

## *Africa in Climate Change*

Barbara Unmüßig and Stefan Cramer

At the UN Climate Change Conference in December 2007 in Bali, the start of a new phase of the international climate negotiations was initiated. African countries remained excluded from all commitments to emission reduction. They expect massive international financial transfers from further negotiations, in order to be able to adapt to the serious impacts of climate change.

### **Analysis:**

Scientists from the *Intergovernmental Panel on Climate Change (IPCC)* are in agreement: No continent will be harder hit by climate change than Africa – and they added “that the continent will be particularly vulnerable (...) because the capacity to adapt to climate change is limited considerably by the widespread poverty.” (Hulme et al. 2001).

- Africa’s interests in the world climate negotiations in December 2007 in Bali were hardly noticeable.
- Scientific findings on climate change and their implications for Africa are gradually attracting the attention of political decision makers and civil society.
- African heads of state admitted recently that the consequences of climate change increasingly form part of national and international agenda – and in Bali they demanded a high quota of the funds to be made available for the adaptation to climate change.
- A climate based *African Peer Review Mechanism* (“APRM”) could be a coordinating instrument for an effective, consistent and international policy on climate protection.

*Key Words: Climate Change, World Conference on Climate*

AFRICA

## 1. Africa's Contribution to Climate Change

The African people and the African ecosystems with their peculiar biodiversity will be the major victims of global climate change. At the same time, no significant contribution of Africa to global warming can be established: less than three percent of the world's total emissions of greenhouse gases emanate from the African continent. This does not even correspond to its low quota in global gross domestic product.

### 1.1. Technical Emissions

Africa's contribution to climate change from fossil energy and transport sources in global context is only worth of foot noting:

- Africa's CO<sub>2</sub> emissions, basically from energy and transport industry, amount to just about 650 million tons per annum – still less than Germany's which is about 800 tons of CO<sub>2</sub>. Main sources are the electricity generation from coal-fired power stations in South Africa (approx. 350 million tons) and gas flaring in the Niger Delta (approx. 100 million tons).
- The annual per capita emission of CO<sub>2</sub> in Sub-Saharan Africa (2004) is put at about 1 million tons (UNDP 2007). In comparison: In Germany alone it is approximately ten times as high.
- The CO<sub>2</sub> emissions are however unequally distributed. The largest amount (about 95 %) of Africa's total CO<sub>2</sub> emission) emanate from only 15 countries<sup>1</sup>, which emit over 10 million tons each. Among them are the OPEC members Nigeria and Angola, as well as the prevalently agrarian economies of Ethiopia, Ghana or Ivory Coast.
- The majority of African countries emit only minimal quantities of 0,1 - 0,3 tons of CO<sub>2</sub> per inhabitant.

The low CO<sub>2</sub> emissions from technical sources are a direct result of Africa's low level of industrial development. Here are therefore no meaningful CO<sub>2</sub> reductions or energy efficiency targets to be set.

The only exceptions are the termination of gas flaring in Nigeria and Angola, as well as the change of electricity generation in South Africa to power sources of lower CO<sub>2</sub> content than coal.

### 1.2. Emissions from Deforestation

The small CO<sub>2</sub> emission from technical sources contrasts with a larger net emission of CO<sub>2</sub> which results from rapid deforestation. This is true for the twelve forest-rich countries of equatorial Africa<sup>2</sup> whose corresponding annual (2005) emissions are estimated at about 1.1 billion tons (FAO 2007;

<sup>1</sup> In descending order: South Africa, Nigeria, Kenya, Zimbabwe, Sudan, Ethiopia, Angola, Ghana, Ivory Coast, Equatorial Guinea, Senegal, Botswana, Tanzania, Cameroon and Congo-Brazzaville.

<sup>2</sup> Angola, Cameroon, Central African Republic, Congo Brazzaville, Ivory Coast Democratic Republic of Congo, Gabon, Nigeria, Zambia, Sudan and Tanzania as well as Madagascar.

UNDP 2007). The stock of CO<sub>2</sub> held by African forests amounts to about 60 billion tons, about as much as in all OECD countries put together, to which, however, the highly forested members like Russia and the US belong. Only in the Amazon Basin is a higher quantity of CO<sub>2</sub> stored in the forests.

