

# KILLING OUR RAIN!

Industrial activities & environmental degradation



Photo courtesy of: <https://sites.google.com/site/lifesciencesinmaine/25-environmental-problems>

**W**e may be making great industrial strides but the quality of our life is shrinking by the day! With industrial revolution in most cities of the world comes the non-relenting challenge of environmental degradation. The two are inter-linked in that there is seldom any industrial growth without major negative impacts on the environment.

With every sky-scraping industrial chimney coming up, the quality of the environment goes down. This is because with the chimneys comes the reality of greenhouse gas emissions. A greenhouse gas is a chemical compound found in the Earth's atmosphere. Acting as gases, these compounds allow sunlight to enter the atmosphere freely. As sunlight strikes the Earth, some is re-radiated off the Earth's surface and back towards space in the form of infrared radiation, or heat. This heat is absorbed by greenhouse gases and trapped in our atmosphere. The Industrial Revolution was a turning point for our society in many ways.

With industry we saw the growth of our economy paralleled by the increase in the level of greenhouse gas emissions. Several greenhouse gases have increased by approximately 25 percent in the last 150 years. Anthropogenic emissions are those caused by man. In the last two decades, almost 75 percent of these anthropogenic emissions come from the burning of fossil fuels. (Publication; Joni Kethi 2013).

It is these emissions from fossil fuels combined with human activities and the explosive industrial growth in our town and cities that is affecting our weather patterns and simply interfering with the quality of the air we breathe. In the long run, even the quality of the precipitation within these emissions becomes questionable.

## This is how we are killing our rain

Recently on June 26th, the World Bank's assessment on Africa's governments Policies and Institutions revealed that Kenya is amongst 11 countries in sub-Saharan Africa whose overall stable growth rose by 1.0. Most of these are pegged on Economic growth and by extension the growth of Industries. Nonetheless, the effects of smog in the air, dust emissions, pollution of rivers

## Also Inside:

How Industrial Activities are messing-up the environment



The bitter taste of Salt industries at the Coast



The Reality of Climate Change in Kenya



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and lakes and the stench that characterizes most industries has become a source of despair for communities living around the industries and its environs.

The eco-system has been badly degraded and people suffer air and water-borne diseases that continue to defy contemporary medication and are increasingly proving fatal.

Ultimately, the reality of environmental degradation arising from industrial pollution questions the sanity of a country that values its industrial growth more than the lives of its people.

This is the urgent cry which governments and establishments may ignore at their peril. Times have changed and so has the climate. Some changes have been positive and sadly some are persistently negative – changes such as those on the environment. Industries have a lot to answer for this.

There is only one earth to live in and if industrial growth is poised to destroy it then sooner there would be no earth to speak of!

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### SPECIAL APPRECIATION:

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## Editors note:



As you read this, there are cities in the world where people are literally choking on smoke! Hard to believe but it is true.

Some regions in countries like Malaysia, Singapore and Indonesia are wallowing in such thick and persistent smog that a state of emergency has been called.

So bad is the situation that some schools have been closed so that children may be protected from the poor air quality. This pollution of the air has largely been caused by the slash and burn practice by farmers and by peat fires. Also enhancing this

environmental disaster is the industrial expansion in these fast-paced cities.

Now we in Kenya have not reached this point with our air quality, have we? More so, we are yet to reach a point where schools have to be closed because the air circulating in the atmosphere is not conducive for human consumption.

Air pollution is hardly a topic you would regularly stumble on in the local media. However, it is as crucial as the same air we breathe!

Today, Kenya moves steadily towards economic gains that are heavily pegged on industrial development. Industrialization is the key to economic empowerment which many developing nations crave. This industrialization is heavily fossil-driven thus a lot of destructive emissions are released to the atmosphere everyday during operations. But with industrialization comes a heavy price of environmental degradation.

Air, water and ground pollution ensues and in the long-run, innocent populations suffer unending miseries. Air and water borne diseases suffice while arable land diminishes exposing communities to food insecurity. Animals and the entire flora and fauna bear the consequences.

Such is the case for the communities in some parts of Mumias, Malindi, Kilifi and Nairobi. With industries comes the misery of the impact of pollution on their environment and on the livelihoods dependent on it.

In this second issue of the Climate Change News we focus on industrial pollution and various aspects of climate change and the environment.

Once again, Peace Pen Communications appreciates the team of journalists, editors and designers who worked on this issue. Special thanks to the Rosa Luxemburg Foundation for their continued support of this project.

Mildred Ngesa

## Disclaimer

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# Environmental Education should be mandatory in schools

By Dorothy Anangwe



**T**omorrow's leaders need to be fully equipped for tomorrow's challenges. There is need to adequately prepare our children for the future they will inherit. This requires a commitment to

providing children with environmental education. In an era where more and more children are disconnected from nature, it is important we recognize the importance of making a real investment in environmental education and outdoor learning. Studies have shown that environmental education engages students in learning, raising test scores and encouraging youth to pursue careers in environmental and natural resources.

On any given day, more than a billion children are enrolled in primary or secondary school. But far too many of those enrolled children do not complete their education. Instead they drop out because the quality of education they receive is poor or because of challenges that make it difficult for them to attend and participate in school. These challenges include deepening poverty, gender imbalances, emergencies and conflict situations, HIV and AIDS and disabilities. Chronic environmental

degradation and climate-related hazards are also reasons why children cannot finish their education.

Nature has always been an integral part of childhood. Children learn about life as they watch tadpoles transform into frogs or examine the complex system of veins on a leaf. Yet, children today are left with little time in their busy schedules for outdoor play, and they often opt for video games and television when they do have time off. Environmental education is an important way to reconnect kids to nature and the benefits it has to offer.

Scientific findings clearly indicate that a changing climate has – and will continue to have – a significant impact on human life and natural systems. Droughts, floods, rising temperatures, and heavy precipitation can lead to problems such as increased malnutrition, diarrhoea and malaria. Floods and rising sea levels can cause drowning, injuries and severe mental and physical trauma, particularly for people who live on islands, along major river deltas and in low-lying coastal areas.

While no area is immune to the impacts of climate change, evidence suggests that developing countries, which already struggle with social, economic and environmental issues, will be worst hit by changes in rainfall patterns, greater weather extremes, and an increase in droughts and floods.

While children are among the most vulnerable to climate change, they should not be considered passive or helpless victims. Children are powerful agents of change and studies reveal that children can be extraordinarily resilient in the face of significant challenges.

Providing children with empowering and relevant education on disasters and climate change in a child-friendly school environment can reduce their vulnerability to risk while contributing to sustainable development for their communities. Educating girls and women is one of the best ways of strengthening community adaptation to climate change, as shown by recent studies.

Our schools need more encouragement, resources, and time to devote attention to environmental education. They need funding and other support to train teachers to incorporate environmental education into their everyday lesson plans and to develop the confidence and skills to take their students outdoors to learn. Students can transfer their knowledge into positive environmental action in their own schools and communities.

"One way or another, the choice will be made by our generation, but it will affect life on earth for all generations to come" - Lester Brown

\*The writer is a journalist and a Programs Officer at Peace Pen Communications.

## Readers Feedback°.

## Readers laud first publication of *Climate Change News*

The first publication of *Climate Change News* released in March 2013 has received positive reviews from readers who are seemingly impressed by the contents of the publication.

Readers in Nairobi, Western Province and the Coast were encouraged that this publication purported to enhance their knowledge on issues of the Environment and Climate Change as well as give a platform for ordinary people to express their views and air their grievances in regards to issues environment.

Here are some comments from readers:-

*"This is a great publication and very encouraging process. We are pleased to know that you take these issues relating to the environment very seriously. This is good effort. Keep it up".* – Dr. Ayub Machari, Director Environmental Education, Information & Public Participation, National Environmental Management Authority, NEMA via telephone.

*'This will now give us room to understand what concerns us most--the climate. Whoever is behind it should keep it up.'* –Justus Mukoshi, assistant chief Indangalasia sub location Lurambi – Western Province.

*"This will give us a break from boring politics we are fed with every day as our environment degrades. Kudos to peace pen communication and the team and may you take it to the highest level at your reach."* - Jude Muchai Safety and fire manager, Mumias Sugar Company.

*"It is good to know that there are people who care about the Environment this much! Good job!"* - Official at Ministry of Environment offices, Nairobi.

*"We hope to use this platform to expose those degrading our environment for personal gains and massive loss. This is timely and should be encouraged."* - Walter Mukungu, chief Kisa East location, Khwisero.

*"This is an opportunity for journalists whose interest in environmental matters keep being shattered. We should all embrace. Keep it up PPC!"* Marvin Wangatia, journalist.

*"It has been difficult to drive our messages to the community on how to address environmental issues. This is the right partner we won't afford to lose"* - Domnic Otieno, forestry head of western conservancy.

*"We are always ready to partner with journalists*

*who write for a good purpose. We will partner with peace pen to drive the climate message to the village"* - Pamella Lutta, Director of Marketing and corporate affairs Mumias Sugar Company.

*"Bring us more copies and involve more community groups especially those dealing with environment matters in the stories you publish. This is the best way to circulate climate change information"* - Mwai Muraguri, Kakamega County forest coordinator.





# “Stealing our rain” – How Industrial activities are messing up the environment

By Cyrus Akhonya and Lilian Mukoche



Photo courtesy by: <http://www.bilfinger.com/en/press/press-photos/industry/>

Industrialization is the backbone of development especially with the introduction of devolved systems of government in Kenya.

Right from the campaigns towards the March 4 general elections, candidate especially those who were vying for the gubernatorial posts gave their commitment to enhancing the establishment of industries.

It was termed as the main source of employment and the only way to take agriculture to the next level. Hardly did any one check on the other side of the impacts of industrialization on the planet.

For instance, Kakamega County in Western Province is the heartbeat of sugar production playing host to the giant sugar producer Mumias Sugar Company. The company which was established in 1970s is enjoying 60% of market share in sugar production. Establishment of West Kenya Sugar Company and Butali Sugar Company located in Malava constituency has created a lot of rivalry making sugarcane a rare commodity. There is also a bread baking company located right at the central business district in Kakamega Town. But despite the economic gains, residents are getting a raw deal in environment effects arising from the gases emitted and other discharges from these companies. The harm starts right from the chemicals in the

fertilizers used to the noise and smoke produced during processing.

Dennis Okoyo the programs director of Nabwabini Environmental Healthcare Intervention Project (NEHCIP) says the fertilizers used for top dressings in the companies has been found to consist harmful gases. “A 50kg bag of urea has methane which contains 20% of bad gas,” he said. Speaking to Climate Change News, Okoyo found fault with regulations which he said are not being implemented. “We are now seeing sugarcane being planted on wetlands which have been a reserve to control water flow. This is leading to unnecessary flooding. There is also oil discharge from factories which is being directed to our rivers,” he said. These are the very waters which are being absorbed by plants and considering the gases emitted by these industries, the vapor which contributes to rain formation may just be something else. Okoyo wants the Government to take the laws out of the shelves and start implementing them on the ground. “We have spent a lot of money and time compiling laws in favor of environment protection but little is being felt on the ground,” he said.

In an attempt to address the situation NEHCIP, is engaging stakeholders in Kakamega County to come up with a county plan policy. The plan aims to address issues in urban centers reserved land and

water. “The major challenge in implementing the laws is lack of networking. We hope that bringing together stake holders and bearing in mind that we are in a devolved government, will step in to enforce the laws,” said Okoyo. Jude Muchai the safety and fire manager at Mumias Sugar Company concurs saying “Even what we are doing inside here in relation to environment protection is not realized by the community. When they see the smoke, they don’t understand that it has undergone purification.”

Okoyo blames the authorities’ negligence especially previous regimes on environmental issues and threatened to engage the power of street demos if the trend is entertained further. The organization wants the Government to enforce the policy and clearly stipulate how the natural resources are to be shared without harming the environment. “Another threat is politics. Some politicians engage in special appeals in the name of championing environment matters but their real goal is to satisfy their personal needs,” he said.

The sediments have been echoed by the local administrators who encounter a myriad of political obstacles while implementing the laws. ‘We have a clear law on environmental impact assessment but you will find that politically funded projects are given a green light to do a project openly bending the regulations,’ said Walter Mukungu, Kisa East location chief in Khwisero. Mukungu who is also an environmentalist cited the Misango hills which have greatly been encroached and the extensive extraction of murram. He blames all these on local politics. The hills have now been gazetted as a government forest a move which the community says will go a long way in rescuing the site.

