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#### About Joto Afrika

*Joto Afrika* is a series of printed briefings and online resources about adapting to climate change in sub-Saharan Africa. The series helps people understand the issues, constraints and opportunities that poor people face in adapting to climate change and escaping poverty.

*Joto Afrika* is Swahili; it can be loosely translated to mean 'Africa is feeling the heat'. Please tell us what you think about this eighth issue of *Joto Afrika* and what you would like to read about in future issues. Contact details are on **page 8**.



A farmer from Mozambique observes plastic tubular biogas technology during an exchange visit to Nguruman, Kenya

© Noah Lusaka, ALIN, 2011

## Should Africa take the renewable energy path?

### Editorial

**Modern energy services are essential for reducing poverty. Countries need energy to increase economic production, which improves livelihood options for women and men. Energy is also needed to increase agricultural productivity, provide clean water and improve human health, and energy enables girls and boys to go to school.**

Increasing access to energy, particularly modern and efficient technologies, is a key challenge for achieving sustainable development in many countries. And climate change is complicating the energy situation in many parts of Africa.

For example, changing rainfall patterns have led to droughts, affecting hydropower generation in many countries. And climate change is likely to worsen desertification, reducing tree cover that is already threatened by deforestation in many places; communities that rely on traditional fuels such as charcoal and wood will face an increased burden as forests become scarcer. A further challenge is that fossil fuel energy is a major emitter of the greenhouse gases that cause climate change. Global efforts to reduce fossil fuel use reinforce the need for wider energy options in Africa.

One alternative is renewable energy. Renewable technologies give countries more freedom around their energy choices and reduce dependence on fossil fuels. But renewables in Africa do not always provide energy security.

- Renewable energy resources are abundant but unevenly distributed, causing supply issues for some communities.
- The underdeveloped nature of energy sectors, many of which are inherited from colonial times, and the slow pace of reform have inhibited the uptake and institutionalisation of renewables.
- Despite attempts to reform their energy sectors, many governments have failed to create the right incentives for companies to explore renewable energy options.
- Renewable energy offers multiple benefits, but can still be prohibitive in

cost, even for people with disposable incomes.

- Scale is a problem; many renewable energy options are pilot experiences, but renewables such as small mini-hydro and biogas digesters need to spread in ways that will reach energy-poor people.

Development priorities are closely associated with the uptake of renewables – especially when these are linked to productive end uses and the welfare and wellbeing of energy-poor communities. The articles in this *Joto Afrika* are rich in information on how renewable energy can serve multiple functions and how energy-poor communities are benefitting – from biogas digesters in Uganda to solar power in Malawi. It is clear that environmental benefits are not the main motivation; improving livelihoods and generating income are the key incentives.

Africa needs policies to expand countries' renewable energy markets – ones that will translate into real benefits for small-scale entrepreneurs and end users. But the biggest challenge is not the limiting policy environment; the real problem is how to move from the micro to the macro. Africa needs to scale up and out successful renewable energy experiences to a magnitude that transforms the lives of millions of people – people who for too long have lived at the bottom of the energy ladder.

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### See also

Links between adaptation, mitigation and low carbon, or 'climate compatible' development, Powerpoint presentation by Fatima Denton, IDRC  
<http://bit.ly/pjVUBI>



# Renewable energy for Malawi's mountain entrepreneurs

## Case study

Women fixing a solar technology system in Malawi  
© Clement Nthambazale Nyirenda

**The slopes of Mount Mulanje in southern Malawi have experienced widespread deforestation. The rising population in the area has increased the demand for timber, firewood and charcoal. Young people in the area collect these fuels to sell, and previously there were few income sources with the same immediate rewards. Since 2009, solar energy clubs are promoting new ways to make a living for over 250 young people.**

The Energizing Mountainous Communities of Mount Mulanje for Sustainable Livelihoods (ECOMUSU) project was started to:

- tackle threats to biodiversity from deforestation
- raise awareness of natural resource management and the value of the forests
- introduce ways to prevent deforestation, including the use of alternative fuels.

