

Return, Nigerian Doctors told

NIGERIAN Minister of Health, Prof. Babatunde Osotimehin has called on Nigerian physicians in the Diaspora to return home and join in the vision to transform the sector.

The minister made this call on Tuesday in Abuja when he received a delegation from the Association of Nigerian Physicians in the Americas (ANPA) led by the body's President, Dr. Julius Kpaduwa, who paid him a courtesy visit. Osotimehin is quoted by a daily newspaper as saying, "the country needs your services back home. You can come home and practice."

The government has created an enabling environment and a level playing field for you to utilise your skills effectively so as to impact positively on the lives of the people through efficient and quality health care delivery." Kpaduwa said, "the purpose of our visit was to seek for a tripartite partnership among ANPA, Federal Ministry of Health and the Federal Government on health related issues and also to intimate the minister on the forthcoming 15th yearly Conference and Scientific Assembly slated for July 14-19, 2009 in the nation's capital, Abuja." He explained that ANPA is the leading African Diaspora medical organisation in the United States with a vision for a healthier Nigeria.

He noted that the aim of the conference is to serve as one of the vehicles for the exploration and discussions of clinical delivery systems, education/training programs, health policy issues and health business development in Nigeria. Kpaduwa also expressed optimism that their visit would enable them explore ways of encouraging and facilitating the transition of American based physicians back to full or part time medical practice and teaching in Nigeria and also to explore opportunities to assist in developing Electronic Medical Record System and Health Insurance programme for Nigeria and to find out the best methods of conducting collaborative medical associations to Nigeria. (ASNS)



HEALTH FOR THE RICH: Africa's underpaid health workers, especially doctors and nurses migrate to rich western and Middle East countries.

Health Workers' Migration Impacts Negatively in Africa

By **Ochieng' Ogodo**, NAIROBI

Several factors account for overall provision of health care but the quality and quantity of its workforce is the cornerstone.

It is for this that the migration of skilled health workforce from the developing world, especially Africa and Asia, has moved up to become one of the critical points of debate in health provision globally.

"Brain drain from rural to urban areas and from the developing to the developed world is a long-standing phenomenon in the health profession but has recently taken acute extent, especially in Africa," says Bruno Marchal of the department of public health, Institute of

Tropical Medicine, Antwerp, Belgium.

At the Geneva Health Forum 2008, Marchal and others brought to the fore the crisis that the developing world.

The causes, he said, range from problematic education and training capacity, low attraction and retention, inadequate regulation of health professionals, problems with accountability, trust and performance.

"Health workforce management at service provision level affects not only attraction, retention and performance of health workers, but also access and utilisation of health services," said Marchal.

According to Uganda's Vice President, Professor Gilbert Balibaseka Bukunya, the country has only 2,900 doctors with a ratio of 1 per 10,000 people.

Sub-Saharan Africa, he said, has only 11 percent of the entire world population yet it has 24 percent of the global disease burden with only three percent of the total global health workforce.

According to Prof Bukunya health indicators such as infant mortality and maternal mortality are related directly to the number of healthcare workers.

Tanzania with a population of 38.7 million people, has 35,202 health workers, which is 28 percent of the required skilled workforce.

Doctors' availability is estimated at 1 doctor per 25,000 people.

Ndiro Ndiaye, Commissioner at the Commission on the Social Determinants of Health and Deputy Director General, International Organization on Migration, says the 'flight of the white coat' is a serious concern as it is depleting the scarce skilled human resource in health sectors of the third world.

"Currently," she says, "African medical schools provide between 10-30 percent of the staff needed."

To prevent this exploitative situation, Ndiaye says, rich countries must train and retain their health workers more effectively.

"They have to invest in training, improve working conditions and cut clear paths of career progression."

In 2001, Ndiaye explains, out of 737 graduate nurses from Zimbabwean training programmes, 473 went to UK alone. On average 1 in every 4 doctors and 1 in 20 nurses trained in African countries work in the Organisation for Economic and Development countries.

In Ghana 29 percent of physicians work abroad while the NHS in the UK employs 30,000 nurses of foreign origin [8.4 percent of the total staff]

Training of HCW costs countries great monetary investments according to Ndiaye. In South Africa it costs US\$ 42,000 [KSh.3.3 million] to train a nurse and US\$ 97,000 [KSh.7.2 million] to train a doctor.