## Recycling efforts

Uses of bagasse which has been an environmental threat have not been exhausted. Farmers practicing artificial mushroom growing have found the commodity most worthwhile. Paul Kisiangani, an expert in mushroom production says the bagasse is used as the soil on which the mushrooms grow. “The remains have for a long time been a menace on environment but we have found it to be the right material for mushroom growing. It serves well when mixed with other ingredients to form what we call substrate,” he said. Kisiangani who is also the coordinator of Kenya national federation of agricultural producers – Kenfap, says they are engaging other groups to embrace the project and is challenging the county Government to fund farmers as a way of facilitating the recycle. “After three months, the lifecycle of mushroom, the bagasse which is the substrate can now comfortably rot and enrich the soil,” he explained.





Journalists are given a tour of the Mumias Sugar Plant

He said they are working on a proposal to attract funding from donors and government to establish a large scale mushroom processing plant as a sure way of exhausting the use of bagasse. Some of the groups engaged in the project have confessed that the disposal of bagasse just like other discharges from factories has been wanting. "The factories used to dump it anywhere even on our farms without permission. The places have remained untenable up to date," said Charles Omanyo, the chairman Jisimamie Community based organization in Lurambi. He says even sound and air pollution have not been fully addressed and asked the companies "to embrace modern technology as we have seen the ability to control harm through the use of modern technology gadgets". Some sugar companies have found refuge in plywood processing plants thus supplying the remnant at a cost.

Environmentalists however are confessing that the industries are stealing rain without farmers' knowledge. "The rate at which trees are being cut down cannot match the planting rate. Factories should realize that the raw material which is sugarcane squarely relies on rain and it is their prerogative role to plant more trees," said Simon Wesechere, an environment planner in Kakamega County. He argues that the tree planting exercises carried out by companies is mostly a corporate social responsibility, but they are yet to embrace it as expected. He says many people are clearing natural vegetation to cultivate sugarcane without realizing that they are destroying rain source and want the companies to step in.

He however appreciated efforts by Mumias Sugar Company to address climate change challenges

Some politicians engage in special appeals in the name of championing environment matters but their real goal is to satisfy their personal needs

through modern technology and called for proper involvement of farmers especially on economic gains and networking with other factories to address the issues. "The factories should go beyond economic rivalry and jointly engage farmers in environment management activities as the effects on our lives do not consider rivalry boundaries," he said. According to him, many farmers are unable to plant trees not because they lack space or interest but it is because they lack capital to purchase seedlings.

The environmentalist is also concerned with the mode of discharging wastes to the water sources

and asked the companies to observe conservation efforts.

### Lack of funding and resources

Inadequate funding has been termed as a setback in implementing various regulations established towards remedying climate change. According to the national environment authority, NEMA a lot has been put on paper but implementation is the thorn in the flesh. "The first problem is lack of staff. For instance in Kakamega County, we are only three and this makes it a hurdle to reach every corner in effecting the laws," said Omondi Were says the Nema coordinator in the County. Seven regulations have been put in place to control industries and individuals against harmful activities towards the environment. Two more are being worked on. We already have Environment Management and Coordination (Waste Management) Regulations 2006 -EMCA, Wetlands regulations, Water Quality regulations 2006, noise regulation 2006, and bio diversity conservation. There are also regulations on ozone depleting substances and environment impact assessment. Regulations on air pollution and economic instruments are being worked on. Another challenge is lack of adequate knowledge about the regulations among the concerned parties. "Many people don't read the regulations clearly. Once they have paid for a specific license, they use it to cover other activities which are outside the regulation," said Omondi. He added that efforts to remedy the situation are being done through sensitization on the community members. "The best way to make a law effective is to engage the community as custodians. They will only raise a concern if they understand that a certain practice is against the law," he added.

He says due to shortage of staff, it is not possible to follow up especially in industries to know whether they are effecting the regulations. "...but if we have a well informed community, it will be easier for us to know that they are bending the agreement."

The authority wants more stake holders to come on board as environment protection concerns every one. With the presence of county governments, Omondi feels the issues on environment protection will be best addressed if they are handled at county level. "They are the ones to draft policies and implement them and this will be a step if we they can allocate funds towards environment," he said. Newly elected Kakamega County Governor has declared his commitment towards addressing climate change challenges.

"Mr. Speaker, ecosystem conservation and management is vital in today global arena. The threats of climate change will be at the fore front of our county plans. We will endeavor to increase forest cover and ensure we benefit from carbon credit trade, enhance wildlife management, promote ecotourism and establish effective controls on noise and air pollution especially within our urban centers," he remarked during the inaugural speech at the County Assembly. He also promised to engage the industries in managing the environment and asked them to first ensure they are addressing environment concerns within their locations and then offer the county government a hand especially in garbage collection, tree planting and protection of water sources.



# Protecting wetlands amidst industries

By Cyrus Akhonya and Lilian Mukoche



Photos by: Isaac Mumani

A local showing some of the trees which have been cut down by charcoal burners in Magarini district

**E**nvironmentalists have condemned the move by Mumias Sugar Company to cultivate sugarcane in wetland areas which are a restricted reserve under the wetlands regulations.

Dennis Okoyo, the programs director of Nabwabini Environmental Health care Intervention project – NEHCIP- says the company has developed a habit of planting sugarcane on wetlands which have been a reserve for water flow within River Nzoia region.

“We feel they are going against the laws as they have not been utilizing these wetlands before,” he said.

The company however refuted the claims saying the company sits squarely on the wetland. “The company was constructed in early 1970s and when the community was asked to offer land, they preferred this site as it was a wetland and therefore not economically viable,” said Kasalu adding that the law came into force decades after the establishment of the company.

With various regulations in place, the company is now taking measures in respect to the rule of

law. Jude Muchai, the safety and fire manager at Mumias Sugar Company says no project is currently being undertaken without carrying out an environmental impact assessment (EIA). “We are even taking our staff both permanent and casuals through serious trainings on safety and environmental management,” he said adding that all departments within the factory are in one way or another affecting the environment and it’s important to engage the entire staff.

Muchai says they are also controlled by the regulations in disposing oil during the factory maintenance period. “We have thousands of litres from the plant and we ensure that we use recommended companies to dispose the oil. This leaves us assured that there is no harm on our environment especially water sources,” he said.

In commemoration of the World Environment Day on June 5th, the company distributed thousands of tree seedlings to the community and schools, a practice which has been going on for years. “We understand the role of trees in sustainability of rain and as a way of grooming our younger generation

to be environment friendly we are involving the schools and the community in the exercise in partnership with the forestry department,” say Kasalu.

While understanding the effects of fertilizer use on farms, the company has also introduced a dairy project to farmers. Kasalu says “the move aims to encourage farmers on the use of manure to enrich the soils and use sugarcane leaves to feed the animals, and we hope with time, there will be enriched soils”.

As the effects of Climate Change unfold, Kasalu has a message to the government: “What we are doing is an indication that indeed climate change challenges can be remedied.

And to the industry management; “Let’s take climate change issues as individual commitment.” As the late Nobel Prize winner Prof Wangari Maathai put it one time, “nature is very unforgiving. If we destroy nature, and if we don’t obey the laws of nature, nature will destroy us.”



# Industries struggle to mitigate climate change challenges

By Cyrus Akhonya and Lilian Mukoche



Mr. Jude Muchai, safety fire manager at Mumias Sugar Company



Mr. Alfrey Kasalu, Safety, Health and Environment manager at Mumias Sugar Company

Industries take the rotten cake for environmental pollution. There are also in the forefront contributing to climate change challenges being experienced in various parts of the world.

From the discharge of harmful gases to other environmental unfriendly remains like bagasse and oil, it has dawned on some of the industries that it is now optional to engage mitigations in controlling effects of climate change.

Mumias Sugar Company of Western Kenya, the leading sugar producer in the country has engaged measures to address environment effects arising from industrial operations. The company has invested in two main green projects; co-generation and ethanol plants. The two have gone a long way in solving the menace from bagasse- remains from sugarcane after extraction of the juice and molasses.

"We are now pleased that we are assisting our competitors in disposing bagasse because what we need to sustain our co-gen plant is far more than what we produce," said Alfrey Kasalu, the safety health and environment manager.

For a long time it has been a problem disposing the bagasse because the factories dumped it along the roads until the authorities intervened after complaints from residents. The remains cannot decompose when dumped or be burnt completely. This means the farms were being rendered irrelevant and even the rain water could not flow on farms as the absorption ability of bagasse is big. "We are now using it to generate electricity which we are partly using to run our operations while the rest is sold to the national grid," added Kasalu saying that the move has replaced a better percentage of thermal generation which emits fossil fuel an environmental harm.

The manager says they have solved the problem of the release of dust and smoke which absorbs humidity in the air. "The bagasse is so fine that it can easily end up in the air as dust and also in the process of burning a lot of smoke is released. We have engaged a technology which traps smoke and dust electronically mixed with water to arrest their mobility and later use it as manure on our farms," he said describing the electrostatic precipitator technology. The technology allows trapping of particles which are too fine to be realized both from bagasse and smoke. The end result is a clear smoke which is environmental friendly.

The trapped ash which is organically enriched is used as manure on the farms. "We have been growing sugarcane for the past 30 years and the

‘We are after sustaining the company and this cannot be achieved if we neglect the environment factor’

soils are now getting less unproductive and that is why the technology has come in handy," he said adding that the use of artificial fertilizers has also proven inefficient. Kasalu says that the move will also save the company from subjecting the universe to harmful chemicals released by fertilizers. Another main stride the company has taken is the establishment of an ethanol production plant. Molasses has been an environment hazard through spillage especially when trucks are involved in accidents. The economic value of molasses cannot be appreciated but having undergone value addition and processing, the company is reaping economic gains at the same time conserving the environment.

"The plant has the capacity to process 80,000 liters of molasses producing 22 million liters of ethanol even though we are yet to exploit its potential," says Daniel Lugalia, the safety officer in charge of the plant. He says the distillation process produces a waste product called fines which is a semi dark liquid that is an environmental threat. The disposal option was to release it to the rivers and this is not environmentally recommended. "We have engaged a technology where we tap the liquid, steam it up and mix with biogases to generate power to run the ethanol plant," he explains.

The target point is however not yet reached. "We intent to blend ethanol with fuel to run vehicle engines and bring to a halt the fossil fuels released by the petrol, but the regulations about the same have not been finalized," he said.

He urged the Government to move with speed in addressing this problem. Ethanol increases the combustion efficiency of fuels thus the vehicle emits lower amounts of carbon monoxide, particulate matter and other toxic substances. He says the industries will continue threatening the environment as long as developing countries are not embracing diversification. "In developed countries, we no longer have sugar companies but rather integrated plants. This is the way the country should move as the yields are no longer sustainable following the over exploitation of soils," he said. The company believes that enough is being done in relation to regulations but addressing environment is more than just regulations. The director of marketing and corporate affairs Pamela Lutta says they are self driven to promote these projects and not just to observe rules.

"We are after sustaining the company and this cannot be achieved if we neglect the environment factor," she said adding that the law is much on paper than on the ground. She is challenging other sugar factories to engage in self-oriented mechanisms to mitigate climate change challenges and environmental conservation.



# Mining Company a curse to Kilifi residents

By Ruth Keah, Photos by: Anthony Mwachiro



It is on a rainy Wednesday morning at the small village of Kwa Randu, Rabai Constituency of Kilifi County. There is very little activity going on in this farming community. Despite the short rains being experienced at the Coast, the villagers have nothing at all to celebrate as their once fertile land is now barren.

Most of them point an accusing finger at Athi River Mining Company (ARM), a cement processing plant in the area which emits a blanket of smoke to the atmosphere. This, according to the locals has rendered their land unproductive.

Situated a few kilometers from Kaloleni Shopping Centre, the trees mostly coconut trees are covered by a coat of grey dust from the Company, an indication that the dust produced at the company is causing more harm than good not only to the people but also threatening the future of these precious coastal plants.

Joseph Masudi a resident of Kwa Randu insists that the activities of the company have negatively affected the living standards of villagers around it. "The company has brought us a lot of stress because of dust leaving in its wake, dead people, and the sick and barren land. To add insult to injury,

our land has been annexed thanks to the expansion of the company," says Masudi. The villagers say that planting of vegetables is a forgotten practice as the crops cannot thrive here and if at all they do, they are harmful for human consumption. They pointed out that the dust has invaded every sector of their lives including houses and clothes.

