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Perspectives on German-African futures

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Energy & the Environment

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in this issue

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EDITORIAL

Dear Reader,

Energy has for a long time been a crucial issue in national and world politics. Not only is it essential for the growth of economies. Access to and generation of energy fundamentally affect individual living conditions in an even larger number of aspects - the incidents in Fukushima being a recent reminder. In this issue, Survival International focuses on another of the flipsides of power generation, when describing the impact of the Gilgel Gibe III hydroelectric dam in Ethiopia's Omo Valley. Henner Busch shows that, in order to fulfill its potential, bio-energy is very much dependent on responsible implementation of the respective projects. Finally, Stephen Karekezi of AFREPREN, a Nairobi-based NGO aiming to foster sound energy-related research, in order to help improve sensible policy-making, tells us about the development of the renewable energy sector in Africa.

Best,
Your JointMAG Team

Alex Schwartz, Julian Bergmann & Linda Poppe
Editors

CALL FOR CONTRIBUTIONS

JM 22 – Small-scale Business and Entrepreneurship

In Issue 22, we would like to focus on the role of small businesses and entrepreneurs in our economies. Under what conditions can self-employment and startups offer an interesting alternative to the regular labor market? Are traditional family businesses a thing of the past? How can political reforms contribute to a more balanced job market? How effective is microfinance as an instrument to fight poverty and to support low-income households? If you would like to contribute to Issue 22, please contact us by August 20th.

Serious DAMage – *The impact of the hydroelectric dam Gilgel Gibe III on the peoples of the Lower Omo Valley, Ethiopia*

) Survival International

The indigenous peoples of the Lower Omo Valley in Ethiopia number around 200,000. They have lived along the Omo river for centuries and heavily depend on the river for their livelihoods. The Omo is the largest tributary to Lake Turkana in Kenya, where a further 300,000 people depend on the lake. In 1980, the Omo Valley was declared a UNESCO heritage site for its beauty and ecological diversity.

However, this precious ecosystem and the people who depend on it are at risk: Ethiopia is investing in hydropower, one of its few exploitable resources, to fuel the country's economic growth. It has started to build a massive dam in the Lower Omo Valley, which threatens to devastate the peoples living in the area. With a total height of 240m, the Gibe III dam will be the tallest dam in Africa.

Building contracts for the dam were awarded to the Italian construction company Salini Costruttori in July 2006, without a tender and with little investigation into the impacts of Gibe III on the environment and the people in the valley. The construction of the dam started the same year. Currently one third of the dam has been completed though it still lacks independent downstream social and environmental assessments.

The Ethiopian government has announced that the damage for the peoples of the Lower Omo Valley will be kept to a minimum: The tribes, which have developed unique cultivation techniques which rely on their river's flooding, will be compensated with an 'artificial flood'. However, this artificial flood, if technically possible at all, is supposed to last for only ten days as opposed to the original flood which usually lasts for several months. It will also be left up to the operators to decide whether to induce the flood in the area. The dam will also lead to increasing pressure on the land. Vast areas of land will be taken up by the dam and other strips of land are due to be leased to foreign investors, keen to grow cash crops once the dam is in place.

Though the Ethiopian government has stated its good intentions, it has failed to consult the local population about their views on the project, thus acting in violation of the Ethiopian constitution. Only four out of the eight tribes in the valley have been consulted on the project. The consultations were carried out in 2007, after the construction had already started, and only 93 out of 200,000 people were directly included in the consultation. Not a single Kenyan was consulted. Moreover, the information is extremely difficult to obtain for the tribal peoples living in the Omo valley, due to language barriers, their isolated way of life and government policies. In 2009, the government shut down 41 community groups to prevent local people from exchanging (critical) opinions.

