



## BIOTECHNOLOGY

# Maize Boom Expected as its Complete Genetic Make-up is Finally Unveiled

- Its 32,000 genes compete the human genome

**By Sharon Davis (SciDev.Net) and ScienceAfrica Reporter**

The genome sequence of a variety of maize called B73 was deciphered by more than 150 scientists under lead researcher Patrick Schnable, based at Iowa State University in the United

States. They identified more than 32,000 genes according to the research published on 20 November in *Science*.

The dream of maize breeders, especially in Africa, where its shortage is equated with famine, could soon be realized if they effectively utilized important information generated from the sequenced genome of the

cereal that was brought into the continent from South America five centuries ago.

The research is expected to be useful in teasing out the genetic basis for important traits, such as yield, quality and stress tolerance. This will allow scientists to develop improved crops with better yields and higher nutritional content.

Sequencing maize was a challenge because of its huge size — almost as large as the human genome — and complex organisation, in which the genes are often found in 'islands' within swathes of DNA that is not directly encoded into protein.

The researchers said the sequence will "facilitate

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## The Science and Politics of Mau

First Installment

The Mau Complex is currently a horrifying mixture of science, Kenya's raw politics, law, economics and culture. Kenya's largest forest, occupies 400,000 hectares. It is one of the country's five main "water towers." Others are Mt. Kenya, the Aberdare Range, Mt. Elgon and the Cherenangani Hills.

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## View Points

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## AU Honours Top Women Scientists

African Union recently honoured the continent's top women scientists with cash prizes of \$20,000 for those who excelled in areas of basic sciences, technology and innovation; and earth and life sciences. Women researchers from Egypt, Mauritius and South Africa were at the top. Judges included officials from Kenya's ministry of higher education, science and technology.

(Full Details Next Issue)

### REGIONAL ALERT

**KEMRI Expert: Expect Malaria and Rift Valley Fever Outbreaks**

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## Save Energy Use Fireless Cooker

Fireless Cooker keeps food hot eight hours and water for 12 hours. It completes cooking of all types of food conserving 50% of energy thus increasing household's disposable income during these hard times. It reduces cooking fire related accidents and the time of exposure by the user to indoor energy related air pollutants. It accumulates initial energy from heating for a short period of time.

When food is transferred to the fireless cooker, heat energy stored in the food and water continues to cook the food for the normal period of time that it would take on a direct fire. However, the filler material is a bad conductor of heat. Food should not remain in the fireless cooker for more than eight hours because the temperature will fall below the recommended level of 49 degrees centigrade.

- The Christian Agricultural and Related Professionals Association (CARPA)

## 10,000 Children in East Africa Born with Cleft Lips

By Lizzy Awuor

Every year close to 10,000 children in East Africa are born with a birth defect that results when the tissue around the upper roof of the mouth fails to form completely during pregnancy, a deformity known as cleft palate.

They vary in degree of severity and can occur on one side of the mouth, known as unilateral, or both sides of the mouth, bilateral. Some kids have clefts that extend through both the front and the rear part of the palates while others have only partial clefting.

"A cleft palate is usually closed within the first year of life so that the speech of the child develops normally, if this does not happen, child's speech will be affected." Dr Loise Kahoro, a



senior reconstructive surgeon at Kenyatta National Hospital in Nairobi, said during a recent interview with Science Africa.

Most children with clefts are vulnerable to ear infections because their eustachian tubes do not drain fluid properly from the middle ear into the throat.

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## Higher Education: Victoria Institute of Science, Technology Opens

The Victoria Institute of Science and Technology (VIST) is now operational in Kisumu on the Kenyan shores of Lake Victoria. The institute is partnering with the Kenya College of Accountancy University, known for its innovative approach in its business and technology teaching programmes.

KCA, headed by the highly energetic Vice-Chancellor, Dr Daniel Oruoch, gave a cash advance of \$250,000 to help VIST launch a multimedia training center on rented space of 10,000 square feet. It is already helping young entrepreneurs in multimedia fields such as video editing, web design, podcasting and animation.

Still private individuals and institutions donated \$22,000 to help VIST acquire 200 computers, a digital library and other basic equipment. Additional netbooks were provided by the One Laptop per Child (OLPC). The emergence of VIST is another effort to equip Africa's younger generation with knowledge



Vice-Chancellor KCA, Dr. Daniel Oruoch (left), Prof. Calestous Juma of Harvard (centre) and Bitange Ndemo, PS Ministry of Information and Communication celebrate the launching of VIST.

and skills needed to survive and compete in the 21<sup>st</sup> century. VIST could be molded into the much needed second generation universities with innovative graduates who

are more inclined towards job creation and entrepreneurship. KCAU/VIST Multimedia Research Centre could be step in this direction.

## Getrude's Children's Hospital Expands facilities



Getrude's Children's Hospital in Nairobi has expanded its facilities with the opening of a new ward designed to accommodate both mothers and children who are hospitalized.

The ward was officially opened by Mrs Alice Macaire, wife of the British High Commissioner to Kenya. She uses the hospital's services for her family.

## KEMRI Expert: Expect Malaria and Rift Valley Fever Outbreaks

As the month of November begins emergency or disaster preparedness should include of Rift Valley Fever worsened by the doubling of in parts of the highlands. According to Dr. Andrew K. Githeko from Climate and Human Health Research Unit of the Kenya Medical Research Institute (KEMRI), this El Nino indicates a risk of RVF outbreak due to the above normal rains in the Eastern Kenya and seasonal malaria outbreak is expected in the coastal region.

"Heavy rainfall in October November will lead to high mosquito populations in and we should expect malaria outbreaks in January," Dr Githeko said during a recent Nairobi workshop on seasonal weather forecasting for Eastern Africa. "Valley that are V-shaped require at least

300 mm per month for mosquito populations to increase while U-shaped valleys requires only 150 mm for mosquitoes to increase. Malaria in the Highlands of East Africa is sensitive to temperature, topography and drainage, Dr Githeko said.

He explained that three highland ecosystems –plateaus, V and U shaped valleys have specific sensitivities to malaria transmission. His presentation focused on Transferring the Malaria Epidemic Prediction Model to End Users in East Africa.

He said that predicting climate driven malaria epidemics remained elusive for many years and were identified while in advanced stages when it was too late to effectively intervene. However, the risk could be identified 2-4 months ahead of the event

providing sufficient time for intervention, he added.

The R&D began in 1999 when the US National Oceanic and Atmospheric Administration provided KEMRI with a grant to try and develop a climate based malaria epidemic prediction model. The model was developed using data from a site in Western Kenya Highlands and published in 2001. It was validated in 2004 using data from other sites in Kenya, Tanzania and Uganda.

Dr Githeko said that the model is being transferred end users while policy and decision makers are being sensitized. It also involves the training of district level personnel.

The model uses historical data to detect the risk of an epidemic occurring. At least 26 people have been rained in the three countries and are

satisfied with the performance of the model which was used during the Seasonal Climate Outlook Forum (COF) of the Greater Horn of Africa to forecast the risk of malaria epidemics. Vulnerability of the populations to malaria epidemics is determined by numerical characterization of the immune profile. Two MSc students from Tanzania being trained in the University of Nairobi in bio-meteorology and biostatistics, a MSc student from Uganda being trained on disaster management and humanitarian assistance at Masinde Muliro University and another MSc student from Kenya is training on immune profiling of malaria affected population in Western Kenya. Meteorological and malaria hospital data being collected from the same sites in the three.

## 10,000 Children in East Africa Born with Cleft Lips

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This fluid may accumulate and in the process build pressure on the ear.

The defect could result from various factors including high intake of alcohol by expectant mothers, smoking, and intake of drugs during pregnancy. It can also be genetic, inherited from relatives or parents whom ones in their lifetime had it, poor nutrition, infections and presence of abnormal chromosomes that may occur in the feet and heart problem.

"It can be detected through a prenatal ultrasound and be identified immediately the child is born. Also, when there is a change in the misaligned of the teeth and nose shape in a child, the mothers is encouraged to seek medical attention to help do the surgery at an early stage." Adds Dr. Kahoro.

Expectant mothers are advised to eat a balanced diet, vitamins supplements and food rich in folic acid during early pregnancy available in Broccoli and lots of vegetable. Patients can always get treatment at various hospitals in Africa as many hospitals are equipped with various facilities to handle corrective surgery, but this has always been an up-hill task as explained by Dr Kahoro. "Most patients are afraid to get out of their houses for fear of discrimination that they might face as most community relates the defect to witchcraft resulting into the increase in number of patients with the deformities".

The surgery can be done from the third month of birth into adulthood. Some patients are operated onto in their late 50s and still heal completely.

The operation involves drawing tissue from either sides of the mouth to rebuild the palate. The needs for more operations depend on the severity of the cleft, its shape and the thickness of the available tissue that can be used to create the palate.

Some kids also require more surgeries to help improve their speech. Final repair of the scar left by the initial surgery may not be performed till adolescence when facial structure is fully developed.

"My second operation was done few weeks ago and I am healing properly now, the first one was done when I was barely one year old." confesses a recovering patient in his early 60s who resorted confidentiality.

If not treated the defect can result into the flow of milk through the nasal as the child will not be able to control intake of the milk resulting into feeding problems and passages during feeding, failure to gain weight due to poor feeding, speech deformity, poor growth, ear infections, misaligned teeth, and poor growth.

Discrimination also plays a major role since most people will never want to associate themselves with these people with the deformity. There are not welcomed in social places and seen as the outcasts in the society.

BRIEFS

**Bilharzia worms sequenced**

The genomes of two of the parasitic worms that cause schistosomiasis or bilharzia have been sequenced. It afflicts millions of people in tropical areas. The genome sequences of *Schistosoma mansoni* and *S. japonicum* were published in *NATURE* (16 July). There is currently only one approved drug against the disease, praziquantel, leading to concerns that the worms might become resistant. (SciDev).

**Wellcome Trust Now Minimizes Funding Conditionalities**

It is constantly whispered that one of the major reasons why Africa seems to have too many ineffective or irrelevant research and development activities is the competition to meet real or imaginary “donor expectations” at the expense of local “realities.”

However, Britain’s Wellcome Trust, involved in major biomedical research activities in Africa, will in a year’s time initiate its “Investigator Awards” that will have minimal conditionality while at the same curbing research grants for U.K. scientists. At least \$180 million will be availed for the Investigator Awards researchers who will have more time to attain their goals.

It also means that many other major “national or regional” donor agencies may have to change the way they have been handling research activities in Africa over the last four decades.

**Maize Boom Expected as its Genome is Unveiled**

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efforts to meet the world’s growing needs for food, feed and energy ... in an era of global climate change”.

It also paves the way for the sequencing of crops such as wheat and barley, “whose larger and more complex genomes have long been viewed as making these plants unapproachable”, wrote Feuillet.

*Science* published three papers alongside the sequence, one of which compares specific sections of the genome of 27 globally representative maize varieties to show common patterns of genetic variation.

The research, led by Michael Gore of the Institute for Genomic Diversity at US-based Cornell University, “Already a critical source of food, fuel, and fibre, the addition of genomic information allows maize to be further improved through plant breeding that exploits its tremendous genetic diversity,” the team wrote.

For biotechnology researchers in Africa, the research presents unlimited opportunities to get governments to increase funding for agricultural research and give biotechnology research the funding it urgently deserves apart from helping curb anti-biotechnology propaganda peddled by groups based in the North with such pioneering innovations.

TECHNOLOGY

**Mordern Information Technology Service Revolutionises Fish Industry**

By Allan Obiero

**A** new modern technology by the Kenya Marine and Fisheries Research Institute (KMFRI) is now revolutionizing fishing industry and marketing in Lake Victoria and promising to change lives of thousands of the fisher folk.

The innovation dubbed Enhanced Fish Market Information Service (EMFIS) project is developing a fish market information system using modern communication technology to generate information from fishing activities.

Dr. Richard Abila who is the Project Coordinator says the project funded at a tune of Kshs 6.3 Million by the International Labour Organization (ILO) will increase fish business income through enhanced access to correct market information faster, cheaper and easily.

“This is an innovation that ought to have been invented yesterday just like the information systems on market scenarios of livestock’s and agricultural products that are already in the market,” said Dr Abila.

The project generates information from fish landing sites, markets, fish processors and fishing material suppliers and then appropriately packaged and made accessible to the fishing community and other consumers via Short Messaging Service (SMS).

According to Dr Abila, the data is sent to the KMFRI centre in coded form by the fisherman or any other user and then packaged and decoded back to the sender in a more accessible form with all the required information.

“You simply send the name of the land-

ing site to 5565 and after 10 seconds you would have received information on the available fish species, quantity, price and even the weather at the site,” explains Dr. Abila.

The EMFIS project already covers key landing sites and markets in Busia, Bondo, Kisumu, Homabay and Suba districts along the lake Victoria basin and over 50 landing sites and ten inland markets are being covered under the SMS information system.

Dr Abila said the accuracy of the data is not questionable since they employ manual data input and they have a team of experts that monitor and evaluate the whole process both at the center and at the sites.

Speaking during the launch of the project at the KMFRI research centre in Kisumu, Dr Abila said they have already come up with two information packages to help sustain the project and meet the set objectives.

He says EMFIS SOKO service enables fishermen, fish traders, cooperatives and other consumers to get current information on prices and quantity of fish, availability of fish trucks and basic weather information at landing sites and markets.

EMFIS VIFAA package can be used by fishermen to know current prices of fishing materials like gillnet, hooks, ropes, life jackets, fishing lines and lamps from various suppliers.

Beach Management Unit (BMU) National Chairman Tom Guda says fishermen have welcomed the initiative since the project will not only open up the market for their produce but also share the proceeds earned from the service usage with the BMU’s.

Guda tells fishermen to give suggestions on which services they would like included in the EMFIS so as to encourage a needs based approach and make the project more user-friendly.

“Am appealing to all BMU leaders who are entrusted with the responsibility of giving data to ensure they consistently give accurate and updated information,” he says.

But, he warns fishermen to avoid using illegal fishing gears and exertion of pressure in the lake’s resources arguing that the project may not help much if the fish commodity is not available due to poor practices.

The project coordinator Dr Abila confirmed that they have signed a memorandum of understanding with the BMU leaders operating where the EMFIS service is available whereby the two parties will share proceeds from the SMS service.

He adds that the projected impact of the project is extensive and that it will also give room for more research and innovative ways of coming up with other packages.

Reduction in price disparities between landing sites and other fish markets in the Lake Victoria is also expected with the introduction of the new market information system.

Dr Abila further clarified that the project will help reduce price margin from middlemen, reduce post harvest losses, reduction in market costs and would create greater awareness of market trends.

Lake Victoria is Kenya’s most important fishery resource, producing fish valued at about US\$ 70 million and earning US\$ 50 million from fish exports.

**Training on GMO Risk Assessment**



**A** major training workshop- *Introduction to GMO Biosafety Risk Assessment*- was hosted and conducted at the Faculty of Agricultural Sciences, Makerere University, Kampala, Uganda, from 19 to 23 October. The workshop was the result of collaboration between BiosafeTrain and the International Centre for Genetic Engineering and Biotechnology

(ICGEB).

The training focused on biosafety in legal and regulatory contexts in Africa; authorisation process; risk analysis and problem formulation; assessment and management of identified risks to humans and the environment; agricultural biotechnological techniques; experimental design; and management of quarantine facilities.

Eastern African countries are cur-

rently involved in R&D of GMOs and the training introduces key biosafety issues in GMO risk assessment so that they will acquire basic skills in the use of scientific data to draw balanced science-based conclusions regarding the experimental release of GMOs. The course is aimed at biosafety regulatory officials and scientists working in national research institutions.



# AGRA Launches Major Agricultural Policy Initiative

*New Initiative Announced for World Food Day Recognizes Policy's Pivotal Role in Attaining African Food Security*

The Alliance for a Green Revolution in Africa (AGRA) launched an initiative to empower African governments to shape home-grown agricultural policies that provide comprehensive support to smallholder farmers. The initiative is supported by a US\$15 million grant from the Bill & Melinda Gates Foundation.

With an initial focus on five countries (Ethiopia, Ghana, Mali, Mozambique and Tanzania), the initiative will strengthen African agricultural policy-making capacity through training agricultural policy analysts; bolstering policy think tanks; establishing data banks to support evidence-based policy development; and coordinating national policy hubs. It will focus on policies that support farmers in the areas of seeds; soil health; markets and trade; land rights; women's rights; equity; environmental sustainability; and climate change.

"Unlike farmers everywhere else in the world, African farmers, most of whom are women, receive little or no support from their governments," said Mr. Kofi A. Annan, Chairman of the AGRA Board and former Secretary-General of the United Nations. "We must change this. The new support to AGRA from the Bill & Melinda Gates Foundation is coming at the right time for Africa, where strong national policy action is essential to end poverty and attain African food security."

The Bill & Melinda Gates Foundation announced this grant at the World Food Prize Symposium in Des Moines, Iowa, along with a package of nine agricultural development projects totaling \$120 mil-

lion to address long-term food security.

"Melinda and I believe that helping the poorest smallholder farmers grow more and get it to market is the world's single most powerful lever for reducing hunger and poverty," Gates said.

For this to happen, African farmers need enabling agricultural policies. But Africa's agricultural policy system is in shambles, following decades of externally-driven policies which gutted public support for agriculture and created a vacuum in Africa's agricultural policy capacity. External policies imposed through "structural adjustment" programs left tens of millions of farmers locked in poverty, unable to invest in their farms or to access markets.

"We cannot abandon our farmers and be surprised that Africa is in a food crisis," said Dr. Akin Adesina, AGRA's Vice President of Policy and Partnerships. "We must replace 'policies of abandonment' with policies of comprehensive support for smallholders. African institutions must lead by developing evidence-based and locally relevant policies to transform African agriculture into a sustainable, competitive and highly productive system."

