon to provide more financial and staff support for urgently needed environmental measures. Funding should be applied specifically to ecological reorganization at all church levels. Each regional church needs to work toward sustainability in their buildings, their procurement systems, and their use of energy and resources. This will require objective criteria (such as the church-based "Green Cock" environmental management system, and EMAS certification) as well as advice and evaluation for the projects. We call on each regional church to increase their commitment, and that of paid staff and volunteers alike, to the environment, including the additional funding necessary in the process.

5. **Supporting climate-friendly mobility:** Transportation is a main cause of rising greenhouse gas emissions. Reducing these emissions will require a change in our mobility behavior. Churches, congregations, and regional churches are called upon to motivate their church leaders, staff, and church members to travel in as environmentally friendly a manner as possible. The church should offer public transportation tickets, organize carpools, favor telephone and video conferences, limit and/or compensate for air travel, use cars with reduced carbon emissions, and drive at a maximum of 130 km/h on Germany's motorways without speed limits.

6. **Using water in a sustainable and responsible manner:** At the global level, climate change will lead to regional and national conflicts over water use. Bearing in mind the needs of a just climate policy and a sustainable development policy, this means that we need to reexamine our consumer habits. Each imported product that we purchase involves the consumption of other countries' water supplies in the production process, and thus to potential water shortages, while also causing additional carbon emissions in the costly global transportation process. The church as an institution is thus called upon, via its partnerships and development agencies, to support water supply projects in other parts of the world, to introduce local initiatives to protect water quality, and to contribute to an overall fairer use of the precious and vital resource that is water.

7. **Protecting biological diversity:** Climate change and our food habits both entail major burdens to numerous animal and plant species, burdens that can lead to their marginalization or even extinction. We must protect the diversity of

habitats and all biological diversity at the regional, national, and global levels. This can also be viewed as a contribution to intergenerational justice. The churches and church institutions can meet their responsibilities with regard to protecting the integrity of creation by using their church properties and agricultural areas in an environmentally friendly manner. External leases should also be reconsidered in this light.

8. **Using energy in a sustainable manner:** Our current energy use and energy supply systems will not prove to be a sustainable option for the future. This can be addressed by saving energy, using energy in an efficient manner, and using, supporting, and expanding renewable energy sources. Existing church buildings should be renovated to improve their environmental impact, and should be equipped for the use of renewable energies.

9. **Upholding the decision to stop the use of nuclear power:** Nuclear power does not constitute a responsible contribution to climate protection and can only impede the change in course that we need with regard to energy sources.

10. **Keeping the needs of a sustainable economy in mind:** We need a thorough change in mentality. Sustainability, climate protection, and distributional justice need to be taken into account in our use of natural resources. The church and its institutions and agencies must hold itself accountable to play its part in bringing about a just climate policy and a sustainable development policy in all its spheres of activity. It must advocate for a change in course in all areas of society.

7.2 Supporting Sustainable Development at the Ecumenical Level

Church development work aims at overcoming global poverty, while keeping a particular eye on the integrity of creation. Bread for the World and the Protestant Association for Cooperation in Development (EZE, merged with other development bodies to form EED in 1999) started addressing ecological issues in the 1980s. Especially in rural areas, they have supported projects involving (re-)forestation, effective irrigation, and the prevention of erosion damage.

Climate-related issues thus play an increasing role in the support of poverty projects. Waves of migration from the countries of the South are either directly or indirectly the consequence of climatic changes. Expanding deserts, torrential rains, droughts, and erosion damage can all lead to the impoverishment of entire groups of people, as has been the case in the Sahel region of Africa. Rural development projects, including reforestation projects as a protection against sand movements, and organic farming initiatives are thus central to the work of aid agencies such as

Germany's Bread for the World and the Church Development Service (EED). With a more direct regard to climate change, adaptation assistance is key to church aid projects. This can provide, in cooperative projects, practicable alternatives for the poor people of the world to survive through development opportunities that support climate protection as well.

A second pillar of church aid activity lies in lobby and advocacy work toward creating just and sustainable climate and development policies. Limiting climate change means more than taking on responsibility for the integrity of creation, but is also about protecting and securing human dignity, the right to equitably share in environmental goods, and the realization of sustainable development opportunities for people in developing countries and for future generations. It is important in church cooperation work to give the poor and those affected by climate change a voice and to support them in exercising their rights. EED and Bread for the World support their church and civil partners abroad through joint workshops and financial assistance, by sending experts to train people in lobby and advocacy work, and by encouraging them to involve themselves in political discourse at the local, regional, national, and international levels.