According to a 2006 study, The cost of health professionals' brain drain in Kenya, it

costs US\$ 65,997 (KSh.4.9 million) to train a single medical doctor from primary school to university and for every doctor who emigrates, a country loses about US\$ 517,931 (Ksh.38.8 million) worth of returns from investment.

The total cost of educating one nurse from primary school to college of health sciences is US\$ 43,180, (KSh.3.2 million) and for every nurse that emigrates, a country loses about US\$ 338,868 (Ksh.25.4 million) worth of returns from investment.

"The brain drain aggravates existing human resources problems. While South African nurses work abroad, are 32000 nursing vacancies in that country," Ndiaye says.

The loss of health workforce can bring the whole health system to the brink of collapse.

— *Ochieng' Ogodo is a The English-speaking Africa and Middle East region winner for the 2008 Reuters-IUCN Media Awards for Excellence in Environmental Reporting. ochiengogodo@yahoo.com or ogodo16@hotmail.com*

Technique Development

radiation to provide diagnostic information about the functioning of a person's organ or to treat them. Radiotherapy has been used to treat some medical conditions especially cancer where radiation is used to weaken or to destroy cancerous cells in the body. The thyroid, bones, heart, liver among other organs can now be easily imaged and disorders in their function revealed.

Based on this knowledge various radioisotopes have been attached to biologically active substances and inserted in the body to help diagnose and even treat ailments in those organs in what is known as diagnostic radiopharmaceuticals. Radiopharmaceutical as a medical tool has helped in the early detection of diseases and ailments and together with awareness of early signs and symptoms has increased the probability of cure.

Water plays a major role in agriculture and the overall wellbeing of animal and human population. Strategies to effectively utilise the available water resources and rainwater should therefore be employed in an effort to achieve water security. Isotope and related nuclear techniques are effective and unique tools for obtaining hydrologic information for a wide range of water resource management issues. Isotope hydrology allows the identification of water characteristics; thereby

helping to determine its source, pathway and rate of recharge which are very useful to help manage the scarce water resources.

Presently, over eighty water projects deal with trans-boundary aquifers, groundwater and surface water resources in Africa; Asia and the Pacific, Europe and Latin America.

The use of isotope methods in determining recharge, leakage and evaporation from and into water harvesting systems, contributes to the protection of people from floods hazards and drought especially those in conflict-prone, arid and semiarid areas by providing them water security with harvested water for agriculture and domestic use. Are these not challenges that we need daily, affecting thousands of Kenyans? Can we use the nuclear technique to address them?

Environmental activities which focus on the sustainable use and management of natural resources and on using nuclear technologies to understand and protect marine and terrestrial environments can also be undertaken.

We need to address these issues as we plan to realise the Vision 2030, we need a healthy nation to run the agenda.

— *Prof Abdulrazak is the Executive Secretary, National Council for Science and Technology in Kenya. sabdulrazak@yahoo.com*

Climate Change Underestimated, Impact Serious, Diverse

CARBON emissions have soared far above the expectations of most climate scientists, according to a leading member of the Intergovernmental Panel on Climate Change (IPCC).

Christopher Field, a lead author on the IPCC's fourth assessment report published in 2007, said emissions are now far higher than even the worst-case scenario envisaged by that report.

"As a result, the impacts of climate change will probably be more serious and diverse," he told the annual meeting of the American Association for the Advancement of Science (AAAS) in Chicago, United States, recently.

Field said that while emissions increased at a rate of 0.9 per cent per year between 1990 and

1999, they have increased at a "startling" 3.5 per cent per year since 2000.

He said the surge could be attributed mainly to developing countries such as China and India that have rapidly expanded their electricity generation — using mostly coal to do so.

If developing countries continue to use coal and other carbon-intensive fuels to meet their energy needs this trend can only continue, said Field, director of global ecology at the US-based Carnegie Institution.

"We are looking at a future climate that is beyond anything we have considered in past models," he said.

Since it was founded by the UN in 1988, the IPCC has produced four reports assessing the latest scientific research on human-induced

climate change. In its fourth assessment, it used models developed in 2000.

In addition to underestimating future carbon emissions these models did not reflect the complexities of the effects of tropical forests, ocean cycles and the thawing of the Arctic permafrost, said Field.