The villagers are a disappointed lot because the company promises to take action to reduce their suffering but so far, the company has done nothing. They have sworn to stay put even if they are offered an alternative land saying that they are ready to die if nobody is ready to help them in their ancestral land which was turned inside out by uncaring companies out to benefit from the suffering of the people it is supposed to be helping.

## Dust of misery

According to Ms. Dorah Kenga, her 15 hectares of land has been grabbed by the company and now she might be forced to vacate her home of over four decades. The widow says that the matter was solved before a court of law and ruled on her favor but the turn of events have been causing her sleepless night. Their quest to fight for justice landed some of them in more problems. Khamisi Kadzomba, 50, received letters from the firm's

lawyers accusing him of giving false information that was defamatory to the company.

"Our only hope is the Almighty God because those whom we thought would help us have failed us but this will never kill our quest to fight for our rights even if it means dying in the process," lamented the Kwa Randu villager. Caroline Johanna who has been married in this area for the last 30 years says the dust has affected her fertility. 'I would love to conceive again but I cannot because of this dust known for affecting women's monthly cycles,' she says. She added that some of her children have developed hearing problems due to the dust which they claim is mostly spread at night. She says she lost five cows last year in unexplained circumstances. Even the veterinary officers could not save the livestock in the face of the poisonous dust that eat away everything on its wake.

"Long ago we used to get more than five sacks of rice but things have changed. Whenever we plant rice, they don't grow instead they stagnate and slowly wither away,' she says.

Caroline adds that growing of vegetables in the area is now a thing of the past not to mention the fast





Journalist interviewing a resident of Kwarunda village in Rabai-Picture by Anthony Mwachiro

‘ Long ago we used to get more than five sacks of rice but things have changed. Whenever we plant rice, they don't grow instead they stagnate and slowly wither away ’

disappearing coconut trees thanks to emissions from the Company. Five years ago one could see children carrying many mangoes to school for their lunch but now the mango trees have all dried up. The villagers said they have reported their tribulations to the local administration and the then Member of parliament followed up the issue and each house hold them Sh.10,000 as compensation for loss of livelihood but since then, they have received nothing in spite of continuous loss.

The villagers also claim that some government agencies are also behind their troubles because they are compromised by the company's management whenever they are called upon to intervene. Though the government encourages investors to create employment, some of the companies cause more harm than good to the people and the environment.

### Fighting for the rights of the locals

Hussein Khallid, who is the executive director of Muslim Human Rights organization ( MUHURI), told this writer due to climate change experienced globally, some mitigation measures must be taken by offending companies. 'The Constitution protects the rights of human beings to live in a clean environment,' he emphasized.

The Kenyan Constitution Chapter 5 article 69 (a) gives everybody rights to live in a clean environment. MUHURI is already undertaking measures to ensure that all companies operating at the Coast and are guilty of polluting the environment must adhere to the rule of law. MUHURI's sentiments are echoed by the new Rabai MP, Mr. William Kamoti. He insists that all investors in the area must adhere to the law

that calls for clean working and living environment besides offering employment opportunities to the locals.

He told investors to operate according to the country's Constitution and also take seriously their corporate responsibility of uplifting the lives of the local communities.

"We cannot do away with these investors but they have to respect us. Before I initiate talks with ARM with a view to finding a lasting solution, we need to form a team drawn from leaders and community leaders and thereafter we table our demands as a team," said Kamoti. Kamoti called on the need to partner with all relevant ministries to solve the myriad problems faced by residents living near the company. The Legislature said that the community is not going to ask for funds but it's up to them to do what is required by the community. On the insecurity facing the company, the politician asked the organization to use the locals to guard their property pointing out that this can only happen if ARM relates well with the people.

### ™We are doing our best

Responding to the above lamentations in an earlier interview at Mbugoni Primary School in Rabai Constituency, the Public Relations officer of the ARM Mr. Julius Nyabicha assured the residents that they have invented new technologies such as building of dust filters aimed at mitigating the flow of dust. "There persistent problem of dust cannot be avoided by companies like these and this includes industries all over the world," he said. He added that proper measures must be taken to make ensure that the dust produced is controlled

through the use of modern technologies. According to Nyabicha, the machines used by ARM now have the capacity to reduce pollution. He dismissed claims by residents that the company grabbed their land and does not give those first priorities in terms of employment.

He clarified that contrary to these allegations, the locals are the most beneficiaries of opportunities in the Company. Nyabicha said that the company is aware of the dust but pointed out that ARM is alive to its corporate responsibility. Kilifi County director of National Environmental Management Authority (NEMA) Mr. Godfrey Wafula, revealed that ARM has been given an improvement notice to make sure that it desists from producing dust.

Wafula said NEMA gave ARM the notice a month ago and they expect to carry out an assessment to see what measures they have taken to curb the dust problem. The officer warned the company that the environmental watchdog would not hesitate to take legal action against the offending company if they fail to comply with laid down regulations. However, NEMA expressed discomfort over the failure to gazette the Air Quality Regulations that would have brought a sense of soberness on the irritating issue.

"The delay in gazetting the rules is one challenge standing on our way right now because we cannot gauge the amount of polluted air," he said. He however assured the residents that their problems will be resolved sooner than later through all means possible. As for now, the local communities have to put up with the dust until a lasting solution is found.



# Cement factory a 'Hazard' for the locals?

By Harrison Mbungu



A view of Bamburi Cement Company - Photo by: Anthony Mwachiro

It is the second largest industrial centre in Kenya after the capital city of Nairobi. Mombasa city which is well known for its historical Swahili culture since time memorial is linked by an international railway to Uganda and truck road to major eastern and central African cities. It brags of major industries which include oil refineries at Kipevu and Changamwe, cement factories at Bamburi, tourist related industries like hotels, textile and engineering works spread through the urban area. These industries attract a labour force from the entire coastal region, upcountry and the whole world at large. Despite the growth rate of urbanization in this beautiful city of Mombasa, several industrial hazards of climate variability and change pose grave threats to the livelihoods of the people as well as to the country's socioeconomic development. Mombasa is already affected by an unprecedented rise in sea level, flooding, high temperatures and humidity levels. These climate-related disasters are projected to increase in frequency and intensity with long-term climate change disasters as it was experienced in the informal settlements of Likoni, ziwa la Ngombe in Bombolulu and Tudor.

Like many developing cities, Mombasa has been experiencing the demographic phenomenon on urbanization. A recent Survey shows that about 70 percent of the urban population in Mombasa town live in informal settlements that are prone to inland flooding, drought and water scarcity. The adaptation of climate change in the informal settlements of Mombasa has been barred by industrial pollution caused by poisonous gases emitted from the manufacturing industries around them which the locals do not understand. The slums in Mombasa areas of Tudor Morroto are some of the areas highly affected by the pollution. The locals here especially within the town centre lack the knowhow of why and what has been the key participatory factor in the rate at which industrial disaster related catastrophes are increasing. Mama Fatma a 68 years old widow with two children and a resident near Bamburi Cement

Manufacturing Industry which is located along the Mombasa -Malindi highway a few kilometres from Mombasa city centre explains how things have changed in the area since the cement factory was established within their neighbourhood.

She says that even though her children are employed in the industry as well as to the majority of the locals who benefit from skilled labour severe industrial hazards have contributed to the agricultural degradation in the region. "I used to grow some plants here in my farm but the smoke that is produced in the factory and the dust from the trucks transporting the already processed cement have affected my farms now we cannot grow anything here", she explained. She explained how young children around the area suffer from pollution disease infection like the persistent common colds and other diseases. However mama Fauzia adds that despite many governmental and non-governmental organs visiting the area and promising to address the issue, it has not been dealt with which she says is violating the rights of the residents. "We see many people coming here asking us about how the pollution is affecting us but no action has been taken so far" said Fauzia.

Another resident Mzee Shauri, 55 years old, says sometimes he is forced to travel to his rural home to take a break so as to avoid the noise pollution from the tracks. Having lived for the last 10 years now Mzee Shauri says he has been getting frequently sick with respiratory diseases, something he thinks might be caused by inhaling poisonous gases emitted from the manufacturing industries. A number of other residents also complained bitterly about their "helplessness" to address the pollution issue from the Bamburi Cement factory terming it a "David versus Goliath" kind of battle. But According to Jane Chameleon the Public Relations Officer at the factory, Bamburi Cement is one of the most technologically advanced cement manufacturing industries yet environmentally responsible. She said the factory is aware of the impact of its activities on the environment and as a result, started strategizing at an early stage

about ways of reconciling industrial imperatives with the preservation of ecosystems. "We have been working to reduce the environmental impact of its activities by finding ways to obtain value from waste products" She explained.

## Alternative energy at Bamburi Cement Limited

As the company gears in achieving its goals in improving its cement production it has focused in limiting greenhouse gas emissions by reducing the use of non-renewable raw materials and fossil fuels like oil and coal which are highly known for environmental production. According to the company officers who deal with the production, the company has put in place several environmental measures in reducing energy costs by limiting dependence on traditional fuels which at many times plays a big role in environmental pollution. The company has been committed to serve the community by recycling wastes that would otherwise need to be processed and eliminated by throwing them away. However, the exercise has given the local community an opportunity to sell the used vehicle tires as non-hazardous material in the company at good prices which the company uses as alternative fuel in the industrial cement kilns to boost their production.

The tires are introduced at different points of the process depending on the type and the size of the kiln prepared.

## NEMA firmly on the look-out

The National Environment Management Authority NEMA has clear regulations on industries, motor vehicles and other environmental management procedures. This regulation is referred to as The Environmental Management and Co-ordination (Air Quality) Regulations which was formed 2008 to prevent and control air pollution and to ensure clean and healthy environment. Following the foul cry of the residents living along the roads heading to the Bamburi Manufacturing Industry, NEMA has been in the watch-out to ensure that the regulations stipulated are strictly followed. According to NEMA Coast region programs co-ordinator Wilfred Osumo, the law provides for establishment of emission standards for various sources such as motor vehicles and industries.

He said the Environmental Management and Co-ordination Act which was gazetted in 1999 covers any other air and industrial pollution as may be determined by the environmental ministry in consultation with the organ NEMA. According to Osumo the law provides the procedure for designating controlled areas and the objectives of air quality management plans. Osumo confirmed that all the industries operating in Mombasa County are aware of environmental pollution adding that NEMA works alongside them to make sure they adhere to laws and regulations as stipulated. He added that last year, only two cases of environmental pollution were reported around Bamburi area where the company had spilled off some industrial waste in the forests which forced NEMA to intervene after the locals alerted them. In the issue of supervision, he said that NEMA officials regularly survey each industry monitoring whether the law is followed as stipulated.



# The bitter taste of Salt Industries at the Coast

By Alloys Musyoka



The entrance to Krystalline Salt Limited in Malindi - Photo by: Alloys Musyoka

**T**he unforgiving effects of massive deforestation in Magarini District, Kilifi County are now being heavily felt by the locals. The same effects are terrorizing locals in Malindi. They now have to grapple with persistent droughts and famine caused by lack of rainfall.

Trees attract rainfall and serve as wind breakers and so their absence exposes communities in affected areas to untold suffering. Affected communities narrate heart-wrenching stories of how they have been reduced to abject poverty by the effects of deforestation. Environmental experts say that 50 percent of Dakacha woodland forest in the Coast is already lost adding that the percentage can be higher than that because deforestation is still going on. Concerned locals and environmentalists are awe-struck at what is happening and the locals say that government agencies have been charged with the responsibility of taking care of forests have been too lax in ensuring the law is upheld. This writer visited some of the locals in Gongoni to witness what is bedeviling the communities. In Marereni area of Magarini, locals say that tree-cutting has turned their lives upside down.

## Salt-firms™ invasion

"Drinking water is now a thing of the past because of the salt firms' activities which has scared away the rain. In short, we have no water anymore and this is brought about by massive tree cutting by salt firms," Mrs. Bahati Hare a resident explained pointing to some of the trenches dug by Malindi

Salt Company a Kinyaule Village. These are trees that are mostly used to attract rainfall.

She revealed that many years ago the area had a lot of trees but the activities of salt companies in the area have cleared them all after forcefully displacing locals. Mrs. Hare almost sheds tears when she recalled the problem facing her community at Kinyaule in Magarini as she claimed that the rains have been so scarce and the only means of them getting food is fishing which is also being interfered with by the salt companies.