According to FAO, Africa's forests shrink at an alarming rate of about one percent per annum (FAO 2007). Other studies attribute the rapid economic overexploitation and fast thinning of the forests to firewood collection (Achard et al. 2002). The biomass held in the forests is dropping - and the emissions of CO<sub>2</sub> from the forests increase – a development which is disastrous for both Africa and the global climate.

At the climate change conference in Bali the topics deforestation and forest conservation came back on to the agenda of the international climate policy. Now, the world has come to the realisation that a coherent climate strategy is not feasible without an end to global deforestation. Rain forests are on the one hand a huge sink for atmospheric carbon. On the other hand, their exploitation for wood purposes sets free huge quantities of CO<sub>2</sub>. With proper protection of the African forests, the continents' emissions would be compensated for many times over, and with that an important contribution to the retention of carbon in the forests in global context would have been made.

## 2. Effects of Climate Change

The chapter on African of the latest reports of the IPCC has established that in the last few years many connections between *climate variability* and *climate change* have been discovered. All the same, there is still an urgent need for research, so that the complex interrelations between climate change and land use systems, food security, health and the ecosystems in Africa can be better understood. (Boko et al. 2007)

### 2.1. Rise in Temperature and Rainfall

However, the level of information on the consequences of climate change in Africa has clearly improved in the last couple of years. The latest IPCC report confirms the continuing trend which has since become visible on the continent: rising temperatures as well as less rain in some areas and – sometimes - more in others.

Apart from a scenario of average emissions, as presented in the IPCC report of 2007, a rise in global average surface temperatures by three or four degrees Celsius is expected within the period 2080 - 2099, in comparison with the last two decades 1980 – 1999. These averages still do not give information about regional differences; probably the rise in temperature in Africa will show regional and seasonal variation:

- In North Africa, particularly hotter summers are expected; the winter temperatures will in contrast be lower.
- In the Sahel zone, one must reckon with a rise in temperature of 2.6 – 5.4 (average 3.6) degrees Celsius (WBGU 2008).

Rainfall projections are comparatively less consistent. The average emission scenario leads to the speculation that rain-

fall along the Mediterranean coast north of the Sahara would be reduced by one fifth by the period 2080 – 2099 (Boko et al. 2007: 443). Declining rainfall and a rising rate of evaporation due to high temperatures will likely lead to a situation where water scarcity further worsens in North Africa.

In contrast, current climate models do not allow for any reliable forecasts of average rainfall for the Sahel zone. The scenarios are contradictory to the point that some show further drying of the region while others show increasing humidity and rising hopes of expansion of vegetation into the Sahara.

The Sahel zone which already has been hit by reduced rainfall could suffer worse drought and desertification (WBGU 2008: 147).

For the regions of Southern Africa which lie in sub-tropical belt the projections indicate a clear reduction in precipitation in the winter months (WBGU 2008: 147). Here, the precipitation figures could even be reduced up to 40 percent during the southern winter (Boko et al. 2007: 443). This no doubt is a regional projection with the most dramatic consequences.

Compare this to *tropical and Eastern Africa*: Here, a seven percent increase in rainfall is to be reckoned with (Boko et al. 2007: 443). In East Africa the rainfall distribution is furthermore highly variable. Records show that rainfall increased in the last century. However, projections up to 2050 show differences: In parts of equatorial East Africa rainfall will increase in winter, while in summer it will decrease. On the whole, it is to be expected that the intensity and frequency of rainfall will change. High temperatures and less rainfall in the dry months will affect the water level of the rivers. The Pangani and Ruvu Rivers in Tanzania will probably carry up to six to nine percent less water. Kenya's fresh water spring - the Kilimanjaro glacier - has now to a large extent already melted away - and by 2015/20 is expected to have completely disappeared (WWF 2006: 4).

## 2.2. Agriculture and Water Scarcity

Whether in reports of Stern (Stern 2006) or in many other reports on the consequences of climate change in Africa, the negative effects of availability of water and agriculture occupy pole position. Even if African farmers have adjusted to the hardly predictable changes in weather, the climate change will exceed all what African farmers had so far faced in their survival strategies. They will have to expect a considerable drop in agricultural yields. In the entire continent arid and semi-arid lands are expected to expand by between five and eight percent by 2080. That corresponds to a loss of about 60 – 90 million hectares of agriculturally productive land (WBGU 2008: 148).

Furthermore, Africa's agriculture is to a large extent a climate sensitive sector, because here rain-fed agriculture is prevalent. Climate change – according to IPCC projections - will shorten the cultivation phases and more land areas will become unproductive due to water scarcity.