"Our goal is not to set policy for African countries, but to empower countries, and move beyond policy analyses into policy action," said Dr. Namanga Ngongi, President of AGRA. "We will give voice to African farmers."

To ensure that new policies benefit smallholders, the program will strengthen farmers' policy advocacy platforms, with a special focus on women farmers, to help them gain full and equal access to land

security, farm technologies, markets, finance, and extension services.

"AGRA is helping to give African farmers and policy-makers a voice they have lacked for decades," said Stephen Wazira, Minister of Agriculture of Tanzania. "We need policies that unlock the potential of agriculture, feed our people and support economic development. This initiative will further empower our government to put policy to work for smallholder farmers."

## Policy Impacts

According to Adesina, the tide is turning in favor of African farmers, as nations such as Malawi, Tanzania, Kenya, Rwanda, Mali, Ethiopia, Mozambique, Ghana and Nigeria are taking new bold steps to revitalize agriculture.

Many more countries are signing up to the Comprehensive African Agricultural Development Program (CAADP) to provide at least ten percent of their budget in support of agriculture. As these funds become available, effective, locally-determined policies to guide investments will be even more critical. "AGRA will further bolster CAADP efforts at national and regional levels. Success of the green revolution at country levels across Africa is critical for countries to achieve the 6% agricultural growth target that African Presidents agreed to under CAADP" said Adesina.

Policy impact can already be seen in countries like Malawi and Rwanda which are providing comprehensive support to their farmers. Government policies, including seed and fertilizer vouchers for

poor farmers, have helped transform Malawi from a net importer to a net exporter of maize for four years running, and fueled a national economic growth rate of seven percent. In Rwanda, policies which increased farmers' access to quality seed and fertilizers have boosted food production for two straight years. Food production grew by 15% in 2007 and 16% in 2008, as the country embarked on a green revolution program. This has improved national food security, even as 20 million people in neighboring countries must depend on food aid for survival.

AGRA stresses that across African nations, there is no single policy solution for promoting smallholder agriculture. While farmers need direct support, equally important are accelerated investments in public goods such as agricultural research, extension, small-scale irrigation and roads.

"In the long-term, the ability of Africa's smallholder farmers to adequately feed the continent depends on a policy environment that improves access to agricultural technologies, assures market access, stabilize food prices for the poor, protects the environment and helps farmers adapt to climate change," said Annan. "That is why this AGRA policy initiative is so important."

Organizations such as the Economic Commission for Africa, African Development Bank, Africa Union-NEPAD, Regional Economic Communities, the African Economic Research Consortium and the International Food Policy Research Institute will be key partners in the policy initiative.

## The Science and Politics of Mau

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If the country manages to solve the complex and potentially explosive environmental problems caused by destruction of one of Africa's major water catchment areas then on a positive note, Kenya could be on its way to sustainable science-led socio-economic development.

Unfortunately, the revival of Mau is not an issue of pure environmental science although its importance to the survival of Kenya as socio-economic entity begins with its role as the ultimate water catchment area.

The sight of some ordinary Kenyans – who had settled in the forest- returning their title deeds to help save the country's water tower from death, could be the beginning of widespread awareness on the need to practically conserve natural resources, especially forests. It could also be the beginning of ordinary citizens taking back their country because the chances of such individuals tolerating land grabbing in future could be minimal.

It could also mark the end of political elites and administrators sidelining experts in forestry, water management, wildlife, agriculture and other specialists when allocating or authorizing use of forest for agriculture, timber, industrial plants and tourism. In Kenya, for example, administrators like the district commissioners and not forest officers, have the final say in the issuing of permits to businessmen who ruthlessly exploit forest resources.

Equally it is top policy makers or politicians who have had and still have both 'legal and illegal power' authority to allocate not just forestlands but all others too including coastal beaches. However, current efforts to save not just the Mau but millions



of nomads, hunter-gathers and farming communities and wildlife requires cool-headedness and extreme patience.

According to information compiled by the United Nations Environment programme, Kenya Wildlife Services, Kenya Forests Working Group and Ewaso Nyiro South Development Group, Mau forms the upper catchments of 12 main rivers west of the Rift Valley.

These rivers include Nzoia, Yala, Nyando, Sondu and Mara which all flow into Lake Victoria. Four others Njoro, Nderit, Makalia and Naishi rivers flow into Lake Nakuru. Still Kerio flows into Lake Turkana, Molo into Lake Baringo and Ewaso Nyiro into Lake Natron.

Lake Victoria, Natron and Turkana are cross border resources and Ethiopia has already told Kenya to keep off its plans to use its resources for various development projects including dams to generate hydro-electric power. This could be a reflection of the widespread feeling that Kenya which leads in destruction of forests and water resources apart from corrupt land allocations,

has no business poking its nose into Ethiopia's environmental affairs until it gets its acts together.

On the basis of science, the Kenya government aims to restore degraded forests and water catchment area with actions that include relocation of people living in forests. Assessment studies involving experts from National Museums of Kenya, Moi University and legal advisers. The government says that illegal activities has reduced by 60% - 70% in the southern part of the Mau and has establishment of offices for surrender of title deeds in the 14 districts of the Mau region.

However, as noted in the daily mass media, the Mau issue has been highly politicized and those opposed to evictions are allegedly having their own legal experts to help them stop evictions if people from forests are not given alternative settlements.

There are those who say that degradation of Mau and drastic reduction of water including drying up of rivers can be linked to the worldwide phenomenon of climate change.

However, they overlook their massive destruction of the forest and vegetation.

Some of the politicians opposed to the removal of people from the Mau say that climate change is occurring in all parts of world and there is no credible proof that locally it is humans and not climate change caused by various factors and not people in forests. However, it is the issue of compensation that generates negative emotions, especially. Apart from misuse by politicians there are those with genuine title deeds who may not easily find alternative land because Kenya, more than other nations, seem to be one nation where land prices rise endlessly. Still settling into new communities may not be easy in a nation that is said to be rapidly declining into clan groups.

However, for political elites such problems seem to provide opportunities for generating extra "political mileages" thus evading sober discussions. It is the poor or ordinary Kenyan going to lose if sober and humane discussions excluding politicians get sidelined.

Reclaiming the Mau in a humane manner remains the biggest challenge for Kenya and it needs external support although the country says it already has started providing basic human needs to the poor who may end up in camps like the political refugees thus giving politicians more power to attack their real or imagined enemies.

The country's scientific, technical and industrial base is weak and not capable of promptly offering alternative livelihoods to the poor.

• *The next issues will examine the specific including strengths and weaknesses of various environmental science approaches to Mau.*

# Confusing Generics with Counterfeits

By Redemptor Atieno

There are fears that Kenya's new Anti-Counterfeit Act could fuel the war against generics.

Kenya's minister for Industrialisation Henry Kosgey backdated commencement of the Anti-Counterfeit Act to a day before a case was launched against the Act in the Constitutional court.

The Act has faced stiff opposition from public health advocates and HIV/Aids treatment activists who claim it will infringe on the rights of Kenyans to access medicines.

In a Kenya Gazette Supplement No. 50 dated 24<sup>th</sup> July 2009, the Minister gave the directive for the Act to be operational from 7<sup>th</sup> July 2009 even though on 8<sup>th</sup> July 2009, three people living with HIV filed a petition with the Constitutional Court challenging the constitutionality of the Anti-Counterfeit Act.

"It is interesting that the Act has suddenly commenced on 7<sup>th</sup> July, the day before the case was filed... yet the gazette notice was published on 24<sup>th</sup> July, three weeks later. We sense mischief in all this back-dating," a furious James Kamau, the coordina-

tor of the Kenya Treatment Access Movement (KETAM) said.

Kamau also took issue with the Anti-Counterfeiting Agency, a new corporate body now established to oversee the implementation of the Act. "We would like to see the face of this new Agency. Who is its Chief Executive, and staff? Has its Board been constituted? Where are its offices? Was this agency even budgeted for in this year's budget? We need to know the answers," he said.

He fears that unscrupulous people pretending to be part of the Agency could start seizing generic medicines in Kenyan ports and calling them counterfeits, just like is frequently happening in Europe.

On 8<sup>th</sup> July 2009, the three petitioners filed the case with the support of KETAM and said their decision to sue government was based on the fact that the Act threatens access to medicines and would deny them life-saving medicines.

The petitioners said the Act confuses counterfeits and generic medicines through inaccurate and confounding language. By noting that generic medicines are legitimate exact copies of their brand-name original, the petitioners stated

"Generics are not counterfeits and should not be confused with counterfeits. The manufacturing of generic medicines is not a criminal offense. We can only afford generic medicines because they often cost up to 90% less than the originals. By fighting this Law, we are NOT for counterfeits, of course. We believe our government should combat counterfeiters and counterfeit goods, including medi-

**"We believe our government should combat counterfeiters and counterfeit goods, including medicines. But not at the expense of our health and our right to life."**

cines. But not at the expense of our health and our right to life."

**Problematic and vague**

Mr Kamau has taken issue with the definition of Counterfeiting in the opening section. He termed it as problematic and vague as it could easily be mis-

interpreted to include generic medicines. He said even though a clause was added which specifically mentions "medicines" it is still incomplete – for example, the clause does not include vaccines. He also said the Anti-Counterfeit Act does not distinguish medicines from other goods. "Medicines are essential and life-saving and should be distinguished from non-essential goods such as DVDs and batteries," he explained.

Mr Kamau further noted the Act contravenes sections of the Industrial Property Act, 2001 such as Section 58 (2) (providing for parallel importation) and Section 80 (government use). He observed that these sections have played an important role in the struggle to increase access to essential medicines in Kenya.

The KETAM Coordinator also argued that Section 34 on seizures of suspected counterfeits goods (including medicines) is too broad. He said based on the reality of the seizures of generic medicines in Europe, they feared that from that section, the same thing could happen in Mombasa or Busia. The section allows the holder of Intellectual Property Rights (IPRs) accrued elsewhere to enforce its rights in Kenya -- notwithstanding the existing

laws in Kenya do not recognise those IPRs.

**Voices not heard**

The KETAM Coordinator lamented that the voice of the people is not being heard. He said that various efforts were made to improve the draft Bill before it was enacted but their efforts only bore a bit of fruit, in that the definitions were amended somewhat.

The petitioners then took action with the court case. The Attorney General did not respond in the allocated fourteen days; he still had not responded.

**Global concern**

The Kenya Anti-Counterfeit Act has raised widespread attention locally and abroad because it is seen as a yardstick that will determine whether similar anti-counterfeit bills in the neighbouring East African countries (e.g. Uganda and Tanzania) will be developed and enforced.

There have been numerous cases in recent months of generic medicines mostly made in India en-route to Africa and Latin America impounded in European ports. Custom officials who have no technical knowledge of medicines carry out the seizures arguing that the medicines violate European patent rights.

# New System to Cut HPV Vaccine Cost

*-While vaccination programmes against HPV focus on young women aged 9 to 25, there are calls to include boys to eliminate the virus since it is sexually transmitted-*

By Clifford Akumu

Cervical cancer remains one of the most common malignancy affecting women in Africa. It is caused by 'high risk' types 16 and 18 of the Human Papillomavirus (HPV), which are sexually transmitted.

A recent shocking report of increased teenage sex in Kenya paints a grim outlook. Further revelations that teenage girls were having multiple sexual partners and opting not to use protection has left many experts worried.

The HPV virus, for example, can easily be passed through sexual intercourse. However, HPV has to be present for cancer of the cervix to progress. With the current economic crisis and hiccups in rollout of the vaccines to every eligible woman and girls in poor countries, very few women are getting the jab.

A new initiative dubbed 'tiered pricing' whose finer details are still in the works, will come in handy especially for the poor. It is a system whereby rich nations pay more than low resource nations for the vaccines.

"Cost is always a deterrent among poor nations in fulfilling an all-inclusive vaccination program. But with this new concept the results are going to be overwhelming," says Patrick Abele, Vaccines Director for East Africa at the giant pharmaceutical GlaxoSmithkline.

This concept and subsidies are already being offered by GAVI Alliance in other countries. According to Abele, the move

will benefit Kenya just like any other poor country where screening facilities are often few and cervical cancer is on the rise. This will be achieved through bringing down the price barriers hence making sure these vaccines reach the women who need them most.

In this new initiative, Abele says, the Gross Domestic Product (GDP) per capita of a country will largely determine pricing of the vaccine. Kenya's GDP as at 2009 stood at 1.70 per cent.

"Basically, this is to say that Kenya for example will not pay the same price for the vaccine as the United Kingdom or Europe", he explains.

A comprehensive and a sustainable vaccination programme realized through easy access to the vaccines would help in preventing infections before they occur.

"The primary way of preventing cervical cancer is through vaccination against the HPV virus. This, coupled with existing screening and treatment of cervical cancers and pre-cancers will greatly complement the effort," he adds.

Two vaccines, which are claimed to be almost 100 per cent effective in preventing their target HPV infections, have been developed by GSK and Merck pharmaceuticals.

The GSK vaccine costs around (US\$686) for three shots in Europe but only US\$40 in Mexico.

In the Kenyan case, says Abele, the pricing is highly dependent on the mark ups drawn by different distributors, hospitals and chemists leaving the patients

with no choice but at their mercy.

"The initial cost of an HPV vaccine from GSK is Shs.4,512 ex-GSK per dose. But since a patient needs three doses this means she has to part with Shs.13,536. However, this price becomes even higher after factoring in markups"

About 500,000 new cases of cervical cancer are diagnosed every year, 80 per cent in the developing world, where more than half are fatal.

A World Health Organisation (WHO) report estimates that only about 5 per cent of women in developing countries had gone through a screening process for the cervical disease compared to 40-50 per cent in the developed world.

Though free screening process is now being offered in major hospitals in Kenya, the number of women or girls accessing this program has not been promising.

"At GSK we have partnered with other players to educate the women on the need for screening. We will still continue with the process," says Abele.

In a report in the journal 'New England Journal of Medicine' the authors, Jan M. Agosti and Sue J. Goldie say that a committed global effort is needed to bring the life-saving HPV vaccine to the developing world. The two scientists further point out that every five-year delay in doing so would lead to another 1.5 to 2 million deaths from cervical cancer.

In Africa alone, 62,000 women die from complications caused by the disease every year, with highest mortality rates in the Sub-Saharan African countries espe-

cially Tanzania, Zambia, Zimbabwe, Morocco and Tunisia.

These deaths, he says, could be averted through involvement of stakeholders including government manufactures Global Alliance for Vaccines and Immunisation and WHO in scaling up the vaccines rollout in the developing world.

"Although much is being done by stakeholders, they need to double their efforts if HPV were to wipe out", Abele adds.

While vaccination programmes against HPV focus on young women aged 9 to 25, there has been a call to include boys to eliminate the virus since it is sexually transmitted.

HPV also causes about four per cent of cancers in men mainly anal, penile and oral cancers, all of which are on the rise in Africa. Although there are no concluded studies to administer vaccines to boys, when this happens they will also benefit, he says.

The standard cervical cancer diagnosis has been, for a long time, Papanicolaou test or simply the 'pap smear'. However, major breakthroughs like the inclusion of Digene HPV Test and a simpler technique such as painting the cervix with vinegar have also shown promise.

According to studies, there are about 150 types of HPV, 30 of these viruses can pass from one person to another through sexual intercourse. Some of them are regarded as 'low risk' but can cause genital warts. Then there are the 'high risk' ones that can easily cause cervical cancer.



# Improving West Africa Seed Alliance

By Agatha Ngotho

**R**egional effort seeks to dramatically improve smallholder farmers' access to higher-yielding seed varieties of staple food crops.

A broad coalition of public and private sector organizations announced a new partnership committed to raising the yields and incomes of smallholder farmers in West Africa by increasing their access to improved, locally adapted varieties of major food crops.

The partnership between the Alliance for a Green Revolution in Africa (AGRA), the African Seed Trade Association (AFSTA), the Economic Community of West African States (ECOWAS) and the United States Agency for International Development (USAID) establishes the West Africa Seed Alliance (WASA).

The goal of WASA is to promote a sustainable commercial seed industry focused on ensuring that small-scale farmers in West Africa have affordable, timely, reliable access to good quality seeds and planting material.

WASA will work closely with West African governments and regional organizations to implement policies that encourage private sector investments in local seed production that will stimulate increased adoption of improved high-quality seed and complementary inputs.

USAID support to WASA started in late 2007 but the signing of this Memorandum of Understanding today at the opening of an international conference in Bamako, Mali, organized by AGRA greatly reinforces the Alliance.

"The livelihoods of smallholder farmers in West Africa are directly linked to a modernized agriculture," says Dr Joe DeVries, Director of AGRA's Seed Program.

"It is also no coincidence that the most successful agricultural enterprises come about mostly through an effective public-private sector partnership," adds Dr. Robert Kagbo, Senior Agricultural Advisor of USAID/West Africa.

Farmers in West Africa only cultivate about one to three hectares and do not use improved seed of varieties of locally bred material except for such cash crops as cotton and cocoa.

They generally rely on poor quality seeds saved from previous years or provided by aid organizations. Crop yields are therefore quite low and harvests often do not provide enough food for their families, much less to have a surplus to sell or store for later consumption.

A key goal of WASA is to support ex-

isting seed companies and entrepreneurs interested in producing and marketing seed and complementary inputs by providing relevant training and technical expertise, business development management, and marketing assistance.

"Our goal is to work with our partners and with local businesses to provide them the means to benefit from modern science for improving the livelihood of the African farmer," said Mr. Justin

Rakotoarisoana, Secretary General of AFSTA.

WASA will focus on commercial production of conventionally bred varieties from various sources world-wide so farmers have a wide range of choices in the market.