Another local Mrs. Constaney Biryia laments that they are forced to walk 50 kilometers away from their village known as Kinyaule to Robinson Island in search of water where they are forced to use boats. "When the sea is in high tide, we cannot access the island and so we get a lot of problems trying to get water for survival. We wonder why the government has been silent in controlling the salt firms to ensure they don't cut down trees even as they go on with their activities here," she complained. Mrs. Biryia says that all their wells and sources of water which harbored fresh water especially along the sand dunes in the area have dried up following the massive tree cutting by the salt firms in the area.

"This well you can see here is among many others which dried up. There were a lot of trees among them Coconut trees, Casuarinas, Mango trees and cashew nut trees among others which we used for domestic and cash but they were cleared to pave way for expansion of salt firms," she adds

pointing to a deserted area. Gongoni Ward county representative Mr. Albert Kiraga expressed his dissatisfaction with the salt firms' activities in the area especially the issue of evicting locals only to fell down trees which are highly depended on for rain. He said that although the salt companies in particular have brought employment opportunities in the area, the destruction of trees is something the entire Kilifi County and the country at large should be concerned about considering environmental effects already being experienced.

## The situation is urgent.

"You can imagine all these trees have dried up because of the salty water that the salt companies are releasing into our farms. Their wastes which they release in rivers are too salty because of chemicals and so have also affected our crops also," she adds pointing to remains of dried trees. "We cannot desist from saying lack of rains here is brought about by activities of salt firms who cut down trees without replacing or even planting them. We are also concerned that the national environmental management authority NEMA remains silent about this" counselor Kiraga pointed out. The firms are also accused of blocking a number of rivers in the area. Initially, Kiraga says, locals in the area were able to grow Simsim, cotton, cashew nut and maize for sale but now cannot farm because of the persistent unreliable rainfall. "This is an environmental problem which is affecting everyone here and so there is need for all stake holders to come together and urgently seek a lasting solution" he said. The civic leader blames NEMA officers in the area for laxity in their failure to protect the environment by restraining salt firms from cutting down trees. "Before issuing license to these salt firms, NEMA should consider the environment impact to ensure it is protected" he said. Some salt firms use wood fuel as the source of emerging while producing and processing salt. Nature Kenya officer in the area Mr. Francis Kagama says this is the biggest cause of deforestation in the area. One of the firms, Crystalline Salt Company located at Gongoni area uses firewood to fire its boilers for drying salt which according to Mr. Kagama is quiet destructive. Tones of logs of timber are used to facilitate this operation.

## A plea for Environmental Impact Assessment

Kagama blames NEMA for failing to protect the environment by licensing the salt firm without involving all stakeholders concerned and looking into the environmental impact assessment. Mr. Kagama who is in charge of conserving environment, pointed out that the salt firm not only uses firewood but prefer a special breed of trees. "They specifically use the slow growing trees which take many years to grow discriminating those with fast growing rate. They use Mangoes trees and Neem trees which they said produce more energy





A woman going to fetch water at River Belise which has been blocked by the salt firm

‘Drinking water is now a thing of the past because of the salt firms’ activities which has scared away the rain’

when they burn compared to trees like cashew nut, casuarinas, blue gum, acacia and albizia which are too many and with fast growing rate,” he explained. In response, a NEMA officer Mr. Samuel Ng’ang’a says they permitted the Crystalline firm to continue working some years back and admitted that a lot of deforestation is being witnessed in the area by the salt producing firm since. “It is indeed true that we allowed the company to work but they are damaging the environment. We did not expect it to be like that” said Mr. Samuel Ng’ang’a.

But Kilifi county Ecosystem Forest conservator Mr. Christopher Maina said the claims that the salt firms were officially “allowed” to cut trees from forest is not true. He said the Kenya Forest Service in the area is very concerned with conservation of the environment. “The salt firms should not lie to the authorities if they are found ferrying logs at road blocks, they should be asked to clarify because actually we don’t give them permit to cut trees from forests unless they are buying trees from a private farms in the area,” said Mr. Maina. His sentiments however contradict with Malindi and Magarini NEMA officer Mr. Samuel Nganga who admitted that they had licensed the salt firm to use wood fuel without considering the effect to the entire environment. Nganga however confirmed that National Environmental Authority has directed the crystalline salt firm management to look for another source of energy in drying their salt instead of wood fuel which is threatening existence of important trees in the area. “It is very true that we had approved the salt firm to go on and use wood fuel but there are a lot of concerns being raised and also the destruction of important

trees is very open to be seen by everyone and so we advised the company to shift to another method of drying up their salt,” he says. The NEMA officer says that they asked the company to remove the wood fuel plant from their premises and bring another plant which can use petroleum or come up with other methods as much as destruction of trees is stopped in the area. But what type of energy can the salt firm use alternatively instead of firewood to ensure their operations are not undermined? Kagama suggests that the salt firm can make use of a problematic tree Prosopis Jolyflora also known as Mathenge which grows in Tana River County and has been disturbing locals. The officer says that the Mathenge tree has high energy voltage because it is hardwood and they can use it instead of cutting down trees in the area which have helped locals to get rain. “Deforestation due to tree cutting has caused reduction of rainfall and already there is soil erosion where soil is being taken to the ocean,” he notes. There is a great need of conserving the environment which surrounds the society according to Kagama. Chairman Dakacha Woodland Forest Association Mr. Joshua Kahindi Pekeshe explains how the said salt firm has destroyed the forest for their company’s usage. “Crop production here is very low and sometimes we don’t even harvest because no rains to water our crops while trees are daily being cut down and ferried to Crystalline salt firm for use,” he laments.

#### The association has many challenges.

Pekeshe says that their association has 40 forest guards who move around the forest but they lack vehicle to get inside the forest and secure by preventing people from cutting trees and especially people from Crystalline salt firm and charcoal burners from Bamba in Kilifi district. The areas which the group conserves and no one is allowed to cut down trees are Watayo, Dagamra, Nyalibore, Adu, Chamari and Dakacha among others. The group also lack permit from Kenya Forest Service to have mandate to conserve the environment and restrain anyone from destroying the forest. If given the mandate by KFS they will be able to question anyone found ferrying wood from the forest or burning charcoal in the area and reporting them to police and KFS for the sake of conserving the environment. “Lack of water and inadequate rainfall in the area is caused by nothing else a part from deforestation which has taken place in the area for some years now,” he adds.

#### Empowering the local on conservation

Locals in the area want the government through KFS to work with conservation groups in Dakacha Woodland Forest for the sake of conserving the environment. Pekeshe says that some locals from as far as Bamba in Kilifi have invaded the forest for commercial charcoal burning who are sponsored by some well known people who are never arrested even when found transporting charcoal at roadblocks. But Magarini DC Richard Karani in a quick rejoinder says that he had no information of his officers being compromised by charcoal dealers to allow them transport charcoal from the area. Karani says that they are doing all they can to ensure Dakacha woodland forest is not destroyed by arresting those found ferrying charcoal and wood. Pekeshe says that although locals in the area also burn charcoal it cannot be compared to those who cut trees for salt company and burning charcoal for commercial purposes.

If commercial charcoal burning and tree cutting for wood fuel by crystalline salt firm is not stopped immediately locals in the area, Pekeshe says, will be in danger or may continue depending on relief food from the government. The issue of inadequate rainfall caused by deforestation in the area has forced locals to remain begging from the government every year to get relief food when their crops fail to grow. Marafa ward representative Mr. Renson Kambi admits that cutting down of trees in the area has affected climate change because farmers are forced to wait until May or June to sow their seeds instead of March commonly known to be the time for rains. He blames NEMA and KFS department for the destruction of trees in the area adding that they have only been arresting locals when found selling charcoals instead of commercial charcoal seller and those cutting trees for salt companies in the area.

Katisho says that the 32,000 hectares forest is reducing day and night due to human activities all directed at cutting down the trees which are most important for attracting rains. “We are asking the government to give our group seedlings so that we can be able to plant them in those areas which trees have been cut down,” he adds. Kilifi county Ecosystem Forest Conservator Mr. Christopher Maina says that KFS is still planning to work closely with forest conservation groups for the sake of conserving the environment.

In line to this, he states that they have already planted one million trees across the entire county out of the 3 million trees expected to be planted in the year. In his right of reply, Seif Mohamed, the Malindi Salt Company manager says that although they have cleared trees in their land for salt activities, they have also planted many trees in the area. “On our side as a company we have planted trees in the area and we are very concerned about conserving the environment. I cannot however speak on behalf of other salt companies” he said. Efforts to get comment from the Crystalline Salt Company were futile by the time we went to press because the General Manager Mr. Rajesh Mentor could not comment on the issue due to bureaucratic issues at the company. A Mr. Wekesa who is the head of security at Crystalline Salt Company situated in Gongoni could not give an



# Ecological benefits of the Mangrove trees

By Moffat Mutero



Photo by: Moffat Mutero

**A**s various industries in the Coast region persist to poison the environment by emitting hazardous gases, the locals have been urged to safeguard mangrove trees along the Indian Ocean to control the emitted carbon dioxide. In an exclusive interview with Climate Change News in Mombasa, the principal officer in-charge of research in the Kenya Marine and Fisheries Research Institute James Kairo said although the emission of carbon gasses has become a challenge in Kenya and many other countries, conservation of mangrove trees can be of great importance to restrain the vice.

Kairo disclosed that a mangrove tree cannot be compared to any other tree species in the terrestrial since it has the capacity to absorb carbon dioxide more times than any other tree, insisting that uncontrolled industrial pollution is a great question in climate change regulation worldwide.

He therefore insisted that the deforestation of mangrove plantation along the sea is a major challenge in fighting excess carbon emitted by various industries, adding that the destruction has also in a way contributed to climate change. "People view mangrove as an ordinary tree but scientifically, the tree is the best in fighting global warming caused by excess carbon emission. It can sequester carbon gas five times more than a normal tree in the terrestrial, and despite this, it's the most unvalued tree everywhere." Revealed Kairo

The officer confirmed that about twenty years ago, 95 percent of the coastline was densely covered by mangrove forest but later human activities led to the deprivation, leaving the shores bare. According to Kairo the most affected areas with destruction of

mangroves is Tudor and Port Reitz creeks, terming the loss as a disaster in waiting. "We have done a research and our latest one shows that both Tudor and Port Reitz Creeks have respectively lost 87 and 47 percent of the mangrove trees. Surprisingly these percentages represent the highest mangrove deficit rate not only in Kenya but globally. He blamed the locals residing along the creeks for cutting down the mangroves for firewood, building poles and charcoal burning, adding that before they inhabited the creeks, there was a very rich mangrove cover.

Kairo however revealed that an huge number of people living within those creeks highly relied on selling the local brew changaa and therefore used mangroves as firewood as a source of fuel, an activity which led to the severe decrease of important trees along the sea shore. "It is very worrying to see the government and people fail to protect the mangrove cover along the coastline since it is essential in climate change regulation, even during times of calamities such as Tsunami which are caused by heavy tides in the sea." Stated a worried Kairo. He said if destruction of such magnitude to the mangrove cover along the coastline progresses, it is very impossible for people leaving within coast to salvage their properties or even save lives should a Tsunami strike because the available mangrove cover may not reduce the powerful tides along the shores. He added that the magnitude of destruction caused by a Tsunami is largely determined by the cover along the shores.

On the other hand, the assistant director of Kenya Marine and Fisheries Research Institute Dr Jared Bosire said that, mangroves have economic

advantage because the sequestered carbon can in fact be packed and sold into the existing and emerging international carbon markets; and the funds can as well be used to support mangrove conservation and as well as funding other social projects. "If our country can really conserve the mangrove cover, technology can be used to tap a lot of carbon gas. If a single mangrove sequesters five times of the carbon that can be impounded by a Eucalyptus tree or any other specie in the terrestrial forests, then the mangrove carbon can be sold and make big returns and use the funds to conserve the same mangrove cover and do other developments." Said Bosire.

He maintained that urgent intensive effort is required to save mangroves before they are completely devastated and thus save the biodiversity adding that sustainable exploitation and management of mangroves and other marine resources will be critical for attaining some of the vision 2030 milestone.

