Agfax Resource: a radio reporter's toolkit

Responding to climate change

Around the world, people are responding to the challenge of climate change. Government responses include development of climate change action plans, covering many sectors from farming and forestry to business and trade. On the ground, there is growth in 'greener' forms of energy, and new farming methods to cope with more frequent droughts and floods.

A resource made by journalists for journalists.

Investigating responses to climate change:

- Water efficient irrigation
- National response strategies
- Seasonal weather forecasting
- Biogas for farms and schools
- Renewable energies

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Responding to climate change: a radio reporter's tool kit

Why is it important to report on climate change?

- Climate change is already impacting on people's lives - the impacts in the future are likely to be much greater.
- Climate change impacts on most aspects of life: health, transport, energy, food, water, the economy, tourism, business and many more.
- Climate change is poorly understood by many people.
- Information is power - people need to know how to respond.
- Climate change may also create new opportunities - such as payments for climate-friendly activities like tree planting or improved farming methods, and new markets for climate-friendly products and services like solar lamps and energy efficient stoves.
- Responding to climate change is a major political issue. Governments have an international obligation to address climate issues through their national policies.

Five top tips for reporting on climate change

- Understand that climate change is both a local and global phenomenon.
- Have a clear understanding of your topic (you will need to read and research it) and how it is relevant to your target audience.
- Make sure your story has a clear focus. When interviewing, keep your questions focused to get short, simple answers.
- Avoid use of technical jargon in your reporting - simplify difficult words and concepts for ease of understanding. Insist on use of simple words when interviewing experts.
- Talk to local people to know how they are affected. Give a human face to climate change stories. Report from the ground.

Quick facts on climate change

- The world is getting warmer. Over the past 100 years, the Earth's average surface temperature rose by around 0.74°C. 2001-2011 has been the hottest period since modern records began.
- Rising temperatures are changing weather patterns around the world. Scientists reported in 2012 that extreme weather events like droughts and floods have already become more frequent and intense in some parts of the world, including Africa.
- Rising temperatures are linked to rising concentration of carbon dioxide and other greenhouse gases in the atmosphere from human activities. If, as predicted, carbon dioxide concentration reaches double its pre-industrial level by the end of this century, this would lead to an average warming of around 3°C. Carbon dioxide is the main cause of climate change.
- One of the most dramatic consequences of global warming is sea-level rise. Sea levels rose by around 17 centimetres during the course of the 20th century. Geological observations indicate that they rose far less over the previous 2,000 years.

Causes of climate change

- A natural blanket of greenhouse gases in the lower atmosphere (called the troposphere) keeps the planet warm enough for life as we know it. When solar energy in the form of visible light strikes the Earth, it warms the surface. The Earth reflects this energy back out to space in the form of infrared, or thermal, radiation. Greenhouse gases block the infrared radiation from escaping directly into space. The resulting 'natural greenhouse effect' keeps the planet some 30°C warmer than it would otherwise be - the perfect temperature to support life on earth.
- The problem we now face is that since the start of the industrial revolution some 250 years ago our emissions of greenhouse gases have been making this blanket thicker at an unprecedented speed. As a result, heat is trapped leading to global warming.
- Fossil fuels formed by long-dead plants and animals are the single biggest source of humanity's greenhouse gas emissions. Burning coal, oil and natural gas releases billions of tons of carbon dioxide every year that would otherwise have remained hidden in the Earth's crust, as well as large amounts of methane and nitrous oxide. More carbon dioxide is released when trees are cut down and not replaced.
- Meanwhile, massive herds of livestock emit methane, as do rice farms and waste dumps. The use of fertilisers produces nitrous oxide. Many greenhouse gas-emitting activities are now essential to the global economy and form a fundamental part of modern life.
- However, unless we make significant efforts to reduce our emissions of greenhouse gases, the global climate will continue to warm rapidly over the coming decades and beyond.

Consequences for the future

- The poorest communities will be the most vulnerable to the impacts of climate change as they have fewer resources to invest in adapting to the effects of climate change. Some of the most at-risk people include subsistence farmers, indigenous peoples and coastal populations.
- Climate change will impact on economies. Conservative estimates show that African economies could be facing losses of at least 1-2 per cent of gross domestic product (GDP), or US$10–20 billion, annually. However, the real figure is likely to be higher as many economic activities are not accounted for in these estimates.
- The average global sea level is projected to rise by 28-58 cm due to ocean expansion and glacier melt by the end of the 21st century (compared to 1989-1999 levels). This may result in African coastal cities being increasingly difficult places to live and work.
- 20-30 per cent of species are likely to face an increased risk of extinction.
- There will be greater heat waves, new wind patterns, worsening drought in some regions, heavier rainfall in others.
- Drier and warmer as well as wetter conditions will impact on agriculture and food security through crop failure and loss of livestock. This will be particularly serious for Africa where many people rely on rain-fed agriculture and fishing for their food, jobs and income.
- Climate change will increasingly alter the distribution of malarial mosquitoes and other carriers of infectious diseases.

Solutions to climate change

Solutions to climate change fall into two categories: adaptation and mitigation.

Adaptation involves changing what you do in order to prepare for, or cope with, changing weather patterns. Examples of adaptation include:

- Strengthening sea defences to prevent flooding by high tides
- Planting drought-tolerant crops to cope with more frequent dry spells
- Urban tree planting to moderate temperature increases
- Rainwater harvesting for domestic use, livestock or crops
- More efficient water-use technologies, such as drip irrigation

Mitigation involves adopting practices which either absorb greenhouse gases from the atmosphere or reduce the quantity of greenhouse gas emitted. Examples of mitigation include:

- Planting trees or re-greening of desertified land, to absorb and store carbon dioxide
- Using energy more efficiently in buildings, vehicles and manufacturing processes
- Switching to renewable energy forms such as wind, solar and geothermal power
- Changing working practices to reduce the need to travel

Glossary of climate change terms

- **Climate change**: a change in climate (e.g. in temperature, rainfall patterns, wind speeds) which goes beyond the normal weather patterns that we would expect (such as different seasons). This extra degree of change is attributed to changes in the global atmosphere (such as increased concentration of carbon dioxide) which have resulted from human activities.
- **Greenhouse gases**: gases such as carbon dioxide, methane and nitrous oxide, which are found in the atmosphere and which reflect heat radiation back towards the earth, thereby 'trapping' it.
- **Greenhouse effect**: trapping of heat from the sun by greenhouse gases. Increased concentration of greenhouse gases in the atmosphere means that more heat is being trapped, leading to global warming.
- **Adaptation**: changing what you do in order to prepare for, or cope with changing weather patterns, e.g. building field terraces or bunds in order to encourage rainwater infiltration (and thereby cope with dry spells) and reduce soil erosion during heavy rain.
- **Mitigation**: adopting practices which either absorb greenhouse gases from the atmosphere (e.g. planting trees) or reduce the quantity of greenhouse gas emitted (e.g. changing from fossil fuels, which emit carbon dioxide when they burn, to alternative forms of energy, such as wind and solar power).
- **Renewable energy**: the production of power from sources that cannot be exhausted, such as the sun (solar power) or the wind. Hydroelectric power from dams is also renewable. These forms of energy are not necessarily constant in their supply - e.g. wind power is affected by wind speeds; hydroelectric by rainfall.
- **Geothermal energy**: power produced by harnessing heat from hot rocks beneath the ground. In volcanic areas these rocks are relatively close to the surface. Where

underground water bodies become heated by these rocks, they produce very hot steam which can be brought to the surface by drilled ‘wells’, and used to power turbines for electricity generation.

- **Carbon sequestration/storage**: removing carbon dioxide from the atmosphere and storing it in solid form. For example, trees absorb carbon dioxide and store it as wood. Organic manure, made from plant material, is another form of stored carbon.
- **Carbon credit**: payment given for the removal of carbon dioxide from the air, for example by growing trees. One carbon credit is equivalent to 1 stored tonne of carbon dioxide. These credits can be bought and sold through the international ‘carbon market’.
- **Seasonal weather forecast**: prediction of weather that is likely to occur in a coming season (particularly used before planting seasons). May include a predicted date for when rains will begin and how much rain is likely to fall during the season.

Agfax
Reporting Science in Africa

Contents - Responding to climate change

Weather forecast supports semi-arid farming
Over the last five years, members of some farmer groups in Machakos district, Kenya, have been using seasonal weather forecasts to guide their farming decisions. The weather information, provided around one month before planting should start, tells them how much rain they should expect in the coming season, and therefore what types of crops to plant. When rainfall predictions are good, they can invest in hybrid seeds and fertiliser, and maximise their yields. When predictions are for a poor season, choosing drought resistant crops is a better option. Peter Labeja speaks to two farmers and one of the scientists behind the initiative, to find out how successful it has been.