If land-use is constantly being reduced as a result of climate change (shift in seasons of the year, water scarcity due to steady drop in rainfall) this will have negative implications on employment and productivity in the agrarian sector and directly on the lives of a greater part of African rural dwellers. About 70 percent of the population lives on agriculture and 40 percent of all Africa exports come from agriculture. The IPCC estimates that the decline in production will reach more than 50 percent in some countries by the year 2020, and the income

from agricultural production could drop by up to 90 percent by the year 2100. Small scale farmers will be the worst affected. African food security would be badly disturbed. This might lead to increased dependency on food imports.

From the projections, accessibility to water will become dramatic. Even today a quarter of the African population is suffering acute water shortage: 200 million Africans have access to less than 500 m<sup>3</sup> of water per person per annum. The number of people who will be affected by water shortage problems in future ranges from 75 - 250 million by 2020 and 350 – 600 million by the year 2050 (Boko et al. 2007: 444).

Also the sea level rise predicted for Africa threatens human settlements and agricultural lands as well as fresh water reservoirs. As little as 50 centimetre rise in level of the Mediterranean could release salt water nine kilometres deep into some coastal ground water sources in the Nile Delta. Egypt's utility and drinking water supply is 90 percent dependent on the Nile (WBGU 2008). Furthermore a rise by one metre would mean for Egypt a loss of 4500 km<sup>2</sup> of arable land; up to six million people would have to be resettled (UNDP 2007: 100).

## 2.3. Poverty and Health

The last UNDP report on human development establishes clearly the connection between climate change and poverty.

The consequences of climate change perpetuate and aggravate the already existing injustices. This is particularly true of Africa, where two factors – poverty and actual climate change – mutually reinforce each other, and come to converge, for example in form of drought. African states, without exception, are the tailights of Human Development Index (Position 156-177) (UNDP 2007).

While the farmers in Germany fall back on insurance when there is no harvest due to drought, people in Africa have to develop other strategies. They will probably reduce consumption, reduce feeding and withdraw their children from school so they could help in neutralizing the damaging effect through productivity. The nexus between environment and development will inevitably end in a crisis. Fighting poverty and adaptation strategies to climate change are linked together.

Beyond the consequences of climate change, increased spread of diseases like malaria and rift-valley fever is to be reckoned with. Even though it is speculated that malaria parasites or their carriers would hardly survive in some regions, due to climate change, other areas would turn into malaria zones. Presently malaria is spreading into the highlands of Ethiopia, Kenya, Rwanda and Burundi which hitherto had been malaria-free. The likely spread of malaria is even applicable to the highlands of Somalia and Angola by the end of the century. By and large, it is to be expected that malaria cases will increase by five to seven percent by 2100 (Boko et al. 2007: 446; WWF 2006).

## 2.4. Violent Conflicts

Numerous studies indicate that there is a connection between climate change on the one hand and security and violent conflicts on the other (Smith/Vivekananda 2007; WBGU 2008; Campbell et al. 2007; Boko et al. 2007: 443). Dan Smith and Janani Vivekananda of *International Alert* have made the observation that climate change can promote outbreak of violence. With increased scarcity of usable land and water resources impoverishment will escalate. This was particularly predicted for North Africa.

Conflicts emanating from diminishing resources (water), and migration (for example as a result of drought) could become more frequent and could come to a head. In cases of conflicts that are just brewing, the fall-out from climate change – as well as other factors – could have an escalating effect. However, the contribution of this factor in comparison to other conflict aggravating developments is difficult to measure.

### 2.5. Loss of Ecosystems

The African continent still has a particularly high biodiversity – one fifth of all known mammals, birds and plant species live there. Many of these species are threatened by climate change. Local forest exploitation, slash-and-burn agriculture, conversion of pristine habitats into agricultural areas, pollution and over fishing of coastal waters: they all further worsen the situation. Similarly, the warming of the oceans and the sea level rise have effects on protective function and the variety of species in the mangrove forests and the coral reef. If they go into extinction, the spawning ground for fish and an essential coastal protection – a factor not to be underestimated for tourism – will be lost. The extensive bleaching of coral reef in the Indian Ocean and in the Red Sea by the end of the nineties has already led to a loss of revenue from tourism. The projections for the loss of life support for mammals, particularly along the migratory routes of large herds of wild animals and migratory birds, are especially alarming. For Southern Africa it is estimated that the relation between land-use and climate change (particularly desertification) will have serious effects on the survival of larger mammals. In the Kruger National park (South Africa) it is feared that at least two thirds of the species would be lost (WWF 2006: 9). Additional economic losses in the tourism sector are to be reckoned with along with genetic losses.