Since 1985 up to date, this country has lost over 20 percent of the mangrove cover. On its part, the National Environmental Management Authority enforcement officer in Mombasa county Benson Wemali confirmed that the authority is making great efforts to control the destruction of mangrove and other trees along the coastline and other forests in the region. He insisted that human activities are a big threat to important tree species adding that the authority's goal is to ensure all areas facing mangrove destruction are conserved and those found guilty of illegal deforestation should be arrested. He also urged industries mostly within Mombasa County to innovate ways of controlling excess emission which originate from combustion



# The reality of Climate Change in Kenya

By Douglas Mwanga



Photo courtesy of: [https://www.kenyaredcross.org/index.php?option=com\\_content&view=article&id=464&Itemid=124](https://www.kenyaredcross.org/index.php?option=com_content&view=article&id=464&Itemid=124)

Climate change is perhaps the most considerable environment challenge of our time and it poses a great challenge to sustainable progress in not only Kenya but globally. It affects eco systems, water resources, food, health, coastal zones, industrial activities and human growth.

None theless, addressing these effects gives room for opportunities for innovation, business and enhanced living. If we are to cut down the many impacts of climate change or variability, then the necessary mitigation, adaptation and coping up strategies must be implemented. Kenya needs about US \$500 million per year to address current and future climate change effects by 2015. It is predicted that this figure will rise to US \$1-2 billion per year by 2030. Unless effective mitigation and adaptation systems are immediately instituted, the combined effects of the climate change induced impacts will slow or even hinder realization of the targeted goals as documented in Vision 2030.

Consequently, it is important to formulate a range of policy apparatus to deal with climate change. While the National Climate Change Response Strategy (NCCRS) was finalized in 2010, there is need to go further and formulate a national policy on climate change and enact a climate change law.

The threat of climate change in Kenya Kenya is already feeling the effects brought about by Climate change. Moreover, widespread poverty, recurrent droughts and floods, inequitable land distribution, overdependence on rain-fed agriculture, and few coping mechanisms all combine to increase people's vulnerability to climate change. For instance, disadvantaged people have little security against intense climatic actions. They have few resource reserves, poor housing and depend on natural resources for their living. Excessive weather events always have serious economic implications. Floods and droughts have caused damage to property and loss of life, reduced business opportunities and increased the cost of transacting business as recently witnessed in most parts of the country. Vulnerability to climate change is not consistent across Kenya.

According to Eriksen et al 2008, IPCC 2007a, Climate change and variability are considered to be major threats to sustainable progress. The major areas likely to feel the greatest impacts comprise the economy, water, ecosystems, food security, coastal zones, health and the distribution of populations and settlements. Africa is considered to be predominantly vulnerable to climate change-induced effects largely due to lack of financial, institutional and technological capacity.

## Global Climate Change

There is increasing agreement that the world has to put more measures to fight with increasingly severer climatic events due to mounting scientific substantiation. Some of the manifestations of climate change are rising average temperatures with the last three decades having got successively warmer (Arndt et al 2010), increasing sea levels which have been rising at an average 1.8 mm/year between 1961 and 1992 and about 3.1 mm/year since 1993 (IPCC 2007) and the tapering snow cover in the Northern Hemisphere.

Climate change and variability have also led to more regular intense weather events such as hurricanes, erratic rainfall, flooding, more intense and protracted droughts and destruction of some coastal areas, species' disappearance, and a reduction in ecosystems' diversity and negative impacts on human health (IPCC 2007).

Future IPCC projection circumstances indicate a probable range of global warming of between 0.3°C for a situation of regular levels of greenhouse gas (GHG) emissions to 6.4°C for the highest case emissions situation. The evaluation of regional climatology involve more study, as well as research on climate-model projection and allied down-scaling of climate outlooks from regional to local scales (Hulme et al 2005, Vogel and O'Brien 2006). The key drivers of global warming are thought to be anthropogenic aspects. Human actions have led to revolution in the atmospheric chemical composition by adding more greenhouse gases (GHGs) to it. According to IPCC 2007 between 1970 and 2004, global GHG emissions increased by 70 percent. The energy sector contributed largely to global GHG emissions, increasing by about 145 percent. Over the same period, direct emissions from transport expanded by 120 percent; industry 65 percent; and land use, land use change and forestry 40 percent.

A study of the trends in temperature, rainfall, sea levels and extreme events points to clear evidence of climate change in Kenya. Studies indicate that temperatures have generally risen throughout the country, primarily near the large water bodies. Other projections also point to increases in mean annual temperature of 1 to 3.5°C by the 2050s (SEI 2009). IPCC 2007, UNEP 2009 points that the country's arid and semi-arid lands (ASALs) have also witnessed a reduction in intense cold temperature occurrences. This warming is leading to the depletion of glaciers on Mount Kenya. This will have negative implications on biodiversity and water supply in the country and tourism, whose continued double-digit growth is crucial to achieving because of the vital ecological role of mountains. In some areas like Nairobi, night-time nevertheless, some of the observed trends may be related to rising urbanization with the effect that more pressure will be exerted on already stretched





Photo courtesy of: <http://nutritionwonderland.com/2009/09/maasai-warrior-kenya-food-nutritional-crisis-agriculture-backpack-program/>

It is important for the Government to invest in broadening and strengthening the requisite scientific and technological capacity if the atmospheric resources are to be efficiently controlled in order to meet the ambitious targets outlined in Vision 2030

resources. This will in turn worsen the climate change indicator already being observed. Effective urban planning could nevertheless help to reduce urban environmental degradation. The country's growing motor vehicle numbers are commensurate with growths in the human population. Vehicles emit significant levels of air pollutants, including GHGs while charcoal burning emits methane (CH<sub>4</sub>), carbon monoxide (CO) and particulate matter into the atmosphere. These, together with rising industrial emissions, use of charcoal and wood

fuel and open burning of waste, are some of the main sources of atmospheric pollution. Rainfall is also projected to increase with many models indicating an escalation of heavy rainfall especially during the wet seasons, and an associated flood risk. Seasonal rainfall trends are mixed, with some locations indicating increasing trends while others show no significant changes. The annual rainfall totals show either neutral or slightly decreasing trends due to a general decline in the main long rains (MAM) season.

Along the coast there are signals of sea level increase. This is likely to flood agricultural lands and cause ground water salinity. These effects will be aggravated by escalating human-induced pressures on coastal areas. Sea level rises will also increase the impact of storm surges which have the potential to destroy the coastal infrastructure as has been the case in the recent past. Consequently, urban populations have risen very swiftly and with that too is increase in GHG emissions. therefore There is need to have initiatives that uphold, development of infrastructure so as to give room for little carbon growth and allow mechanisms for mass transport such as trains and reticulated buses for main commutation, security and good water, administration practices, development of green areas, hygienic landfills, alternative energy technologies like solar heating and cooling systems.

#### Forests contribution to climate change

When one talks of forests, what normally come to mind are trees. Yes trees are largely what make up forests globally. Forests have four key responsibilities in climate change: presently they add about one-sixth of global carbon emissions when cleared, overused or degraded; they react with sensitivity to a changing climate; when managed well, they generate wood fuels as a benevolent alternative to fossil fuels; and finally, they have the potential to absorb about one-tenth of global carbon emissions expected for the first half of this century into their biomass, soils and products and store them predominantly and in eternity.

In Kyoto, Japan in 1997, the international community undertook a first, concrete step to combat global

warming, agreeing to reduce net emissions by 5.2 percent below 1990 levels. The impending role of forests in reducing of global greenhouse gas emissions is attracting substantial attention from global community. Deforestation and forest dilapidation is mostly being determined by exterior forces. Many of these forces are closely tied to agriculture like tea, coffee, pyrethrum and others. Therefore, an isolated sectoral approach focusing exclusively on forests cannot be successful in implementing the (Reduced Emissions from Deforestation and Forest Degradation) policies.

While I was on a tour of several counties in the South Rift and Kisii respectively recently, I came across several bunch of firewood arranged at the road side on the main Nairobi Kisii highway. I was perturbed by these and took an attention towards knowing what and where the firewood was intended to be used as fuel. Shockingly, the firewood was to be used as fuel in local tea factories to process tea. Further investigation took me to the interior parts where I encountered several bunches and in large quantities. This shows how local tree species have been cut down to benefit the tea agencies. Farmers in those areas say they sell the tree to factories in order to earn a living citing high poverty rates in the affected counties. While we acknowledge the economic contribution of the tea sector in the country, we cannot afford to witness trees being cut down to fuel factories whilst there can be alternatives of energy that can be used instead.

It is important for the Government to invest in broadening and strengthening the requisite scientific and technological capacity if the atmospheric resources are to be efficiently controlled in order to meet the ambitious targets outlined in Vision 2030. This is in respect of the useful but scarce role local knowledge and traditional management strategies play in militating against and adapting to climate change and changeability.

Global and regional (COMESA, EAC and IGAD) partnerships in training and research can help to advance the extent to which suitable innovations and technologies in climate change adaptation and mitigation are harnessed to meet the far reaching challenges in the agricultural, forestry and business sectors.



# The two faces of Nairobi City

By Born Maina



The two faces of Nairobi city - Photos by: Rebecca Nduku

**N**airobi is one of the fastest growing cities in Africa. It is home to many international corporations and organization such as the United Nations Environmental Program (UNEP) and the United Nations' (UN) Africa offices among others. Due to this uniqueness, Nairobi hosts a number of international conferences apart from being a tourist site. It is the engine of Kenya's economy and also serves as an economic artery for the East Africa bloc.

It has tall, beautiful buildings and clean, fresh parks including a game park that is the only one of its kind in East Africa. It is a melting pot of all tribes and foreigners.

The defunct Nairobi City Council (NCC) launched a massive project whose aim was to spearhead the beautification of the city. Trees were grown along major highways on top of town parks. However, the project was short-lived because greedy vultures took advantage of the same by mismanaging funds allocated to the project.

If our ancestors were to resurrect suddenly and take a glimpse of the city, they would be crestfallen by the abject squalor associated with the city and its environs. What was once a forest has been replaced by skyscrapers, with powerful grabbing land at will to enrich themselves. The late Nobel Prize Laureate Prof. Wangari Maathai was in the forefront trying to salvage Karura forest that was being threatened by greedy individuals.

A walk through the City paints an ugly picture. The garbage menace in Dandora has derived Eastland

locals of a sense of hygiene. Slums have sprouted over the past five years and now host over sixty percent of the city's population of 3 million. With the surging population, resources available vis-a-vis the population is dwindling. Nairobi River is located in the south of the City with an elevation of 1795 m above sea-level. The city got its name thanks to this river. It was originally called 'Enkare Nyirobi'. The once clean river is now the cause of many diseases including cholera afflicting residents.

The phrase 'flying toilets' is synonymous with slum dwellers who defecate in polythene bags because they do not have toilets. A tour to Kibera slums for instance, ushers you to the bad smells of human waste and garbage that flow along major drainage ditches.

Nairobi, once known as East Africa's "Green City in the Sun," is no longer the "Green City." It has become choked with gases emitted from the many cars in the streets and industries that continuously damage the environment. The city was founded in 1899 as a rail depot on the railway linking Mombasa to Uganda, the town quickly grew to become the capital of British East Africa in 1907 and eventually the capital of an autonomous Kenya in 1963 after natives successfully waged a war against the colonial rule. Nairobi is currently the 13th largest city in Africa based on population and fourth largest in infrastructure development and its size.

Nairobi Governor, Dr. Evans Kidero has his job cut out. He is entrusted with returning the City to

its lost glory. Land grabbing is a major issue too. Lack of recreational facilities in the estate is also to blame for dwindling land. Even with the stench in our estates, Dandora still holds the trophy for being the filthiest place to live.

Located on a 32-acre piece of land, the site is East Africa's largest dumpsite and the single most hazardous environment in Kenya. The first heap of garbage was dumped in Dandora in 1975. It rapidly grew to form a mountain of garbage and after 26 years of its existence in 2001, the now defunct NCC declared it full. This fell on the deaf ears of the cartels that ran garbage business in Nairobi. They have since continued to dumb tonnes and tonnes of garbage on the site. In 1979, four years after the site was opened, Nairobi's population stood at 827,000, growing to 3.2 million people by 2010.

One can be shocked to realize that the garbage is becoming home to thousands of street children.