Many young people who once sold firewood and charcoal now work in 'alternative energy enterprises'. These are based in 10 solar-powered business centres around the mountain. Their businesses include barbershops, battery-charging stations, TV viewing rooms and telephone bureaus – all powered by solar energy.

### Looking long term

Solar generators were installed in 10 villages using US\$40,534 (£26,272) received from the Global Environment

Facility (GEF) Small Grants Programme, which is implemented by the United Nations Development Programme. The generators have become the focus for 10 solar energy clubs, established by the GEF in partnership with the Mulanje Mountain Conservation Trust.

Sustainability is always a crucial factor with newly introduced technologies such as solar energy. The design, installation and long-term maintenance of each solar generator are the responsibility of an executive solar energy committee, which works alongside government extension officers.

Alex Damaliphetsa, National Coordinator of the GEF Small Grants Programme in Malawi, admits that renewable energy enterprises do not necessarily bring the immediate cash returns that selling firewood or charcoal can. But he notes: "One does not have to invest the same amount of energy once the enterprise is operational, as opposed to going into the forest to cut firewood or make charcoal. I think we can talk of renewable energy as being the smart way of making money."

### Tree planting

As well as promoting alternative energies, the project has focused on other solutions to deforestation. A conservation awareness campaign has been launched in schools, youth groups and faith-based organisations, which offers involvement in renewable energy-based business as an incentive

to take part in environmental protection activities, such as tree planting.

A total of 80,000 trees of various species have been planted during two tree-planting seasons, all through community participation. These include species with high economic and social value, such as the nitrogen-fixing *Pongamia pinnata*, and plants and trees grown and managed for their firewood, fodder or medicinal value.

Raising awareness about the Mount Mulanje ecosystem, and building the confidence of the communities in making decisions on energy and business development, have created the potential for wider solar energy take-up. And while more funding is required to ensure final checks and balances are in place for long-term sustainability, seeing the football World Cup on TV shows the young people of Mount Mulanje what is possible in a solar-powered future.

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Georgina Smith is a science writer based in Lusaka, Zambia. A version of this article was published in *New Agriculturist*.  
[www.new-ag.info](http://www.new-ag.info)

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[www.alin.net](http://www.alin.net)

You can subscribe by sending an email to [jotoafrika@alin.net](mailto:jotoafrika@alin.net).

Please include your organisation and your full postal address. You can also subscribe and send feedback via SMS, to **+254 71703 2322**; start your message with the word 'Joto'.

Please tell us what you think about this eighth issue of *Joto Afrika* and what you would like to read about in future issues – contact details are on **page 8**.



# The spread of biofuels in Zambia

## Research summary

*If jatropha is intercropped with food crops, as it is here in northern Zambia, food security is not always compromised by the jatropha expansion*  
© Jeff Walker, CIFOR, 2009

**Changes in Africa's energy demands and supply will not only depend on climatic factors; patterns of economic growth, land use, population growth and distribution, technological change, and social and cultural trends will all be important. Large-scale agro-fuel projects are springing up across the continent in response to increasing energy demands. But are they a solution to fighting climate change?**

Biological materials such as wood, dung and bagasse have long been used for fuel, but now crops are being grown on a large scale to produce biofuels such as bioethanol and biodiesel. These include jatropha, sugar cane, sweet sorghum and cassava.

In Zambia, the biofuel industry is still in its infancy. But similar to other countries in southern Africa, the government supports and endorses biofuel production, believing it will be good for development, economic growth, and for the environment. The Fifth National Development Plan, launched in 2007, identified energy as vital for Zambia's social and economic development, and included developing the biofuel industry in its aims.

There is potential for widespread biofuel production. 66 percent of Zambia's landmass is woodland and forest and about 26 percent of this could be cleared to grow the crops used to produce biofuels (the other forest areas are important reserves or protected water catchments). But Zambia already experiences serious deforestation; clearing forests to produce biofuels will make this worse. Developing the biofuel industry will need to be done with consideration for the environment.