### 3. Challenges of African Climate Policy

All African States have ratified the Climate Convention adopted in Rio de Janeiro in 1992 (United Nations Convention on Climate Change – UNFCCC). The same applies to the Kyoto Protocol passed in 1997. But it was only in the last couple of years that African states started to hold talks before and during the UNFCCC annual conferences of signatory countries.

This time, the countries of some regional groups like the *Economic Community of West African States* (ECOWAS) and the *Southern African Development Community* (SADC) first met together. These regional negotiations found continuity in the Pan African meetings. Before Bali, 38 African Ministers of the Environment met for talks in Abuja, Nigeria. The outcome of these deliberations then formed part of the major block of negotiations between developing countries, the Group 77+China. The G77+China would speak for this group only if there is an agreement on the topic.

Now, the African Union (AU) takes up the topic climate change more frequently. In January 2007, for the first time in its history, the AU organised an African summit on this topic. At the summit, Nicolas Stern – author of the *Stern Report* – was invited to give a lecture on the consequences of climate change – to the chagrin of the few African climate scientists like Youba Sokona, head of the *Sahara and Sahel Climate Observatory* (Tunisia), one of the authors of the IPCC. His speech time was extremely shortened as a result of Stern's lecture. Sokona criticised the AU for that because in his view such invitation policy would reinforce the already existing impression in Africa that climate change was a problem of the

North and not of Africa, and indigenous expertise would be neglected and would then have little political voice.

The *New Economic Partnership for Africa's Development* (NEPAD) also concerns itself intensively with climate change besides the AU. In May 2007, the NEPAD secretariat announced that it would – in conjunction with a consortium of environmental and nature conservation economic experts – present detailed and region- specific studies which would contain climate policy proposals for African ministers of the environment.

Within Africa, Nigeria, South Africa, Kenya and Egypt play leading roles in climate change in Africa. Even within this small group it becomes evident how diversified the interests are. All the same, only little is known in concrete terms about the divergences in political interests. Nigeria, for example, is present also at the negotiations organised by the OPEC. South Africa on the other hand coordinates its positions with representatives of India and Brazil within the IBSA Group and supports these developing countries in their position against binding reduction commitments in the Post-Kyoto-Regime.

Nevertheless, South Africa takes up a bridging function between industrialised and developing countries – and thereby plays a constructive role in the North-South negotiations on reduction commitments. The first reactions to the latest South African energy crisis – mining has to be reduced by up to 20% – indicates that more renewable energy should be employed. In contrast, massive investments in nuclear energy and national coal production are undertaken.

All African countries are in agreement with the following positions, which were also taken in Bali; they recently demanded:

- adequate and reliable financial support for their measures towards adaptation to climate change, that means a high proportion of the adaptation funds decided on in Bali,
- more technology transfer for the mitigation and adaptation to climate change as well as – in conjunction with the G77+China –
- the implementation of the principle of collective, but differentiated responsibility towards the reduction commitment and
- the right to development as well as global justice and having a share in the global environmental space.

Like in all global negotiation processes, African governments still find it hard to achieve success in the negotiations on climate change. They often lack the necessary expertise. The topic has in the meantime become highly complicated. While the industrialised countries arrive with dozens of experts, African delegations are made up of a maximum of ten members (Germany: over 80 persons). That is highly insufficient even to show presence in the numerous working and contact groups.

Even while the African governments show that they try to be better prepared than ever, the inadequate expertise remains a problem. In contrast to that, it is evident that Africa uses so far too little of the expertise of her scientists and civil society organisations which more than ever before have knowledge of climate policies.



#### 4. African Priorities

African countries are not committed to any emission reduction in order to avoid climate change. However, they should also draw up the so called greenhouse gas inventory, deliberate on national guidelines for the reduction in the emission of climate changing gases and take measures to avert the harmful effects of climate change. In the meantime all African countries (with the exception of Equatorial Guinea) have done this in form of the so called *First National Communications*.

How must the new priorities for a comprehensive climate policy for African countries look like? What role can international development policy play?