According to Dandora Four Chief Monica Waithera, the dumping site has caused many children to drop out of school. Buru Buru OCPD Hassan Barua says the dumping site now harbors Nairobi's most dreaded under-world criminals. "Children of as low as 15 are recruited into this delicate gangs that continues to terrorize the city," Barua says. According to the County government director of environment Isaac Muraya, it will require at least 300 acres of land to put up a new dumpsite.

Aviation industry players are opposed to a site identified in Ruai in Embakasi, almost 20 kilometers from the CBD, because birds which are attracted to dumpsites are a risk to planes that use the Jomo Kenyatta International Airport. The climate in the city is also affected. It is now becoming unpredictable due to human-nature conflict. People continue to encroach forests for charcoal and posts. The campaign of planting three trees to replace the one that has been felled has been discarded.

The Cabinet Secretary for Environment, Water and Energy Prof. Judy Wakhungu may provide a lifeline for the city's problem. As a scientist, Prof Wakhungu was recently nominated to advise world leaders on how to tackle global climate change and food scarcity and sits on the global Commission on Sustainable Agriculture and Climate Change. This rich experience, is expected to come in handy during her tenure. "The issue of climate change has affected Kenya badly. The eastern Kenya continues to dry while the Western region continuous to face flooding cases. This is a challenge for the Government to act fast to avert such problems," she said.

However, the city has its positive side. A walk in the leafy suburbs where the rich inhabit ushers you into a different environment. Sweet scents glimmer through Nairobi's cool breezes and broad avenues. Sweet vanilla and plump peach aromas open the mind like a morning blossom when the sun first kisses its petals. Flames of clove slip in and out of shadows, so peaceful that each infusion is a breath of the soul.



# How safe is the water you use?

By Jane Okoth



A boy drinking from a tap - Photos by: Rebecca Nduku



According to UN habitat, over half of Africa's urban residents are poor and without access to affordable, clean water and sanitation services. In Kenya and particularly in informal settlements, it is a challenge for residents to access safe clean water. Urban services such as water and sanitation are scarce hence there is a greater need for water treatment before it is dispatched for domestic use. With access to water being a huge challenge, the issue of safe and clean water for consumers seems to further aggravate the situation. According to the Millennium Development Goals, MDGs) the entire poverty index of Africa is characterized by lack of access to clean, safe drinking water. In Nairobi, treatment of water before consumption may sound normal to others but to some it is a complete waste of time. The big question as to whether Nairobi residents treat their water before drinking still hangs in the balance. Very few city dwellers have admitted to treating their water at least once just to be safe. One therefore wonders whether the water running in the taps courtesy of Nairobi Water Company is also treated before reaching consumers. The answers to these important questions may be answered by the water treatment plant situated in Kabete, a 30 minute drive from the city centre. This is a treatment plant serving Nairobi County. A visit to the plant is met with an eerie quiet environment coupled with foul smelling gases with white lab-coated individuals carrying samples for further testing. This is a clear indication of a complex and serious process going on at the plant. According to Engineer Michael Mbugua who works in the plant the water goes through a number of procedures and process before it is finally released for consumption. "First process here is abstraction. This involves collecting the water from its main source and in this case the famous Ndakaini Dam. What follows is a process known as screening. During screening the water is checked carefully and thoroughly examined just in case it carries impurities. If there are impurities, the water is subjected to different screening to get rid of the impurities.

This processes happens in different ways in the various laboratories. In case the water has

suspended impurities after screening, it is carefully removed in a process called clarification with the help of well built equipment known as clarifiers. Lastly, and most important of all process is the disinfection process which involves pouring chlorine and other chemicals in an effort to kill all the harmful bacteria and microorganisms contained in the water. NCWSC has well equipped laboratory facilities to analyze the quality of water at different stages of treatment and distribution in order to ensure that it meets the required standards set by World Health Organization (WHO) and the Kenya Bureau of Standards (KEBS). Engineer Mbugua pointed out that once the water completes these processes, there is no need for any further treatment. He further argues that the Nairobi city water and Sewage services conducts more than 70,000 tests annually just to make sure that all the necessary drinking regulations are met. This interesting revelation opens room for Nairobi residents to find out whether the water is really treated before it reaches their taps. Nancy Nyaboke, a school teacher at a local primary school is not even aware that the water is treated first before reaching her household. "I am used to treating my water because I cannot risk my children and I being sick because of cholera or any other water borne disease. I am not sure where this water passed before reaching me so I have to treat it just to be on the safe side."

According to Dr. Paul Makenzi, a lecturer at department of environmental science, Egerton University, boiling water is the best option because it is safer. Many Nairobi residents admitted to boiling water as their only way of treating their water before consumption. In other areas, people who are conscious of treating water are finding other innovative ways of treating water.

Joshua Otieno, the programs coordinator at Kibera water for Health Organization, an NGO in Kibera that deals with treatment of water says using the sun's rays is the best option. This, he explains, is the best way because the entire micro-organism is killed in the water without removing important nutrients in it. How is this process carried out? Joshua explains; " You first fill water to the brim in a plastic bottle then you tightly fix the lid. The

plastic bottles are then placed on the roof of the iron sheets. The bottle is then left in the sun for appropriately eight hours. After that your water is completely safe and pure for drinking". In other rampant instances, there are still cases of tap water not being safe for consumption because it could be colored or smelly. Maxwell Okore, a veteran water vendor in Nairobi explains the possible reasons caused by this happening. "The water may be safe at the source but it may be exposed to contamination because of illegal connections caused by selfish and unscrupulous business people. There are so many connections of water pipes which sadly might mix up with the sewage transporting pipes. This unfortunate occurrence makes the water unsafe for drinking and therefore thorough treatment is recommended," he says.

In cases of water shortage in the city, the trucks ferrying clean water courtesy of selfish individuals who are out to make a kill in the water vendor business also sell water to unsuspecting Nairobi residents. This water which sometimes is borehole water requires treatment because its distribution is not authorized by the Nairobi Water Company, therefore, its' safety is questionable. However, the National Climate Change Response Strategy 2010 by the Government states that research on climate change related water challenges should span hydrological systems, drinking water, waste water and storm water issues and should involve assessment of water quality as it relates to source and receiving waters, storage, treatment conveyance and demand in addition to research on adaptation and management practices to protect and manage water quality. This research should also involve assessing the use of cost effective and environmental friendly water purification methods which includes using locally available natural absorbents to purify water if need arises. But engineer Mbugua still maintains that there is no need for further treatment as long as the tap water is supplied by the Nairobi Water Company. He laments about the issue of illegal connections saying the problem still remains rampant unless the Government and the relevant stakeholders step in. Kenya is a water-scarce country. This essentially means that its' annual per capita renewable water resources are less than the conventional universal minimum of 1000 cubic meters.

With the stress that climate change is about to add to the country's vital water catchment areas, river banks and water bodies such as Lake Victoria are likely to be degraded or even worse, contaminated.

According to the National Climate Change Response Strategy 2010, the climate change adaptation strategies that will improve the quality of water supply is proper planning of urban settlements which takes into consideration the expected high growth rate of urban populations due to climate and induced migration from rural to urban centers. This, the strategy report states will require urban planners and real estate industry players to implement proper and adequate housing structures and waste disposal machinery as well as a strong and efficient water infrastructure.



# “Think. Eat. Save” marks the global theme on World Environment Day

By Otieno Owino



Some of the participants following proceedings of the world Environment Day celebrations in Nairobi - Photo by: Eric Abuga

The world was united on June 5, 2013 to celebrate the UN World Environment Day with the global event being held in Mongolia while national events were held all over the world in UN member states.

In Kenya, Nobel Laureate Prof Wangari Maathai a renowned world environmentalists who passed away in September 2011 was celebrated in an event which organized by Peace Pen Communications in Nairobi.

Participants lauded contributions of the Green Belt Movement founder praising her great deeds in environmental conservation and advocacy, works which continue to carry her legacy even in death. Speaking at the event, Peace Pen Communications Executive Director Mildred Ngesa expounded the theme of the event, ‘Think, Eat, Save; Reducing your Food Print.’ Ms. Ngesa called on Kenyans to reduce food wastage so as to conserve the environment.

“Food and Agriculture Organization (FAO)

estimates that about 1.3 billion tons of food is wasted annually, an equivalent of the amount of food produced by the Sub-Saharan Africa region,” she said. A UN report on the environment titled ; Reducing Food Loss and Waste which was also the twin focus of the event indicates that one in every seven people go to bed hungry and more than 200,000 children under five die of hunger-related causes annually.

Ways of reducing food wastage include sharing it with others as opposed to throwing it away. It however emerged that modernization has separated neighbors making people lifetime strangers hence making it difficult for them to share items as vital as food and be there for each other.

It was debated whether ‘sharing food’ is the same as ‘giving food’ demonstrating a clear need to reshape attitudes if food wastage is to be controlled through sharing with the less fortunate. Climate change is a great threat to food security and through partnerships PPC has been able

to spearhead trainings and engagement with journalists to bring media attention to this matter. Joan Leon from the Rosa Luxemburg Foundation, Dar-es-Salaam reiterated this while committing that their partnership with PPC will continue. “PPC is spearheading efforts to tackle the ghost of climate change. PPC is demystifying climate change and bringing it to the core as an important issue,” she said.

Joan said that the Rosa Luxemburg Foundation will continue to support the three main areas of their work: Natural resources, International Trade and Participatory Democracy. The event was graced by a former Provincial Commissioner, Mr. Joseph Kaguthi who lauded the role played by various actors in environmental conservation. Mr. Kaguthi led the PPC team in planting indigenous trees to commemorate the World Environment Day making practical the famous words of Prof Wangare Maathai: “It is the little things citizens do. That’s what will make the difference. My little thing is planting trees.”





Former PC Joseph Kaguthi following the Proceedings of World Environment Day in Nairobi - Photo by: Eric Abuga



Proceedings during the World Environment Day Celebrations - Photo by: Eric Abuga



## World Environment Day



Former PC Joseph Kaguthi and Ms. Joan Leon of Rosa Luxemburg Foundation plant a tree to mark World Environment







Joan Leon of Rosa Luxemburg Foundation plants a tree on World Environment Day-Picture by Eric Abuga





# Indigenous communities argue their rights over environmental conservation

By Douglas Mwanga



Photo Courtesy of: <http://intercontinentalcry.org/indigenous-peoples-rights-ignored-as-tanzanian-govt-protects-foreign-investors/>

Indigenous people are now paying the double price for letting go their quest for conservation and preservation of their ancestral land.

They are also full of regrets for selling their birth right for little money.

The native communities are guilty of contributing to the pollution of the environment, deforestation and climate change. This emerged during a three-day workshop dubbed "Indigenous and Local communities Dialogue and Lobbying forum with the REDD+ Process" held recently in Nairobi.

The well-attended forum organized by Indigenous Livelihoods Enhancement Partners (ILEPA) and funded by the Rosa Luxemburg Foundation, East Africa was held from June 4th to June 6th.

The workshop focused on the implementation of the REDD+ process in Kenya which participants said had failed to take off because the funders did not seek the participation and partnership of the indigenous communities living in forests and other affected area.

According to the Executive Director of ILEPA, Mr. Kimaren Ole Riamit, there is still hope that the agencies dealing with the reduction of emissions,

deforestation and degradation will come up with measures to militate against carbon emissions threatening indigenous forests.

Pastoralist challenges were also discussed in the workshop and it was brought to the attention of the participants that if forests continue being depleted it will mark the end of pastoral communities not to mention the obvious reduction in meat production.

Among major issues that were discussed are the impacts brought about by carbon emissions and destruction of forests. Deforestation accounts for 15 to 20 percent of all the carbon emissions hence the need for local communities to help in efforts aimed at safe-guarding the flora and fauna.

Participants at the forum decried the rampant cutting of trees to pave way for commercial farming such as plantations saying that it depletes forests giving way to desertification and spiraling of human-wildlife conflict as is witnessed in various parts of the country.

Several lions have been killed by communities in areas such as Ngong, Maasai Mara and other national parks. Also some animals are randomly

## Fun Environment Facts!

- Worldwide some 300-500 million tons of hazardous waste are produced each year, with industrialized countries responsible for 80-90 percent.
- Recycling one aluminum can save enough energy to run a TV for three hours - or the equivalent of a half gallon of gasoline.
- The energy saved from recycling one glass bottle can run a 100-watt light bulb for four hours. It also causes 20% less air pollution and 50% less water pollution than when a new bottle is made from raw materials.
- If every car carried one more passenger during its daily commute, 32 million gallons of gasoline would be saved each day.
- 11% of the Earth's coral reefs are regarded as permanently lost, and it is estimated that this number will rise to 40%.
- Recycling creates 6 times as many jobs as land filling.
- It is estimated that 50,000 species living in tropical rainforests become extinct each year. That is 137 species per day or 6 species per hour.
- Due to human impacts, the world loses 7% of its topsoil every ten years. It takes 1,000 years to produce one inch of topsoil.