Given the importance of crop biodiversity to local farmers and regional plant breeding programs, WASA initiatives will however encourage the use of land races for further crop improvement.

WASA also focuses on policy reforms that encourage private sector investment and facilitate cross-border seed trade, as well as on improving crop productivity for various agribusinesses.

AFSTA is the main private seed industry association in Africa, consisting

of 16 national seed trade associations, 44 private African and foreign seed companies, agricultural service providers and non-governmental organizations (NGOs).

It has received commitments from private sector members to support the Seed Alliance activities, which will include providing technical assistance in seed production, processing, sales, distribution and marketing.

ECOWAS promotes regional economic integration of West African countries and has already adopted a regional regulation on seed harmonization in its 15 member states to facilitate cross-border trade in seeds.

The next preoccupation of ECOWAS and WASA partners is to work with national governments on implementing the regional seed agreement at the national level in order to facilitate private sector investment in seeds in West Africa.

WASA has fully embraced the Comprehensive Africa Agriculture Development Programme (CAADP) and understands that farmers hold the key to breaking the cycle of food insecurity in West Africa," says Dr. Norbert Maroya, WASA Coordinator.

"We believe farmers will see in this innovative Seed Alliance an opportunity to build a stronger economic foundation for an integrated and prosperous regional agricultural sector in the region."

**The goal of WASA is to promote a sustainable commercial seed industry focused on ensuring that small-scale farmers in West Africa have affordable, timely, reliable access to good quality seeds and planting material.**

## Finally Stingless African Bees

By Naftali Mungai

**A**s Kenya prepares to launch a massive reforestation campaign to restore and rehabilitate the Mau Forest Complex, Kenya's most important water tower, few recognise the magnitude of the loss of biodiversity that has been wrought by this human catastrophe. To most, the Mau degradation is about the drying of major rivers such as the Mara, threatening the rich fauna of the majestic Maasai Mara Game Reserve. But to a young researcher who is undoubtedly one of Kenya's unsung heroes, the destruction of our environment poses great danger to a most important but inconspicuous insects, the stingless bees.

Joseph Macharia, a young researcher at BIOTA East Africa, has spent a considerable part of his life studying these forgotten but beneficial insects that play a crucial part in the country's agriculture and biodiversity through their pollination services. He graduated from Jomo Kenyatta University of Agriculture and Technology with a Masters degree on stingless bees and his research is supported by the Royal Belgium Institute of Natural Sciences.

Macharia participated in a science, technology and innovation meeting organized by African Technology Policy Studies (ATPS) in Mombasa last July to discuss the drawing up of a science manifesto for the continent.

According to Macharia, the practice of apiculture (bee keeping) has existed for millennia in Africa. In fact, the honeybee (*Apis mellifera*) is one of Africa's best

known beneficial insects and apiculture (beekeeping) is a thriving rural industry in Africa.

However, almost unknown, are Africa's stingless bees, and their keeping for products like honey and beeswax, as well being pollinators of both cultivated and wild plants.

According to Macharia, Stingless bees (Apidae, Meliponinae) together with honeybees are eusocial insects. They occur in all tropical and subtropical regions of the world where they are abundant in species and numbers. There are more than 600 species in 56 named genera and six of these genera with 19 species are found in Africa. In Kenya, about eight species have been identified.

"Meliponiculture, the name given to stingless bee keeping, is a practical activity that can be integrated into forestry, horticulture and contribute to the increase of the agricultural production and regeneration of natural vegetation through pollination. Deforestation and poor management are the main problems faced by this incipient industry, Macharia told *ScienceAfrica*. In Africa, stingless bee honey is mostly obtained by harvesting from feral colonies, an activity which kills or destroys the colonies.

Replacing destructive harvesting of stingless bees with well designed management practices would provide honey for food, income, medicine, and enhance pollination of both commercial and indigenous plants.

Macharia says the development of meliponiculture provides new opportunities for people in the rural areas as a source of income and can improve the economics



Traditional meliponary in Kakamega

of many households though income from sale of the highly valued honey and increased food production through pollination services. "Pollination services from these bees increases the agricultural production especially of horticultural crops and regeneration of natural vegetation," he adds.

Stingless bees nest in tree hollows/cavities for their natural reproduction and colony growth and are dependent on older trees and natural flora in the forest for their survival. Hence, they are vulnerable to deforestation and habitat fragmentation as these processes diminish nesting-sites and food plants. Not much attention has been given to these threatened and valuable bees. Furthermore, little knowledge exists on their biology, behavior and domestication in most parts of Africa. The main thrust of Macharia's project is to initiate stingless beekeeping by documenting the folk knowledge,

analysing their honey to set standards and test the antibacterial activity of stingless bees honey.

In the course of his interesting research, Macharia has already established that farmers around Kakamega forest are aware of existence of stingless bees and some were already keeping them in log hives. Most of these farmers depend on the forest resources, where honey gathering both from stingless and honeybees is their main activity. He has observed that the honey gathering methods used by these farmers are very destructive, a situation that he is now reversing.

Through research and development, the world-renowned International Centre for Insect Physiology and Ecology (ICIPE), has introduced two types of rational hives in the area and farmers are adopting the practice, with Macharia's assistance."

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ScienceAfrica  
AFRICA'S LEADING PUBLICATION ON SCIENCE INNOVATION AND DEVELOPMENT  
Editorial

## Harmonize National Biosafety Frameworks

There is need to constantly remind African policy makers and biotechnology experts that the region is slow in creating functional national Biosafety frameworks. It is a very strong indicator that the continent is not practically focusing on the importance of biotechnology including creation of credible and favorable investment opportunities by firms with much needed technological knowhow.

There is no reason why nations with relatively skilled biotech specialists like Ghana, Nigeria, Uganda, Tanzania, Ethiopia and others should lack fully functional national biosafety frameworks. Modern biotechnology changes very rapidly creating innovations needed in the war against poverty. Few African nations can compare with India and China in the biotech race.

In most African nations, including those with huge revenue base, efforts to create national biosafety regulations relies heavily on the goodwill and corporate responsibility of biotech firms in the developed nations and donor agencies. However, there are plenty of opportunities when it comes to training experts in various biotech fields.

In short there is room for Africa to move very fast to create national or regional biosafety frameworks. It would be ideal if regional frameworks are given priority instead of having over 50 sets of regulations as pointed out by Dr Francis Nangayo of African Agricultural Technology Foundation during a recent conference in South Africa. Africa's geographical, cultural and economic linkages should make it easy for experts to develop biosafety frameworks that serve regional groupings. Having biosafety frameworks for each of the Eastern Africa nations-Rwanda, Kenya, Uganda, Tanzania, Kenya and even Ethiopia, Sudan Djibouti, Somalia and Eritrea- is a waste of resources and time.

The world is celebrating the sequencing of maize genome with what seems to be its potential positive implications for food security in a continent that equates famine with maize shortage. However, positive consequences resulting from the breakthrough will benefit Africa least if most nations in the region continue to lack biosafety frameworks.

## Putting Food on the Climate Change Table

- Time for Climate Negotiators to Put Meat on the Bones of the Next Agreement-

By Dr Carlos Sere, Director General, International Livestock Research Institute(ILRI)



Dr. Carlos Sere, Director General, International Livestock Research Institute(ILRI)

Livestock systems are major global asset. They occupy 45% of the earth's surface, employ at least 1.3 billion people and are valued at about 1.4 trillion US dollars. They provide 17% of the calories and a third of the protein we consume. According to FAO, milk is the world's number one agricultural commodity, worth about \$144 billion annually, and meat from cows, pigs and chicken rank 3, 4 and 5 respectively.

These statistics, however, hide stark differences in how livestock are raised. In poor countries, most livestock are raised on small farms or herded by pastoralists. Throughout their (usually long) natural lives, they survive largely on grass and other vegetation including the stalks, leaves and other wastes of food crops after the grain has been harvested.

Meoli Tarayi, 18, a Maasai herder in Kenya can see his cows dying as he prods them to move along in search of pasture. "We left home in with 88 head and a month later 64 are left. There is nothing for them to eat so we must turn back".

Kenya is undergoing one of its frequent and severe droughts. Pastoralists like Meoli have been moving far and wide to find food for their animals. But the animals become increasingly emaciated during the long search for grass.

Worldwide climate is changing and our livestock, which are vital to food security and agricultural systems in marginal regions of the world, must adapt to survive just as the herders and farmers who keep them.

In contrast, most livestock in wealthy counties are 'factory-farmed' using industrial processes.

climate change is particularly hurting Africa's livestock and other food producers and the ecosystems on which they depend. And they predict things are going to get worse on the continent. The productivity of rain fed cropping systems is likely to drop dramatically in some areas where water shortages will be common; and important human, livestock and crop diseases are likely to spread to new regions and become more severe.

Many of the world's small-scale livestock keepers will have to adapt, for example, by changing the mix of livestock species they keep and the types of crops they grow, or switching to new sources of feed for their animals. Some will probably have to get out of agriculture altogether.

When negotiators meet later this year in Copenhagen to finalize the global climate pact, they must pay attention to the many small farmers and herders who are ready feeding most of the world's poor. And they must begin to pay attention explicitly to farm animals that remain neglected by policymakers even as they become increasingly important to food security and raising small holders incomes. African negotiators in particular, need to champion small-scale animal agriculture, which form the backbone of their nation's economies.

Food security and climate change are inextricably linked. Policymakers must become adept at moving on both fronts simultaneously. And if our climate negotiators hope to address the needs of more than a billion animal keepers in the world, they must begin to provide differentiated policies that support rather than neglect the multifarious small livestock enterprises that make food production possible throughout the developing world.

(Next issue of ScienceAfrica will focus on ILRI.)

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# New Conservation Strategy for Elephants in Kenya

**In the first of a Two-part Series, Daniel Otunge reports on new ways to save Kenya's elephant.**

The Kenya Wildlife Service is in the process of developing a comprehensive national conservation strategy for elephants in the country. This could not have come at a better time given the increasing human-wildlife conflict experienced in various parts of the country where animal sanctuaries are located such as the Tsavo and Mara regions, among others.

Conserving elephants is an uphill task as it requires one to focus not only on the animals alone but also on their habitats and the ecosystems. At the centre of the challenge is the biology of elephants, with which any solutions must recognize and work. Key aspects include their large size, long lifespan, low population growth rates, generalist feeding behavior requires large quantities of vegetation from all layers, high mobility, exceptional intelligence, communication and memory and potential conflict with people. High sociality, with matrilineal family groups as the context of social learning, loss of key leader/matriarch may mean high vulnerability and aberrant behavior.

Elephants are many things to many people. To some they are a "flagship" species, a charismatic large mammal, which can be used to generate interest in, and financial support for, the conservation of all wildlife which share their habitats while to others they are a "conflict" species, an economic burden similar to other wild animals that affect the livelihood interests of people, through their contribution to crop failure, livestock mortality, property damage, injury or loss of life.

Although there are many factors, including climate and human actions, that contribute to agricultural and property losses, which in numerical terms may have greater impact than elephants, but in the case of elephants, the effects are dramatic and, at the time of the event, catastrophic. Speaking recently while opening the planning meeting at Mpa-la Research Center in Laikipia, KWS Deputy Director Dr Samuel Kasiki, said all these aspects have bearing on elephant conservation and management hence will form the theme of the National Elephant Conservation and Management Strategy for Kenya.

Two factors have a large effect in determining the numbers and distribution of elephants in Kenya, and elsewhere in Africa. These factors are poaching and conversion of landscapes by people for other economic activities. There has been a steady decrease in elephant habitat over many decades throughout Africa wherever human populations have



increased. KWS experts say there is a linear, negative relationship between human and elephant density. In fact co-existence is possible only at low human densities, while loss of habitat occurs at a critical threshold level of roughly 15 people per square kilometer. The situation is worse off in West Africa, where most elephants now live in unconnected zoo-like habitat, and in South Africa, where all elephant populations are now isolated behind fences. But even the East African Elephants are not safe warns the rangers who say that due to population pressure, rangelands are now being cultivated and settled on by humans.

According to a briefing report by KWS, historically, Elephants were eradicated from large areas of Africa in the 18th and 19th centuries, when ivory exploitation was often combined with the trade in human slaves. However, massive recovery of was experienced in mid-20th century especially in protected areas like Tsavo East and West National Parks.

However, there was a marked increase in hunting for the ivory trade in later years. It is notable that the international trade in ivory, which had been rebuilding during the 1960s, accelerated dramatically with a large illegal component in the 1970s and 80s, leading to rapid declines in elephant populations across West, Central and East Africa.

Between 1973 and 1990, numbers in Kenya dropped from some 130, 000 to 16,000, an average loss of 6,700 annually. Since 1990, after the formation of KWS and the end of the legal ivory

trade, made possible through elevation of African elephants to Appendix I of CITES, the national population has gradually increased to roughly 30,000 according to the African Elephant Status Report 2006 compiled by the African Elephant Specialist Group of the Species Survival Commission of IUCN.

**Elephants are many things to many people. To some they are a "flagship" species, a charismatic large mammal, which can be used to generate interest in, and financial support for, the conservation of all wildlife which share their habitats while to others they are a "conflict" species...**

However, the report prepared in 2002 by KWS and *Save the Elephants* is the most recent comprehensive summary of the status of elephants across Kenya, compiling and discussing the available information on numbers and trends in the period following the ivory trade ban of 1989. The previous national level effort was in 1992 which described the history of elephants in the country up to that date and documented the dramatic

decline in elephant populations across the country. The decline appeared to be brought to a halt with the protection of elephants offered by the formation of an effective Kenya Wildlife Service in 1990, and the CITES ban on the ivory trade.

The KWS-STE 2002 report presented survey data and other estimates confirming that the 1990s were the first decade since the 1960s that Kenya's elephants were not in substantial decline. The numbers of elephants in the major savanna populations such as Tsavo, Laikipia-Samburu – these two include the largest savanna numbers – and Amboseli appeared to be increasing, while others such as Meru and the Mara Ecosystem were stable or

increasing slightly. The status of forest populations is much less clear, within the Mount Kenya and Aberdare highland forests (the largest forest populations), other highland areas in Central Rift or Western regions, or the coastal forests. In contrast to the savanna populations, there is no clear evidence that forest populations were affected by the massive poaching of the 1970-80s, with some indication that most of them are at moderately high densities (more than 1 elephant per km<sup>2</sup>). However, as a result of continued deforestation, the habitat for forest elephants has been reduced significantly, and it is thus possible – though not reliably established – that forest populations may have been reduced accordingly.

Reliable trend data are available only where time series of good quality estimates are available, and this is the case for a limited number of well-studied populations in Tsavo, Amboseli and Meru National Parks. Data from aerial total counts in Tsavo during the period 1988 – 2008 show a steady increase, at an annual increase rate of 3.5% over this period. The Amboseli Elephant Research Project has recorded known elephant numbers continuously since the early 1970s and the population has increased at an average annual rate of 3.8% since 1978.

A key factor affecting elephant population status is mortality. Levels of poaching remained relatively low in most populations throughout the 1990s, although poaching in several of Kenya's major elephant populations, including Tsavo, Laikipia-Samburu and Marsabit, showed a moderate increase in the last few years. The major threat to these northern elephant populations is the large numbers of firearms in the hands of local communities, due to the breakdown of law and order in Somalia in the early 1990s.

Estimating and evaluating the quality of the range of elephant populations is central to their conservation, but faces certain difficulties. The area and configuration of terrain used by African elephants is affected by their search for food and other resources, by the history of use of the area by people and elephants, and the elephants' own assessment of the disturbance and risk posed by people, KWS experts say.

For instance, in Mwea National Reserve and in the coastal forests of Shimba and Arabuko-Sokoke, human settlement and land use conversion has steadily spread, and in the absence of effective action by government or conservation bodies in land use zoning, these areas have become entirely isolated from adjacent natural habitat areas. This formation of closed enclaves, entirely preventable, creates serious management problems for the maintenance of habitat and wildlife diversity.



# New NHIF Innovations Designed to Improve Health Insurance for All Kenyans

*Changes Bound to Revolutionise and help Streamline Insurance Industry to Serve the Poor*

**K**enya's National Hospital Insurance Fund (NHIF) is one of Africa's first and has survived to enter into the 21 century with innovations that will definitely set high standards and inject competition in whole national and regional health insurance industry that has remained above the reach of ordinary people especially the poor in both rural and urban areas.

The National Hospital Insurance Fund (NHIF) is a state corporation that provides affordable contributory medical cover to Kenyans. NHIF and CIC Insurance have come together to provide quality, affordable and sustainable healthcare for its customers. This medical cover enables Kenyans to pay a premium when they are well so that they are able to access quality healthcare anytime they need it.

Currently NHIF has six innovative packages that include: Comprehensive family medical insurance which covers all hospital costs for admission and treatment procedures for any illness or accident for a period of up to six months. Treatment is available in over 500 hospitals country-wide. The second is Loss of income (for principal member) which offers



Kshs. 2,000 per week for the duration the member is hospitalized following an accident up to a maximum period of 25 weeks.

The third is Accidental Death cover for principal member. It pays Kshs. 100,000 after the principal family member dies as a result of an accident. The fourth is Permanent Disability for Principal member which pays Kshs. 100,000 after the principal member is permanently disabled as determined by a qualified doctor.

The fifth is Funeral Expenses for principal member. It pays Kshs. 30,000 incase of death from any cause to offset funeral expenses. There is also the Funeral Expenses extended to additional family members as the sixth package. It extends the Kshs. 30,000 benefit to cover the whole family at an additional cost of Kshs. 210 per year per child.

## ACCESSING BENEFITS

The NHIF benefits can be accessed in contracted government hospitals for comprehensive cover; Mission,

community and private hospitals where top-up for surgical cases may be required; and lastly all accredited mission, community and private hospitals.