More recent models show that atmospheric carbon dioxide concentrations could increase as tropical forests are cut down or destroyed by fire — which is increasingly likely as they dry out because of climate change.

"It is increasingly clear that as you produce a warmer world, lots of forested areas that had been acting as carbon sinks could be converted to carbon sources," Field said.

Meanwhile recent studies show that

warming has altered wind patterns in the Southern Ocean, which in turn has reduced the ocean's capacity to soak up excess atmospheric carbon dioxide.

But the most critical, short-term concern arises from new estimates of the amount of carbon that lies frozen in permafrost soils in the Arctic. As the Arctic warms it could release billions of tonnes of carbon into the atmosphere.

"There's a vicious-cycle component to both the tundra-thawing and the tropical forest feedbacks, but the IPCC fourth assessment didn't consider either of them in detail. That's basically because they weren't well understood at the time." (SCIDEV.Net)

HIV/AIDS: Congo, Uganda Wars Push Infection to 70%

Kenya to lay off 500 Health Workers

From Page 1

and cross border refugees caused by the war in eastern part of Democratic Republic of Congo.

The landing site and the migrations extend to Hoima District mid-western Uganda. According to the district health officer in Hoima, Joseph Ruyonga, when the department tested blood sample around landing sites a year back, HIV/AIDS infection rate was 40 percent but it currently reaches 70.

The blood testing exercise took place at Tonya landing site and people living along the landing sites of Lake Albert including Tonya, Kaiso, Mpuuta, Mbegu and Kyebooro.

All districts around the oil and gas exploration and exploitation like Hoima, Buliisa and Bundibugyo in Western Uganda have urged the ministry of health and NGOs to consider their plight and help find solutions or preventive measures before whole populations are wiped out in this part of the world.

One Non-Governmental Organization, GOAL Uganda, focusing on health, said it is to introduce ARVs in health centers around the landing sites, apart from sensitization workshops, distribution of condoms and availing of them to all the public places like bars, lodges and others.

What has occurred in Northern Uganda where the Lord's Resistance Army rebels left many people displaced, is now happening in eastern Congo where the internal conflicts have also been complicated by external forces. Women are raped, displaced and forced into prostitution in order to earn a living as refugees or illegal aliens.

Meanwhile, there seem to be increased cases of epilepsy with pupils in Hoima and Kamwenge in western Uganda being the hardest hit according to Dr. Sam Zamba the director general of health services, ministry of Health Uganda.

Across the boarder Kenya is to lay off 500 health workers by June. The country is already feeling the crunch of the failure to get funding from the Global Fund for HIV/AIDS, TB and Malaria and has announced

plans to lay off at least five hundred workers from the Voluntary Counseling and Testing centers countrywide by June this year.

Making the announcement the new head of the National AIDS and STI Programme, NASCOP, Dr. Nickolas Muraguri said VCT workers including nurses and VCT counselors are to be axed following dwindling Global Fund money.

"This comes with a backdrop of over 250,000 people needing ARVs each month but we hope we can absolve them in the civil service by June this year instead of laying them off. There is a biting crisis of workers against the rising demand of public services," said Dr Muraguri.

According to studies, the annual recurrent cost of maintaining VCTs in Kenya is approximately US\$6,600 per health centre.

This means that in order to provide VCTs in all 579 health centres throughout the country, it would cost approximately US\$3.8 million per year.

(This cost excludes the cost of training and other start-up costs.)

Of this amount, approximately US\$3.3 million goes to salaries of full-time counsellors and US\$0.5 million is incurred for materials (including rapid test kits).

The total recurrent cost of VCTs is estimated to consume approximately 2 percent of Kenya's health budget.

It is not yet clear at the moment how the move by the government if effected is going to impact on scaling-up VCTs so as to provide services throughout Kenya's 579 health centres. Dr. Muraguri says that the funding crisis is already affecting services countrywide especially on people who require drug therapy.

"So far only 15,000 people out of the required 450,000 people are under our food nutrition program. The government needs to allocate at least 37 billion shillings by May this year to avert many HIV related deaths that could result.

"The food crisis could worsen the problem even further since many who are HIV positive need more food than those who are not because their immune system is compromised.



Drugs for Lymphatic Filariasis are Becoming Widely Available

The Bill and Melinda Gates Foundation has called for a global effort to cut the burden of neglected tropical diseases — and injected US\$34 million into the endeavour.