Bread for the World and EED will accompany and react to the international climate negotiations in cooperation with their international ecumenical partners (World Council of Churches – WCC, Association of World Council of Churches related Development Organisations in Europe – APRODEV, European Christian Environmental Network – ECEN) and other representatives of civil society (Climate Action Network – CAN). The main topics in the process include the effects of climate protection measures such as the effect of the expansion of agrofuels on food security, the social and ecological effects of the emissions trade in developing countries, increasing financial support for the adaptation fund, and the need for technological transfers. In Germany, church aid agencies have joined with other church actors to advance ecumenical positions in political discourse and in civil society networks such as the Climate Alliance, and the "Climate of Justice" platform for development policy, founded in 2008, which already brings together some 20 Protestant and Catholic churches and agencies to call for a greater link between the issues of poverty and climate protection.[115] These alliances work to use the potential of international partnerships in domestic lobby and advocacy efforts, and thus to advance the development aspects of the climate debate.

115 Klima der Gerechtigkeit. Entwicklungspolitische Klimaplattform der Kirchen, Entwicklungsdienste und Missionswerke, October 2008;
www.ekvw.de/fileadmin/sites/ekvw/Dokumente/texte/Klimaplattform_Endfassung_22-10-08.pdf

These activities are founded in the conviction that each individual has the same rights to resources such as air, water, and land. It is part of the commission of the church agencies to critically reevaluate the model of prosperity as exemplified in the industrialized countries, and to develop new models that can allow each citizen of the world to participate equitably in the riches of our planet.

Box 6: The Clean Development Mechanism as a Financial Instrument for Church Development Projects as used by the EED

The Clean Development Mechanism (CDM) is an instrument introduced by the Kyoto Protocol for the reduction of greenhouse gas emissions in developing countries. While the mechanism is not without controversy, it opens up avenues of financing that could be used in church developmental aid programs. One EED partner organization in southern India, for example, was able to finance the construction of 8000 small biogas systems for rural families through the sale of CDM emissions certificates (*Certified Emission Reduction*, CER). An even larger follow-up project is currently in the works. Other partners are also beginning to examine innovative financial methods that feature the sale of emission certificates, which can also be used in projects aimed at fighting poverty. Information and reflection on the results of these efforts can be shared at meetings and within networks. The EED also extends financial support to its partners in the South in the lead-up to the creation of a CDM financing plan.

The EED is currently evaluating possible methods of providing cost-efficient support for its partner organizations in their local energy projects, which are aimed at reducing poverty so that these projects can also be recognized as compensation projects and therefore receive additional income from the emissions trade (CDM and voluntary market). This takes CDM Gold Standard criteria into account that entail high demands for ecological sustainability while emphasizing social and developmental dimensions. Successful programs can gain access to new financial possibilities through the emissions trade – and the compensation payments made by the EED for its air travel does little to change this balance.

In its environmental budget, the EED agreed to finance CDM projects, beginning in 2009, as a means of compensating for the greenhouse gases emitted as the result of its staff's unavoidable air travel. While the EED has launched this program by availing itself of the programs run by the atmosfair organization, it plans to work through the programs of its own partner organizations as soon as possible.

In general, a great awareness and active advocacy for a just climate policy has emerged among the church development organizations and institutions, mission agencies, and many individual Christians throughout Germany. This has resulted in a wide variety of initiatives whether for the avoidance of greenhouse gas emissions or for compensation projects. The EED is in regular contact with the regional churches and other agencies with regard to climate policy. They are currently considering the introduction of a national

church climate fund, and not only as a means of compensating for air travel. This would combine a number of different initiatives to provide a broad package of compensation schemes to its partners in the South. It will now be necessary to evaluate the cost-efficiency of such a plan, and the EED will therefore seek to advance the dialogue on the matter, both internally and with its various partners.

7.3 A Sustainable Lifestyle

As Christians, we cannot call for others to repent if we are not ready to do so ourselves. This call to repentance is, however, not a threatening call, but one which itself upholds the promise of life. "Repent and live" is a call that will make it possible to have a future. And it only seemingly entails sacrifice: Those for whom God's gifts suffice, who do not run themselves into the ground in their insatiable greed for more, are promised a new and more abundant life. Making and encouraging others to undertake this "shift in perspective" is the greatest task and responsibility of each Christian in a time of climate change, one from which all other ethical and political consequences must be derived. "Repentance" in this case refers to a change in lifestyle anchored in an ethic of justice and sufficiency.

A sustainable lifestyle involves a reconsideration of our own consumer behavior. For Christians, this means supporting fair trade, ecological and social production conditions for consumer goods (such as food, textiles, flowers, paper, furniture), the use of solar energy, and more intelligent transportation and nutritional habits. [116] We can indeed demonstrate, through our own behavior as consumers, how feasible environmentally and socially sound consumption in fact is.