### Out-grower schemes

Private companies are already working to produce biofuels. The Biofuels Association of Zambia has been lobbying the government for incentives to help the industry flourish, such as minimum biofuel blends for all customers and financial capital to develop the industry.

However, producing crops for biofuels can create problems for farmers. Many are

tied to long contracts with one company to produce biofuel crops. For example, Marli Investment contracts farmers (or 'out-growers') to produce biofuel crops. Farmers in the out-grower scheme have to pay obligatory membership, statutory contributions and deductions, while also paying for management, extension and licensing services. The company determines both the price of the seeds and services and the price they pay for the farmers' crops. This limits the options available to farmers, forcing them to deal entirely on the company's terms.

### Alternatives to biofuels

The development of biofuels will not produce the desired outcomes – both environmental and developmental – unless the policy and regulatory framework, instruments, price signals, market incentives and standards are in place. Instead, policymakers in both the developed and developing worlds should look for solutions that are inherently sustainable, such as wind and solar energy, rather than trying to make biofuels sustainable.

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## Do biofuels help to tackle climate change?

Biofuels are seen as a way to help fight climate change as they release less carbon than fossil fuels. This is because the plants, crops and other vegetation that form the basis of biofuels reduce the carbon dioxide in the atmosphere by turning it into less harmful organic compounds – a process called 'carbon fixation'.

However, the extent of the climatic benefits depend on: the previous use of the land on which crops are grown; production patterns (such as the extent of fertiliser use); and the transport range of the produced fuel. For example, if biofuel production occurs on previously forested land, the climatic benefits may be neutral or even negative, while biodiversity and ecosystems, such as water availability, can be severely affected.

## See also

A more detailed explanation of biofuels:  
<http://bit.ly/rmyFNu>



## Join the Joto Afrika debate online

Joto Afrika Eldis Community Group, which has over 1000 members  
<http://bit.ly/bM3ESo>

Joto Afrika Facebook Group, which has over 184 friends  
<http://bit.ly/aMNLth>



# Hydropower in East Africa

## Research summary

A demonstration of improved stoves in Tanzania  
© themongers.blogspot.com

**East Africa depends heavily on hydropower for its electricity – it currently supplies around 79 percent of the region's electricity. But changing weather patterns including the predicted decline in rainfall could be devastating for countries that lack diversified energy sources.**

Increased droughts and shorter rainy seasons frequently cripple East Africa's power sectors, leading to sharp drops in their economic activity. In addition, the ongoing encroachment of agricultural and commercial activities into water catchment areas appears to be making hydropower even more vulnerable to drought and the erratic weather being experienced across the region.

At the same time, the changes in rainfall intensity are leading to increased floods. These lead to the rapid build-up of silt in hydropower dams, reducing the amount of water for electricity generation.

Governments in East Africa have failed to plan adequately to tackle these crises in their power sectors. At present, their response during power crises is to buy emergency thermal electricity to meet the shortfall in power supplies. But this is expensive and the price is unstable; thermal energy is partly linked to world oil prices, which peaked at US\$140 (£90) per barrel in September 2008.

To reduce the vulnerability of large-scale hydropower generation to drought and floods, governments and electricity companies need to adopt a more robust and resilient plan to deal with power shortfalls. This could be achieved in several ways.

*i) Diversify the mix of energy sources*  
Countries using renewable energy sources to diversify their electricity appear better able to survive the impacts of severe droughts than those relying exclusively on hydropower. For example, Kenya is more resilient than Tanzania and Uganda to drought-induced power generation shortfalls, because Kenya uses a wider range of renewables, including geothermal power, biomass generation and, to a lesser extent, wind.