**NHIF members include** Kenyan residents aged 18 and above, small and medium sized entrepreneurs (SME's) and their employees, transport sector workers, domestic workers, farmers, street Vendors, Jua Kali artisans, fishermen and other self employed persons.

**The annual premium is** Kshs. 3,650 per family which is Kshs. 10 per day. All the payment are done in all CIC branches or NHIF branches countrywide. All that one needs to be a beneficiary of these innovations designed to reach the poorest in the country is to register with CIC, obtain membership card from CIC, provide details of the dependants, update ones account (or premium) regularly and present a valid card to the hospital when admission case arises

NHIF has one of stongest and rapidly expanding networks country-wide that should provide appropriate information on all aspects of its activities.

## Kenya Training Southern Sudan's Wildlife Officers

**F**orty seven wildlife officers from Southern Sudan reported for training with 16 of them starting a three-month training course in wildlife management and biodiversity conservation at the Kenya Wildlife Service Training Institute in Naivasha. The remaining are training in wildlife protection and law enforcement at the Manyani Field Training School in Tsavo.

Speaking during the opening ceremony yesterday, KWS Director Julius Kipng'etich said such training focused on building African capacity to sustainably benefit from her abundant wealth of natural resources.

In a speech read by Ms Abshiro Halake, the Deputy Director in charge of Strategy and Change, Mr Kipng'etich noted that the institute contributed to the training of participants from many African countries. The training in wildlife management is part of the Kenyan Government's technical support worth US\$3.5 million dollars (Sh300 million) pledged in 2006 towards the reconstruction of Southern Sudan, following the signing of the Comprehensive Peace Agreement in Naivasha. A donors' conference was later held in Oslo, Norway, to mobilize resources towards the re-

construction of Southern Sudan.

More than 1000 officers from the Government of Southern Sudan have been trained in various sectors since then, under a three-year programme coordinated by Kenya Southern Sudan Liaison Office under the Office of the President. The programme ended in January this year but has been extended by another year. The training in wildlife management is the first beneficiary of the extension.

Various trainings have been conducted at the Kenya Institute of Management, Multi-Media University and Kenya Institute of Mass Communication. In March this year, KIA opened a satellite branch in Juba, Southern Sudan, where 200 people have been trained. Some 25 Kenyan experts have also gone to Sudan to conduct more training in various fields, including public finance, management, health, telecommunication, education and human resources, among others.

Mr Jervasio Okot from the Government of Southern Sudan Kenya said, was a gateway to many sectors in Sudan and was looking forward to working with the East African Community.

He said: "We don't need to go to Europe when our neighbour Kenya has the expertise to transform non-oil



**KWS Director Julius Kipng'etich opens an important bird area at Nakuru National Park.**

natural resources".

The Kenya Southern Sudan Liaison Office was set up to address the special needs of Southern Sudan after the signing of the Comprehensive Peace Agreement in 2005.

The Naivasha-based Kenya Wildlife Service Training Institute is one of the Kenya Wildlife Service's training units. It was established in 1985 with support from the World Bank.

(Source: KWS Press Release)

## Africa Agriculture Science Competition and Award

The Forum for Agricultural Research in Africa (FARA) and partners, has announced the opening of the Africa Agriculture Science Competition and Award 2010.

FARA has been designated to lead the consortium of prominent African institutions harmonizing their investments in recognizing and promoting excellence in science and technology. The 2008-09 young professional and women in science competition organized by CTA/FARA/RUFORUM/ATPS is being merged to RUFORUM's IMPRESSA Awards to form a more prestigious African Agricultural Science Award recognized and endorsed by the African Union program NEPAD.

It is an initiative to recognize outstanding young professionals, women in science and scientists in the agricultural research for development. This is the first Africa-wide competition and award organized by FARA, CTA, RUFORUM, ANAFE and the African Union program NEPAD. The consortium believes that recognition and promotion of research achievements will not only encourage increased investments in agriculture by African governments, but also motivate scientists and the youth that agricultural research is a promising career. The announcement was made by Monty Jones executive director of FARA and 2004 World Food Prize Laureate. website: [www.fara-africa.org](http://www.fara-africa.org)



## SUPPLEMENT



## THE LAUNCH OF KARI'S SECOND STRATEGIC PLAN, ITS

## Message From Hon. William Ruto, EGH, MP Minister For Agriculture

The Vision 2030 recognizes the important contribution of the agricultural sector to the achievement of the objectives of the economic pillar. In Kenya, growth in the agricultural sector is closely linked to growth in the overall economy. Under the Vision, the overall agricultural sector is projected to grow at an average rate of 7% per year over the next five years. This is expected to significantly contribute to the envisaged annual economic growth of 10% per year which translates to an additional KES 80 billion, that will significantly contribute to the national GDP.

The sector is dominated by subsistence smallholders and therefore to achieve the targets set in Vision 2030, transformation of the smallholder agriculture from subsistence to an innovative commercially-oriented and modern agricultural sector is unavoidable. In view of these developments, my Ministry in collaboration with other line ministries has developed a new sector-wide strategy, the Agricultural Sector Development Strategy (ASDS). The new strategy and the Science Technology and Innovation (STI) sector under Vision 2030 have recognised the role of research as one of the foundations for social and economic transformation of a modern Kenyan economy.

KARI as the premier public agricultural research institute is expected to lead the way in carrying out agricultural research of strategic national importance and produce public goods in the form of knowledge, information and technologies that will transform the agricultural sector. It is my pleasure to note that KARI's strategic direction has comprehensively embraced the issues of concern in both the Vision 2030 and the ASDS. The Implementation Framework of the Strategic Plan



clearly details the activities that KARI intends to undertake during the next five years, to achieve the Institute's mission. The Implementation Framework has also indicated the resources that are required to implement the Strategic Plan.

In addition, I note with satisfaction that KARI will also today launch her Service Charter, which provides her commitment to deliver on her mandate, vision and mission. The Charter also empowers KARI's clients to make informed choices from a wide range of services and products it offers. My Ministry will continue to provide the necessary support to enable KARI attain its Mission. On this auspicious occasion I urge all stakeholders, to make their contribution(s) individually and collectively to enable KARI realise these noble ideas.

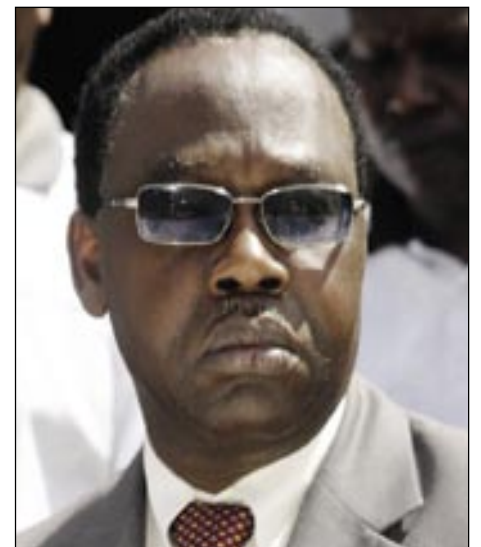
## Message From Dr. Romano Kiome, CBS Permanent Secretary, Ministry Of Agriculture

The Agricultural Sector Development Strategy (ASDS) was developed by the agricultural sector ministries to align sector goals to Vision 2030. The strategy envisions developing an "innovative, commercially oriented and modern agriculture sector". This will be accomplished through the following objectives;

- transforming key institutions in agriculture and livestock to promote agricultural growth,
- increasing productivity of crops and livestock, especially those with high growth potential,
- introducing land use policies for better utilization of high and medium potential lands,
- developing more irrigable areas in arid and semi-arid lands for both crops and livestock,
- improving market access for smallholders through better supply chain management, and
- adding value to farm and livestock products before they reach local and international markets.

Achievement of the above objectives calls for concerted effort among key actors in the agricultural sector. Through the Plan and its Implementation Framework which are being launched today, KARI will contribute to increased productivity, commercialization and competitiveness of the agricultural sector by generating and promoting knowledge, information and technologies that respond to clients' demands and opportunities.

I am delighted to note that KARI has developed a Service Charter which informs KARI



clients, stakeholders, development partners and the public about the Institute, her vision, mission, mandate, core values and functions. The charter also informs clients about the services and products that the Institute offers. Through the charter, it is expected that KARI clients will receive a timely, efficient and cost-effective service.

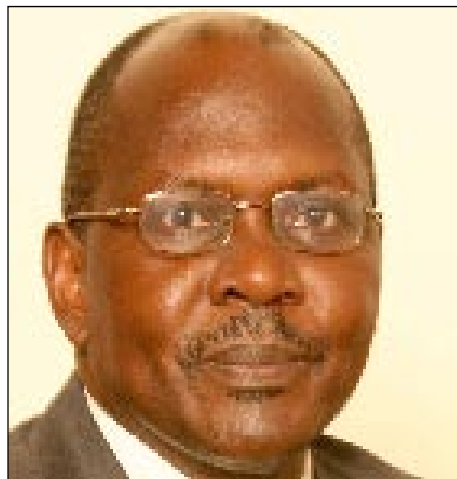
In conclusion, let me thank KARI and all those who were involved in the development of the Strategic Plan and Service Charter.

## Message From Ephraim Mukisira, Phd, OGW The Director, KARI

As the premier national agricultural research organization, the Kenya Agricultural Research Institute (KARI) is mandated to conduct research in agriculture and veterinary sciences. To date, KARI has kept pace with the increasing demand for agricultural knowledge, information and technology and has been instrumental and proactive in providing scientific solutions for agricultural development. With the recent launch of the Kenya Vision 2030 as the new development planning blueprint, the agricultural sector ministries have developed the Agricultural Sector Development Strategy (ASDS) which recognizes the role of research in agricultural development. In response, KARI has developed its second Strategic Plan (2009 - 2014) to address issues raised in the ASDS. This Strategic Plan explores a new paradigm of agriculture as a commercial business where farmers will move from subsistence to earning a decent livelihood from their farming enterprises. The concept of Agricultural Product Value Chain (APVC) which encompasses the whole continuum of technology development to consumption has been adopted in the Strategic Plan.

In this regard, this strategy stresses the need for KARI to work with partners, collaborators, the farming community and other players along the various agricultural product value chains. The current Strategic Plan therefore provides a framework and a roadmap for KARI's research programmes for the next five years. As a framework, the document provides the guiding principles and basis on which a detailed five year implementation framework was developed.

The developed implementation framework seeks to meticulously rationalise and prioritise activities in order to allocate available resources appropriately. The IF shows the intervention strategies that are expected to contribute to the attainment of the pro-



gramme results. The Implementation Framework is intended to guide KARI management and in particular programme leaders and scientists to understand the efforts KARI is making in operationalising the current Strategic Plan. It also sets out the roles of collaborating partners and provides a framework for monitoring and evaluation which is a critical component in successful implementation of all APVC based projects to be developed.

In addition, to the Strategic Plan and the Implementation Framework, KARI has also prepared a Service Charter which provides guidelines on what products and services are available in KARI and mechanisms of accessing them. As an institute, we are committed to providing quality services and products to our clientele.

## Message from Prof. Onesmo ole Moiyo Chairman, KARI Board of Management

Agricultural research plays a key role in economic development, and in particular agricultural development. It is with this view that today we launch KARI's second Strategic Plan and its Implementation Framework (2009 - 2014), and the Service Charter. The plan presents the strategies the institute will employ to realize its mission in the next five years, whereas the Implementation Framework shows what activities will be undertaken, resources required and expected outputs / outcomes within the plan period. The Service Charter gives KARI's commitment to her clients on products and services the institute will offer; the mechanisms for delivery and also sets out the obligations of the clients.

The Vision 2030 and Agricultural Sector Development Strategy (ASDS), together with climatic changes, and technological advancement, required that KARI reviews its Strategic Plan. The second Strategic Plan has therefore been developed in view of these changes. This strategy is an outcome of several months of continuous learning, communication and negotiation by the Institute and its stakeholders, with the primary objective of building consensus around the institute's strategic direction. It is envisaged that through this strategy, research will continue playing a key role in improving food security, increasing smallholder real incomes and raising agricultural productivity.

A Monitoring and Evaluation component has been factored in for all activities to ensure that the implementation of the plan takes into consideration any unforeseen factors which may arise during its implementation. The Board will provide prudent stewardship of the Institute dur-



ing the implementation of the Strategic Plan and the Service Charter both of which are being launched today. It is my hope that the charter will promote better understanding, realization and appreciation of KARI's range of products and services.

Finally, on behalf of the KARI Board of Management and the entire KARI staff, let me take this opportunity to warmly welcome you all to the launch of the KARI's second Strategic Plan, its Implementation Framework and the Service Charter. It is my hope that all our stakeholders will find the documents pragmatic and adequately reflective of their needs from the point of view of agricultural research for development.

SUPPLEMENT

IMPLEMENTATION FRAMEWORK AND SERVICE CHARTER



Highlights of The Strategic Plan 2009-2014

Background of KARI

Kenya Agricultural Research Institute (KARI), the premier national agricultural research organization, was established as a semi-autonomous government institution by the Legal Notice No. 7 of 1979 Section 4 as enacted into CAP 250 through the amendment of the Science and Technology Act.

Mandate and core functions of KARI

The Institute has the legal mandate to carry out research in the fields of agriculture and veterinary sciences. Besides, KARI

- Collaborates with other organizations and institutions of higher learning in training programmes and on matters of relevance to research and technology transfer.
- Liaises with other research bodies within and outside Kenya carrying out similar functions.
- Disseminates research findings and catalyzes adoption of suitable technologies.
- Cooperates with the agricultural sector ministries, the National Council of Science and Technology and relevant research committees in matters pertaining to development of agricultural research policies and priorities.
- Supports sector ministries through provision of research products and catalyze their use for enhanced agricultural productivity.
- Does all things as appear to be necessary, desirable or expedient to carry out its functions.

Research activities in KARI are carried through programmes, which are organized into six broad thematic areas namely: Food, horticultural and industrial crops research, livestock research; natural resource management; biotechnology and bio-diversity conservation; adaptive research, partnerships and outreach; and socio-economics and applied statistics.

Composition of KARI

As a state corporation, the governance of KARI is vested in the Board of Management (BoM) and the day-to-day management is vested in the Director-KARI, as the Chief Executive. The Office of the Director is assisted by two Deputy Directors, 10 Assistant Directors, three Chiefs of Divisions and 22 Centre Directors in the management and administration of the Institute. Research is organized into ten technical and five support services divisions. The institute is organized into technical and support divisions to enhance effectiveness in management, and catalyzing technology dissemination.

KARI has a wide network of 23 main centres and 14 sub-centres with specific mandates based on different agro-ecological zones and socio-economic settings. The Headquarters is located in Nairobi, on Kap-tagat Road, Loresho (see map).

Rationale for the strategic plan

Following the preparation and launch of the Kenya Vision 2030 and its first Medium Term Plan for the period 2008-2012 and in compliance with the Government's directives for all the Ministries and Semi-Autonomous Government Agencies to revise their Strategic Plans to align them with Vision 2030, KARI has developed this Strategic Plan covering the period 2009-2014.

The Strategic Plan is aimed at positioning KARI as a key driver in facilitating the agricultural sector to achieve an average growth rate of 7% per year over the next five years as stipulated in Vision 2030. This will in turn contribute to the delivery of the 10% annual economic growth rate envisaged under the economic pillar of Vision 2030.

Vision

KARI envisions "a vibrant commercially-oriented and competitive agricultural sector propelled by science, technology and innovation."

Mission

To contribute to increased productivity, commercialization and competitiveness of the agricultural sector through generation and promotion of knowledge, information and technologies that respond to clients' demands and opportunities

Core values

As an institute, KARI is committed to generate impact through its research and dissemination efforts as an ultimate measure of its performance. It will generate impact in a cost-effective and efficient way while being responsive to its clients' needs and demands. To this end, KARI embraces the following core values:

- Integrated and holistic approach
- Impact, performance and service orientation
- Scientific excellence, creativity and flexibility
- Partnerships for collaborative advantage and synergies
- Effective knowledge and information management
- Respect for staff and client diversity
- Transparency, accountability and cost-effectiveness

Strategic Themes and Objectives

KARI's strategic focus during the plan period be to generate technologies, information and knowledge; enhance commercialization and competitiveness of the agricultural sector. This focus will be achieved through the following strategic objectives.

Strategic Objectives

KARI has five strategic objectives which form the foundation pillars of the Institute and the basis of the Implementation framework of the current Strategic Plan. They are:

- To generate and promote technologies and innovations for demand-driven agricultural product value chains
- To develop and promote markets and marketing strategies for agricultural product value chains
- To facilitate and advocate policy options for enhancing demand-driven agricultural product value chains
- To strengthen capacity for implementing agricultural product value chains research.
- To enhance availability of knowledge, information and technologies on agricultural product value chain research

The role of KARI in attaining Vision 2030

KARI will contribute to Vision 2030 through generation and promotion of agricultural technologies, innovations and new knowledge for agricultural enterprises. Specifically KARI will

- Generate knowledge, information and technologies (KITS) for increasing productivity, commercialization and competitiveness of food crops, horticulture and industrial crops, and crop health.
- Generate KITS for increasing productivity, commercialization and competitiveness of livestock production, animal health and range management.
- Generate KITS for sustainable environmental protection and NRM protection.
- Generate KITS for efficient land and water management including appropriate water harvesting techniques.
- Participate in the design, development and utilization of irrigation schemes for agricultural production.
- Develop and promote crop and livestock suitability maps for sustainable land use planning.
- Participate in product development and

NETWORK OF KARI CENTRES AND THEIR MANDATE AREAS



- diversification.
- Provide scientific data and evidence to support decision making in reforming institutions.
  - Participate in policy analysis and formulation of better agro-policies.
  - Promote capacity building for collective action.