Changing our energy use habits can also lead to positive effects. This can include the thermal insulation of buildings, the installation of photovoltaic and solar panels on the roofs of our homes, the purchase of modern heating systems with an efficient control mechanism, all while refraining from purchasing systems with stand-by functions and thus reducing their market share. Changing to an ecological electricity company in our own homes can also contribute to sustainability.

There have also been numerous church groups, communities, and initiatives that have embraced new, simpler lifestyles of social and environmental responsibility,

116 This includes eating less meat: The global livestock trade alone is the cause 18 percent of all greenhouse gas emissions; cf. Zukunftsfähiges Deutschland in einer globalisierten Welt. Ein Anstoß zur gesellschaftlichen Debatte. Eine Studie des Wuppertal Instituts für Klima, Umwelt, Energie, published by *Bund für Umwelt und Naturschutz Deutschland* (BUND), *Brot für die Welt* and *Evangelischer Entwicklungsdienst* (EED), Frankfurt am Main 2008, 573.

thus inspiring and encouraging others to do the same. The Laurentius Convent [117] is one such community, in addition to initiatives such as "Ökumenische Initiative Eine Welt" [118] and "Anders besser leben". [119]

The idea of sacrifice is of course nothing new in Christian thought. The biblical and church tradition of fasting dates back centuries, and has recently returned to greater significance in contemporary spiritual practice. Spiritual fasting retreats, which have gained a recent popularity, and Lenten programs in individual congregations connected to the "Sieben Wochen ohne" campaign [120] are two examples of practicing an ethic of sufficiency in community. The churches' criticism of the lengthening of store opening hours on Sundays and public holidays is also to be viewed in this framework. We need greater acceptance for an ethic of sufficiency that includes a willingness to make do with less. This also involves a shift in values from purely material wealth to other types of wealth, whether in terms of time or of social relationships. All of these activities entail both an ideological and practical turning from the growth mentality that, for many years, has served to drive economic development in Germany, and often continues to do so today. We must now instead turn to a growth founded in environmental awareness. Anchored in the gospel, Christians need to be persuasive in their words and deeds that life is not limited to a quest to obtain more and more. The better we are able to do this, the more we can change society for the better.

7.4 Summary and Outlook

The following steps will be needed for the churches to repent and turn toward a sustainable lifestyle:

- Matters of justice and the environment need to be given a higher priority on the church's policy agenda, both in terms of contents and in terms of church structures;

- Climate change and poverty issues need to be more interlinked (as demanded by the Platform "A Climate of Justice");

- Regional churches and church agencies need to dedicate enough staff and resources to their educational, informational, and advocacy efforts;

117 www.laurentiuskonvent.de

118 www.oeiew.de/oi-cms

119 www.anders-besser-leben.de

120 www.sieben-wochen-ohne.de

- Environmental management needs to be made mandatory in all church establishments;

- The church's mobility habits need to be reassessed and there needs to be new incentives for more climate-friendly means of transportation (e.g. conducting telephone and video conferences instead of travelling to meetings; using rail transportation instead of cars and airplanes where possible);

- Energy use needs to be reduced, and sustainable and climate-friendly energy sources need to be favored;

- More purchasing decisions should take ecological and fair trade into account.

This – by no means comprehensive – list of ideas demonstrates that we as churches have numerous options that we can take and must take for the sake of justice and sustainability in the world that God has created.

To conclude, let us remember in the words of Desmond Tutu, that we, as a church, are part of a global community, one in which we can only survive if we cease to live at the expense of others, and if we turn to a lifestyle in solidarity, sufficiency, and awareness:

"Of course, rich countries can use their vast financial and technological resources to protect themselves against climate change, at least in the short-term – that is one of the privileges of wealth. But as climate change destroys livelihoods, displaces people, and undermines entire social and economic systems, no country – however rich or powerful – will be immune to the consequences. In the long-run, the problems of the poor will arrive at the doorstep of the wealthy, as the climate crisis gives way to despair, anger and collective security threats.

None of this has to happen. In the end the only solution to climate change is urgent mitigation. But we can – and must – work together to ensure that the climate change happening now does not throw human development into reverse gear. That is why I call on the leaders of the rich world to bring adaptation to climate change to the heart of the international poverty agenda – and to do it before it is too late."[121]

There is still time to repent. We can still follow the biblical call "turning to life".

121 Desmond Tutu, Archbishop Emeritus of Cape Town. We do not need climate change apartheid in adaptation. Human Development Report 2007/2008: Fighting Climate Change: Human solidarity in a divided world, UNDP 2007, 26.

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