Biogas - clean energy from animal dung
Biogas expert, George Kamau, demonstrates how farmers can generate clean gas for cooking and lighting, through use of a biogas digester. Animal manure is fed into an underground tank on a daily basis. As this is 'digested' by bacteria, methane gas is produced which is piped to the house, reducing the household's need for firewood or electricity. Paschal Bagonza visits a farm in Kiambu district to the north of Nairobi, to see the system in action.

Biogas - power for a school kitchen
Gachoire Girls School in Kiambu, Kenya, has installed a biogas digester under a specially designed toilet block. Toilet waste is digested by bacteria to produce natural gas, a clean and environmentally friendly source of power for the school kitchen. Connected by pipes to a stove ring, the biogas is a very efficient fuel, and using it has enabled the school to reduce its expenditure on firewood, as well as saving trees from being cut down. The toilet block has also provided a long term solution in terms of school sanitation, replacing normal pit latrines which have a limited lifespan.

Kenya's climate-smart sources of energy
Kenya has a high dependence on hydro-electricity for its electricity generation. But when rains fail and river levels drop, electricity supplies are threatened. But the country also has large reserves of geothermal power - hot rocks just a few thousand metres below the surface of the Rift Valley heat underground water to create steam, and this is being used to drive turbines at the Olkaria Geothermal Power Plant. A technician at the plant explains the process, and Noah Lusaka from the Arid Lands Information Network explains how this, and other renewable energies like biogas, are helping Kenya to have a more reliable and environmentally friendly power supply.

Clean energy from geothermal heat
Frequent power blackouts are causing huge annoyance and frustration to ordinary Kenyans, as well as hindering factories and other businesses. And in recent years, droughts and dry spells have lowered water levels in reservoirs, reducing power generation from hydroelectric dams, which account for more than 60 per cent of Kenya's electricity supply. Audrey Wabwire visits the Olkaria Geothermal Power Plant in Naivasha to find out about this alternative method of electricity generation, which provides an uninterrupted power supply without emitting harmful quantities of carbon dioxide to the atmosphere. She also speaks to Mark Wopicho, whose company WindGen installs small-scale, electricity-generating wind turbines to households, schools and other users in areas where the national electricity grid does not reach.

Climate change brings cultural change

Noah Ole Matiek - *Maasai farmer, Isinya, Kenya*
Jeremiah Atetei - *Maasai leader, Isinya*
Margaret Noah - *Maasai mother, Isinya*
Benson Mwangi - *Extension officer, Isinya*
Peter Mula - *Maasai farmer, Isinya*

Summary

Maasai farmers in Kajiado County to the south of Nairobi, reflect on the changes that have happened to their livelihoods in recent years. In the past they were almost entirely dependent on livestock. Now, while keeping cattle continues to be an important part of their culture, they are also supplementing their food and income by growing crops. They have invested in a range of technologies, including drip irrigation and greenhouses, in order to get maximum yield from small amounts of land. Audrey Wabwire speaks to four farmers and a local extension officer to hear how and why their lives have changed.

Suggested introduction

Across the drylands of East Africa, changing weather patterns in recent years, such as delayed rains and more frequent dry spells, have forced farmers in some areas to adapt their farming methods. Planting drought-tolerant crops, using irrigation in their fields, and harvesting rainwater are all strategies that can help farmers cope with less reliable weather. Yet, as Audrey Wabwire recently found out when visiting a Maasai community near Nairobi, the increasingly dry conditions may have had an even bigger impact on those who have traditionally depended on livestock keeping.

CUE IN "(SFX Maasai song) The Maasai in East Africa …
CUE OUT … doing crop agriculture (SFX Maasai song)."
DURATION 5'55"

Suggested closing announcement

And that report was by Audrey Wabwire.

For further information

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Making the most of this interview…

It would be fascinating to find out from your listeners what the biggest impacts have been on their lives, in coping with the changing weather patterns in recent years. Some may have given up farming altogether and started a new way of making a living. Some may have migrated to an urban area. Ask them to phone in with their stories of change.

Climate change brings cultural change

Noah Ole Matiek - *Maasai farmer, Isinya, Kenya*
Jeremiah Atetei - *Maasai leader, Isinya*
Margaret Noah - *Maasai mother, Isinya*
Benson Mwangi - *Extension officer, Isinya*
Peter Mula - *Maasai farmer, Isinya*

Transcript

SFX Maasai song.

Wabwire *The Maasai in East Africa are known for their rich tradition with energetic song and dance, and beautiful beadwork. These Maasai women are singing a Christian worship song in their language, as they welcome guests into their home.*

SFX Maasai song.

Wabwire *Noah Ole Matiek remembers some cultural practices his community took part in some years back.*

Matiek About 20 years ago I can describe how the Maasai are living in that time. At that time we had a lot of cattle, so many of them, and a lot of land. So when you have a lot of cattle you graze in community land of which there is nobody who can stop you. So, and also in type of food they used to eat, our community because we are Maasai we use meat and milk only and our people they are so healthy. When you see the children growing, so you can see them, they are healthy.

Wabwire *Livestock has always been an important part of the pastoralist community, as their animals are their main source of livelihood. Jeremiah Atetei, a Maasai leader, says the culture of the Maasai revolves around livestock keeping.*

Atetei We do not usually sell because we do not see cattle going to the market. We just feel that we just want to own them but we do not usually sell. Because if a Maasai has no cows you will never be recognised by your community. So you have to keep cattle even if it is one or more, you have to have them.

Wabwire *In Isinya, 20 kilometres south of the Kenyan capital Nairobi, a Maasai community is slowly adopting a new way of life. Margaret Noah is a happy mother because she earns a lot from growing vegetables on her small piece of land, compared to the times when she only kept livestock. She has small pipes in her garden to water her crops even during dry periods.*

Noah We have vegetables, we have potatoes, tomatoes, sugarcanes, maize and beans. We sell even to get 15-20 thousand a month. Paying school fees it is easier and home management is going to be ok.

Wabwire *But I can also see here you have a place for cattle?*

Noah Yes I also keep cattle, cows, goats but if I compare, to sell a cow when it is small you have to wait maybe five years, but in the garden you will use three to four months and you get money.

Wabwire *This change has not been voluntary. With scarcity of grazing land and water for their livestock, this community has had to learn and adopt crop farming. Some have even gone ahead to develop a business angle in their farming. So now I am in Kajiado County in Isinya. This is quite a flat area and it is inhabited by the Maasai. To talk to me more about this is the Area Extension Officer, Benson Mwangi. Benson just to start, explain to me why is crop farming suddenly being taken up by some people?*

Mwangi We are having drought occurrence after every season or after every two to three years. That makes it very hard for the pastoralists to continue grazing their livestock.

Wabwire *And I am just seeing right here where we are standing that's in someone's farm, I hope we are not stepping on any plants but I can see some pipes going straight across the farm, some black pipes. Could you maybe tell me what is this people are trying to do on their farms?*

Mwangi We refer this system of farming as irrigation. To be specific it is drip irrigation system.

Wabwire *Drip irrigation is a sustainable method of watering crops in this semi-arid area. Pipes are laid in the garden close to the roots of the crops and they slowly release water which is soaked into the soil. This type of irrigation conserves water without letting the crops dry up. The government also gives incentives by providing free fertilizer to farmers to enhance their produce. (Vernac) Some farmers like Peter Mula, use greenhouses which are expensive but suitable for sustainable practice. He shows me invoices documenting his regular supply of vegetables to the local supermarket. Greenhouses ensure that small plots of land are fully utilized to deliver the maximum amount of produce.*

Mula We do not have land, land has gone. So the small land you have it, just utilise it.

Wabwire *Climate change has made droughts in this region more severe, more deadly. To avoid losses, many Maasai are adopting a new way of life to cope with these changes. Benson Mwangi says agribusiness is just another way of living.*

Mwangi By doing agriculture they will not lose any of their culture. Their culture is even strengthened but what they do is that they are doing now farming business whereby before they used to keep a lot of livestock but now today we are advocating them by keeping small amount of livestock and doing crop agriculture.

SFX Maasai song. *End of track*

Shifting from livestock to crops

Noah Ngotiek and Sospeter Mwazumbi - *Maasai farmers, Isinya, Kenya*
Noah Lusaka - *Arid Lands Information Network, Kenya*

Summary

In Kenya's semi-arid Isinya district, a number of livestock farmers have shifted to irrigated crop production in order to supplement their food and income. With boreholes to tap into groundwater reserves, the farmers are using drip irrigation to grow a range of high value vegetable crops, including tomatoes, potatoes and spinach. Emmanuel Okella meets farmers to find out how successful this change has been, and also speaks to Noah Lusaka of the Arid Lands Information Network, an organisation that provides practical information to help people cope with the increasingly challenging climate.

Suggested introduction

For some Maasai livestock herders in Kenya, life is having to change. Declining land availability and frequent droughts are forcing these communities to abandon their usual nomadic pastoralism and adopt new strategies to help them cope. Traditionally, Maasai travelled over large areas in search of pasture and water for their livestock, but in recent years their movement has been restricted by population growth and privatisation of land which used to be communally owned.