Monitoring, Evaluation and Reporting

To ensure a successful operationalization of the Implementation Framework (IF) of the Strategic Plan, KARI has developed and put into use a suitable monitoring and evaluation (M&E) system capable of tracking the implementation of the approved projects and activities. The M&E system shall include the use of logical frameworks, workplans, field visits, quarterly and annual reports, mid-term internal evaluations and end of projects external evaluations. The mid-term evaluation will assist in an external evaluation of KARI's programmes, the results of which will form a major input into the preparation of the subsequent IF.

Highlights of the Service Charter

The charter highlights our key commitments to service delivery. It provides for the following:

Purpose of the service charter

This service charter underpins the importance KARI bestows in improving service delivery to clients. The charter informs KARI clients, stakeholders, development partners and the public about the Institute, her vision, mission, mandate, core values and functions. It also informs them about the services and products offered. It also highlights on clients' expectations and KARI's commitment to a timely, efficient, and cost-effective service delivery. As an institute, KARI is committed to providing quality services and products to our clientele.

Principles of service delivery

The principles of KARI's service delivery include: setting clear and explicit standards of service delivery; providing clients with adequate information about KARI's products and services; communicating clearly and effectively; serving clients with courtesy and respect; upholding the principle of natural justice in decision making; utilizing resources prudently; cultivating continuous improvements and processes of embracing best practices and innovation; embracing monitoring and evaluation to keep track of performance and changing needs of clients and discharging KARI's mandate consistently, efficiently and effectively.

KARI Partners/ Stakeholders/ Collaborators

Our Partners/Stakeholders/Collaborators are essential to our success. These include:

- National, regional and international agricultural research organizations
- Universities
- Development partners/donors
- Agri-business community
- Government Ministries, Departments and State Corporations
- Farmers, farmers associations and community based/service organizations
- Agricultural and veterinary professional bodies
- Private sector
- The Media

Clients' expectations

- KARI clients should expect:
- To be treated with courtesy, respect and integrity
  - Confidentiality in handling any information provided by them
  - Prompt response to their requests and feedback
  - Sharing of information
  - Transparency and accountability
  - Timely payment for services

Clients' responsibilities

In a bid to provide quality services and prod-

- ucts, KARI expects her clients to:
- Make requests for information with clarity and allow reasonable time for response
  - Make arrangements for consultations in advance where possible
  - Demand high quality service
  - Give feedback on our services and products and suggestions for improvement
  - Comply with user guidelines provided for our services and products
  - Abide by legal and institutional requirements
  - Treat staff with respect, courtesy and integrity

Services and Products Offered

KARI offers a wide range of products and services which include

- Generation of knowledge, information and technologies, and catalyzing of farmer linkages to markets
- Offering advisory services, technical back-stopping and capacity building to the agricultural sector ministries, farmers and other agencies dealing with agricultural research for development.
- Identification and prioritization of research agenda together with partners.
- Capacity development of other service providers including extension, non-governmental organizations (NGOs), community-based organizations (CBOs) and civil society.
- Management of a national gene bank.
- Quality assurance of technologies developed, multiplied and disseminated through the uptake pathways.
- Development and management of agricultural research information systems.
- Contribution to policy formulation and advocacy.
- Offering laboratory and consultancy services.
- The Institute also offers the following services and products in the indicated centres at a cost.
- Soil, manure and plant tissue analysis at KARI Kabete and Muguga South.
- Livestock feed analysis at KARI Muguga South and Naivasha.
- Water analysis for irrigation purposes at KARI Kabete.
- Diagnosis of plant diseases at KARI Kabete.
- Diagnosis of animal diseases at KARI Muguga North, TRC Muguga and Biotechnology Centre, Kabete.
- Pesticide and veterinary drug residues analysis in livestock products at TRC, Muguga.
- Pesticides and drugs efficacy tests at Muguga North.
- Environmental impact assessment at KARI Kabete.
- Contract research at all KARI centres.
- Consultancy in agriculture and related sciences at all KARI centres.
- Information bulletins and brochures at all KARI centres.
- Planting materials and seeds through the KARI Seed Unit at KARI Headquarters.
- Student attachments at all KARI centres.
- Conference facilities at most KARI centres.

Commitments on service delivery

- KARI is committed to:
- Quality and timely delivery of services.
  - Serving clients with dignity, courtesy and respect.
  - None-discrimination in service delivery.
  - Maintaining appropriate confidentiality in dealing with clients.

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## BIOTECH

# China Plans \$3.5 Billion GM Crops in New Green Revolution

By Richard Stone

**B**EIJING - Confronted with land degradation, chronic water shortages, and a growing population that already numbers 1.3 billion, China is looking to a transgenic green revolution to secure its food supply. The government is expected to roll out a \$3.5 billion research and development (R&D) initiative on genetically modified (GM) plants. "The new initiative will spur commercialization of GM varieties," says Xue Dayuan, chief scientist on biodiversity at the Nanjing Institute of Environmental Science of the Ministry of Environmental Protection.

A central aim is to help China catch up with the West in the race to identify and patent plant genes "of great value," says Huang Dafang, former director of the Biotechnology Research Institute of the Chinese Academy of Agricultural Sciences in Beijing. Once intellectual property rights are in place, says Huang, transgenic technology could transform Chinese farming "from high-input and extensive cultivation to high-tech and intensive cultivation."

In the decade since China first allowed commercial planting of four GM crops, the government has moved cautiously, granting only two further approvals for small-market species: poplar trees and papaya. Currently, just one GM crop--insect-resistant cotton--is now planted widely, says Xue. China has balked at commercializing GM versions of staples such as rice, corn, and soybeans. That may change,

as China's leadership has thrown its weight fully behind GM. "To solve the food problem, we have to rely on big science and technology measures, rely on biotechnology, rely on GM," Premier Wen Jiabao told academicians last June at the annual gathering of the Chinese Academy of Sciences (CAS) and the Chinese Academy of Engineering. China's State Council, which Wen leads, approved the GM initiative in July.

Details of the new initiative, including which crops will gain initial support, are being hammered out, scientists say. Some funds will go to R&D on transgenic livestock, an area that has lagged behind GM crops. By 2006, the Chinese government had granted permits for 211 field trials of 20 GM crops, including the six approved for commercial production. As in other countries, the varieties that China has commercialized so far are equipped with genes to resist pests, tolerate herbicides, or stay fresh longer--not genes that directly boost yields.

Proponents note that China's cautious embrace of transgenic technology has yielded a major success story: GM cotton. Introduced into commerce in 1997, 64 varieties of pest-resistant

cotton are now grown on 3.7 million hectares, or about 70% of the area devoted to commercial cotton, averting the use of 650,000 tons of pesticides, says Huang.

The big prize is GM rice. Three years ago, Huang Jikun, director of CAS's Center for Chinese Agricultural Policy in Beijing, and colleagues reported that field trials of GM rice in

China were going well--boosting yields and reducing pesticide use on plots--and predicted that the varieties were on the threshold of commercialization. But the Chinese government is reluctant to tinker with the country's most important crop and has put off commercialization. The new

initiative might break the logjam, says Huang Jikun. "I hope the commercialization of GM rice will come within a couple of years," he says.

Although the central government has not released a budget figure for the new initiative, a spokesperson for the Ministry of Agriculture told *Science* that it would cost \$3.5 billion over 13 years. Half is expected to come from local governments on whose land GM crops will be grown and from agricultural biotechnology companies. "It's a new

way to support a big science project in China," says Huang Dafang. Another departure from other R&D initiatives, he says, is that each funded program is expected to produce an economic payoff.

One component of the initiative will be to educate the public about GM crops, says Huang Jikun. Although China is unlikely to see the sort of protests that have derailed field trials and commercialization in Europe, there are currents of disquiet in the general population. "For consumers, the safety of GM crops is the biggest worry. Just like some people are afraid of ghosts, some people are afraid of GM crops," says Zeng Yawen of the Biotechnology and Genetic Resources Institute of the Yunnan Academy of Agricultural Sciences in Kunming. Although Zeng believes that GM food safety will be demonstrated adequately, he worries that the new initiative will push China to "move too fast to commercialize GM varieties."

But with questions mounting about China's ability to feed itself, others contend that not pushing ahead with GM varieties could be more detrimental than any theoretical hazard. "Any kind of new technology may have risk," says Huang Dafang. But legitimate concerns, he says, should not be overshadowed by scare tactics designed to "mislead the public in the name of environmental protection." With the country's leaders firmly behind GM crops, it's unlikely that any protests would get very far.



GM Cotton: China's success story

## FHI Collaborating with Artists against HIV/AIDS Stigma

By FELIX MBOLE

**S**ongs are used in all cultures to communicate important values and deepest feelings of individuals therefore Family Health International (FHI) is collaborating with artists and community based organizations to fight stigma against people living with HIV/AIDS.

A senior FHI official in Africa, John McWilliam said this during a recent meeting at a Nairobi hotel attended by artists, leaders of CBO, health workers and journalists. He said that "the young generation should at the frontline to get tested and know their status."

He was supported by the director for Women Fighting Aids in Kenya (WOFAK), Ruth Onyango who said that across the world, stigma is at the root of silence, denial and

inaction in addressing HIV/AIDS. "Not everyone at risk is tested and those who test positive often fear disclosure and so until we realize that we are all a part of the same global family, our progress in fighting the epidemic will not be swift enough to avert millions more deaths," she said.

Mobilizing communities and providing psycho-social support along with life saving care and treatment is at the core of the war against HIV/AIDS but stigma and discrimination continue to act as powerful barrier, desperate the fact that both are addressed in almost every HIV programme in most societies in Africa, McWilliam said.

Through this the project captured the feelings and values of people dealing with HIV/AIDS. The making of the songs was inspired by Abbi's composition he made sure the song

went steps higher to reach the targeted group in the society.

He further said the stigma can be fought by accepting the fact you have got the disease and know how to relate with people in the society. He further said the married people are the most vulnerable people in the society who have more chances of getting the virus.

Family Health International has dedicated itself to improving lives knowledge and understanding worldwide through a highly diversified programme of research education and services in family health and HIV/AIDS prevention care and treatment. FHI has formed partnerships with national governments and local communities' throughout the developing world to support lasting improvement in the health of individuals and the effectiveness of entire

health systems.

Technical support and assistance in implementing HIV/AIDS initiatives that span targeted interventions, care and support given to the patients.

The launch started with "edu-tainment" a slogan that has been one of the key factors to the youth that means education and entertainment to get the attention of the youths. Ruth Onyango shared her personal experience living with HIV/AIDS for over 15 years and the challenges she had.

She said providing a forum for civil society, community-based organizations and people's networks to articulate and voice what is needed to make universal access a reality; identifying the key issues in scaling up towards universal access where social mobilization can make a difference by creating demand for services and also by support-

ing the role of communities at all levels of the response; sharing, learning, refining, adapting, building consensus and taking initiative for people-centered social actions and multi-sectoral mobilization to end HIV and aids. FHI's global research and programmatic efforts to reduce the prevalence of sexually transmitted infections (STIs) span three decades.

Sexually transmitted infections pose serious and continuing risks to the health and well-being of hundreds of millions of men and women. Consequences of STI infection include both female and male infertility, ectopic pregnancy, stillbirths, chronic disease and death in babies, and cervical cancer. STI can increase the likelihood of HIV transmission and controlling STIs is an important strategy for preventing the spread of HIV/AIDS.

# Move to Accredite Africa's Medical Labs

## - American Volunteer Professionals to Spearhead Initiative

By Agatha Ngotho

**G**overnment health officials from 13 African countries launched the first-ever push for accreditation of the continent's medical laboratories.

The process, according to the World Health Organization will be a historic step to strengthen health systems, improve patient care through better training and expanded diagnostic tests.

"It's time for Africa to go in this direction, accreditation is the only way to be sure a laboratory is a good laboratory," said Agnes Binagwaho, Rwanda's Permanent Secretary in the Ministry of Health.

"We cannot provide high quality care no matter what type of disease we're fighting without strong laboratories. This will greatly strengthen our health systems while building sustainable health systems," the permanent secretary said.

Just a handful of Africa's laboratories are now accredited, in part because the existing international accreditation process is so time-consuming. Kenya's Medical Training College completed its accreditation in August.

Many laboratories lack equipment, proper funding, adequate training and systematic management of work.

This new effort will operate under the guidance of the WHO Regional Office for Africa (WHO/AFRO) and the U.S. President's Emergency Plan for AIDS Relief (PEPFAR), implemented through the U.S. Department of Health and Human Services/Centers for Disease Control and Prevention (HHS/CDC).

The American Society for Clinical Pathology (ASCP) will assign dozens

of volunteer American lab professionals and the Clinton HIV/AIDS Initiative will help implement action-oriented training programs to boost and standardize the quality of African laboratories.

"Every patient deserves access to accurate and reliable diagnostics for treatment they receive. The laboratory accreditation process is an important means to encourage, evaluate and recognize competence, quality and reliability in medical laboratory testing.

"We consider laboratories to be a gateway to the management and treatment of priority diseases," said Philip Rotz, Training Coordinator of the Laboratory Services Team for the Clinton HIV/AIDS Initiative.

WHO-AFRO has established a five-step accreditation process structured around its core standards for laboratories, which will allow labs to gradually receive credit for improvement and eventually attain accreditation.

Laboratories form the backbone of health systems around the world, providing doctors and other health care workers with results of a battery of tests for deadly diseases.

If laboratories function properly, doctors and nurses will not only get correct diagnoses of diseases and an indication of when and how to begin treatment, but they will also know when drugs fail and when people develop resistance to medications.

Studies have shown that when patients need to return for a second visit to a hospital or clinic for test results, significant percentages fail to do so.

The work to improve laboratories began to gain momentum nearly a decade ago, with the intensified fight against

HIV/AIDS represented by PEPFAR and others provided funding and demand to improve laboratory services.

"Supporting governments' efforts to strengthen national health care systems, including laboratory quality management, is essential to ensuring sustainability of country-driven HIV/AIDS interventions," said Ambassador Eric Goosby, U.S. Global AIDS Coordinator.

"Efforts like this new lab accreditation process are essential to equipping countries and communities with the tools necessary for progress on health."

El-hadj Belabbes, HIV Lab Officer for the WHO Inter-country Support Team, Central Africa, said the outcome is the result of efforts initiated by WHO-AFRO and HHS/CDC eight years ago, leading to meetings with partners in Zimbabwe, Ghana, South Africa, Ethiopia, and Senegal.

"Following these meetings, WHO-AFRO, in collaboration with its partners, has initiated the first phase of laboratory accreditation but also has started the implementation of comprehensive Quality Management Systems and laboratory management training," Belabbes said.

The meeting held in Kigali by African experts and policy anticipated to unveil a blueprint toward the path of accreditation, obtain key stakeholders' support for accreditation as well as showcase a task-based training program in support of laboratory improvement required for accreditation.

"This is a tremendous leap forward for diagnostic laboratory services in Africa," said Dr. Lee H. Hilborne, past president of the American Society for Clinical Pathology, which helped design the training

program and will send volunteers from U.S. laboratories to assist the training.

"The commitment of laboratories, ministries of health and international partners, speaks to the realization that investments in infrastructure to date have matured to the point where it is now possible to explicitly commit to having Africa's laboratories aspire to and achieve compliance with international standards. The people of Africa and the world will benefit from this essential step forward."

It is estimated that the Africa has more than 2 million deaths annually from AIDS, nearly 2 million deaths from tuberculosis, and roughly 1 million deaths from malaria, yet its laboratories are among the most ill-equipped and poorly resourced facilities anywhere.

Connie Wilkins, a hospital laboratory director in Joplin, Missouri, in the United States and one of ASCP's volunteers, said that the process will be critically important in helping laboratories run more efficiently. Much of the effort will be focused on training laboratory managers and other administrative staff to improve the management of the facilities. After the laboratories go through the five-stage process for WHO-AFRO, they will be closer to applying for international accreditation as well.

"Anything we can do in education, including in improving laboratories is not just about saving a life but about improving quality of life. We're improving healthcare starting with being able to deliver to doctors a more accurate diagnosis of the problem and by allowing doctors to see how well treatments are working through periodic testing. It's just a huge deal," Wilkins said.

## KEMRI Molecular Biologist Awarded 20,000 Euros

**D**r Alexis Nzila, a Senior Scientist and Head of the Molecular Parasitology Group at the KEMRI Wellcome Trust Research Programme in Kilifi, has won the European and Developing Countries Clinical Trials Partnership (EDCTP) Award for Outstanding Senior African Scientist for 2009.

The award was officially announced yesterday at the EDCTP Fifth Annual Forum in Arusha, where Dr Nzila received the Certificate of Recognition and a Cash Prize of 20,000 Euros. The award is aimed at fostering research activities of the winners.

The announcement sent a wave of excitement and pride at the Kenya Medical Research Institute (KEMRI) headquarters. "This award is a statement of confidence and appreciation towards the excellent work being done at our research facilities. Our focus is always delivery of quality health to our people and

awards such as Dr. Nzila's are usually by products of our work, which delight all of us," said Dr. Solomon Mpoke, Acting Director, KEMRI.

"Alexis' work on developing anti-malaria drugs from existing cancer drugs is an approach which could bring alternative anti-malaria drugs to those who need them most," says Dr Norbert Peshu, the Director of the KEMRI Centre for Geographic Medicine Research, Coast.

Prof Kevin Marsh, the Scientific Director at the KEMRI Wellcome Trust Research Programme, says "Alexis work on understanding the mechanisms of drug action and drug resistance is important in the continuing effort to ensure that we have effective drugs with which to treat and prevent malaria. We are delighted that his work has received international recognition."