*ii) Promote proven renewable energy technologies*  
East African governments are stuck in a vicious cycle of heavy investment in hydropower; they urgently need to break out of this. Investments in mature renewable energy options, such as geothermal, small-scale hydropower, biomass cogeneration and wind are ideal sources to complement large-scale hydropower generation. They are environmentally friendly and provide additional development benefits, such as jobs and reduced oil import bills.

*iii) Set renewable energy targets*  
Renewable energy targets in the countries'

energy policies must be entrenched in power purchase agreements (PPAs). This will induce more private sector-led investment in renewable energy. The PPAs must be attractive to companies, with a pre-determined standard offer (or feed-in tariff) at which the national utility will purchase all energy produced by renewable energy plants.

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## See also

*Large scale hydropower, renewable energy and adaptation to climate change: climate change and energy security in East and Horn of Africa*, by Stephen Karekezi, John Kimani, Oscar Onguru and Waeni Kithyoma, AFREPREN/FWD Occasional Paper 33, 2009  
<http://bit.ly/ofFMGK>

## Joto Afrika evaluation: your responses!

Dear Readers,

Many thanks for all who participated in the just concluded Joto Afrika evaluation. The feedback was very encouraging - 90 percent of survey respondents said that they have experienced personal learning from engaging with *Joto Afrika*. Over 70 percent of survey participants have shared *Joto Afrika* by discussing an article with friends and colleagues, with many specific practical examples of changes that have happened as a result of this. It was also interesting to learn that community radio stations also discuss *Joto Afrika* with their audience!

We are hoping that your feedback will inform decisions about future issues of *Joto Afrika*.

Keep sharing knowledge on climate change adaptation!

## Boiling Point.

A PRACTITIONER'S JOURNAL ON HOUSEHOLD ENERGY, STOVES AND POVERTY REDUCTION

Boiling Point is a practitioner's journal for those working with household energy and stoves. It deals with technical, social, financial and environmental issues and aims to improve the

quality of life for poor communities living in the developing world. Articles are contributed by readers and peer reviewed; the journal is a forum for the sharing of information and experiences on household energy. Boiling Point reaches over five thousand addresses and has around five times that number of readers worldwide.

More information visit <http://bit.ly/mW4t8c>



# Biogas – an alternative energy source

## Case study

Mme Mesafnt and Jean Marc Sika in front of the inlet pipe of her biogas digester in Ethiopia  
 © National Biogas Programme of Ethiopia, 2009

**Millions of people in the rural areas of Africa face serious energy problems. The availability of traditional fuels such as wood is declining, while commercial fuels are too expensive or their availability is unreliable. Renewable energies such as biogas could lift households out of poverty and help small businesses develop.**

But renewable energy technologies are not always accompanied by capacity development to support local actors to use them. This limits the sustainability of these initiatives.

The Africa Biogas Partnership Programme (ABPP), a partnership between HIVOS (Humanist Institute for Cooperation with Developing Countries), SNV (Netherlands Development Organisation) and the Dutch Ministry for Development Cooperation, supports domestic biogas programmes in Burkina Faso, Ethiopia, Kenya, Senegal, Tanzania and Uganda.

By 2013, the ABPP aims to construct 70,000 biogas plants and, in each of these countries, stimulate the emergence and development of a commercially viable, market-oriented domestic biogas sector. These are expected to provide half a million people with access to a sustainable energy source.

### Biogas

Biogas is produced from animal waste, organic materials and human excreta. This is collected and controlled in a simple underground structure known as a biogas digester, which can be installed in a household's compound. Biogas has multiple benefits for people in rural communities. Biogas users in Tanzania and Uganda identified the main benefits as:

- a source of cooking fuel that replaces wood for rural households
- reliable lighting in areas not connected to the national electricity grid and grid-connected areas with an unreliable service

- improved health; kitchens are now free from smoke and sanitation and hygiene are improved when a toilet is attached to the biogas digester
- financial savings on fertilisers and fuels
- reduced workloads, especially for women and children who no longer need to collect fuelwood.