This already shaky situation has been worsened by changing weather patterns, such as extreme droughts. These have caused massive livestock deaths, forcing communities to seek alternative ways to survive. As a consequence, crop agriculture is now becoming common. Emmanuel Okella met with Maasai farmers in Isinya, about 50 km south of Nairobi, to find out more.

CUE IN "In the olden days, we Maasais …
CUE OUT … able to cope. Emmanuel Okella reporting."
DURATION 5'16"

Suggested closing announcement

And Emmanuel was reporting from Isinya, a dry area 50km south of Nairobi.

For further information

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Making the most of this interview…

Drip irrigation is a very efficient and relatively low cost way of irrigating vegetable crops. On a small-scale farmers may even be able to irrigate using water collected from their rooftop. Invite an agricultural advisor to explain how the system works, and give tips for how farmers can get started.

Shifting from livestock to crops

Noah Ngotiek and Sospeter Mwazumbi - *Maasai farmers, Isinya, Kenya*
Noah Lusaka - *Arid Lands Information Network, Kenya*

Transcript

Mwazumbi In the olden days, we Maasais used to keep a lot of cattle. Now as rains continued coming down, down and sometimes we could stay for two years without rains and when they found that they can have boreholes where underground water is plenty, many people have just gone to agriculture.

Okella *That's the voice of Sospeter Ole Mwazumbi, an elderly farmer, describing how families here used to have many cattle but many have now changed to settled crop agriculture. One of the farming technologies becoming popular here is drip irrigation. But what is drip irrigation and how does it work? This is the question I put to Noah Ole Ngotiek, a middle aged father of four, one of the farmers using this farming method.*

Ngotiek The drip irrigation system, we normally bring the experts to arrange the garden accordingly and the systems of the pipes from the tank to put water to the ground.

Okella *So these pipes are connected to a water tank somewhere?*

Ngotiek Oh yes, yes, they are connected to a water tank somewhere and then you just open to the gate valve, and then to the shamba.

Okella *So the pipes have some holes that drop water?*

Ngotiek Oh yes, yes the pipes drop water into the garden and then to the crop itself.

Okella *Why did you start this idea of drip irrigation?*

Ngotiek I started this one because it doesn't take a lot of water and I have been experiencing a lot of challenges when I try to cultivate the land and pour water, I can see I use a lot of water. So I just started to shift to cultivate with drip irrigation because it takes little water.

Okella *Originally before you did this you were engaged in livestock?*

Ngotiek Yes in livestock, I have been pasturing, I had a lot of cattle some years back but I saw a lot of challenges when climate changes come, they die anyhow when the droughts come. So I have changed now to see how I can earn a lot of cash in my crops.

Okella *What has been your own experience with drip irrigation, how has it improved the livelihood of your family?*

Ngotiek Yeah, I earn a lot of money, let's say in a month I earn more than 20 thousand just within one acre.

Okella *What do you grow on this acre?*

Ngotiek I grow tomatoes, onions, potatoes, spinach and so on.

Okella *How do you compare it with livestock?*

Ngotiek Ah, you earn a lot of money in crops. So in cows you have to wait for so many years for a cow to grow, for you to sell and you have to have so many of them and you need a big land for them to get grass and right now I am trying to advise the community in general to change from the pasture to this kind of crop system.

Okella *But where do you get the water that supplies this farm?*

Ngotiek Myself I have drilled my own borehole, so I am using my water. I have used more than 2.5 million shillings to drill my borehole.

Okella *What about a small farmer who doesn't have all this money?*

Ngotiek To a small farmer I could just tell him to look for a rain water harvesting system, to get water from gutters, you put a small tank and then you put a small kitchen garden to start your development.

Okella *Where did you get that idea from?*

Ngotiek I got it from Maarifa centre; I normally attend so many seminars. I have been seeing a lot of things through that Maarifa centre.

Okella *The Maarifa centre that Ngotiek refers to here is a knowledge centre that provides free information services to communities here on farming methods that help them cope with drought. At the centre you find a book library, internet connected computers, farming publications and DVDs. The knowledge centre is run by a local organisation; Arid Lands Information Network. Noah Lusaka is the organization's project manager.*

Lusaka The centre basically uses various technologies to educate the communities so that they are able to respond accordingly and also to take some mitigation measures on climate change related issues, and we have seen communities picking up new technologies which they have learnt from the centre. Some of these technologies include; we have quite a number of farmers now who are making their own hay, to store it. When there is a drought, they then can give their livestock so they avoid moving their livestock for long distances. So we can say that's one of the adaptation measures to prolonged droughts. Another technology that has really picked up is the drip irrigation, where farmers are using this to conserve water; this being a dry area, water is very critical. So the little water that's available, pastoralists can also now grow some crops using drip irrigation technology because it uses very minimal amounts of water to grow crops.

Okella *With challenges of farming getting bigger due to unreliable weather patterns, helping farmers get information on sustainable farming and management of resources such as water and land, is critical. Here in Kenya, the Maarifa centres are helping set a good example of giving farmers what they need to be able to cope. Emmanuel Okella reporting. End of track*

Kenya's national climate change response strategy

Alexander Alusa - *Senior policy advisor, Office of the Prime Minister, Kenya*

Summary

Alexander Alusa, a senior advisor in the Kenyan government, discusses what is being done to implement the country's national climate change response strategy. He emphasises that climate change creates opportunities as well as challenges, and encourages the private sector to invest in the development and sale of climate-friendly technologies, such as solar lamps and energy efficient stoves. He describes a government initiative for renewable energy generation, and collaboration to tackle cross-border climate change issues in the East African region.

Suggested introduction

In recent years, the East African region has seen numerous incidents of extreme weather, many of which have been blamed on climate change. According to climate scientists, understanding exactly how weather patterns in the region are changing is very difficult, but one common trend is that extreme events, like droughts and floods, are becoming more severe and more frequent.

Around the world, governments are being encouraged to make plans and policies that can reduce the speed of climate change and help people to cope with the changes already occurring. In Kenya, a national climate change action plan is being formulated. But what kinds of strategies are being included, and what impact will these have on ordinary people? To find out, Joseph Sekiku spoke to Alexander Alusa, a senior adviser on climate change in the office of the Kenyan Prime Minister. He began by asking who had been involved in developing the strategy.

CUE IN "What we have actually is …
CUE OUT … plant trees as a matter of course."
DURATION 5'46"

Suggested closing announcement

Alexander Alusa, a senior Kenyan adviser on climate change. He was speaking to Joseph Sekiku.

Making the most of this interview…

Find out more about the national climate change action plan in your country. Are their policies in the pipeline, either to encourage the private sector to benefit from climate-friendly technology development, or to support local communities in dealing with climate-related challenges?

Kenya's national climate change response strategy

Alexander Alusa - *Senior policy advisor, Office of the Prime Minister, Kenya*

Transcript

Alusa What we have actually is a national climate change response strategy. We involved the private sector, we involved CBOs, we involved non governmental organisations, we involved all climate sensitive ministries. We also involved the general public because after we wrote the few drafts, we did sensitisation workshops, we did hearings to make sure that they share, and we got feedbacks from various parts of the country.

Sekiku *And you have mentioned that the government is active in this area but what does the government of Kenya have to do to help or to support people affected by climate change already in the country?*

Alusa With regards to climate change, the government basically needs to provide the enabling environment in terms of policy. By the way, I want to make it clear that climate change is both a challenge and it can be also an opportunity. There is an opportunity in climate change with regard to private sector where you can generate and have a technology and market your technology and make money as a business of climate friendly technologies: solar lamps, cooking stoves that are energy efficient. So there are opportunities for the private sector to actually take up this and also to benefit from it and make money out of it. The government can only provide the enabling policy environment and that it is doing through policy formulation. But also the government negotiates with the donor communities and it also helps the private sector in getting engaged either by giving them soft loans or involving them in a manner in which they can make money or raise money to involve in wind energy generation, solar energy generation and so forth.

Sekiku *And you have mentioned that climate change is not only a global issue but nationally, it is looked at as a cross cutting issue. Now as government, what is it doing to ensure that this is on the priority list of your interventions in the country?*

Alusa At least in the Kenya setting, we have now an action plan of the national climate change response strategy. That action plan has put in place a way of mainstreaming climate change in the various climate sensitive sectors: agriculture, energy, water, health. What it is, is that we include them in 10 year or 5 year development plans and then make sure that on an annual basis there is budgetary provision to address climate change in the sectoral sense.