### DID YOU KNOW?

- During the time it takes you to read this sentence, 50,000 12-ounce aluminum cans are made.
- To produce each week's Sunday newspapers, 500,000 trees must be cut down.
- If all our newspaper was recycled, we could save about 250,000,000 trees each year!
- Plastic bags and other plastic garbage thrown into the ocean kill as many as 1,000,000 sea creatures every year!
- The U.S is the #1 trash-producing country in the world at 1,609 pounds per person per year. This means that 5% of the world's people generate 40% of the world's waste.
- Even cleaners and body products labeled as natural can still have yucky chemicals in them that can harm the environment- and you, too! Read the ingredients with your parents to make sure that what you're using is good for you and the world around us.





hunted for their skin, meat and horns by poachers who collaborate with other players.

According to Kanyinge Sena, the chairperson of the UN permanent forum on indigenous people, climate change discussions are held with a view to engaging and encouraging local communities to full participate as partners in the sustainable protection of the environment to avert deforestation and related problems.

Owing to these strong partnerships, indigenous and local communities have discovered that they are the key stakeholders in the implementation of the REDD+ process. This will go a long way in alleviating environment pollution and carbon production which threatens not only ecosystems but also wildlife.

Mr. Kanyinge also stated that relevant authorities seldom keep abreast with policies that have been passed at the UN level hence they do not have a clear understanding of what action to take in confronting climate-change hiccups. He said that policies are also difficult to implement because the implementation frame works are very poor.

The forum regretted that the country proposes systems on REDD+ process which do not work due to bureaucracy and dishonesty involving stakeholders at various levels over the funds that are meant to drive the process.

The indigenous people argue that policies should not only revolve around land rights but should extend to using land for agricultural production without necessarily destructing natural resources.

UN Agencies such as the World Bank, African Development Bank and UNEP are ready to work with indigenous communities through funding of projects that are aimed at implementing the REDD+ process locally. Different community forest associations have also come together to advocate for community forests protection and indigenous trees conservation.

Many stakeholders from various parts of the country such as Narok, Kajiado, Turkana, Marsabit, Mt. Elgon, Baringo, Tana Delta, and Malindi in the forum expressed their dissatisfaction in the way in which indigenous forests were being cut to feed the charcoal business in the country. Rosa Luxemburg

Foundation was represented by its Programs officer, Joan Leon who flew in from neighboring Tanzania.

It is lamentable that Kenya is still far from achieving the REDD+ policies given that timber used in Kenya is derived from tree forests.

They said that charcoal business should be regulated so that there are clear rules in the sector to safeguard trees especially indigenous ones that take more than a century to mature.

The forum resolved that there should be clear safeguards on the indigenous forests because they provide medicinal herbs among other benefits. If indigenous communities and other stake holders are not involved in the REDD+ process, the forum heard from a participant, goals set will never be achieved. "The sad is that, we will remain vulnerable to harsh climate-change conditions such as prolonged droughts and long rains which definitely continue to make our lives a living hell" complained the participant.

# The unending benefits of the elegant Bamboo

By Njenga Hakeenah



Photo Courtesy of: <http://asinatpaminta.wordpress.com/2009/06/21/kawayanbamboo/>

**B**amboo used to be commonly referred to as the poor man's timber. However, research and demand for bamboo products is defying this tag in an era of technology and civilization. As demand for wood surges, several bamboo species are now being used for different purposes ranging from furniture to land reclamation.

Bamboo has been in very high demand in Asia where it is common in rafting but now this grass is being used the world over. Yellow bamboo (*Bambusa vulgaris*) is mostly used for ornamental purposes while the giant bamboo (*Dendrocalamus giganteus*) is used in building, for food and furniture making. The edible bamboo shoots have become a delicacy in several fine-dining establishments especially those that cater to those with oriental preferences. In Kenya, the major uses are on river beds for soil conservation especially in areas where surface runoff threatens soil health.

The country has been experiencing a boom in the need for timber as the construction industry expands. This has left most lands denuded as forests are cleared for wood and cultivation.

The fast growing giant bamboo can be used as an alternative source of fuel and timber in the country. However, its production has been limited as it requires expansive swathes of land to be commercially viable.



## Bamboo in Kenya

In Kenya there are several types of bamboo with the most common being *Arundinaria alpina* which is restricted to the highlands above 2,000 meters above sea level. A defunct project in Thika focused on the yellow bamboo and the giant bamboo and the project ostensibly failed because large tracts of land would be needed to commercially grow the giant bamboo. This is beside the fact that most forest land has been deforested and the rehabilitation of water towers like the Mau and Mt. Kenya forests have not incorporated the giant bamboo.

The Kenya Forestry Research Institute (KEFRI) is growing several edible bamboo species shoots, as they are high in trace elements and vitamins but low in carbohydrates, fat and protein. There is also a new venture in bamboo clothing as it is durable and the target is a self-sustaining clothes line with bamboo as the raw material and with products ranging from bags, shoes, curtains, carpets and many more to create job opportunities and self-sustenance for several families. A range of bamboo products are locally available and which are of a very high quality. The World Agroforestry Centre (ICRAF) has trained local artisans to make bamboo furniture. Among these was the Undugu Society which deals with accommodating and rehabilitating street children.

The products were made under the tutelage of Wayan Neka, an Indonesian, who taught artisans from Kenya, Tanzania and Uganda to make high quality bamboo products. However, the limitation of land meant that the project could not go forward but the knowledge transferred continues to work today. Margaret Oluoch, author of "Putting Science into Practice", is one beneficiary who learned from Dr. Chin Ong who was in charge of the project at ICRAF. She founded Smejok, an organization dealing with conservation in agriculture.

Margaret has managed to apply the science and replicate it in her rural home in Kisumu to

rehabilitate a river and also for fruit production on her farm in Kisumu. She says, "It came to me as a surprise that we can restore our land using resources we already have as we do not need to search for seeds. For instance, if I have to plant cotton, I just need to collect the seeds and in due time they will germinate and be ready for transplanting."

Margaret adds that science was so much in the books but it was not being implemented through application. She is working to rehabilitate the Oroba River through the Friends of Oroba River initiative bringing the community together harnessing the resources and reclaiming them.

She uses the knowledge to teach community members on how to rehabilitate the environment and reap benefits while at it. For the environment conservationists, advocating the use of Bamboo for its products will help not only in conserving nature but also addressing the emotive climate change issue. Giant bamboo is one of the best sources of the demanded building materials that are sustainable, and unlike the other trees, it grows at very high rate (three times faster than eucalyptus!) and matures in only three years. The towering plant can grow to a height of a hundred feet. Some species have a great tensile strength rivaling that of steel and a weight-to-strength surpassing that of graphite (with some supporting 50,000 per square inch!). In Asia, it has for long been used to reinforce concrete and as scaffolding material on skyscrapers of thousands of feet high. As a source of food, edible species of bamboo are being used extensively in Asia with the world consuming an estimated two million tonnes a year. Europe and North America are importing over a hundred and thirty tonnes a year!

This means that bamboo is more than an income generating venture which calls for an investment in the field. Bamboo has several advantages, the major one being as a source of timber as it is self-replenishing, resilient and easy to maintain.

Another reason bamboo is preferred to other trees is that it creates a source of income generation which is manageable to many people especially those in low income groups who cannot afford a high capital to start their sources of livelihood. Environmentally and most importantly, bamboo does not consume a lot of water. It can be grown in all areas from sea level to the highlands and it also has excellent hydrological properties in terms of high infiltration rates and low erosion rates compared to other types of land use.

Bamboo is very effective in soil erosion control as its rhizomes are very good in holding surface runoff thus it can be used to curb the problem of silting and sedimentation in rivers and lakes which is a problem on the headwaters, especially the Tana river which has as much as five litres of top soil per cubic meter of water flowing into the Indian ocean (DO1).

Bamboo is also very important in balancing oxygen and carbon dioxide in the atmosphere with some species sequestering up to twelve tones of carbon dioxide from the air per square hectare and is also the fastest growing canopy for the re-greening of degraded areas. The bamboo plant is known to absorb heavy metals from water bodies thus can be very effective in sewage cleansing and can be planted along river banks for the same purposes.

As a source of fuel, it produces 7000 kilocalories (half the calories of petroleum) and also as a source of firewood and charcoal it is very good owing to its high biomass production statistics per hectare.

Bamboo is also being used in the manufacture of parquets which is a direction away from the tradition of boards being made from other trees like the eucalypts, mahogany and many more.

The market response in Europe and North America has been described as 'very good' where a square meter of the board is retailing at a range of between eighty and a hundred dollars.

# Hotels and local communities promoting green tourism at the Coast

By Ruth Keah

**E**nvironmental degradation leads to scarcity of resources such as water and food which in turn lead to heightened risk of human and wildlife conflicts. In recent times the country has been engulfed in conflicts among communities triggered by a stiff competition for scarce resources due to the impact of deforestation and climate change. Associated to this, there is therefore need for a collective raft of measures aimed at addressing the

impacts of climate change among them reclaiming water catchment areas. This is the reason the managements of Taita Hills and Salt Lick Lodges are making use of the number of tourists visiting these premises to help in turning the environment around and in the same vein get revenue from the tourism sector. It is evident that climate change experienced globally has affected many spheres of life. To mitigate against the negative effects of

climate change, this part of Taita Taveta County is capitalizing on the help of tourists who have since played a major role in improving the environment. Mr. Richard Obanda, a senior warden at Taita Hills Sanctuary which sits on a 28,000-hectare land said the tree-planting project, a brain child of the tourist outfit, requires that all tourists visiting the lodges must plant a tree before returning to their countries. It has been a great conservation strategy.





Journalist join Sarova whitesands staff in a tree planting exercise at Taita Hills sanctuary  
Photo by: Anthony Mwachiro



The sanctuary is managed by Sarova Hotels. "Trees dry up in many sanctuaries like ours because of reasons like environmental degradation chiefly caused by human beings," he said adding that the vice is now limited even though everyone needs to play a role in mitigating impacts of climate change in our surroundings.

He stated that human beings are the main causes of environmental degradation and not wildlife. The Sarova Hotel project involves the setting aside of a 35-acre of land for the planting of indigenous trees. All tourists who visit the two lodges have a chance to plant trees on this sprawling land.

As part of the corporate social responsibility programme carried out by the Sanctuary the local community was also encouraged to go green by planting seedlings in nurseries which are in turn bought by the organization to be planted by the tourists.

In the land set aside for tree planting, 8,000 trees have already been planted. The land is protected and is fenced with an electric fence to keep out wild animals. The project has been lauded by the local communities for creating employment opportunities to the youth who take care of the trees planted by watering them regularly. Obanda says in a period of five to six years, the area will be full of trees. When this is achieved, the project will be started in another area within the sanctuary.

In another 20 years, Sarova is projected to have three or four more projects each of which will cost Sh1.2m. The project is aimed at reducing the level of drought being experienced at the area as trees play a big role in ensuring reliable rainfall and

providing a conducive environment for wildlife. The project was started in 2010 by various stakeholders who pooled resources to make a better world for everybody. The local community however has their share of problems as they do not have enough seedlings to sell to the Sanctuary. To solve this problem, the locals have to satisfying the increasing demand of seedlings through innovative ways. The youth who are the major players in the seedling business are sometimes forced to travel far to buy seedlings for between Sh30 and Sh50 per seedling.

The lodge's manager who is also the chairman of hotel keepers in Tsavo East, Tsavo West and Amboseli Mr. Willie Mwadilo urged the Government and all stakeholders to sensitize the public about climate change. He said one of the greatest challenges facing humanity is environmental degradation, deforestation, desertification, pollution and climate change.

"Environmental degradation increases the vulnerability of the societies and it affects and contributes to acute scarcity of resources. It is also one of the many factors fuelling tensions and conflicts among communities at the Coast especially in Taita Taveta," he said. In other related news, the Intergovernmental Panel on Climate Change (IPCC) predicts that up to 250 million people across Africa could face more severe water shortages by 2020. According to the World Health Organization, climate change contributes to 150,000 extra deaths and five million illnesses each year. In addition, climate change can compound existing problems, such as poverty, social inequity, mass migration and demographic pressure.