### Bio-slurry

Installing a biogas digester has other benefits, particularly bio-slurry – digested manure produced by the decomposition of organic matter in biogas digesters. This can be used for agriculture and can build healthy, fertile soils. Bio-slurry fertiliser has a higher yield kg/ha than other fertilisers, and users do not need to buy chemical fertilisers and pesticides. Biogas users in Burkina Faso, Ethiopia, Senegal and Uganda increasingly value the benefits of bio-slurry more than biogas.

The ABPP's dissemination model is inspired by the successful sector development approach implemented by SNV in Asia for more than 20 years. This model is based on multi-actor initiatives to build a sector, and market-based relationships to build sustainability.

There are many constraints which help explain the slow uptake of biogas technology in Africa. The cost of a biogas digester remains the major one; this initial investment is very high when considering the purchasing power of many rural households. As an example, the digester which Mme Mesafnt bought (see box) cost 6,000 Ethiopian Birr (£233) in August 2008; now it cost 14,500 Birr (£538). This is a major challenge to increasing the market for household biogas digesters.

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## Biogas in Ethiopia

Madam Azmera Mesafnt is a dairy farmer with eight hybrid cattle. In August 2008, she invested 6,000 Ethiopian Birr (about £230) in a biogas digester. Fed with 80 kgs of cow dung, mixed with the same quantity of water, it produces more than enough gas for her daily cooking and lighting needs. And her bio-digester is reliable – since 2008, she has only had to change the main valve.

Interviewed by Ethiopian TV, Madam Mesafnt identified the many benefits of biogas. "I am free from smoke and have installed my kitchen in the main house [rather than outside]. I save time because cooking is faster; I save approximately 300 birr (£11.30) per month as I don't need to buy kerosene, wood fuel and charcoal. I also use biogas to boil drinking water.

"I now legally practice my farming in town. Before, it was forbidden by the municipality because of the sanitation conditions and nuisances for the neighbours (due to the smell of the cows' manure). Thanks to biogas, this is no longer a concern and my farming has been legalised."

She also uses the wet and dry bio-slurry as manure on her vegetable garden, as well as for commercial plants. Azizi can really see the difference; the plants grow larger than with chemical fertilisers and are more resistant to disease because the manure does not contain pathogens, thanks to the anaerobic digestion.



# Making fuel briquettes to save trees

Case study

International Climate Challenge club members demonstrate fuel-briquette making in Kenya  
© Greig Whitehead, ICC, 2011

**Forests are vital in the fight against climate change. Carbon dioxide, a greenhouse gas, is absorbed by forests and stored in the trees and soil. Subsequently, the accelerating destruction of forests is a major cause of climate change. At Our Lady of Fatima secondary school in Nairobi, Kenya, students, teachers and community members are helping to reduce deforestation by making fuel briquettes.**

The briquettes are made from locally available waste materials, such as dry leaves, charcoal dust and sawdust. These combustible materials cannot be used as fuel on their own because of their low density. Instead, the students collect and compact them into briquettes.

Most students come from communities that face environmental pollution. "Making fuel briquettes was a result of the garbage the students saw in their environment," says Mrs Marindich, a teacher at the school. "The students are optimistic that the project will help to change the community's attitude, and use more fuel briquettes instead of charcoal and firewood."

The students raise awareness of their fuel briquettes during general meetings and open days, at which they demonstrate the materials used and the burning process.

## Advantages of fuel briquettes

Antonina Machanja is one student who has made fuel briquettes. She no longer uses charcoal because 2 kg of charcoal costs 50 Ksh (£0.03) and burns quickly, wasting a lot

of energy. Fuel briquettes are much cheaper and burn more slowly. She also notes that the briquettes help fight climate change. "Using our briquettes reduces the pressure on wood resources, reducing deforestation."

Fuel briquettes have many other advantages.

- The briquettes are dustless, and hollow at the centre to allow the even circulation of heat during combustion.
- They produce far less smoke than charcoal.
- The technology is simple and replicable; the students have taught other community members how to make briquettes.
- Young people like Antonina benefit from selling the briquettes at local markets. Employment and income for the youth is important, as unemployment and under-employment are high among youths in Kenya's towns and cities.