Sekiku *Could you provide some specific examples on how the government of Kenya is making progress in this line of addressing climatic change issues?*

Alusa Well first of all in the Prime Minister's office, for example, we have established a task force to generate 2000 mega watts of renewable energy using renewable sources - wind energy, and we have 300 megawatts coming up under wind in Turkana. We also have geothermal energy; we are getting support from our development partners to do geothermal. We have zero rated solar panels so that they can be more easily accessible. What I plead with our

private sector is to make sure that some of these benefits can be spread onto the customer, the user and the ordinary *mwananchi*.

Sekiku *And you have talked of challenges, what are the immediate challenges that you are facing as government in implementing these plans?*

Alusa The real challenge is finance. Climate change is such a massive challenge that you need considerable amount of resources, and much as we get a lot of support from the private sector and from the development partners, we are trying to enjoin the private sector, to show them that the climate change challenge can also be an opportunity for making money for the private sector. The minute that can established beyond reasonable doubt, they will come on board, they will make their money and they will address the climate change thing and we will resolve it.

Sekiku *I find that the government of Kenya is globally involved?*

Alusa Yes.

Sekiku *Now looking at the regional context within the East African community, is the government of Kenya trying to work with the neighbouring countries within the East African block to address climate change?*

Alusa Yes we are. In fact I was involved in one of the working groups of the East African community in establishing an East African community master plan on climate change. So we are engaged with Tanzania, Uganda, Rwanda, and Burundi. I even went to Burundi for one of the discussions on the master plan and I think they have finished the master plan now; they are trying to evolve a regional climate change policy. Essentially what that policy will do, is to see the extent to which the cross-border challenges can be resolved at the community level and the national challenges can be addressed at the national level because climate change is cross-border and cross-sectoral.

Sekiku *And lastly from me, climate change affects you, affects me, affects that other man down the road. What advice do you have for me or for the farmer down in Kisii or in Isinya about climate change?*

Alusa Well, for a farmer I would suggest diversification. Look at climate resilient crops and plant them. Where you have enough water, go through the normal crops that your are planting but also be ready to actually exploit what we now call orphan crops like sorghum and others. And then also as an ordinary Kenyan and an ordinary Tanzanian or East African, have a sense of belonging and play your role in environmental stewardship because that has a bearing on climate change. Don't cut trees haphazardly and if you do, replace them and plant trees as a matter of course. *End of track*

Deforestation - causes and effects

Alexander Alusa - *Advisor, Office of the Prime Minister, Kenya*
Nic Pacini - *Naivasha Basin Sustainability Initiative, Kenya*
Isabella Masinde - *Policy Advisor, Ministry of Environment and Mineral Resources, Kenya*

Summary

Forest areas, or farmland with large numbers of trees, offer many benefits to people and the environment. At a global level, trees remove carbon dioxide from the air, helping to control the levels of greenhouse gases in the atmosphere and prevent global warming. And at a local level, forest areas trap cool, moist air near to the ground, thereby reducing temperatures and protecting people, crops and animals from excessive heat. But despite these and other benefits, in Kenya, uncontrolled felling of trees continues, including from protected areas. In response, the Kenyan government aims to achieve 30 per cent tree cover by 2030 through support for tree planting.

Suggested introduction

Every year, around 4 million hectares of forest in Africa are burned or felled - an area roughly twice the size of Rwanda. Rates of deforestation vary between countries, but in some parts of East Africa there are now large areas with very few trees at all. In Kenya, for example, it is estimated that only two per cent of the land surface is now under forest cover.

This loss of trees is well recognised as one of Africa's most serious environmental problems, contributing to land degradation and loss of wildlife. But African forests have also been a vital component in global weather systems, absorbing large amounts of carbon dioxide from the air and regulating temperature and water cycles. Pius Sawa now reports on the importance of tree cover in Africa, and what is being done in Kenya to address the problem of deforestation.

CUE IN "I'm at a workshop in the Kenyan …
CUE OUT … plant in their own farms."
DURATION 6'05"

Suggested closing announcement

Isabella Masinde, an advisor to the Kenyan Ministry of Environment, on support for tree planting as part of a national strategy to address deforestation.

For further information

MongaBay: Afrotropical Realm - http://bit.ly/Lf8Cy5

Making the most of this interview…

If you have a National Tree Planting Day in your country, you may have featured tree planting projects done by local schools or communities. Why not (re)visit a project to see how effective it has been? Have the trees survived; are they growing well? If not, why is this and what is needed to ensure tree planting has long term benefits?

Deforestation: causes and effects

Alexander Alusa - *Advisor, Office of the Prime Minister, Kenya*
Nic Pacini - *Naivasha Basin Sustainability Initiative, Kenya*
Isabella Masinde - *Policy Advisor, Ministry of Environment and Mineral Resources, Kenya*

Transcript

Sawa *I'm at a workshop in the Kenyan capital, Nairobi, to learn more about climate change, what is causing it, how it is affecting people's lives and what is being done to tackle it. Today we have several guest speakers, including Alexander Alusa, a climate change policy advisor in the office of the Kenyan Prime Minister. He is asked to explain what the biggest challenges are for East Africa, in terms of the causes of global warming.*

Alusa In East Africa, the big climate change challenges have to do with deforestation, because as you remove forests you remove the capacity to absorb carbon dioxide which is part of what is responsible for global warming. When you do afforestation you will increase the capacity of forests to absorb carbon dioxide, but as to whether or not it will have the impact of changing the rainfall regimes, the temperature regimes, depends critically on what everybody globally is doing.

Sawa *Nic Pacini is a scientist who has been studying water use in the area around Kenya's Lake Naivasha for over ten years. From his work there, he has seen that trees and forests have a very important impact on the local climate - particularly temperature and humidity. And while he agrees that changes in the global climate system are having an impact on weather patterns in Kenya, he also believes that preserving forest cover by not cutting down trees may be an even more important influence on local weather. He explains how a forest can trap cooler, moist air close to the ground.*

Pacini The head of the forest is hit by the sun and is hot, produces cold moist air that is underneath. Cold air is trapped below hot air. Hot air goes up into the atmosphere. Cold air is heavy and stays down. So through this temperature inversion system you actually keep moisture down longer and you reduce temperature. But if you cut all the forest you lose this moderating effect, and you are much more vulnerable then to global scale effects.

Sawa *Dr Pacini explains, cutting down trees has a significant impact on the local climate and makes an area more vulnerable to other weather patterns associated with climate change. For example, an area with no trees is much more at risk of erosion by heavy rainfall, and this can have an impact on agricultural production. Isabella Masinde, a policy advisor with Kenya's Ministry of Environment explains more.*

Masinde When you cut down trees you expose the ground. It is left bare and therefore when it rains it directly falls on the soil, making it loose, and then it is swept away. It is harder then to grow anything on that soil because you lose all the top soil and all the fertile soil.

Sawa *So deforestation is causing big problems, both to the climate and for crop production. But why are so many trees being cut down? I asked Isabella what she thought were the biggest causes among rural communities.*

Masinde Most of the causes at community level are due to lack of alternatives and increased levels of poverty. People think they can make up for other sources of income from taking trees from the wild or from protected areas. These trees are supposed to be protected, that's why they are in protected areas, but because of laxity, or lack of funding to help the authorities to protect these resources, the local communities find it easier to go and take trees that have been planted by other people because they probably have already depleted what is available to them.

Sawa *If people are forced by poverty and lack of alternative income to cut trees, what are the most important steps to reducing deforestation? Isabella Masinde again.*

Masinde The important steps are, first of all to educate people on the values of having trees and the dangers of deforestation: what it could do to food security of an area. So it is important to encourage them to protect what is already protected and encourage them to grow their own woodlots where they can diversify the types of trees they want to have. They could mix indigenous and exotic. They should also consider growing trees with multiple functions, so the trees can provide fodder, they can provide food like in terms of fruit, they can provide firewood, they can provide timber and materials for other industrial uses.

Sawa *Lastly, I wanted to find out what the government in Kenya is doing to support more tree planting. Isabella explained some of the strategies.*

Masinde Of course there are laws that protect trees which are in protected areas. There are also laws that are promoting the growth of, or planting of trees on people's individual pieces of land. And generally planting trees in marginal areas, so that we can increase the tree cover from the current 2% to at least 30% by 2030.

Sawa *But what is the incentive to a local person to plant these trees?*

Masinde The incentive? People are given some seedlings to plant on their own land because everybody is expected to have ten percent of tree cover on their land. So if they can be given some seedlings to put on their land, and especially of their choice, where they are encouraged to grow trees that have some economic value, that will help them in future. Like they could sell fruits, they can sell firewood to their neighbours, they can produce their own charcoal, as long as they can show where they are getting the wood from.