Dr Nzila has been working on the mechanism of the resistance to antifolate drugs (py-



**Dr Alexis Nzila**, Senior Scientist and Head of the Molecular Parasitology Group at the KEMRI Wellcome Trust Research Programme in Kilifi

rimethamine and sulfadoxine and lapudrine/dapsone) and on the understanding of their mode of action. One of his research interests has been to look into the folate biochemistry in cancer cells and utilise this information to better understand the malaria folate pathway, and discover

new drugs

Extending on his knowledge on antifolate resistance, Dr Nzila is now working on understanding the mechanism of resistance to other antimalarial drugs including lumefantrine, piperaquine and artemisinin, using phenotype characterisation and whole genome analysis, in collaboration with The Sanger Institute, Hinxton, UK.

In 2006, he won the United Kingdom's Royal Society Pfizer Award for "an outstanding, innovative contribution to biological science, including basic medical science, which contributes significantly to capacity building in Africa".

Alexis believes firmly that "there will not be lasting solutions to malaria without a strong contribution from African scientists. Controlling malaria is not simply a matter of distributing bed nets and medication. It also requires planning and research so we can predict what the situa-

tion may be like in 5 or 10 years from now. To tackle malaria at a national level, governments need scientific evidence to make effective policy decisions. Without strong research groups, government programmes for malaria control cannot work

The KEMRI-Wellcome Trust Research Programme tackles malaria and other important diseases in Kenya. Safeguarding the health of young children in Africa and their families is the primary motivation of the programmes research. In Kilifi, the Programme is embedded within Kilifi District Hospital, building its research programmes around local medical in

The European & Developing Countries Clinical Trials Partnership (EDCTP) was created in 2003 as a European response to the global health crisis caused by the three main poverty-related diseases of HIV/AIDS, malaria and tuberculosis.



## EDUCATION AND INNOVATION

# Higher Education for Sustainable Development in Africa (HESDA)

Second Part of a Keynote paper By Dr Kevin Chika Urama, the Executive Director, African Technology Policy Studies Network (ATPS) and the President, African Society for Ecological Economics (ASEE). It was presented during the 12th General Conference of the Association of African Universities, Abuja, Nigeria. Dr Urama is E-mail: kurama@atpsnet.org

## Part Two

### Implications

The brief discourse on the science and politics of sustainable development show that the concept of sustainability is complex and adaptive, and its operationalisation is context specific and dynamic depending on the prevailing social, economic and biophysical conditions at local, national, regional, continental and global scales. The economies of nations are integral parts of the life support system which we popularly call the “environment”, encompassing the social, economic and biophysical life support systems (see Figure 1).

This poses significant challenges to the implementation of HESDA in Africa. Some of these challenges are discussed briefly below:

**Complexity & adaptive system:** The environment is “a complex adaptive system”: - a dynamic and complex whole, interacting as a structured functional unit. No part of the system can be effectively managed “sustainably” in isolation.

**Collaboration:** We are therefore in a “Space ship earth” where energy, materials and information flow constantly amongst its components. Each actor in the space ship are rational and will necessarily seek their own interests as resources are finite and without boundaries. Knowledge will continue to be generated and shared in the global knowledge economy and these will inform global responses and policies for addressing global sustainable development challenges.

**Dynamic and multiple equilibrium:** Systems are often composed of entities (actors) seeking (partial) equilibrium but can exhibit **selfish behaviour causing oscillating or exponential behavior in the system.** The science of sustainable development does not therefore respect partial equilibrium”, or “*certis paribus*” assumptions. Instead, it celebrates “complexity” and feedback loops within the system.

**Externalities:** All actions by each actor in the space ship often have unintended effects (externalities) on other actors, some, with significant implications for global sustainability such as climate change, poverty alleviation, food security, water security, etc. Most significant global sustainability challenges such as climate change are global phenomenon with localized impacts. The externalities of these global sustainability challenges on developing countries are far reaching, especially in Africa. For example, Africa will bear the greatest impacts of climate change while it contributed least

to green house gases. If African Scholars do not proactively engage in sustainable development, actions of other global actors will of necessity, have externality effects on African development. This has significant implications for global environmental governance systems and implementation of sustainability principles such as the Polluter Pays Principle (PPP), the Precautionary principle (PP), Payments for Ecosystem Services (PES), Carbon markets, etc.

**Uncertainty & Irreversibility:** Most environmental impacts are low probability high risk events. It is therefore imperative that African scholars should proactively and continually evolve new knowledge to inform Africa’s responses

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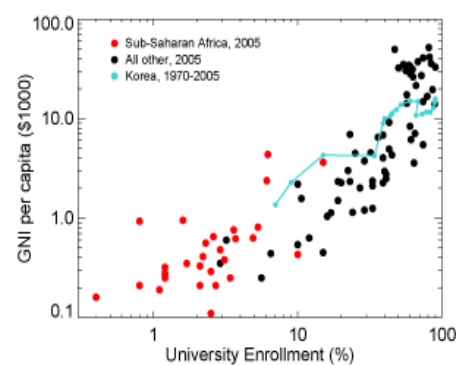


Figure 1: The Nexus between the Social, Economic and Biophysical Environments

to global environmental challenges and policies at all scales.

Based on the brief analyses above, it is evident that the sustainability of African economies is significantly dependent on the extent to which Africa strategically engages in the sustainable development agenda at the global, continental, national and local scales. Africa is a super power in terms of natural resource endowments but still ranks amongst to poorest continents in the world. Investing in HESDA is therefore a necessary condition for sus-

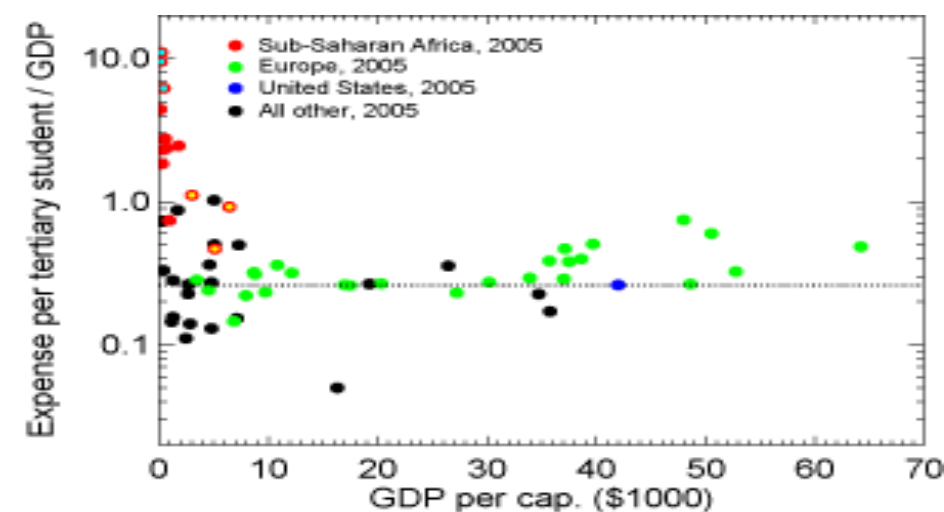


Figure 3: National Government Expenses per Tertiary Student as a Proportion of Gross Domestic Product (Source: Moyer, (2007).



Dr Kevin Chika Urama, The Executive Director, African Technology Policy Studies Network ATPS

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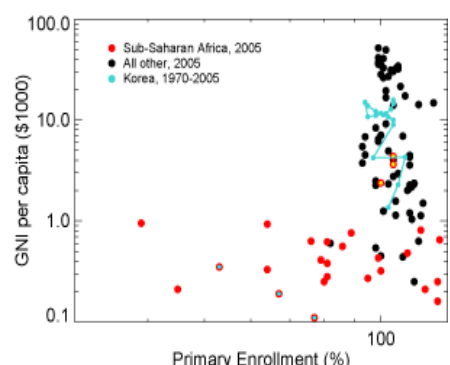


Figure 2: Correlation between Gross National Incomes (GNI) and Enrolment Rates in (a) Universities and (b) Primary Education (Source: Moyer, E.J. (2007).

ability in Africa, as well as the maintenance of the global natural capital stock. It is therefore not a question of if African should invest in HESDA, but rather how Africa should implement HESDA most cost-effectively.

### Current Scenarios

To address the question of how to implement HESDA, the paper examines the current scenarios in Africa in comparison with other developed and emerging continents, drawing lessons where appropriate.

A rapid assessment of selected Higher Schools and Universities in Africa show that the current pedagogies and incentive structures in are discipline base, focuses on literacy and publications, organized in faculties with rigid boundaries and hence discourages collaboration, trans-disciplinarity and responsible innovation. The disciplinary domains focus on scientific enquiry and building “academic tribes” rather than collective learning. Single authored publications are often priced more than collaborative publications in the staff promotion exercises and Research Assessment Exercises (RAE). Curriculum has been seldom reviewed in the light of emerging development challenges in many countries. Science is not fully embedded in society and corroboration of theory is often easier to publish in peer reviewed journals than falsification of theory. This is even more debilitating for young researchers as most of the international journals are not accessible. Most of the journals are also hosted in Europe and America and hence are designed to address development agenda of the North, hence scientific enquiries into African development challenges are seldom published. There has been an increase in the emergence of African journals during the past decade, but these are still not very popular as ISI journals attract higher impact factors and hence higher chances of promotions under the current RAE system.

The implications of the above are that contribution of Africa’s Higher Education systems to economic growth, social equity and sustenance of Africa’s rich natural resources has been dismal. In the following section, the paper illustrates the low impact of current Higher Education paradigms in Africa on the three pillars of sustainable development.

### The Impact of Higher Education on Economic Growth in Africa

Empirical studies find significant correlation between university enrollment rates and growth in national incomes in many countries (Moyer, E.J. 2007). No educational factor correlates as strongly with national incomes as university enrollment rates. Analyses show that attaining full primary education for all which has been the main focus of government policies in many African countries may be a necessary but no sufficient condition for development in most countries globally. For example, Togo and Madagascar have attained over 90% primary school enrollment rates but this has not translated into higher national incomes. The same relationship holds not only between countries but also over time for a single developing country (for details, see Moyer, 2007). On the converse, university enrollment rates in sub-Saharan Africa are among the lowest in

the world, averaging 5%, compared to > 60% elsewhere and up to 72% in the United States of America. The rate of university enrollment also varies within the region with South Africa attaining up to 15%. Overall, the contributions of higher education in Africa to gross national incomes are significantly low.

A more in-depth analyses provided by Moyer et al., (2007) suggest that the relative cost of higher education per student trained as a proportion of Gross National Income (GNI) is higher in Africa than in the developed countries, including the USA and Europe (Figure 2).

This leaves the African Higher Education in significant dilemma. A rapid appraisal of the system shows that African governments are the primary source of funding for higher education in Africa. If higher education does not contribute significantly to national income growth, it is most likely that governments will prioritize other development challenges such as poverty alleviation, climate change adaptation, water insecurity, peace, etc. over continued investments in higher education.

Yet, providing a reasonable level of higher education will continue to require a minimum threshold of investments in the sector. This would, in turn, limit enrollment rates further as budgetary constraints increase. Inherently, this leads to reduced standards in teaching and learning facilities as University faculties engage in moonlighting activities and staff unions evoke industrial action (strikes) to lobby

for increased investment in the sector.

This analysis suggests that it is likely that this could become a vicious cycle unless Higher Education in Africa finds innovative ways of increasing investments, enrollment rates and relevance to the socio-economic and environmental needs of the continent.

## 2.2. The Impact of Higher Education on Social Sustainability in Africa

The hallmarks of social sustainability are participatory democracy, stakeholder empowerment and social equity. This, in turn requires active engagement of the quadruple helix (the governance sectors, the academia, the private sector and the civil society) in framing and shaping the social, economic and environmental policies of countries.

However, a rapid assessment of the institutional and operational structures of higher education in Africa suggests that most of the governance structures are strictly hierarchical and rigid bureaucracies. Most scholars attribute this to Africa's colonial history. University systems in Africa were designed by the colonial masters to reproduce the characteristics of theirs (mainly British, French & Belgium). Subsequently, there was rapid expansion in Higher Education in the early 1960s, but still within the constrained colonial systems. In the 1970s, the global oil crisis led to reduced funding and Higher Education was viewed as a secondary priority. Since then, Donor funding has remained influential in defining

research and teaching programs and university management systems. The socialisation of African science in Africa, i.e. embedding our science in our society therefore took the back seat.

Knowledge and technology transfer mechanisms are still largely based on the linear models of innovation diffusion. Innovation is largely regarded as the product of research within the codified knowledge communities (science disciplines) in which knowledge dissemination is largely an end-of-pipe activity at the end of linear process: information gathering and field observations, data analyses and hypothesis testing, and final dissemination of results. The sector within which most involvement of the stakeholders has been observed is in the agricultural sector. Yet, within the sector, innovation diffusion process is modeled on the assumption that research findings, once packaged by extension staff, are expected to be inherently suited to transfer to the farming community. The initiator of innovation is codified science and increase in scientific inputs into the pipeline will directly increase the number of new innovations and technologies flowing out the downstream end. Little attention is paid to tacit knowledge held by the farming communities and other relevant stakeholders. Traditional farming practices such as multi-cropping and organic farming were described as conservatism until recently when the environmental movement led to the realization that these practices were more sustainable than conventional modern practices (see Urama,

2003; 2005). Years of experience have also shown that "technical changes do not occur in a perfectly linear sequence, but through feedback loops within the system" (OECD, 1997, p. 12).

In addition, the language of science remained the colonial languages, mainly English, French and Portuguese. This mutually excludes the civil society, the government and the private sector in knowledge generation and knowledge valorization in Africa. Students are often taught about food crops in their locality in *Botanical (or Latin) names* which make no sense to the student beyond the class rooms. Different discipline evolved its own specialized language "disciplinary jargons" that precludes any form of bilateral or tri-lateral collaboration and interdependencies between university faculties, knowledge networks, the private sector, local communities actors, policy makers, etc. Also, flexibility, creativity and innovation remain seldom rewarded by the research assessment exercises (RAEs) as preference is mainly given to publications in international journals. Science in African Universities has therefore been described as an artifact of Africa's colonial past. Recently, the Chairman of NEPAD Steering Committee urged institutions of higher education in Africa to create "a culture of developing new knowledge and skills for generating solutions to Africa's development challenges" (cited in UNESCO, 2005).

(Part 3 continues in the next issue)

# Finally Stingless African Bees

## From Page 6

The colonies are transferred from the logs, house walls and posts. Trap nests are also used in catching swarms in the forest and colony division is being carried out," says Macharia.

In Mwingi district (an arid area), many farmers distinguish stingless bees by their 'very sweet honey'. Here there are two commonly domesticated species of stingless bees. Farmers cut the trunks in which the colonies occur and continue keeping the bees in the trunk near the homesteads.

Macharia has also studied the stingless bees of the Arabuko-Sokoke forest (a coastal forest along Indian Ocean), and found that there are four species of stingless bees. Some of them easily colonise other types of hives like the Kenya Top Bar Hive and honeybees catcher boxes. He says they have harvested 300ml of liquid honey from one nest of one of the species in a single harvest during the study, attesting to the honey production potential of stingless bees.

However, it is as pollinators that stingless bees may find their most important role.

Stingless bees are among the potential alternative pollinators, since they play an important ecological role as pollinators of many wild plant species. At the moment, says Macharia, the main limitation to the commercial use of these bees for pollination services is the lack of knowledge of mass-breeding. "Artificial colony reproduction needs to be further

developed before these bees can become available as commercial pollinators. But given the range of species available and the range of plants used by them as food sources, it is merely a matter of matching bees to crops and developing management techniques," says Macharia.

Their role as crop pollinators has been assessed in 18 crops. Some of these crops are grown in open fields in tropical climates, but others are grown in enclosures such as cages and greenhouses. Eleven species of stingless bees across six genera have been found to forage effectively under enclosed conditions, indicating their potential as pollinators of greenhouse crops. An economic incentive for the use of stingless bees as commercial pollinators is that colonies can be kept (outdoors or indoors) for years and do not die after reproduction (like bumblebees do). There is no doubt that Macharia's research will one day come up with strategies that might see stingless bees being sold globally for use as pollinators.

## Honey harvesting methods

Stingless bees store only limited amount of honey. But colonies found in the forest can yield even up to 15- 20 litres. In Kenya, honey is frequently collected from natural colonies in the forest (honey hunting). This often leads to the destruction of the nests, and often that of the tree as well. During the harvest, honey is squeezed out of the storage pots. Since pots with pollen are also found in the honey storage area, considerable amount of pollen generally gets lost. The emptied nest material is thrown away.



Established meliponary in Kakamega

Also part of the brood is destroyed when the honey is taken out due to the narrow size of the log. Stingless bees honey is highly valued due to its medicinal value that includes treatment of cough, cold, chest pains, burns and wounds. Scientific evidence on the medicinal value of this honey is lacking.

## Prospects for meliponiculture development

The development of meliponiculture provides new opportunities for people in the rural areas as a source of income and can improve the economics of many households. Meliponiculture can also be organized to ideally provide agriculture and wildlife with essential ecosystem services such as pollination.

Rationalized management of domes-

ticated colonies, based on the biology of the bees, is necessary to increase honey production, although the amount of honey produced by stingless bees will always be less than the amount produced by the honeybees. The fact that stingless bees can be used for pollination in agroecosystems is likely to encourage meliponiculture. In Kenya, where stingless bees occur, farmers are enthusiastic to initiate meliponiculture.

The challenges for development and improvement of meliponiculture in Kenya include. Identification of proper honey storage/processing methods, for boosting natural populations, maintaining the bees in rational hive, utilization of stingless bees for pollination and information exchange and training at all levels. However, most of these challenges can be resolved through basic research.



# Africa Must Move Beyond Importing Ideas and Technology

By Monty Jones, Executive Director, FARA.