Fuel briquettes are a low-cost alternative to domestic fuel, providing energy to low-income urban families. There are still challenges to expanding the technology more widely, however.

- There is limited data on the likely contribution of this technology in other communities.
- There is a need for in-depth studies to understand the influence of different types and amounts of raw materials on the quality of the fuel briquettes.
- There is limited choice of machines to compress the briquettes, and the efficiency and quality of those currently in use needs improving.
- The stoves that use the briquettes need to become more efficient, and the market value chain for these must be strengthened.

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## How to make fuel briquettes

1. To make fuel briquettes, you will need a supply of waste materials and a compressing machine. In Kenya, compressing machines are locally made by the Ruiru Youth Community Empowerment Programme and cost 10,000 Ksh (£66). The locally modified machines have twin cylindrical cartridges, with tiny holes drilled in to squeeze out the water during pressing.
2. Soak waste paper in water. Add a mixture of charcoal dust and sawdust then mix evenly with water. The ratio of waste materials to water determines the combustion quality of the briquettes. The best ratio is two amounts of paper to one of the other waste.
3. Put the mixture into the compressing machine. All the water will be squeezed out during compaction.
4. Dry the briquettes in the sun for two days; they are then ready to use.

Watch a video about briquette making:  
<http://bit.ly/qoQSYy>



## See also

*Community-based energy briquette production from urban organic waste at Kahawa Soweto Informal Settlement, Nairobi, by Mary Njenga et al, Urban Harvest Working Paper Series: 5, 2009*  
<http://bit.ly/rjW2dg>

# Letters to the editor

We welcome your feedback on this eighth issue of *Joto Afrika*. Please send us your thoughts using the contact details on **page 8**. Please include your full contact address or email. A selection of letters will be printed in the next issue.



Dear Editor

*Joto Afrika* is a very informative magazine. The information in it can be used again and again.

*Joto Afrika* is highly relevant in Zimbabwe. If this information could reach all our communities, I am sure the problems we face, like overgrazing, river siltation and the cutting down of trees, would come to an end.

I have used *Joto Afrika* in my community to teach locals how they can protect their environment, and the teachings have helped a lot of people. However, one challenge I face is a lack of resources, like a vehicle and money to move from place to place. I normally use public transport but some places are very remote and there is no public transport.

The remote communities that I have managed to reach have started changing the way they plant crops near the river bed, so that the river does not dry up. Otherwise, they will be forced to travel long distances in search of water for their animals. Keep up the good work, *Joto Afrika*!

**John Chinyai Mutare**  
Zimbabwe

*Editor:* Dear John

*We are glad you find Joto Afrika useful. Keep up the good work of empowering communities. We are exploring the option of sharing Joto Afrika with a community radio station for wider dissemination in rural communities that are remote and difficult to access.*

Dear Editor

I am a keen reader of *Joto Afrika* and would like to congratulate you for the good job you are doing for people living in arid and semi-arid lands in particular. I have a group of peasant farmers who are making bio-sand water filters. I am wondering if you will do an article about them. They are cheap to make and effective in cleaning water for domestic use.

I believe this could be very helpful to other people. Our group can even train others how to make these filters. Please don't hesitate to contact the group

Dear Editor

The *Joto Afrika* briefings are informative and educational. The knowledge gained helps us to develop strategies to adapt to climate change in our area. Future issues should cover topics in other climatic regions besides arid areas.