##### 4.1 Avoidance of Greenhouse Gas Emissions

For continued economic development, Africa will need to expand her energy needs and with that she will necessarily increase CO<sub>2</sub> emissions. Only very few studies are done on Africa's anticipated energy consumption in relation to climate change (Boko et al. 2007: 446). Even a two digit rate of increase in CO<sub>2</sub> emission would be unrealistic considering the present economic growth of an average of 5% and the fact that there is a lot of catching up to do in the energy and transport sectors.

To attain lasting economic growth and to reach the millennium development goals, the potentials in renewable energy (wind, water, the sun, geothermics) can be better exploited in Africa through appropriate investments. This would be even for the oil importing countries of Africa a feasible option considering the steady rise in oil prices on the world market. Also the donor community calls for investments in a climate compatible future of Africa.

##### 4.2. Forest Policy

In Bali developing countries agreed to commit themselves to prepare verifiable progress reports particularly on their forest policies. A coherent forest policy embracing all countries of Africa would make an important contribution towards averting global warming. This should be harmonized with such goals as social compatibility, biodiversity and economic re-orientation. How the affected African countries will adequately be assisted technically and financially is still being negotiated. This will of course play a central role in the "Bali Roadmap". Various financial models – new multilateral funds, the inclusion of forests in the global carbon market (emission trade) as well as contributions and taxes - are being discussed.

In Bali it was further resolved not to wait first for more rounds of contracts but rather to create above all a database for a rational forest policy through various early interventions.

Today, not a single African country can claim to have a coherent forest policy, a real-time monitoring system (as in Brazil) or even the ability to put it in place. The Federal Republic of Germany is supporting, for example, the cross-border "Congo Basin Forest Partnership" in which a common and sustainable forest policy for the six countries sharing the Congo River basin is being worked out.

##### 4.3. Adaptation to Climate Change

From an African point of view the accessibility to the *Adaptation Fund* which was set up in Bali was an important event,

because modern and efficient flood protection perhaps makes the most important contribution to Africa's adaptation to climate change.

More and more people live in areas threatened by floods. Even today, flooding, land erosion and the destruction of agricultural lands and residential areas are the order of the day.

The recent flood disaster in Zambia and the current one experienced in Mozambique, threatening the lives of millions of people on a regular basis are only a pointer to that effect.

In flood prevention, a cross border water management is highly important. The whole repertoire of preventive flood protection (environmental planning, land-use planning, afforestation, erosion prevention, building of dams etc.) is now required. The transboundary authorities for environmental management of the large river basins of Africa (Senegal, Niger, Nile, Limpopo, Zambezi etc.) are only barely subsisting. The Southern African Development Community (SADC) for example could play a key role in the regional water management in Southern Africa.

Future negotiations will be centred mainly on whether the developed countries will be ready to provide the substantial amount of funding needed to implement measures towards mitigating of and adapting to climate change. This will be the key issue in the post-Kyoto negotiations. On the other hand, there is the question whether African governments have the will to effectively and transparently utilize the new and additional funds for the purpose they are meant for. Presently, there is hardly any African country which has a sufficiently transparent budgetary system, adequate checks and balances, institutional expertise for a fair contract award, and an acceptable accountability.

The 500 million US-dollars grant approved in Bali for developing countries from the year 2012 onward is only a little beginning. In reality the estimates are of a different order of magnitude. If adaptation to climate change should become a new and additional part of the *Millennium Development Goals* (MDGs), an estimated amount of 86 billion US dollars would be needed for that. (UNDP 2007:19f.). Added to that is the financing of forest conservation (see above).

There is a great deal of scepticism among African governments on whether the words of Bali would be followed by action. But there is already a model that could be adapted to future negotiations an climate with Africa: the *African Peer Review Mechanism* (APRM). This (in principle) participatory and (considerably) transparent monitoring instrument for good governance in Africa could be easily extended to the introduction of climate response laws, to climate friendly economic and financial policies, keeping to climate protection agreements and effective implementation of climate adaptation programmes. The APRM facilitates a structured dialogue between all parts of the society. A successful "Climate-APRM" would then be honoured with additional transfer of funds, improved technology transfer and more efforts towards capacity development in Africa. However, the normal APRM is still controversial (Grimm/Nawrath 2007) regarding its "self-evaluating" effect in Africa, and climate protection criteria must not be allowed to water down the democracy related criteria.

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