Science and technology are keys to global development. In Africa their application to agriculture is expected to open the doors to economic and social development and, global competitiveness. Therefore strong endogenous science and technical capacities are essential for Africa to acquire the new knowledge required to overcome its persistent problems instead of just importing ideas and technologies. However capacity cannot be built by individuals or institutions working in isolation.

A free flow of readily accessible information is a common characteristic of all successful innovation systems and this depends on having strong and appropriately oriented education and training institutions as well as well functioning information and communication technologies (ICTs). African countries have been historically dependent on selling raw materials, with very little value adding processing or marketing. Not surprisingly these economies have waxed and waned over time following the fluctuations in commodity prices without making real sustainable

gains in employment and income generation. The new foreign scramble for Africa's minerals and agricultural land has starkly exposed the weaknesses of Africa's innovation systems in general and in agriculture in particular. This is catalyzing a new African determination to strengthen the continent's scientific and technological capacities as components of innovation systems that are capable of harnessing the genius of all actors in the agricultural value chains. These chains are only as strong as their weakest links and there is no body of knowledge that Africa can afford to dispense with. Science and technology must not only address the needs of smallholders but must also tap into their generations of accumulated unique knowledge of African agriculture at its roots.

Contrary to the popular image, innovation is not foreign to Africa. For example, the continent is the fastest growing global market for mobile telephony and its uses are diversifying exponentially in areas such as market information, technical advice, commodity brokerage, money transfers and many more. The new commitment is exemplified by Rwanda which is aiming to transform its predominant



Monty Jones

subsistence farming systems by investing in i) improved agricultural techniques, ii) establishing centers of science and technology, and iii) adopting value chain approaches with focus on quality control such as certification of products like coffee and tea. Other examples can be found in Uganda on the adoption of high impact technologies in aquaculture and organic farming; Kenya is demonstrating the power of sharing technologies within enterprise clusters for the production of cut flowers, auto parts, handicrafts, and other locally manufactured products.

While acknowledging the huge impact of conventional research

in areas such as crop breeding and veterinary vaccines, FARA's stakeholders were nevertheless disappointed by the overall low economic returns to agricultural research in Africa. In stakeholders' consultations leading to the development of the Sub Saharan Africa Challenge Programme (SSA CP) they expressed a demand to go beyond farming systems research (FSR) and integrated natural resource management (INRM) to adopt an approach that would involve all value chain actors. They were mindful that the late Nobel Laureate Norman Borlaug would never have saved so many lives if he had stopped at just producing high-yielding varieties. His advocacy and skills of persuasion to political leaders such as Prime Minister Indira Gandhi to make adequate quantities of seeds and fertilizer available were equally essential to his success. The outcome of FARA's consultations on how to achieve greater impact was the holistic and inclusive Integrated Agricultural Research for Development approach to agricultural innovation. These steps are being taken through the Sub Saharan Africa Challenge Programme at three Pilot Learning Sites (PLS)

involving eight countries in the ASARECA, CORAF/WECARD and SADC-FANR sub-regions.

The research being conducted by the task forces supported by the SSA CP is focused on (i) delivering proven international public goods on best practices in multi-stakeholder engagement in the generation and wide-scale adoption of agricultural innovations and (ii) evaluating whether IAR4D is more efficient and effective in realizing significant benefits than alternative conventional approaches. Assuming that the present positive signs lead to a successful proof of concept, which the partners aim to achieve by the end of the current research phase. The respective Sub Regional Organisations (SROs) will have assumed full leadership of the ongoing research in the Pilot Learning Sites and for up-scaling the approach and methodologies.

At the continental level, the FARA Secretariat will continue to be a centre of knowledge on International Agricultural Research for Development taking account the strengths, weaknesses, opportunities and threats in its implementation and impact. (FARA Newsletter)

# The Way Forward on Food and Nutrition Security

By Joachim von Braun, Executive Director IFPRI (Edited Statement for the World Summit on Food Security November 16, 2009)

The world is facing protracted and especially difficult food and economic crises, and climate change will increasingly provide serious challenges. Hunger is on the rise and the lives and health of millions of people are being compromised. Now more than ever, a global response to the problems facing poor people is needed.

Focusing on narrow issues will not be sufficient. Fortunately, the G-20 and the UN are calling for a "comprehensive approach" to achieving food security. A truly comprehensive approach for supporting the poor in managing growing food-security risks must include agricultural productivity enhancement, strengthening market and trade opportunities, insurance opportunities, and social-protection opportunities.

Food security risk prevention will not be achieved without accelerated innovation, and therefore at a global level the investments in agricultural research, especially in the Consultative Group on International Agricultural Research (CGIAR), have to increase. This must be comple-

mented by four priorities that need to be addressed now in the context of a comprehensive approach:

## 1. Investing in Nutrition

Despite extensive research demonstrating the overwhelming social and economic benefits of improved nutrition, this issue remains a step-child. Nutrition interventions are rarely discussed, much less vigorously pursued, by developing-country policymakers, in part because nutrition does not fit neatly within any one government sector. In addition, because undernutrition is a quiet crisis of the poorest and their children, ignoring it rarely imposes political costs on leaders. Nevertheless, nutrition programs are often the most cost-effective inventions. Improving nutrition contributes to productivity, economic development, and poverty reduction by improving physical work capacity, cognitive development, school performance, and health.

## 2. Improving Market Access

Lack of market access for small-scale farmers is one of the biggest barriers to rural development, especially in Sub-Saharan Africa. Without a reliable market for their products, farmers have little incentive to increase their



Joachim von Braun

productivity. Additionally, farmers need reliable price information, contracts enforcement, and other measures to allow them to compete effectively. Government policy to facilitate market access requires strengthening. Increased investment in rural market infrastructure is key. For example, evidence from China and Uganda shows that low-cost forms of infrastructure, such as rural feeder roads, often have the highest payoff per unit of investment in terms of growth and poverty reduction. Access to good seeds and fertilizer also require public policy in environments of market malfunctioning, with targeted support in

transition periods until infrastructure and financial institutions are in place.

## 3. Reducing Food Price Volatility

The food price crisis that raged throughout 2008 and still lingers in 2009 had several causes, including stagnant agricultural productivity growth due to low investment in agricultural research, rising demand for food and feed and biofuels, and high oil prices. A number of countries reacted by restricting grain exports that only worsened the crisis, and some adopted retail price controls, creating perverse incentives for producers. Speculative price spikes have built up, and the gap between cash and futures prices has risen. These reactions impede the free flow of food to where it is most needed and undermine the flow of price signals to farmers, and impose enormous efficiency losses on the global food system, hitting the poorest countries and people hardest. To counteract these problems, IFPRI has proposed a new global institutional arrangement that would consist of two prongs: (1) a minimum physical grain reserve for humanitarian assistance, and (2) a virtual reserve and intervention mechanism to calm markets under speculative situations,

backed up by a financial fund. Implementing this risk mitigating instrument of real and virtual reserves would go a long way to prevent future price spikes.

## 4. Adapting to Climate Change

Developing countries will be hit hardest by climate change and will face bigger declines in crop yields and production than industrialized countries. Small-scale farmers will suffer the most. Without new technology and support for adjustments by farmers, climate change will significantly reduce yields. An international public research network for climate change related technology generation and sharing shall be established and funded to operate as an independent consultative group, with a focus on knowledge related to both adaptation and mitigation. It shall complement innovations that are property rights protected. In the field of agriculture, forestry and land use and land cover change as well as water related research it shall draw on the CGIAR (and other resources as appropriate).

In closing, it is important to remember that the world has achieved great successes in agricultural development that have fed billions of people.





## FOCUS on World's Largest Malaria Conference

# Kenya's Vice President Opens 5th Pan African Multi-lateral Initiative on Malaria Conference

(Edited Speech by Hon. Kalonzo Musyoka)

**H**olding the 5<sup>th</sup> Pan African Multi-Lateral initiative on malaria (MIM) Conference in Kenya will boost the confidence of scholars, researchers and practitioners in medicine, particularly those dealing with malaria. It will also increase Kenya's commitment to the advancement of malaria research and implementation of effective malaria control. Similar effect will be felt throughout the Africa and the world.

There have been some remarkable achievements in malaria control. 40 percent of the populations in Sub-Saharan Africa currently enjoy access to long lasting insecticide treated mosquito nets compared to ten (10) percent in 2005. It is worth noting that the majority of countries in Sub-Saharan Africa are now using the World Health Organization

recommended artemisinin-based combination therapies as the first line treatment of malaria.

These treatments have been proved to be much more effective. As a result of this prompt treatment and in combination with other strategies, malaria infections have reduced by 50 percent in more than 20 African countries during the period 2000 to 2008. This can be further improved with increased access to the recommended malaria medicines within 24 hours of the onset of systems especially in children less than 5 years of age.

In Kenya, massive scale-up on the use of insecticide treated bed nets, in door residual spraying campaign and the nationwide implementation of the use of artemisinin-based combination therapies for malaria admissions.

In spite of these successes, many



countries are unlikely to meet the 2010 milestones, owing to inadequate resource to make the interventions universally accessible.

African leaders meeting at UN General Assembly in New York, formed an alliance against malaria whose main objective is to mobilize resources to enable the

achievement of the 2010 targets, 2015 Millennium Development Goals and elimination of death due to malaria by 2015. I encourage African government and our development partners to honour their commitments so that we can eliminate this scourge without which, economic growth and development will be greatly curtailed, especially in the African tropics.

Research is key to helping the African continent find home grown solutions to the malaria problems. I challenge you to find new ways to deal with resistance to malaria medicines and insecticides for vector control, and to develop innovations that will make our desire for a continent free of malaria a reality.

The use of insecticide treated nets; in door residual spraying and the adoption of combination

treatments to fight the problem of the drug resistance have given us hope that malaria vaccine may soon be eliminated. Innovations and interventions such as the malaria vaccine may soon be available to add to the arsenal of malaria control and prevention tools. In deed, several countries in Southern Africa, Zanzibar, Mauritius and Gambia are clearly on the path to malaria elimination through the effective implementation of malaria preventive and control.

This conference should be proud that African scientists are playing a leading role in the initiative to develop a vaccine to protect young children from malaria infections. We are indeed hopeful that the new vaccine will have the same impact as the vaccine used to eradicate small pox globally.

## Unite to Outwit Malaria Parasite

(Edited Statement by Hon. Beth Mugo, Minister of Public Health and Sanitation)

**T**he MIM-PAMC was first held in Dakar, Senegal in 1997, in Durban, South Africa in 1999, Arusha, Tanzania in 2002 and in Yaoundé, Cameroon in 2005.

Every year, Kenya loses 30,000 children to malaria infection (1 child every 12 min). Malaria accounts for 30 percent of outpatient attendance and 19 percent of admissions in our health facilities placing a heavy burden on the health care system. In terms man-hours, each year, an estimated 170 million working days are lost due to malaria, resulting in tremendous losses to our economy.

WHO, together with my Ministry have consistently advocated for the use of available and proven tools including Long-Lasting Insecticide-Treated Nets (LLITNs), Artemisinin-based Combination Therapy (ACTs) and Indoor Residual Spraying (IRS).

Half of the global population is at risk of malaria, which kills one child every 30 seconds and is one of the world's deadliest and most persistent diseases. Fortunately, in recent years, the world has made significant progress toward defeating malaria, with the long-term goal of eradicating the disease.

The MIM conference comes to Nairobi at a critical and defining moment: When widespread drug and insecticide resistance threatens to undo the important progress we have achieved on malaria. *ACTs are the gold standard for malaria treatment, the over-use of artemisinin monotherapies is breeding drug resistance.*



On the other hand, expanding access to insecticides and agricultural use of insecticides, are putting evolutionary pressure on mosquitoes to develop resistance to the most effective malaria control methods available such as Insecticide Treated Nets and Indoor Residual Spraying.

Unfortunately, there are no new classes of malaria drugs or insecticides in late-stage development. If we allow resistance to spread, it could render our best treatment and control options useless.

However, new and improved drugs, diagnostics, vaccines and vector control methods remain our best hope for the eradication. This conference will discuss financing and delivery even as we invest in research and development of new candidates. Substantial political and financial support, along with a critical mass of scientists working on malaria in Sub-Saharan Africa, are needed to successfully develop, implement and sustain an effective malaria research agenda.

In addition the forum will enhance malaria awareness and status on the international political and also involve the launching of the Malaria Eradication Agenda (MaIERA) and finally review the progress made following the Abuja Declaration by African Leaders in 2000.

United we will outwit the parasite and disjointed we will continue to count losses.

## KEMRI Solving Malaria Problem

By Dr. Solomon Mpoke  
(Acting Director, KEMRI)

**K**EMRI which is hosting the 5<sup>th</sup>, Multilateral Initiative on Malaria Pan-African Malaria Conference is a health research institution with a mandate to undertake human health, conduct training, disseminate and translate research findings into policy. In the discharge of our mandates, we collaborate with a number of research and academic institutions at local, regional and international level.

Our approach to malaria research has been modeled alongside that of the government's National Malaria Strategies that seeks to reduce morbidity and mortality associated with malaria by 30 percent from 2006 and maintain it by 2010.

As an Institute we have made considerable contribution towards this strategy through appropriately well defined and coordinated research on Malaria. In addition, KEMRI and her collaborators and partners, is firmly committed to the objectives of the Roll Back Malaria Programme (RBM).

Together with our collaborators such the Centres for Disease Control and Prevention (CDC), the Walter Reed Army Institute of Research, the World Health Organization, the Japan International Cooperation Agency (JICA), the Wellcome Trust of UK, parent Ministries of Medical Services and Public Health and a host of local and international Universities, remarkable results have been registered.

KEMRI's focus on malaria has been the development of innovative approaches that combines both preventive and curative strategies for Malaria. For

instance, as you lay down in your bed tonight under a Insecticide Treated Nets (ITNs), it will gratify you to note that the initial multidisciplinary trials and research on the development of ITNs were done by KEMRI and adopted by WHO.

Another remarkable contribution towards the fight against malaria was in the monitoring of the effectiveness or otherwise of the anti-malaria drugs in the country. Thanks to our research, we now know that drugs such as chloroquine or sulphadoxine pyrimethamine have become increasingly ineffective due to drug resistance.

Resistance to chloroquine now reaches over 90 percent in many parts of Africa and has completely been removed from the shelves in Kenya by the government. Studies carried out by KEMRI and other partners, has since 2001 been advocating for use of combination therapies, preferably those containing artemisinin derivatives (ACTs – artemisinin-based combination therapies), and to fixed-dose combinations when possible.

Malaria research concentrates on epidemiology, vector biology, parasites, immunology, molecular biology, pathophysiology, prevention and control of vectors. In addition it focuses on drugs management and development of vaccines.

KEMRI and her partners have embarked on Phase III Malaria Vaccine trial. One of the promising malaria vaccine, RTS,S is being tested in Kenya at three KEMRI sites in Siaya and Kombewa in Nyanza Province and in Kilifi in Coast Province. Tanzania, Mozambique, Gabon, Malawi, Ghana and Burkina Faso are participating in the trial. We can defeat malaria.



## FOCUS on World's Largest Malaria Conference

# Coartem Dispersible Winning the Battle Against Malaria in Infants and Children

By Naftali Mungai

During the 5<sup>th</sup> Multilateral Initiative on Malaria (MIM) conference that was held in Nairobi from 2-6 November 2009, among other milestones that were discussed was the development by Novartis of an Artemether/Lumefantrine (Coartem) fixed dose combination for infants and children. Coartem Dispersible tablet, as it is now popularly known, is an artemisinin-based combination drug that has been formulated for infants and children.

"It disperses in water, is sweet tasting and easy to take," says Dr Nathan Murule, the Novartis Manager, Africa

Operations, Malaria Initiatives. The drug was developed by the Medicines for Malaria Venture (MMV) and Novartis. According to Murule, clinical studies were conducted two years ago in six African countries. The study titled *Efficacy and safety of Artemether-Lumefantrine Dispersible tablets compared with crushed commercial tablets in African infants and children with uncomplicated malaria: a randomised, single-blind multicentre trial*, was conducted by Dr Salim Abdulla of the Ifakara Health Research Centre in Tanzania and several colleagues from other African countries.

It was published in 2008 in Issue Number 372 of *The Lan-*



**Dr. Nathan Murule**  
Manager, Africa Operations,  
Malaria Initiatives

*cet*. The study was predicated on the need for a palatable and

attractive alternative formulation of ACT that can prevent children dying from malaria.

It was predicted in the *Lancet* article that from a public health perspective, the study would have consequences for current clinical practice. This has proved true as the use of Coartem dispersible tablet continues to enhance and promote better treatment outcomes in addition to delaying the development of drug resistance at the same time.

The study showed a high efficacy for the drug (over 96%) and this led to the approval of Coartem Dispersible tablet by the World Health Organization (WHO). So far, it remains the only ACT for children that

enjoys WHO approval. It is also the only ACT to have been approved by the Food and Drug Administration of the US which has very stringent requirements for drug approval.

To add to its efficacy and safety profile, the drug has also been approved by the European Medical Evaluation Agency (EMA), the European equivalent of the FDA.

Currently, says Dr Murule, Coartem Dispersible is available in public sector or public medical institutions in Tanzania, Mali, Zambia and Niger while in Kenya it is available in private institutions but will soon be in the public institutions or sector.

### REMARKABLE PARTNERSHIP

## Pioneering Collaboration Between Novartis and Chinese Partners

Artemisinin, the parent compound of the artemether component of Coartem is derived from the plant sweet wormwood (*Artemisia annua*). Its first recorded use was in China in 168 BC for the treatment of fever. In 1967, the Chinese Army screened more than 10,000 traditional remedies in the search for treatment of malaria-stricken soldiers in the Vietnam War. *Artemisia annua* proved successful, and by the mid 1970s, the active ingredient – artemisinin – had been isolated and proved to be a potent, rapidly-acting antimalarial agent.