Sawa *Are the seedlings free of charge or they buy them?*

Masinde Some are bought, but when they are participating in a national exercise then they are given some seedlings to go and plant in their own farms. *End of track.*

Climate-resilient farming for crops and livestock

Kizito Kwena - *Soil scientist, KARI-Katumani, Kenya*
Phillip Mbai and Juliet Wambua - *Crop and livestock farmers, Machakos, Kenya*
Cecilia Ngina - *Local veterinary officer and farmer, Machakos, Kenya*

Summary

Farmers Phillip Mbai, Juliet Wambua and Cecilia Ngina explain some of the strategies they are using to maximise their crop and livestock production even when rains are poor. These include adapting their planting according to seasonal weather forecasts, terracing and mulching to make best use of rainfall, and water harvesting from rooftops. The seasonal forecasts also help them decide on animal numbers, and they are harvesting hay in order to feed their cattle in dry periods.

Suggested introduction

Increasing your production, whether from crops or livestock, usually demands an investment. It could be investing in high quality seed, paying for animal vaccination services, or using labour to build water harvesting structures on your land. But deciding to invest isn't easy. For example, what happens if rains fail? All that investment might be wasted.

In Machakos County, Kenya, farmers have been facing a problem known by scientists as increased climate variability. In simple terms this means that extreme weather events, like droughts or flooding, are becoming more common and more severe. In response, over the last three years several farmer groups in the area have been given detailed weather forecasts before each planting season, as well as advice on what farming activities will match the expected rainfall. But has this information, known as a seasonal advisory, increased their productivity? From Machakos, Diana Wanyonyi now reports.

CUE IN "This is a semi-arid part …
CUE OUT … sufficient food and income throughout the year."
DURATION 5'08"

Suggested closing announcement

Diana Wanyonyi reporting from Machakos County in Kenya.

For further information

Kizito Kwena, KARI-Katumani - kwenakizito@yahoo.com

Making the most of this interview…

This report includes many strategies that farmers are using to cope with reduced rainfall. Your listeners may have many more suggestions from their own experience, including crops or livestock breeds that are particularly appropriate for your area. Ask them to send their ideas, and invite an agricultural adviser to comment on them and make their own recommendations.

Climate-resilient farming for crops and livestock

Kizito Kwena - *Soil scientist, KARI-Katumani, Kenya*
Phillip Mbai and Juliet Wambua - *Crop and livestock farmers, Machakos, Kenya*
Cecilia Ngina - *Local veterinary officer and farmer, Machakos, Kenya*

Transcript

Wanyonyi *This is a semi arid part in eastern Kenya, dominated with hills and big chunks of land. At the moment we are in the rainy season and I can now see some storm clouds gathering behind the hills. But for much of the year this area has no rain and the farmers do not know when the rain will come next. For the last three years, Kenya Agricultural Research Institute has been working with the farmers in this area to provide more accurate weather forecasts for each planting season. Mr Kizito Kwena is a soil scientist based in Kenya Agricultural Research Institute, he explains about climate variability.*

Kwena Climate variability is a major issue here and it has been a major constraint to adoption of the many technologies which as an institute we think farmers could adopt and improve their situation. So we thought that using an advisory, we could help stimulate the adoption of those technologies, to minimise the risk and therefore make them palatable to the farmers.

Wanyonyi *Mr Philip Mbai is one of the farmers who has been provided with information by Kenya Agricultural Research Institute.*

Mbai The climate information which we get from KARI is very helpful to us because it gives us direction and it helps us to know what types of crops to plant, what amount of cattle to keep; because sometimes if we do not follow that climate information we may go wrong or we may lose. Sometimes the harvest is very reliable. When it is poor, we make sure we harvest about half of what we expected to get.

Wanyonyi *Mr Mbai says that most of the farmers have adapted their farming practices to plant drought resistant crops and rear livestock to provide better income. We walked on to where his cows were grazing near the river.*

Mbai At the moment I am keeping the drought resistant cows using crossbreed. That way they are disease resistant, they eat less food and I am planning to increase fodder. During dry seasons I can be self reliant without buying grass from outside.

Wanyonyi *Mr Mbai not only keeps cattle but has also invested in bee keeping.*

Mbai During dry seasons, it's when actually we get a lot of honey. Now like the ones you see there, the new type, I can harvest after every three months. Top bar hives I harvest after every four months and I get some honey. The local ones I can harvest after six months.

Wanyonyi *Mrs. Juliet Wambua, another farmer in the area, explains how women prepare land after receiving the information on when the rains are predicted to come and how they also conserve water during the dry spell.*

Wambua When we get the advisory note, we go back home and we prepare ourselves. Before it rains we start cultivating our lands and we also apply manure and

we also cut the terraces whereby we can plant after rains. We use the cow dung manure. When it has started raining, we put the gutters and we collect the water to our tanks. We have big tanks whereby we invest the water because in our land there is no water. So we usually use the tank. Inland we dig terraces, whereby it holds the water and sometimes we usually cover our plants with grasses so that it can absorb the water in the crops.

Wanyonyi *Local veterinary officer, Mrs. Cecilia Ngina, also a farmer, explains the advantages of drought resistant cows, meaning cows which can survive better when water is scarce.*

Ngina The advantage is you get a lot of milk, a lot of meat, a lot of butter. They can eat little feeds, the consumption is low. They are productive.

Wanyonyi *As we walked across the poultry pen, Cecilia went on to explain how she also crossbreeds chickens.*

Ngina I go for a hybrid cock then I bring for my local one, then I crossbreed. They produce the big ones with meat, eggs are big. They are resistant against some diseases like the killer disease Newcastle, but I do vaccination.

Wanyonyi *There is a need for other countries in the continent to also improve their productivity and efficiency in agriculture by learning from the farmers in Machakos County in Kenya as a way of adapting agriculture to climate variability and ensuring sufficient food and income throughout the year. End of track*

Weather forecast supports semi-arid farming

Cecilia Muya - *Crop farmer, Machakos, Kenya*
Kizito Kwena - *Soil scientist, KARI-Katumani, Kenya*
Phillip Mbai - *Chairperson, farmers group, Machakos, Kenya*

Summary

Over the last five years, members of some farmer groups in Machakos district, Kenya, have been using seasonal weather forecasts to guide their farming decisions. The weather information, provided around one month before planting should start, tells them how much rain they should expect in the coming season, and therefore what types of crops to plant. When rainfall predictions are good, they can invest in hybrid seeds and fertiliser, and maximise their yields. When predictions are for a poor season, choosing drought resistant crops is a better option. Peter Labeja speaks to two farmers and one of the scientists behind the initiative, to find out how successful it has been.

Suggested introduction

In recent years, semi-arid areas in East Africa have become a difficult environment for successful farming. Traditionally farmers in these areas have been able to know, with some certainty, the timing of the two annual rainy seasons, and this has helped to plan their farming activities throughout the year. Dry spells and droughts have always happened, but previously they normally only occurred roughly once every ten years. That pattern seems to have changed, with dry spells now happening as frequently as once every three years, and this means that the risk that crops will fail is now much higher than before.

The Kenya Agricultural Research Institute, KARI, has been developing technologies to help farmers cope with these difficult conditions. One strategy has been to provide a detailed weather forecast around one month before each planting season, which tells farmers how much rain is predicted and when it will start. Peter Labeja recently went to meet a group of farmers in Machakos County, an hour's drive to the south of Nairobi, to find out how valuable the improved weather information had been.

CUE IN "They forecast on how the rain will rain …
CUE OUT … making farmers more climate resilient and food secure."
DURATION 7'13"

Suggested closing announcement

Peter Labeja reporting from Machakos County in Kenya.

For further information

Kizito Kwena, KARI-Katumani - kwenakizito@yahoo.com

Making the most of this interview…

Many radio stations issue weather forecasts, but few stations provide supporting information, so that farmers can interpret these forecasts, in terms of their farming practices. This project in Machakos is combining information from both the meteorology department and agricultural experts. If radio stations took a similar approach, they could increase the value of the weather forecasts they provide.

Weather forecast supports semi-arid farming

Cecilia Muya - *Crop farmer, Machakos, Kenya*
Kizito Kwena - *Soil scientist, KARI-Katumani, Kenya*
Phillip Mbai - *Chairperson, farmers group, Machakos, Kenya*

Transcript

Muya They forecast on how the rain will rain, either it is low or below, below normal. So when they forecast to us that the rains are above normal we grow crops which resist heavy rains. If it is below normal we grow crops which are drought resistant crops.

Labeja *That is the voice of Cecilia Muya, a member of a farmer group in dry land areas of Machakos in Kenya. The farmers receive up to date seasonal weather information which has helped them to know when to expect rainfall and its rough amount to better plan their cropping activities and get enough food in increasingly harsh weather conditions. This has been made possible by the introduction of agro-based weather advisory information from the Kenya Agricultural Research Institute, KARI. I would like to find out how farmers have been using this seasonal weather information for the last five years and what impact it has had on their food security situation. So I visited Machakos County where this new approach is being carried out and spoke to Dr. Kizito Kwena, one of the scientists behind the new technology. I began by asking him why it was so hard to grow crops in this semi-arid area of Kenya without proper weather information.*

Kwena Like any other semi-arid region in this country and the world, water is a major constraint to crop production brought about by variable climate. And soil fertility is another one. We thought that if they had prior knowledge about rainfall before the start of the season they would do things differently and make the most out of a season.