**Daniel Magaci**  
Kenya

*Editor:* Dear Daniel

*We are glad you find Joto Afrika informative. Do share specific topics you would like covered in other climatic regions within sub-Saharan Africa, and we shall consider your request in future issues.*

**Francis Ng'ang'a Kagunya**  
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**Hudson Wereh Shiraku** Environmental Sciences-ICIPE, Kenya

*Editor:* Dear Hudson and Francis

*We welcome contributions to Joto Afrika. Please send us the case study. You can get guidelines on how to write an article from our website. <http://bit.ly/ntafvu>*

Dear Editor

*Joto Afrika* contains very useful information. I have used *Joto Afrika* as a reference in postgraduate studies and shared it widely with other colleagues. However, I would like to suggest that you consider having *Joto Afrika* articles more than 500 words since it is currently very short.

**Raheem Usman A**  
Ilorin, Nigeria

*Editor:* Dear Raheem

*Thanks for your useful suggestion. We are limited in the space we have for each article and, where possible, put contact details for the author or a link to more information. However, we will bear your suggestion in mind in future issues.*

## Contribute to *Joto Afrika*

Do you want to tell people about how your community is adapting to climate change? Are you involved in a programme, project or research that is helping people to find practical ways to cope with the effects of climate change? We want your contributions for *Joto Afrika* – especially contributors from regions beyond East Africa.

We are looking for research work, community case studies, videos, audio clips and photo essays about climate change adaptation across sub-Saharan Africa. The case studies need to be short (no more than 500 words), easy to understand, and provide practical information for other people facing these problems. If you would like to contribute, please contact the editor at [jotoafrika@alin.net](mailto:jotoafrika@alin.net). We welcome contributions in French and English.





# Africa's National Adaptation Programmes of Action

*A water pump using human power in Maradi, Niger*  
© Moussa Na Abou Mamouda, 2008

**The climate change debate within the international community focuses primarily on how to reduce greenhouse gas emissions, particularly through energy efficiency and reduced energy consumption in developed countries. But the least developed countries are more concerned with adaptation policies and measures that will help them reduce their vulnerability to climate change.**

A key area of vulnerability in the least development countries (LDCs) is the over-dependence on natural resources (water, forests, soils) and on crops and livestock farming as the primary economic sectors. These all depend heavily on climatic conditions, meaning climate change adds a considerable burden to the existing social and economic vulnerability of the poorest people.

The United Nations Framework Convention on Climate Change (UNFCCC) introduced National Adaptation Programmes of Action (NAPAs) to help LDCs address their "urgent and immediate" adaptation needs, addressing all forms of vulnerability and the low capacities of countries to cope with climate variability and change.

By November 2009, 41 LDCs had identified 455 adaptation projects. These were highly diverse and concentrated on food security,

agriculture, water resources and forestry. Energy provision is not a priority area, and only 3.7 percent of these projects relate to the energy sector, even though all the other projects will require energy services. For example, when planning for water management, adaptation options make no reference to energy security. This is partly because planners have little control over the integration of energy services into the adaptation options selected, and also because the energy sector is not mainstreamed in vulnerability analysis.

#### Ongoing initiatives

ENDA TM's recent review of NAPA documents from 41 countries indicates that energy is still not sufficiently mainstreamed in these plans, and that the implementation of adaptation options assumes that the required energy services and infrastructures already exist. Apart from cross-sectoral projects in Benin, Lesotho, Rwanda, Solomon Islands and Sudan, only the Democratic Republic of Congo has developed an energy access project through the NAPA process and classified it among its three priority projects for urgent and immediate adaptation needs.

The role of energy in meeting urgent and immediate adaptation needs in LDCs is critical. Our analysis of the NAPA documents identifies a pressing

need to introduce energy to improve the effectiveness of the adaptation options countries propose in their NAPAs.

We recommend the following policy options:

- integrate energy adaptation into the planning processes for other sectors, such as water and agriculture, that will need to adapt to climate change
- consider the role of renewable energy and energy efficiency in adaptation options, particularly in oil-importing countries
- evaluate the impacts of climate change on renewable energy systems, such as solar, wind, hydroelectric and biological energy sources.

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## See also

*Energy, climate change and poverty alleviation*, GNESD policy paper, 2009-2010  
<http://bit.ly/q0nUmi>

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