“Environmental degradation increases the vulnerability of the societies and it affects and contributes to acute scarcity of resources. It is also one of the many factors fuelling tensions and conflicts among communities at the Coast”



# The tribulations of Mathari River

By Samuel Imujaro



‘Is it lack of city planning or is it just human negligence?’

<http://www.indymedia.ie/article/94825>

**N**airobi River is a very rich and pampered river with many other feeder rivers at its beck & call! Among the rivers that empty their precious waters into it is Mathare River. Ever loyal to a hilt, it snakes its way from the leafy Muthaiga Estate, Kiambu County towards Utalii Hotel, Mathare, Kariobangi, slowly draining its water into Nairobi River as it zigzags lazily towards Ngomongo.

What really ails Mathare River is a question that begs answers. It is best answered by garbage, human waste (effluent) directed towards the river. As it snakes its way from Muthaiga, the water looks brown, a sign of the red soil from Kiambu area, that does not mean the water is dirty. This can be witnessed by the children swimming just behind the National Youth Service (NYS) fence. They are happy that the condition of the water allows them to enjoy themselves - swim and play around.

Just a few kilometers downstream, after passing through Mathare valley, one cannot think of stepping into the river due to the human effluent that has been directed towards the beautiful river

from the residential areas along the river.

By the time the river crosses the bridge along Outer Ring Road, it is quite unbelievable what is witnessed. The sorry state of the beautiful river has degenerated into a total mess. This is quite mind boggling to say the least.

Another pitiable state of the river is the aquatic life has been destroyed by the effluent. You will never find fish, frogs, crabs or any water insects along the river due to dirt that chokes the river. The river has barely any signs of life.

Nairobi normally has water shortages, a situation which the river water could help supplement. Even those doing car-washing businesses cannot use the water from the river due to how filthy it is!

What is disturbing though is that the government is doing very little to remedy the situation. Mr. Patrick Mamai who is a resident of Huruma and lives just metres from the river bank says they have been neglected by the authorities. Nobody cares and disease could break out one day, to wipe out many who reside along the river. Just next to his house, effluent could be seen flowing from a man hole

near his house directed towards the river.

He says the man hole was broken due to blockages. When he moved to the area he found it in that state. He says even if they offer to repair it there will be no one to manage it and unblock it in case of blockages. Communities residing along the river lament that those developing structures along the river are also to blame because many of them do not have sewer lines near their buildings, so they end up directing the human waste into the river.

“Is it lack of city planning or is it just human negligence?” asks Denis Mwendwa who also resides in the same place.

Due to government failure, citizens have taken laws into their hands to do whatever they like by either constructing along the river or directing effluent into the river. This is disaster in waiting. If the river bursts its banks due to heavy rains that are experienced, the residents are the ones to suffer the consequences the most.

Mr. Mamai appeals to the government and especially those charged with sewer line management to work an extra mile to save the river from filth that comes from effluent.



# Understanding How Greenhouse Gases enhance Climate Change

## What are Greenhouse Gases?

A greenhouse gas is a chemical compound found in the Earth's atmosphere. Acting as gases, these compounds allow sunlight to enter the atmosphere freely. As sunlight strikes the Earth, some is re-radiated off the Earth's surface and back towards space in the form of infrared radiation, or heat. This heat is absorbed by greenhouse gases and trapped in our atmosphere. There have always been gases that exhibit greenhouse properties. Some of the greenhouse gases occur in nature such as water, vapor, carbon dioxide, methane and nitrous oxide. Others, specifically industrial gases, are manmade. To keep the Earth's temperature constant, the amount of energy Earth receives from the sun should be relatively close to the amount of energy radiated off Earth's surface back into space.

### Why are Greenhouse Gas Levels Increasing?

The Industrial Revolution was a turning point for our society in many ways. With industry we saw the growth of our economy paralleled by the increase in the level of greenhouse gas emissions. Several greenhouse gases have increased by approximately 25 percent in the last 150 years. Anthropogenic emissions are those caused by man. In the last two decades, almost 75 percent of these anthropogenic emissions come from the burning of fossil fuels. (need I remind you, fossil fuels are not a renewable energy source!) These anthropogenic emissions have escalated the concentration of carbon dioxide in Earth's atmosphere.

### How Do Greenhouse Gases Affect Climate Change?

As concentrations of greenhouse gases rise, the average surface temperature of the Earth increases over time. The Earth's rising temperature produces a change in weather patterns and sea levels. This is known as climate change. Reportedly, the Earth's climate has increased between 0.6 and 0.9 degrees over the past century. This increase is attributed to human activity.

### What are the Sources of Greenhouse Gases?

The primary source of greenhouse gas emissions in the US is the combustion of fossil fuels in energy use. (Again, fossil fuels are not a renewable energy source). The demand for energy is driven by economic growth. Weather patterns affecting heating and cooling use and fuel used in electricity generation creates short term fluctuation on energy demands as well. Carbon dioxide emissions that are energy related are a result of the combustion of petroleum, coal, and natural gas. Of the total anthropogenic gas emissions produced by the US, 82 percent were energy related.



Photo courtesy of: [http://www.nasa.gov/topics/earth/features/warming\\_aerosols.html](http://www.nasa.gov/topics/earth/features/warming_aerosols.html)

### Other Greenhouse gases

The following numbers were taken for the Energy Information Administration, Emissions of Greenhouse Gases in the United States 2006 (Washington, D.C. November 2007). Energy related carbon dioxide gas emissions are 82.3 percent of the United States anthropogenic greenhouse gas emissions. Other contributing anthropogenic gases are as follows: Methane - 8.6 percent. This greenhouse gas comes from landfills, coal mines, oil and natural gas operations and agriculture. Nitrous oxide - 5.4 percent. This is emitted through the use of nitrogen fertilizers, from burning fossil fuels and from certain industrial and waste management processes. Miscellaneous - 2.2 percent. This category includes several man made gases, including hydro fluorocarbons (HFC), perfluorocarbons (PFC) and sulfur hexafluoride (SF6) that are released as byproducts of industrial processes and through leakage.

**Note:** Since the Energy Information Administration's report, it has been reported that nitrogen trifluoride is of rising concern. This man made gas was thought

to be a replacement for perfluorocarbons. It was reported in October 2008 that the greenhouse gases it emits had been grossly understated and should be cause for future concern.

### What can we do to reduce greenhouse gas emissions?

We need to stop our reliance on energy produced by fossil fuels. These are a non-renewable source of energy that continues to emit anthropogenic greenhouse gases into the atmosphere. Alternative sources of energy must be sought out to replace our dependency on fossil fuels. Solar and wind power are renewable energy sources that can be immediately implemented. The electricity you currently purchase through your electric company is generated by the burning of fossil fuel. Converting to solar or wind power is simple enough. The payout is immense. Not only will you be making a contribution to the reduction of greenhouse gas emissions, you will see an 80 percent or more drop in your electric bills.

\*From the web; Published by Joni Keith.



# The precious balancing act of water in the Coast

By Harrison Mbungu



Photo Courtesy of: <http://babakfakhamzadeh.com/site/index.php?c=12&i=5165>

It's well known for its historic Swahili culture and famous for donkey transport in East and Central Africa. Its name is Lamu Island, located in the Northern part of the Kenyan coast line. It is about 342 kilometers long from the Mombasa Town and the main economic activity is fishing along the Indian Ocean. Lamu County has been hitting headlines in most of the leading local and international media for the prolonged drought and water shortage that is experienced in the whole county. Shahib Hussein, a 56 year old and a local elder in Faza, explained how Residents of Faza Island in Lamu County are faced with an acute water shortage following a prolonged drought. The residents, who mostly rely on rainy water harvested in tanks, have had shortages since he was born and adds that they are sometimes forced to drink salty water from wells. Hussein said the tanks that are popularly known as Jabia, and that are used for harvesting rainy water are almost empty and the owners who sell water for them had begun rationing the already harvested water from the little rains that were experienced in the previous rainy season. "A 20-litre jerrican has shot up to 60 Kenya shillings and one cannot get more than two jerricans daily. We get only two jerricans that are to be used for cooking and drinking while salty water is used for other household works," he said. Hussein says despite relying on the rainy water the water is also not clean because it is not given the proper treatment. This has raised fears among the residents of diseases outbreaks. The elder who is a father of six children said there is urgent need of government intervention to save the locals from the water disaster.

Hussein however explained how the provincial administration is toothless in regard to little resource-sharing that is provided by NGOs adding that most of the affected are the children and pregnant women because they cannot walk for long kilometers looking for water. Sophia Abdhalla is another resident from faza area in the Lamu County and owner of a water kiosk said although

she is worried the water she harvested during the previous rainy season might soon run out because of the high demand of the rarely found commodity. "We have been forced to ration the water to enable it sustain us for some months before the rains resume again. She explained her fear that if it would rain soon people will be forced to drink salt water hence the desalination plants project by some NGOs in the region had failed." "If it will not rain we shall suffer a lot," she said. She explained how the Constituency Development Funds project that were initiated by the Government to desalinate water had failed saying that the system plants in Kizingitini, Mtwanda and other small islands did not succeed. The residents said the area is also faced with a hunger disaster following the drought that has been caused by drastic climate change experienced in all over the region adding that cost of commodities had really gone up unlike before.

Security officers and other government officials have been forced to adopt the harsh living conditions despite of them being public servants. Pius Murungu the Lamu East District Commissioner confirmed the Water shortage has been a calamity for decades now in the whole of Lamu island adding that the hopes are now on the newly elected leaders in the devolved governments that they might change the situation by implementing and addressing key issues. Issa Timmamy is the newly governor elect for Lamu county and had promised to deal seriously with all the challenges experienced in the whole of Lamu county. He said water shortage will be his priority to address. Timmamy urged the residents to be patient promising that the devolved governments would end the water problems in the whole Island. "I urge the Lamu people to be patient now that we are on power I and the other leaders you elected we will work together and end the problems of Lamu people." He said.

## The Coast Water Company Master plan

The coast water board services company has already launched a master plan to boost water

supply in the whole of coast region following the acute water shortage experienced in the whole of coast region. CWSB Director James Thubu said the plan which was developed by an Israel company Tahal Group is aimed at developing water sources in the whole of coast province. The plan, developed by an Israel company, was planned to identify and develop the water sources to supply the six counties of the coast with clean water.

Thubu added that World Bank has already given some money for the project. "We have received Sh7 billion from the World Bank, part of which has already been used on the Baricho dam, which is in its final stages of completion," he said. The dam, which will be ready in four years, will supply water to Malindi, Watamu, Kilifi, Lamu and Mombasa towns. In the master plan, the board has identified Mwache dam in Kwale, Rare in Kilifi, Mzima II Springs in Taita and Baricho in Kilifi for the development. He however added that the board and the government are seeking loans from the Chinese government to upgrade the Mzima II Springs which are said to be strategically placed to supply water in the southern parts of coast province. Most of the parts in Northern coast of Kenya depend on water pumped from the mzima springs and the Baricho water plant. The Baricho water plant is located about 200 km north of Mombasa in the Kilifi county. It station supplies about 90 million liters of water a day to Mombasa North and other coastal towns. Residents of Mombasa, Malindi, Watamu and Kilifi towns depend on the plant for water supply. But as Thubu explains there has had a lot of challenges experienced as the board puts its efforts to make maximum supply of water in the whole of Coast region. Mr. Thubu said Kenya Power has been charging the water services board commercial tariffs despite water supply to consumers being subsidized. "We supply water to residents at a subsidized rate because it is an essential commodity," he said, adding that the Baricho water pumping station consumes more power than other stations because its flow was not based on gravity.

Another challenge is the destruction of water pumps by wild animals in the forest where the pipes are connected which he says the animals bust the pipes in search of water. This caused a lot of wastage of water through spilling. He however explained how low water volumes from the Athi river have contributed to low water supply hence the company is forced to limit water supply so as to reach all parts of the Coast. He said weather patterns especially the prolonged dry spells in upper parts of the river had led to a decline in water from the river. This has therefore seen tourist hotels and other manufacturing industries run short of losses by counting low tourism turn up since most of the hotels depend on the Baricho water for consumption.