Labeja *To get the view from one of the farmers, I met Phillip Mbai, the chairperson of one of the many farmers groups using the new technology.*

Mbayi The main challenge is that we did not know how to take care of our soil and again we did not know how much it would rain. At the moment we can predict how much rain to expect and that way we prepare ourselves to prepare crops and also the type of seeds to plant.

Labeja *These farmers are fed with seasonal information to make the best of the climate. The scientists who invented the technology have termed it adapting agriculture to climate variability. To find out how the information changed the ways farmers here grow their crops I decided to ask Cecilia Muya, a member of another farmer's group, who we heard from in the beginning.*

Muya In fact it has changed a lot. In fact I have improved my shamba, because when there were no predictions things were not good. I could plant drought resistant and the rains are heavy. The plan is good for the KARI, they have helped us more.

Labeja *So do you have now food all year round now that you are using this technology for the last five years?*

Muya I have food, I have even others to sell. I have a lot of food in the store. I was not storing I was blind before, I was blind.

Labeja *Cecilia is a very happy farmer today. Her farms are full of very healthy looking bananas, maize, beans and vegetables. While she was only able to harvest 3 bags of maize from one acre of her land, she now harvests up to 8 bags. This has given her household food security which was just a dream. In addition to storing part of her harvest to wait for bad seasons, she sells the rest to get money for other basic needs such as medical bills, school fees and livestock farming. Back at Phillip Mbai's farm, he explains that he has learnt how to control soil erosion in this hilly semi arid part of Kenya through making terraces, which also conserve soil moisture. His harvests have also dramatically grown from just 4 bags of maize to 30 bags of maize from a two acre piece of land. I asked him how reliable the weather forecast information has been to farmers in his group?*

Mbayi Very, very reliable because if there is any difference it is just a minor one and we mainly compare it with the indigenous knowledge which we have and at the end of the day we find the new technology is very important and very necessary.

Labeja *So how do you maximise, how do you get the most out of this information? Do you do it by adding fertiliser? What exactly do you do?*

Mbayi The most important is to prepare the farm early enough. The other important thing is to use dry planting because the rain is predictable as it is known and the other thing is to do early weeding. If you do that you are sure of harvesting something at the end of the season.

Labeja *Machakos dry land area experiences two rainy seasons. The longest begins in March and ends in May, while the shortest is in October to December. When a poor rainy season is predicted, farmers plant fast maturing and drought resistant crops and have also been trained to harvest water for irrigation and make hay for their animals. When a good season is predicted, farmers have confidence to invest in hybrid seed and fertiliser, knowing they will get a good harvest. So how are the scientists measuring the success of the project in terms of changes in the livelihoods of the farmers? Dr. Kizito Kwena again.*

Kwena Significant change has been noted in terms of yield. If you compare to their neighbours who do not use the advisory, they are able to harvest even in the worst of seasons when other farmers in the region have failed. And to us that is an indication that the system is working.

Labeja *Is one seasonal update enough to inform farmers or you would recommend more regular updates along the way?*

Kwena A seasonal forecast may not be sufficient and I feel that if combined with the regular updates as issued by the Met department then a farmer would be better off.

Labeja *Finally after success of this project here would you recommend it for other semi arid areas maybe in East Africa like Uganda specifically?*

Kwena The purpose of this project and the people who financed it is to generate good lessons that could be up scaled in the country and in the region. So I am very sure that the technology will spread to benefit other farmers in the region.

Labeja *My visit to Machakos has shown me how important it is for farmers to have up to date and accurate weather information. Rolling out this new approach to other semi-arid areas will go a long way in making farmers more climate resilient and food secure. End of track*

Biogas - clean energy from animal dung

George Gichuhi Kamau - *Biogas expert, Kiambu, Kenya*

Summary

Biogas expert, George Kamau, demonstrates how farmers can generate clean gas for cooking and lighting, through use of a biogas digester. Animal manure is fed into an underground tank on a daily basis. As this is 'digested' by bacteria, methane gas is produced which is piped to the house, reducing the household's need for firewood or electricity. Paschal Bagonza visits a farm in Kiambu district to the north of Nairobi, to see the system in action.

Suggested introduction

Having energy for cooking and lighting can be very costly, whether you depend on charcoal, firewood, paraffin or electricity. And, in addition to the financial costs, there can be costs to the environment as well, such as deforestation. Biogas, already popular in parts of Asia, is now becoming more common as a source of power in rural African homes, particularly among farmers who combine crop farming and livestock keeping.

The gas, which burns cleanly without unpleasant smells or smoke, is produced from waste products - most commonly animal dung - which are fed by the farmer into an underground tank, known as a digester. As the dung rots, it releases the gas which is stored and piped to the house, to power a cooking ring and a lamp. Paschal Bagonza recently went to meet a Kenyan farmer who has adopted the technology, and sent this report.

CUE IN "I am standing in the compound …
CUE OUT … cheap alternative source of energy."
DURATION 4'26"

Suggested closing announcement

Paschal Bagonza reporting from Thakwa village in central Kenya.

For further information

Noah Lusaka - nlusaka@alin.net
Arid Lands Information Network (ALIN) - www.alin.net

Making the most of this interview…

The biogas digester in this report is made from cement, and is quite a big investment. However, much cheaper systems are now being installed, known as tubular biogas systems. Instead of a cement tank, these use a long tube made from plastic sheet. For farmers with livestock, these can be a very affordable way to produce gas for cooking. Find out whether these, or other biogas systems, have been installed in your area, and try to speak those involved.

Biogas - clean energy from animal dung

George Gichuhi Kamau - *Biogas expert, Kiambu, Kenya*

Transcript

Bagonza *I am standing in the compound of Mr Ibrahim Njuguna, a farmer in Thakwa Village, Central province of Kenya. Behind me, is his well built house with a cosy sitting room fixed with a set of cuddly sofas. On my right, is a wooden storied structure he uses for rearing poultry on top, while his exotic breed of cows are beneath it. On my left, there is another wooden single storied structure, housing about ten healthy looking goats. The goats' droppings are used as manure in the small vegetable garden in front of their structure. The smell of cow dung is heavy in the air. Behind the wooden structures, is a biogas digester, a round concrete structure filled with semi-solid dung which is collected from the four cows. The Napier grass near the biogas digester are very green; they dance with satisfaction to the sound of the whispering wind. Njuguna uses the dung from his cows to produce biogas for cooking and light. George Gichuhi Kamau is an expert in installing biogas projects in people's homesteads.*

Kamau So this is the gas outlet pipe. We have ballcock here. The size of this plant is 12 cubic metres. These are the slats that cover the slurry that is here. This is used to maintain the pressure so that the gas can have the pressure to go to the kitchen.

SFX Njuguna's kitchen.

Bagonza *It is almost lunchtime. I am in Njuguna's kitchen. His home is one of the few Kamau installed with biogas. He talks about cooking with biogas.*

Kamau I usually tell the farmers to make sure that this is like now this is good, but this is bad. There is excess. A lot of energy is getting lost. So we have to regulate.

Bagonza *Biogas is a clean and alternative source of energy. Kamau explains some of the benefits.*

Kamau Biogas, once you construct, that's all. The rest is just adding the slurry. The rest there is no bill. For example, instead of using lightning, electricity you use lamp. Cooking you use biogas instead of using electricity or other gases.

Bagonza *Firewood?*

Kamau Yes. The only expensive thing is construction, setting up the plant, you have to use a lot of money, not very much. Once you construct, no more expenses.

Bagonza *Homesteads with biogas don't feel the pinch of load shedding. Homes are assured of constant power supply and their expenditure on electricity is very low.*

Kamau Those who have constructed they are seeing now the bills have come down to a great extent. Cooking using electricity is very expensive. So if you use biogas it is very cheap. Then we have other times where we have blackouts. They just use this one.

Bagonza *Biogas production goes through a process, which connects to the house to provide light and energy. Kamau demonstrates how a biogas lamp is used.*

Kamau This is where we open the lamp, there we have, it is supposed to function automatically. If it doesn't, we use matches. So this has no other additions. It can't spoil your eyes. The light is somehow yellowish but you can see anything, everything. Like now, most of the time they use this one at night instead of electricity.

Bagonza *For Njuguna, raw materials for biogas are readily available. It can be human waste. It can be cow dung. If homesteads had money to install biogas, they would enjoy, clean, safe and cheap alternative source of energy. End of track*

Biogas - power for a school kitchen

Joseph Gitau - *Senior Cook, Gachoire Girls School*
Peter Muraya - *Teacher, Gachoire Girls School*
Naomi Njihia - *Principal, Gachoire Girls School*

Summary

Gachoire Girls School in Kiambu, Kenya has installed a biogas digester under a specially designed toilet block. Toilet waste is digested by bacteria to produce natural gas, a clean and environmentally friendly source of power for the school kitchen. Connected by pipes to a stove ring, the biogas is a very efficient fuel, and using it has enabled the school to reduce its expenditure on firewood, as well as saving trees from being cut down. The toilet block has also provided a long term solution in terms of school sanitation, replacing normal pit latrines which have a limited lifespan.