Several organizations, including Survival International and Friends of Lake Turkana, have started a campaign, calling on the Ethiopian government to stop the construction of Gibe III until the consent of the local peoples has been obtained. Potential donors such as the African Development Bank, the European Investment Bank, the World Bank and the Italian government have been asked not to fund the project and a petition against the dam has received over 15,000 signatures, including nearly 400 NGOs.

The European Investment Bank and the African Development Bank and recently the Italian government have already decided against funding the dam. However, China's largest bank is contributing funding and the Ethiopian government is seeking out further donors.

Ethiopia's President Meles Zenawi is adamant that the project will be completed 'whether you like it or not'. In a recent outburst he accused human rights organisations of doing an 'evil job' by attempting to 'derail the economic development of the country.' However, even experts and international institutions doubt that any serious attempt has been made to mitigate the impact of Gibe III. The 200,000 tribal people along the Omo river are largely unaware of their plight, and deserve to have a say in their future.

Bio-energy – *A local resource or a global problem?*

) Henner Busch

In Germany, the production of energy from renewable sources is booming. Nowadays wind turbines and solar panels can be found country-wide. This development is mainly due to the Renewable Energy Law, which - in its original version – dates back to the millenium change when the coalition of Social Democrats and Greens decided to support this new economic branch. With the recent decision of the current coalition to phase out nuclear energy within the next decade this trend will probably not only continue but even pick up momentum.

Renewable energies (REs) can roughly be differentiated into two groups. The first group directly uses energy from the environment (such as wind, sun or geothermal energy), the second uses an energy carrier (EC). Bio-energy belongs to the second group. The advantages of ECs are evident. While energy produced from wind turbines or solar panels has to be consumed or transformed instantly, ECs can be stored and transported. The conserved energy can thus be tapped whenever it is needed. This characteristic adds flexibility and can help to compensate for the disadvantages of wind and solar in a renewable energy system.

One of the German federal states with remarkably high growth rates in RE is Brandenburg. While being characterized by rural regions Brandenburg surrounds the metropolitan area of Berlin, making the federal state the dominant regional energy supplier for the German capital. Brandenburg historically defines itself as an "energy region". Vast supplies of brown coal have dominated the regional energy production for decades. Against this background, the state's interest to modernize the regional energy supply becomes comprehensible. The government of the federal state thus tried to foster REs actively by developing Brandenburg's Energy Strategy 2020. Solar, wind and bio-energy are not only to guarantee a secure (domestic) energy supply, but also expected to cut greenhouse gas emissions. This will not only reduce Germany's dependence on energy imports, but all people – in Europe as in Africa alike - will benefit from the reduced emissions.

Cutting emissions, relying on local and carbon neutral resources, phasing out fossil fuels - can a bio-based energy regime live up to all these promises? Reflections on the development in Brandenburg may help to find answers.

The guaranteed feed-in tariffs for renewable energies have attracted a great number of investors. Their money in combination with additional subsidies and loan-programs has convinced many farmers to enter the market of bio-energy. As a result vast areas in Brandenburg are now solely used for corn production. This corn, however, is not used to feed people or livestock, but to serve as substratum for fermentation processes in biogas plants. Biogas from corn brings about a number of side-effects that worsen its environmental balance: methane-slips, emissions from fertilizers, and reduction of carbon content in soils worsen the climate-balance of the product while the dominant cultivation practice (big-scale monocultures) negatively influences biodiversity and aesthetics and thus reduces development chances for tourism. Not only corn but also wood is widely used as an energy carrier for bio-energy production. Some of the named concerns are also valid for the so called "agro-wood" (aesthetics, biodiversity). Besides these problems, corn and agro-wood have one thing in common. They both require land to be produced. And this is where the consequences of bio-energy production can become a problem outside of Germany.