A derivative of artemisinin called artemether is now part of the dual combination of drugs used in Coartem and Coartem Dispersible.

Artemether is rapidly effective and quickly eliminated from the body raising the possibil-

ity of some parasites persisting after treatment and the emergence of drug resistance. Chinese researchers at the Beijing Academy of Military Medical Sciences in the 1980s combined artemether with Lumefantrine, the active ingredient in Coartem and Coartem Dispersible. Lumefantrine kills remaining parasites in the blood stream and has the advantage of never having been used as monotherapy treatment, unlike other companion drugs used in ACTs.

In 1990, Chinese officials met with Novartis (then Ciba-Geigy) and ultimately agreed to develop, test and manufacture Coartem through a joint venture – the first collaboration of its kind in Chinese history.

The Chinese government presented the prestigious China International Science and Technology award to Dr. Daniel Vasella in 2005. In 2009, Prof. Zhou

Yiqing from the Microbiology and Epidemiology Institute in Beijing received a 'European Inventor of the Year' award from the European Patent Office and European Commission's DG Enterprise and Industry for developing Coartem.

### Sharing Technologies and Expertise

During the development and early production of Coartem, Chinese researchers did not have access to technologies available in the West. Significant technology transfer from Novartis enabled its Chinese partners to redesign local production facilities and upgrade quality assurance systems to comply with international standards of Goods Manufacturing Practice (GMP) and to build new factories. Coartem is produced by Novartis in China and the US.

## A Unique Collaboration Between Novartis and WHO

A landmark private-public agreement between Novartis and WHO was unveiled in 2001. In a 10-year pact, Novartis agreed to make Coartem available without profit for distribution through WHO in malaria-endemic developing countries.

Developing countries or their agents procure Coartem using grants from the Global Fund to Fight AIDS, Tuberculosis and Malaria and other donors. The Global Fund is the world's largest financier of malaria control programmes, receiving support mainly from G-8 countries and the Bill and Melinda Gates Foundation. The US President's malaria initiative, the World Bank Malaria Booster Program and, more recently, the airline tax charity UNITAID are other important funders of malaria management initiatives. This

broad partnership has provided millions of children and adults with access to a high-quality treatment for malaria.

### Expanding Access to Coartem

For patients in developing countries who are treated through the public healthcare system, Novartis announced a significant price reduction in 2006, lowering the price for Coartem treatment from an average of US\$1.57 to US\$1.00. In April 2008, and again in August 2009, the company made further reductions, cutting the public sector price to an average of US\$0.76 (or US\$0.36 for a child's treatment pack). Since 2001, the price of Coartem for public sector buyers has dropped by over 50%. Coartem production continues to be a non-profit-making initiative for Novartis.

## China's Prof Zhou Yiqing 2009 Winner of European Inventor of Year Award

One of the major lessons for Africa's researchers, especially those involved in the war against malaria, is that credible scientific innovations in what is already a global village often receives appropriate national, regional and international recognition.

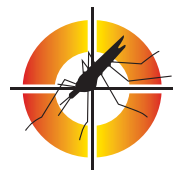


*Prof Zhou Yiqing (left) who is from the Microbiology and Epidemiology Institute in Beijing, is the 2009 winner of 'European Inventor of the Year' Award from the European Patent Office and European Commission's DG Enterprise and Industry for developing Coartem.*

Many people in Africa may not know that one of China's top biomedical experts Prof Zhou Yiqing helped develop Coartem. Prof Zhou Yiqing who is from the Microbiology and Epidemiology Institute in Beijing, is the 2009 winner of 'European Inventor of the Year' Award from

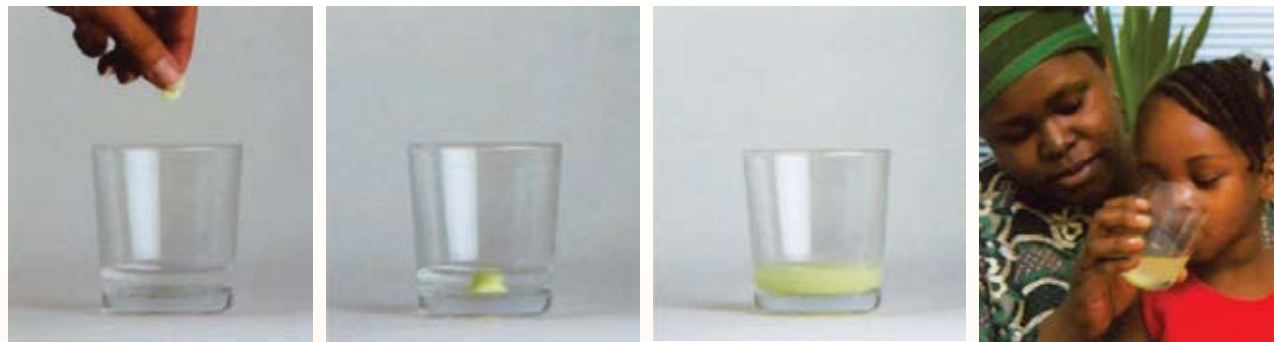
the European Patent Office and European Commission's DG Enterprise and Industry for developing Coartem. This should encourage African researchers focusing on various indigenous medicinal plant with anti-malaria parasite properties to double their efforts.

ADVERTISEMENT



**Coartem<sup>®</sup> D** *ispersible*  
Artemether/Lumefantrine  
**20/120 mg**

# A new dispersible paediatric formulation of the WHO-recommended anti-malarial<sup>1</sup>



- Proven high efficacy<sup>2,3</sup>
- Simple dosing schedule<sup>2</sup>
- Reliable, convenient and safe<sup>2</sup>
- Recommended for infants, children and adults<sup>2</sup>

## Summary Prescribing Information for Coartem<sup>®</sup> and Coartem<sup>®</sup> Dispersible

**Presentation:** Coartem Fixed combination: tablets for oral administration containing 20 mg artemether and 120 mg lumefantrine. **Coartem Dispersible Fixed combination:** Dispersible tablets for oral administration containing 20 mg artemether and 120 mg lumefantrine. Paediatric use only. **Indications:** Coartem Treatment and standby emergency treatment of adults, children and infants with acute and uncomplicated malaria due to Plasmodium falciparum infection or mixed infection including P. falciparum. Coartem is also recommended for malaria infections acquired in areas where multi-drug resistance is present or developing. Coartem Dispersible Treatment and standby emergency treatment of children and infants with acute and uncomplicated malaria due to Plasmodium falciparum infection or mixed infection including P.falciparum. Coartem is also recommended for malaria infections acquired in areas where multi-drug resistance is present or developing. **Dosage for treatment and standby emergency treatment:** Standard dosage schedule is 6 doses over 3 days. Coartem Tablets to be taken with high fat foods or drinks (e.g. milk). Adults and adolescents weighing 35kg and above: four tablets at initial diagnosis, four tablets again after 8 hours, and then four tablets twice daily on the following two days. Infants and children between 5kg and less than 35 kg: one to three tablets (depending on bodyweight) at initial diagnosis, the same dose again after 8 hours, and then the same dose again twice daily on the following two days. Coartem Dispersible Dispersible tablets dissolved in approximately 10 mL of water per tablet with another 10 mL of water to rinse glass. Follow with food or drinks rich in fat (e.g. milk). **Contraindications:** Hypersensitivity to the active substances or any of the excipients. Severe malaria. First trimester of pregnancy in situations where other suitable and effective antimalarials are available (see precautions). Cardiac arrhythmia, bradycardia, severe cardiac diseases. QTc prolongation, family history of sudden death. Disturbances of electrolyte balance, e.g. hypokalaemia or hypomagnesaemia. Concomitant use of drugs that are known to be metabolised by cytochrome enzyme CYP2D6 or drugs that are known to prolong the QTc interval. **Precautions/Warnings:** Not indicated for prophylactic use. Not recommended for severe malaria. Caution in patients with severe hepatic or renal insufficiency, patients refusing food intake, and patients during 2nd and 3rd trimester of pregnancy. Contraindicated in 1st trimester where other suitable and effective anti-malarials are available. Adequate contraception is recommended (see contraindications). Not recommended to breast-feed. Due to risk of dizziness, fatigue/asthenia, driving and use of machinery not recommended. Not to be given with other antimalarials unless no other treatment option. Special care with patients previously treated with halofantrine. **Interactions:** No concomitant use with other antimalarials or drugs metabolised by CYP2D6 (see also Contraindications). Use caution with concomitant drugs known to be metabolised by CYP3A4. **Adverse reactions: Coartem:** When frequency differs between adults and children, the higher frequency is reported here. Very common (>10%): anorexia, sleep disorder, headache, dizziness, palpitation, cough, abdominal pain, vomiting, nausea, arthralgia, myalgia, asthenia, fatigue. Common (1 to 10%): diarrhoea, pruritus, rash, increased liver function tests, anaemia. Less frequent (<1%) but (potentially) serious: somnolence, QTc prolongations. Adults only (uncommon): hypoaesthesia, abnormal gait, ataxia. Paediatrics only: hypersensitivity (rare). **Coartem Dispersible:** Very common (> 10%): anorexia, cough, vomiting. Common (1 to 10%): headache, dizziness, abdominal pain, diarrhoea, nausea, rash, arthralgia, myalgia, asthenia, fatigue, increased liver function tests. Less frequent (<1%) but (potentially) serious: hypersensitivity, sleep disorder, somnolence, palpitation, pruritus, QTc prolongation. **Packs and prices:** Country specific. **Legal classification:** Country specific.

**Note:** Before prescribing, consult full prescribing information. Available from

Novartis Pharma Services Inc

East & Central Africa (Including: Kenya, Tanzania, Uganda, Zambia, Zimbabwe)

Africa Re Building , Hospital Road, Upperhill • P .O. Box 46057 - 00100,GPO, Nairobi, Kenya. Tel: +254 20 2737771 • Fax: +254 20 2737771

References:

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3. Novartis Drug Regulatory Affairs. Coartem<sup>®</sup>/Riamet<sup>®</sup> Dispersible Basic Prescribing information. 20 September 2007.





# KEMRI Hosts World's Largest Malaria Conference

The 5<sup>th</sup> Multilateral Initiative on Malaria Pan-African Malaria conference (MIM-PAMC) hosted by the Kenya Medical Research Institute was held in Nairobi, Kenya, from November 2<sup>nd</sup> to 6<sup>th</sup> 2009. The MIM-PAMC is the world's largest conference dedicated to malaria and over 2000 experts from all over the world attended the meeting.

The Conference was first held in Dakar, Senegal in 1997, then 1999 in Durban,

South Africa, 2002 in Arusha, Tanzania and 2005 Yaoundé, Cameroon. The 2009 MIM-PAMC the presentations included updated information on plasmodium parasites, mosquitoes, drugs, vaccines, immunity, epidemiology, treatment, ethics, socio-economics, capacity building among others.

The theme was **"Building Knowledge for Action."** Malaria is a leading cause of sickness and death in many parts of the developing world with young chil-

dren and pregnant women being hardest hit in sub-Saharan Africa. In Kenya Malaria kills 30, 000 children (4 children per hour) annually and accounts for 30% of outpatients and 19% of hospital admissions. More than one-third of the world's population – over 2 billion people – is at risk of malaria while up to 500 million cases occur annually.

According to Tanzania's Dr W. Kilama, founder member of African Malaria Network, death from malaria can be

equated with loading up seven Boeing planes with people every two days then deliberately crashing them into Mt Kilimanjaro.

World Health Organization says that if malaria had been eliminated over three decades ago, Sub-Saharan Africa's gross domestic product could be \$100 billion higher. Malaria causes fever, shivering, joint pain, headaches, weakness, vomiting, anaemia, convulsions and kidney failure. There is also cerebral malaria.

## Immunisation Remains Best Defence

By Ayoki Onyango

What is the importance of vaccination? Who needs vaccination mostly? How many children are saved worldwide due to immunization annually and how many die due to lack of the service?

These are some of the questions put to medical experts who included Dr Moses Mwangi of KAPI, Dr. Charles Chunge of Typhoid Advisory Committee, Dr. Evans Amukoye of Kemri, Dr. Mohan Lumba, a private practitioner and Dr. Joseph Aluoch of Nairobi Hospital.

The experts told ScienceAfrica that many people continue to die because of ignorance and downplaying the popular wisdom, which says, "prevention is better than cure". Prevention of infectious diseases is simple and cost-effective.

According to these experts, vaccination saves 3 million children annually while lack of it kills up to 1.5 children worldwide. And the risk groups include health care workers, children, the elderly persons and people with underlying medical conditions such as asthmatics, diabetics and kidney diseases patients and HIV/Aids patients. Typhoid which is endemic in Kenya infects 16 percent of the population killing many.

To prevent typhoid requires better hygiene

and constant improvements in immunisation and consumption of clean boiled water.

"To treat typhoid costs nearly \$180 (Kshs. 14,000) to buy strong antibiotics while vaccination with Typhim Vi vaccine is about seven dollars or Kshs. 500, says Dr. Charles Chunge, the Chairman of Typhoid Advisory Committee.

Vaccination also prevents meningitis and is cost effective. With widespread resistance to antibiotics and the difficulties of implementing elementary measures, the preferred line of attack in combating these infectious diseases is prevention through vaccination, says Dr. Chunge.

Yellow fever haunts some 34 African nations, the Middle East and larger parts of Asia and the entire Caribbean countries. Immunisation is the finest example of human triumph over an environment fraught with hostile bacteria and viruses that have long been a source of anguish, despair, suffering and deaths.

No any other undertaking, not even the development of antibiotics has had much of impact on lowering mortality rates, says Dr Chunge. Immunisation can save the lives of many people especially children, the elderly, healthcare workers and those with weakened immune systems.

Pertussis (whooping cough) is a highly contagious bacterial infection and 90 to 100

per cent of susceptible children contract the illness after being exposed to single infected subject. But the widespread use of vaccines against pertussis has led to a spectacular decline morbidity and mortality, says Dr Nicholas Ochieng' of Kenyatta Hospital.

Some of the most common diseases like hepatitis A and B can be prevented by vaccines. Dr. Ochieng' says that most people ignore immunization against Hepatitis A and B.

"During our cold season, especially July cases of flu rise and with the recent cases of avian influenza or bird flu sweeping across the globe, annual or seasonal vaccination against human influenza with a vaccine like Vaxigrip is essential," says Professor P. N. Nyangah of Veterinary Department at the University of Nairobi.

The recent immunisation against measles and polio was expected to save the lives of many children who are at risk. Experts say that children who receive immunisation against measles at 9 months should repeat the combined dose of vaccine MMR (Trimovax) at 15 months for them to also develop immunity against mumps and rubella.

Mass immunisation has helped eliminate the incidence of diphtheria and tetanus from most of the industrialised world while small pox has been eliminated for over 30 years.

Immunisation has transformed the very nature of preventive care all over the world.



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## Vaccination Against Pneumonia is Key During Swine-Flu Pandemic

Influenza pandemic viruses are capable of putting the lives of patients, at increased risk of pneumococcal infections which remain a major cause of mortality during influenza pandemics.

There is need to remember that during the 1918-1919 influenza pandemic that claimed millions of lives worldwide, the major cause of death was bacterial pneumonia following influenza infection. The major bacterial pathogen identified was *Streptococcus pneumoniae*. The 1919 saying by Louis Cruvelhier that "if flu condemns, the secondary infection executes" is still true today.

Influenza creates a dangerous pathway for secondary bacterial infections. In other words interactions between influenza and bacterial respiratory pathogens have major implications for pandemic preparedness.

### Influenza infection

- Damages the respiratory tract and depresses the host immune response.
- Causes Secondary Bacterial infection including Pneumonia, Bacteremia, Meningitis and others.
- Contributes to serious illness and deaths.

Pneumococcal Vaccination is recommended by Center for Disease Control (CDC). During influenza pandemics the CDC advocates to reinforce 23-valent pneumococcal polysaccharide vaccination to persons recommended to receive the vaccine including:

- Persons aged over 65 years
- Persons with underlying medical conditions aged 2 to 64 years
- Persons who smoke or have asthma aged 19 to 64 years

The 23-valent pneumococcal polysaccharide vaccine or Pneumo 23 prevents invasive

**Pneumo 23 and Vaxigrip (Influenza) Vaccines, for prevention of Pneumonia during Influenza Pandemics**

pneumococcal disease, and this limits the disease burden of the pandemic virus. It is effective against:

- 83% of invasive infections due to serotypes in the vaccine.
- -73% Of invasive infections caused by all serotypes.

This has been demonstrated in a meta-analysis involving 65,000 patients (adults and elderly). It provides broad and effective protection in a single shot. It is safe and well tolerated. It has broad coverage against pneumococcal infections. Primary vaccination involves one injection of 0.5 ml and Revaccination which is recommended every 3 to 5 years for those at a high risk of pneumococcal infection. The administration is intramuscular or subcutaneous. However, revaccination must strictly follow the recommendations provided. The vaccine may be administered simultane-

ously with a flu vaccine as long as different injection sites are used.

As a precautionary measure, the Pneumo 23 vaccine should not be administered to pregnant women except for subjects at high risk of pneumococcal infection. However, Pneumo 23 may be used during lactation. The vaccine is prepared from purified streptococcus pneumonia capsular polysaccharide antigen derived from 23 different serotypes that accounts for 90% of invasive pneumococcal infections. The immunity appears 2 to 3 weeks after injection.

**Vaccine once opened should be kept in a refrigerator (2-8degree Centigrade) used within seven days. However, the vaccine has shelf life of two years.**

*Pneumo 23 is manufactured by the Global Leader, Sanofi Pasteur, the vaccines division of the Sanofi-Aventis Group.*