Suggested introduction

Around the world, scientists and engineers are researching and developing new and cleaner sources of energy. One alternative energy for cooking and lighting is biogas. This gas can be burned in a stove just like gas from a cylinder, but it is produced at a local level - usually by individual households - from wastes such as animal dung. Householders feed these wastes into a tank on a daily basis, where they are broken down by bacteria, producing natural gas that is piped from the tank to the house for cooking or lighting.

But in Kiambu district, just north of Kenya's capital Nairobi, a different kind of biogas system is in use. At Gachoire Girls School, waste for the biogas tank comes not from animal manure but from the school toilets, which are connected to the tank. Human manure rather than animal dung is now the source of power. Emmanuel Okella recently visited the school to find out more, and sent this report.

CUE IN "The time is 11am …
CUE OUT … Emmanuel Okella reporting."
DURATION 5'23"

Suggested closing announcement

And Emmanuel was reporting from Gachoire Girls School in Kiambu, Kenya.

For further information

Ecosan Kenya Network - ecosankenya@gmail.com

Making the most of this interview…

This report could be combined with *Biogas - clean energy from animal dung* to explain two types of biogas systems. Organisations involved with improving sanitation could be asked to comment on how biogas systems can help to reduce problems with waste, as well as provide a cheap and clean source of energy.

Biogas - power for a school kitchen

Joseph Gitau - *Senior Cook, Gachoire Girls School*
Peter Muraya - *Teacher, Gachoire Girls School*
Naomi Njihia - *Principal, Gachoire Girls School*

Transcript

SFX Cooking meat.

Okella *The time is 11am and Joseph Gitau, the senior cook at Gachoire Girls School is busy frying up meat. Gitau is using a mingling stick to blend around the pieces of meat from a saucepan, big enough to hold 20 litres of water. The saucepan is sitting on a gas stove, powered by the school's biogas plant.*

SFX Children playing.

Okella *Just minutes before, Gitau has been serving his students break tea boiled from the same energy source. He speaks with fulfilment about how the biogas system has eased his cooking.*

Gitau (Vernac) It has been good because it does not produce smoke, it is also economical. If it was produced in mass we would forget use of firewood. You know this requires less labour, once you light it you are done.

Okella *But what is biogas energy and how does it work? For this answer, I ask Peter Muraya, one of the teachers in charge of the project to take me through.*

Muraya We have this block of toilets here. The waste is pumped into what we have there which is a bio digester, biogas digester.

Okella *What does that one do?*

Muraya Now that one is a very huge tank and what it does is that, when the waste goes there, the bacteria normally breaks down the students waste and in the process a gas is produced, the gas that we normally use even in our houses is produced. That is the gas we have captured there on top where we have that slab there, and then when it is captured it is forced to go all the way to where we have the kitchen.

Okella *The pipe takes it to the kitchen?*

Muraya Yes, when it gets there of course there is a modification that has been done there to ensure that it is able to cook.

Okella *Ok, what contribution is it making to the world that is already facing challenges of climate change and environmental problems?*

Muraya Initially we used to use around three lorries per term of firewood. That is around 21 tons of firewood and getting that firewood you are required to cut about 50 mature trees. So we were concerned. We wanted to ensure that at least we reduce the number of trees that we cut and when those trees are saved they ensure that they take the carbon dioxide that is released into the atmosphere and then we will not have serious problems of climate problem.

Okella *Do you have experience of any communities around, or schools or institutions, around you that have copied this idea and are actually doing it in their homes?*

Muraya I cannot tell you whether actually they are doing it but I know of schools that have come here, the Board of Governors, the people who manage their schools have come into this school. I have taken them through the process of constructing it. I have given them the budgetary estimates and they have said it is a very good thing and they would go and and implement it back in their schools.

Okella *What about the community around?*

Muraya The community around, what they do is that they use their cow dung, because you see with the cow dung you can have ten of them and then they can produce a lot of waste but with human beings I think when you have five, ten people in a family it would be too little to produce an economic viable gas.

Okella *The School Principal, Naomi Njihia says the biogas system has brought about even added benefits, more than just cooking for her 800 students.*

Njihia When you get to the kitchen you realise that is what is used to make our vegetables, to boil the milk, to cook the staff lunch and we are able to save something. But again I also need to say that it has helped us because you know in the school if we were to have the toilet per se, we would keep exhausting the toilets and the sewage system. So it has saved us because we do not think about that. So we do not think about pit latrines for the girls. So unlike what we used to do, exhaust every other time I am sure now because we have more students it would have been more expensive to keep exhausting, keep looking for a place to do the sewage systems and the like. But right now we are comfortable.

Okella *But what about the social aspect of people having to accept the idea of using human waste or cow dung to generate energy for cooking? Well, if you are one of those frightened by this initiative, Njihia has an answer for you.*

Njihia Oh that food is OK, actually it is cleaner. There is no difference with the normal gas that we use. And like you are saying, I agree with you because when our Form Ones come, we take a lot of time to explain to them that this is OK, this food is clean, this food is OK and I would say it is good food. I hope you will be able to taste our tea before you leave, take something from there. I hope nobody will be afraid to do that.

Okella *Emmanuel Okella reporting. End of track*

Kenya's climate-smart sources of energy

Technician - *Olkaria Geothermal Power Plant, Kenya*
Noah Lusaka - *Program Manager of the Arid Land Information Network*

Summary

Kenya has a high dependence on hydro-electricity for its electricity generation. But when rains fail and river levels drop, electricity supplies are threatened. But the country also has large reserves of geothermal power - hot rocks just a few thousand metres below the surface of the Rift Valley heat underground water to create steam, and this is being used to drive turbines at the Olkaria Geothermal Power Plant. A technician at the plant explains the process, and Noah Lusaka from the Arid Lands Information Network explains how this, and other renewable energies like biogas, are helping Kenya to have a more reliable and environmentally friendly power supply.

Suggested introduction

Whether for generating electricity, fuelling cars or powering industry, oil has been the foundation for much human development in the last two hundred years. But in Kenya's Rift Valley, energy experts are drilling for a different source of power: hot steam. And unlike oil, using this steam to generate electricity does not release large amounts of carbon dioxide into the atmosphere; it's a climate-friendly source of power.

Peter Labeja reports now on this and other developments in Kenya that are providing clean energy to a growing number of people in both urban and rural areas.

CUE IN "In response to Kenya's growing energy demand …
CUE OUT … helping to tackle climate change at the global level."
DURATION 4'27"

Suggested closing announcement

Peter Labeja reporting from the Olkaria Geothermal Power Plant in Kenya.

For further information

Wikipedia: Geothermal power in Kenya - http://bit.ly/K5bRpz

Making the most of this interview…

The Olkaria power plant is described as a 'mega' project for energy generation. As such, it requires substantial funding and government involvement. What 'mega' energy projects are currently being considered or developed in your country, and are they based on clean, climate-friendly forms of power?

Kenya's climate-smart sources of energy

Technician - *Olkaria Geothermal Power Plant, Kenya*
Noah Lusaka - *Program Manager of the Arid Land Information Network*

Transcript

Labeja *In response to Kenya's growing energy demand, the Kenya government is exploring alternative environmentally friendly sources of energy. These include solar, energy efficient stoves and wind power. Another is known as geothermal power generation. So then, how does the geothermal power plant work? I visited Olkaria II Geothermal Power Plant located within Kenya's Rift valley. I met one of the senior geothermal technicians and asked him what geothermal energy is all about.*

Technician The whole process starts underground and we have the heat energy that is naturally underground that is as a result of the hot magma that we have underground. Magma is just hot molten rocks because these are rocks which have melted due to the presence of high temperature. Most of the rocks which are underground, they are in molten form. They are very good in storing the underground heat, the one that now we are utilising in geothermal. And this hot magma is the one that heats the underground water. Underground water boils and becomes the steam. Then wells are drilled into the ground to mine steam, hot water and gases. After separation of hot water the steam is led to the turbines that turn the generators to produce electricity.

Labeja *This power plant generates 105 megawatts of electricity, just one megawatt below the amount of electricity produced at Kenya's largest hydro electricity dam. The technician says it is reliable and can meet the entire Nairobi energy needs for years.*

Technician Very much reliable because for one if you compare the geothermal with other sources of energy you will find that geothermal is very much reliable because one, it does not suffer from climatic conditions or even the weather conditions like the ones the hydro power stations suffer. So whenever we have the droughts the hydro power stations they suffer a lot due to the reduced water levels in the rivers. But with the geothermal the production levels remain the same, simply because the water that we are using is not coming from the mountains or from the rivers but it is stored underground and we can be able to use that for very many years. And then there is also another advantage because after we use this steam we return it back to the ground.