The grant announced in January will go the Global Network for Neglected Tropical Diseases, which will use it to raise awareness and unite disease-specific efforts.

They will also boost prevention and treatment of the seven most common neglected diseases: the blinding eye infection trachoma, and the worm infections onchocerciasis, schistosomiasis, lymphatic filariasis, trichuriasis, hookworm and ascariasis.

Key to the strategy will be negotiating

donations or cheap prices on billions of tablets by bulk-buying, keeping prices lower than those negotiable by a single country. A cocktail of four drugs that target the seven diseases can then be used in mass treatment programmes.

Such strategies have already proven successful in the case of lymphatic filariasis, where a public-private partnership is providing drugs for 570 million people in 48 countries each year, compared to 25 million people in 12 countries nine years ago.

But the network has been criticised for concentrating on only seven diseases, ignoring more difficult to treat diseases such as sleeping sickness and Chagas disease.

Multiple Disease Control Model for Kenya and the World

By Clementine Osodo

RESIDENTS of Lurambi now have a reason to smile and live a protected, healthy, malaria and diarrhea free life and a prolonged HIV positive life.

A one week campaign dubbed the Integrated Prevention Demonstration (IPD) was launched on 15th September 2008 in Lurambi Division, Kakamega District, Western Province of Kenya.

The IPD campaign provided an estimated 40,000 residents with voluntary HIV counseling and testing (HCT) services at 30 test sites and offered a lifesaving care pack containing Permanent Long lasting Insecticide Treated Net (LLINs). It provided life straw water purifier, condoms and education material for prevention of Malaria, diarrhea diseases and sexually transmitted diseases respectively. Permatet and Lifestraw have a life span of three years which reduces frequent replacements and is cost effective.

This was a first of its kind in Kenya and the whole of Africa, being a campaign that provided a basic care pack of multiple interventions, encouragement of voluntary HIV testing and counseling. It targeted 40,000 residents of age 15 to 49 years.

The IPD provided public health and policy experts with important information on the scalability and cost effectiveness of delivering a lifesaving care package to be replicable across Kenya and throughout Africa

The IPD campaign was developed and funded about 2.5 million dollars by Vestergaard Frandsen while the Kenya Ministry of Health and CHF international were the campaign implementers

The campaign aimed at contributing to Kenya's national scale-up plan for HIV counseling and testing (HCT) where 80% of adults know their

HIV status by 2010 while providing integrated Malaria, diarrhea and sexually transmitted disease prevention commodities. This approach seeks to break down the policy and funding barriers that have traditionally separated these diseases and create a more efficient and affordable way to address them

Knowing of one's HIV status provides an entry point for HIV positive individuals to access Anti Retroviral Treatment (ART) which has dramatically improved the quality and duration of life for many Kenyans living with HIV and may also reduce the risk of transmission by decreasing the viral load.

HIV counseling and testing affords tested people the opportunity to access other HIV/AIDS prevention, care and treatment services. It is also a first step towards risk reduction and linking clients with prevention services to the majority of Kenyans who are not infected.

Malaria and diarrhea diseases on the other hand are major causes of morbidity and mortality in Kenya and are of particular concern amongst HIV counseling and testing (HCT), promoting the use of permanent long lasting Insecticide treated bed net (LLINs), life straw house hold water purifiers, condoms and education materials can potentially reduce episodes of malaria, diarrhea and sexually transmitted diseases. Ultimately, they may also delay disease progression in HIV positive individuals residing in areas where both Malaria and diarrhea are endemic. By delaying the progression of HIV disease and the need for ART, these interventions can potentially result in cost saving for health programmers in Kenya and beyond.

The morbidity pattern for Lurambi division reflects that one of the entire Kakamega district HIV prevalence is estimated at approximately 10%, Malaria is the most frequent cause of out patient attendance and it accounts for 46% of the total outpatient workload, Diarrhea is the 4th

most important cause of out patient morbidity accounting for 5% of total out patient attendance.

Evaluation of the campaign aimed to provide valuable information on the feasibility and scalability of integrated public health campaigns targeting HIV, Malaria and diarrhea together and will guide the design of similar integrated campaigns in future. The evaluation will also provide objective evidence to be used for advocacy for an integrated disease campaign approach.