Energy plant operators will have a vital interest in having their plant run constantly and without inter-

ruptions. This means, that a supply of wood or corn, respectively, has to be ensured – even in times when the local production of these resources lags behind. A drought or a high increase in demand can easily cause such a situation. Producers will rely on the world market to get access to the needed resources. Using bio-energy carriers that have not been produced domestically corrupts the greenhouse-gas balance of these energy carriers not only because transport can turn out be very energy intense. In addition, for consumers and plant-operators differentiating whether wood or corn has been produced in accordance with environmental standards becomes much harder. An example for such a process can be found in Brandenburg. There, a big Swedish energy company has built a big wood-based energy plant. The regional supply of agro-wood is not sufficient for the plant's needs. in order to compensate for this need, fuel wood is being imported from Liberia. It must be questioned whether "bio"-energy production still makes sense under these premises.

Changes in land-use patterns - such as a switch from food production to bio-energy - has severe consequences for the regional food supply. Sometimes regional demands can no longer be met by regional production, thus greater quantities of food have to be imported from other regions of the world. If a potato farmer from Brandenburg switches to agro-wood, the quantity of food he is not producing anymore must be produced elsewhere. If these potatoes are substituted by rice – a methane intense staple food – from, say, Andhra Pradesh or Nigeria, the positive climate effects are severely reduced. In this case, Germany basically is "green-washing" its energy-supply while worsening India's or Nigeria's greenhouse-balance. Furthermore, land-grab and inefficient production patterns can be the consequence.

If a bio-energy regime can be embedded in the local food system with proper regulations in place and in accordance with environmental needs, a substantial contribution to battling climate change and increasing energy security can be made. Examples for such an approach can be found in Brandenburg as well: An extent area in the North-East of Berlin has been used as a sewage irrigation field for decades. Consequently, the soil is heavily contaminated with pollutants, especially heavy metals. Here, agriculture is not permitted, since pollutants could be absorbed by plants and thus enter the human food-chain. The interdisciplinary ELAN project now seeks ways to use this area for bio-energy production. Purified water and recycled nutrients (mainly nitrogen and phosphorus) from a nearby wastewater treatment plant will be used to irrigate and fertilize short rotation coppice. Pollutants have been extracted at the waste-water treatment plant,so no further degradation of the soil will take place. Plants like willows and poplars even are able to absorb heavy metals. A leaking of these contaminants into groundwater reservoirs can thus be prevented. instead, the heavy metals will accumulate in the residues of the combustion and can then be deposited. Hence, the project is able to tackle several problems at the same time. Energy is produced without tapping carbon sinks; eutrophication of surface-waters is prevented, because nutrients end up on fields and not in rivers; pollutants are being extracted from the ecosphere.

This example shows that there is great potential to use bio-energy in a responsible and reasonable way. However, as a precondition, suitable niches have to be identified regionally and a comprehensive assessment of environmental impacts has to be conducted. If this happens, bio-energy remains what it is supposed to be: a regional energy source with regional impacts.

"Target the local market first" - *Interview with AFREPREN/FWD's Stephen Karekezi on Renewable Energy in Africa*

) Alexander Schwartz

JointMAG: Mr. Karekezi, as Director of AFREPREN/FWD (Energy, Environment and Development Network), can you give us a short overview on your organisation's objectives and fields of action?

Stephen Karekezi: AFREPREN/FWD is an independent non-profit organization with the principal objective of strengthening African energy sector technical and policy skills as well as capacity in energy research and energy investment development. Initiated in 1987, AFREPREN/FWD is a collective regional response to the widespread concern over the weak link between African energy technical expertise, research skills and the formulation and implementation of energy policy as well as development of energy investments in Africa. With vast expertise in energy in eastern and southern Africa and a growing portfolio of activities in West, Central and North Africa, AFREPREN/FWD works with over 300 African energy professionals, researchers, policy makers, energy investment developers and financiers to promote a cleaner and pro-poor energy sector in Africa.

JM: How big a share of African energy demand could actually be covered by renewable resources?