Labeja *Another intervention in the energy sector is the development of biogas technology that uses human excretion and livestock droppings to produce gas which is used for both cooking and lighting. The by product of the biogas system is rich in manure for crop production. Residents in Kiambu County in Central Kenya are already using this technology. Noah Lusaka, the Program Manager of the Arid Land Information Network says investing in these technologies help in cutting down carbon emission, the gas behind climate change and hence conserving the environment.*

Lusaka Because of the changes in our climate which is basically affected by the greenhouse gases, most notorious being carbon dioxide released to the atmosphere, there is need to change, change to alternative renewable energies. By renewable energy we say these are energies which are around,

they do not interfere like with the atmosphere but they are also readily available. A technique like using biogas is actually renewable as long as you keep your livestock, they will keep excreting, they will eat. You know it is a recycling cycle. The governments are also now investing in more mega projects, like in Kenya here we have invested a lot in the geothermal production because we have areas that have potential for production of this and the government has mapped the whole country and they know where they can tap this. Already at Olkaria this production of electricity that is fed to the national grid and just to avail electricity to other Kenyans in different parts.

Labeja *If other East African countries could learn and adopt Kenya's example, the region will address the problems of unreliable electricity while helping to tackle climate change at the global level. End of track*

Clean energy from geothermal heat

Technician - *Olkaria Geothermal Power Plant, Kenya*
Mark Wopicho - *WindGen energy company, Kenya*

Summary

Frequent power blackouts are causing huge annoyance and frustration to ordinary Kenyans, as well as hindering factories and other businesses. And in recent years, droughts and dry spells have lowered water levels in reservoirs, reducing power generation from hydroelectric dams, which account for more than 60 per cent of Kenya's electricity supply. Audrey Wabwire visits the Olkaria Geothermal Power Plant in Naivasha to find out about this alternative method of electricity generation, which provides an uninterrupted power supply without emitting harmful quantities of carbon dioxide to the atmosphere. She also speaks to Mark Wopicho, whose company WindGen installs small-scale, electricity-generating wind turbines to households, schools and other users in areas where the national electricity grid does not reach.

Suggested introduction

Having a stable, reliable supply of electricity, at an affordable price, is essential for most modern industries. In much of the world, electricity is generated by burning of fossil fuels, such as coal, oil and gas – using the heat to drive turbines which create an electric charge as they spin at high speed. In Kenya, over 60% of electricity is produced by hydroelectric dams, and the country is currently investing in other methods of power generation which, like hydropower, are less harmful to the environment than burning fossil fuels.

For example, Kenya is leading the way in Africa in the use of volcanic energy – exploiting large reservoirs of underground steam, formed when groundwater is heated by hot rocks several thousand metres below the surface. Audrey Wabwire finds out more about this source of electricity, known as geothermal power, and what it offers to Kenya's energy users.

CUE IN "In Kenya, two-thirds of our …
CUE OUT … meet the demand of the Kenyans."
DURATION 5'20"

Suggested closing announcement

And that report was compiled by Audrey Wabwire.

For further information

Wikipedia: Geothermal power in Kenya - http://bit.ly/K5bRpz
WindGen - www.windgenpower.com

Making the most of this interview…

Across the world, governments are planning how they will obtain their electricity in the coming years, in order to have reliable and affordable supplies, and to reduce their carbon footprint by adopting cleaner technologies. What technologies are being prioritised in your country, and how may this affect both the cost and availability of electricity supply in the coming decades?

Clean energy from geothermal heat

Technician - *Olkaria Geothermal Power Plant, Kenya*
Mark Wopicho - *WindGen energy company, Kenya*

Transcript

SFX Water gushing.

Wabwire *In Kenya, two-thirds of our electricity is generated using water. Known as hydroelectricity it is not always reliable during droughts as water sources, such as rivers, dry up in the drier seasons diminishing their potential as energy sources. As a developing nation, Kenya needs a regular supply of energy in order to sustain growing industries. Interruption of power can adversely affect the production process of any industry. Kenyans on the ground are also suffering with frequent power cuts.*

Liz I am Liz from Narok. I felt bad one day when I was cooking then the lights go off and that day we slept hungry.

Florence My name is Florence. One day I went into the salon, the power went off, I had already washed my hair. So I planned to meet someone, my friend, so I was not happy about it.

Wabwire *Alternative sources of energy are being explored in Kenya. One such alternative is geothermal energy, which is sourced from heat deep within the ground. This heat is mined from volcanic areas. The Rift Valley in Kenya is one such region, and the location of the biggest Geothermal Power Plant in Africa – Olkaria 2 Power Station in Naivasha Kenya. Inside Naivasha National Park, huge white pipes winding across the hills and bushes congregate at the power plant where steam gushes from deep within the valleys. The smell of rotten eggs fills the air as gases from under the earth escape into the atmosphere. Here I speak to a technician who explains to me the detailed process of generating electricity from below the ground.*

Technician Wells are drilled into the ground to mine steam, hot water and gases.

Wabwire *So you pull steam from the ground?*

Electrician Yes. The steam is led to the turbines that turn the generator to produce electricity. Then the steam which has been used up by the turbine is later condensed into a hot condensate which is later returned back to the ground to recharge the steam reservoir.

Wabwire *Since water is returned to the ground, the wells from which this steam is mined can be used for up to 70 years without worrying about depletion. The concept of geothermal energy remains new to many Kenyans. At the shores of Lake Naivasha, quite close to the Olkaria, I asked a man if he knew about the power plant just across the lake? Have you ever heard of geothermal energy?*

Man Is it the one of cow dung?

Wabwire *The one from under the ground. Is this familiar to you?*

Man So they put the wires in the ground?

Wabwire *No they drill and get steam which they use to get power here in Olkaria. Do you know about it?*

Man Laughing.

Wabwire *Geothermal energy does not depend on rainfall for production. For this reason, if it is available in sufficient amounts, it is available everyday, all year round. This source of energy is clean because even as it is produced, it does not emit gases that affect the climate adversely. Wind is another resource that is being explored for energy in Kenya, both at a large scale and at household level. Windy areas in highlands and in places that are flat, or next to the sea, are ideal for setting up a wind harvesting scheme. I spoke to Mark Wopicho of WindGen, a Kenyan company that has developed small scale wind turbines which are specifically designed to suit East African conditions. He explained more about his company's approach*

Wopicho We are harnessing power from the wind and we are generating electricity using our wind turbines. Our company WindGen Power East Africa is manufacturing wind turbines in Kenya at a mass scale and we are targeting schools, we are targeting homes, we are targeting all areas in Kenya that are off grid that are using diesel generators that do not have access to power and are just clueless where they can get these wind turbines.

Wabwire *The cost of small scale renewable energy is still high, so the development of geothermal energy is perhaps more likely to be supported by the Kenyan government as an alternative to hydroelectricity. But can geothermal energy in Olkaria sustain the growing demands of the Kenyan population?*

Technician Yes we have enough, more than enough in Kenya to satisfy the demand or to meet the demand of the electricity in Kenya. But the problem that is coming in is that, the problem that we have is that we need a lot of investing to do in terms of the geothermal and the major obstacles that we are facing in the geothermal in the establishing of the geothermal projects is the funds that we require to put up these kinds of projects. But it is true that the geothermal in Kenya can meet the demand of the Kenyans. *End of track*

Responding to Climate Change: a radio reporter's toolkit

Responding to Climate Change: a radio reporter's toolkit is the result of a workshop for East African science journalists, who spent eight days in April and May 2012 developing their skills in reporting on climate change issues. This process was commissioned by the Climate and Development Knowledge Network (CDKN) and facilitated by WREN*media* in partnership with the Kenya Agricultural Research Institute (KARI), and the Arid Lands Information Network (ALIN).

The workshop was held in Nairobi and the participating journalists came from Kenya, Tanzania, Uganda, Ethiopia and Burundi. Expert speakers from government offices, non-government organisations and the private sector briefed the journalists on a wide range of climate change related topics. Field trips were made to gather the experiences of rural communities and see climate-friendly technologies and responses in action.

As a result, the reports in this resource pack all focus on responses to climate change in Kenya, whether by rural communities, research and development organisations or government. Broadcasters in other countries should, where possible, make connections to activities happening in their local context, in order to draw the most value from these Kenyan experiences. The 'Making the most of this interview' tips included with each report offer a starting point for doing this.

At the front of this pack you will find some background information on climate change and why it deserves to be reported on. The participating journalists have also offered their five top tips for successful reporting on these issues, which can be complex and are often poorly understood.

All these reports and many more on climate change and other development topics can be found on the Agfax website - www.agfax.net. For further information, contact WREN*media* - post@wrenmedia.co.uk or www.wrenmedia.co.uk

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