SK: If traditional biomass energy and large scale hydro power are counted, well over 50% of African energy demand is already being met by renewable energy. However, an overwhelming proportion of biomass energy resources is used in an unsustainable and traditionally inefficient fashion. If Africa was to use its abundant biomass resources and hydro resources in a cleaner and more sustainable fashion as well as bring on board a wider range of other renewables such as geothermal, wind (both mechanical and electric), and solar (both thermal and electric), the continent could easily meet over 60% of its energy demand from renewable energy.

JM: Do these impressive figures make for a broad support for the idea of renewable energies on the continent?

SK: There is modest, but growing support for renewable energy in Africa. Civil society and environment movements in Africa have been and continue to be important supporters of renewable energy. Growing interest in renewable energy at the highest level of policy-making in Africa is a result of a combination of unstable and often high oil prices as well as the continued commitment of the Development Aid and Finance community to climate change and energy-related environment issues.

JM: Access to energy is largely seen as an important factor in a country's development. The UNDP states that "none of the Millenium Development Goals can be met without major improvement in the quality and quantity of energy services in developing countries". What part can renewable energy play in providing better access to energy for poorer regions?

SK: The key is biomass energy, as it is already widely used by the poor in Africa. Redoubled efforts towards using cleaner and more sustainable biomass energy options (particularly for cooking and heat processing of agriculture produce) combined with wider application of a range of low-cost renewable energy options can play a major role in enhancing access to cleaner energy in low-income areas of Africa. Low-cost renewable energy options range from low-cost mechanical wind-pumps, treadle/hand-pumps, low-cost solar thermal options such as solar distillation stills and solar water heaters. Higher-cost options would be more advanced electrically-based technologies such as photovoltaic (PV) lanterns, PV recharging stations, small wind-power turbines, and micro/pico-hydro generation.

JM: Which are the leading African countries in the field of renewable energy and what are their expectations and positions?

SK: There is a wide range of countries, which are keen supporters of renewable energy: North African

countries that are not major oil exporters (Morocco, Tunisia and Egypt); Kenya in East Africa; Mali and Senegal in West Africa; the island nations of Mauritius, Cape Verde and Seychelles; and, Bostwana in southern Africa. These are countries that either face high fossil fuel imports or possess limited fossil fuels resources and, in some cases, demonstrate strong commitment to long-term development policies and plans. These countries should be the priority target for promoting pro-renewable energy policies.

JM: Ghana just announced that it will implement a stimulus package for selected community and rural banks to provide loans and subsidies to residents that purchase home solar systems and lanterns from accredited companies in the country. Are these state-driven initiatives becoming more common? How do you estimate the effectiveness of these schemes?

SK: There are a large-number of home solar systems programs with different permutations of subsidies provided by local Governments and international aid and finance institutions. A few of these programs receive substantial funding, but the large majority are small-scale in nature with limited funding. While some solar home systems have developed effective and low-cost dissemination approaches, the unusually high-level of international interest in these programs have often resulted in lower flows of local and international flow of funds and subsidies to more deserving and effective low-cost renewable energy options that are largely locally-made or assembled and locally maintained. Examples of more deserving small renewable energy initiatives include improved biomass energy options and other low-cost renewable energy options (e.g. windpumps, treadle/handpumps, solar stills, solar water heaters, etc) for cleaner cooking, value-addition of agricultural produce, dairy farming and fishing that provide cleaner and affordable options for low income households using locally produced, assembled and maintained renewable energy technologies.

JM: How important are the driving forces for policies favourable to renewable energies within Africa compared to foreign demand due to, for example, European energy diversification schemes?

SK: There are a small but growing number of sub-regional institutions (e.g. AFREPREN/FWD in eastern and southern Africa and ECREE in West Africa) that have begun to build databases, country case studies, and model renewable energy investments that promote pro-renewable energy policies. Energy export schemes such as bio-energy plantations for export of biofuels and solar thermal/electric power to Europe need to be better designed and should, preferably, be expansion initiatives that build on proven investment that first meet local and regional energy demand. For example, in the biofuels sector, it is best to start with the development of bio-ethanol that uses by-products of the local sugar industry to meet ethanol blending demand in local transport fuels and then build on this base to develop more ambitious biofuel export programs aimed at Europe.

JM: From what we know about the DESERTEC project, even though it is highly relevant for the North African industry and policy makers, the project was largely developed without the expertise of local researchers. Does this hold true for most renewable energy projects in Africa? What effects does this have for local policies?

SK: That is not true of most renewable energy projects in Africa, especially if you include smaller and medium scale renewable energy investments that are largely driven by local researchers and local project developers. The larger-scale renewable energy projects such as DESERTEC and other large-scale windpower and biofuel schemes designed for export of energy to Europe tend to have lower local involvement primarily due to limited experience. However, if many of the larger-scale renewable energy initiatives take the aforementioned approach of first targeting the local and regional market, the involvement of local stakeholders and local expertise will increase and lay a more solid foundation for developing mega-scale energy investments aimed at export of energy to Europe.

JM: What role does the African renewable energies sector play compared to foreign companies?

SK: In the small and medium-scale renewable energy sub-sector, African companies play an im-

portant role. Of particular note are African agro-industries that use agro-residues and by-products to generate clean electricity/process heat and produce biofuels. These African agro-industries often have the expertise and experience to operate, maintain and, in some cases, design and oversee construction of medium-scale renewable energy investments of up to 50 MW or so.

JM: What are the main challenges you identify for the implementation of policies favourable to renewable energies in Africa?

SK: The absence of reliable, locally-generated and widely-acceptable evidence of the macro-level benefits of renewables as well as limited dissemination of successful pro-renewable energy policies that have been implemented in African countries and other developing countries that are at the same level of development (e.g Nepal and Sri Lanka) – these are the biggest challenges.

JM: So who mainly provides for the funding of these much needed local research projects at the moment?

SK: Primarily international development aid and finance institutions. In a few countries such as South Africa, North African countries, island nations such as Mauritius and to a lesser extent lower income countries such as Kenya, Uganda and Ghana, local funds play an important and growing role in providing funding to local energy researchers and energy analysts.

JM: What kind of incentives do you expect from the international community in order to make the use and generation of renewable energies in Africa more attractive?

SK: For large (e.g above 50MW) and medium-scale (e.g 10-50MW) renewables, the focus should be on placing the emphasis on first meeting local and regional demand before moving into the energy export market, encouraging the institution of pro-renewables policy and regulatory options that include pre-determined and attractive feed-in tariffs, standard power purchase agreements and mandatory ethanol-blending ratio requirements. Concessionary finance for flag-ship installations should also be given priority with the long-term objective of mobilizing substantial local co-finance.
For smaller-scale (e.g. 1MW - 10MW) high-cost renewables such as biomass-based cogeneration, small hydro, biogas for industrial applications, small wind-turbines and wellhead geothermal plants, the emphasis can also be on promoting pro-renewables policies and regulatory options, such as predetermined and attractive feed-in tariffs and standard power purchase agreements but combined with grant financed flag-ship installations that are designed to stimulate local finance from both governments and local finance institutions, who should, in the long term, be the principal sources of future finance.

For micro-scale (less than 1MW) renewables such as household or community biomass-based cogeneration, direct biomass combustion, biogas, improved cookstoves, windpumps, solar stills, solar water heaters, solar PV home systems, PV recharging stations and treadle or hand-pumps, the emphasis should be on promoting deregulation (e.g. removing the requirement for distribution licenses for mini-grids of less than 1MW), establishing subsidies schemes with sunset provisions combined with grant financing of flag-ship initiatives and programs that are designed to stimulate local finance from Governments, provincial and city authorities as well as micro-finance, which should perspectively be the principal sources of finance in this area.

JM: Mr. Karekezi, thank you very much for this interview!

For further information see: www.afrepren.org

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