Present at the event was the Goodwill Ambassador for Malaria and song bird Yvone Chaka Chaka from South Africa, the Deputy Prime Minister Hon. Musalia Mudavadi, Hon. Dr James Gesami Assistant Minister for Public Health and Sanitation, Mikkel Vestergaard frandsen the President of Vestergaard Frandsen among others.

The following are the statistical results of the campaign courtesy of Vestergaard Frandsen. Total Number of People Participating 80.2% of the target group was reached: 41,040 of the sexually active population out of an estimated 51178 persons. This is important because it shows the IPD approach can help governments meet their national goals of having at least 80% of their adult populations (within the sexually active age range of 15-49 years) know their status by the year 2010.

Age and Gender of Participants

The campaign had a goal of testing people aged 15-49 years of age. The results were that 88% percent of population tested was within the sexually active population aged 15-49.

More than 17,000 adult men participated in the campaign. This is a very significant achievement since adult men have proven to be a very difficult group to reach in HIV counseling and testing campaigns.

Total HIV Positives

There were 2,016 (including age group > 50) total people testing positive for HIV.



Of this total, 1,834 persons were within the sexually reproductive age group (aged 15-49). HIV Positives by Gender Prevalence (people testing positive/total people tested):

Male 3%
Female 7%

This reflects the results of the KAIS 2007 survey. The prevalence rate is much higher among females.

HIV Positives by Age

Out of the entire pool of people testing HIV Positive, the age breakdown is as follows:

17% 15-24 year olds
74% 25-49 year olds
9% 50 year olds

Prevalence (people testing positive/total people tested):

2% 15-24 year olds
9% 24-49 year olds
3% 50 year olds

Prevalence in the sexually reproductive age group 15-49: 6%

This also reflects findings of the KAIS 2007 survey. Most of the infections are residing with the 24-49 year olds. This may be due to longer cumulative exposure risk.

By Prof Shem Wandiga

GENERALLY public image of chemistry varies and depends on sophistication of society. Westerners associate chemistry with sorcery, Frankenstein images and pollution. A chemist is the wonder maker, the protector, the connector, the oil spiller, chemical and air polluter. Chemical plants polluting air and rivers

People in Africa are familiar with traditional medicine men and witchcraft. Still Africa has had no chemical warfare waged and there is no widespread chemical pollution.

African chemical industries consist of extraction industries like mining of oil and minerals; agricultural industries-pesticides, herbicides, seed dressing and others. There are also water purification chemicals, food and household goods industries, small scale industries like smelting, welding and plastics fabrications.

Chemistry is perceived as a difficult subject: "I failed chemistry; I could not understand the subject" These are some of the common phrases. The general public has no idea what the subject entails. Most governments' policies support the subject and students numbers reading chemistry is increasing in African universities.

Chemistry is introduced at senior primary and secondary students. Hope of using chemistry to solve societal problems is high. These range from food security, clean drinking water to finding cures of our myriad diseases through chemical sciences knowledge.

In the Western world the student numbers are declining yet the societal needs remain high. African societies knowledge of pollution is increasing, civil societies advocacy for environmental protection is evident in many

Chemistry Seen As Abstract

countries, governments have passed strict environmental laws regulating the disposal of wastes.

African chemical scientists must safeguard the environment. The "precautionary principle" adopted by the European Union in 1992 as the basis for regulation of toxic chemicals holds that in the face of scientific uncertainty, government should err on the side of protecting public health and safety.

In other words, if scientific evidence indicates there is a good chance that a chemical may pose a risk of irreversible harm, regulators should not wait for absolute proof before acting. Awareness of changes is essential:

The current state-of-the-art processes are not perfect, and only the constant search for new improvements will lead to a sustainable future. Every reaction design and process should use the best available knowledge of sustainability, renewability and environmental safety; Promotion of chemical safety is critical. Students should never be made to fear chemistry and retreat to the western fear of the subject. Knowledge of what is objective and rational today may not remain so tomorrow. Tracking fate of every chemical in a reaction is impossible.

Incidences of chemical seepage into the water system have resulted in fish, birds of prey and human deaths. Drinking of contaminated waters, eating of contaminated foods or breathing of air with toxic chemicals may cause endocrine disruption, internal organs damage, poisoning and death.

However, used with strict safety standards, chemicals benefit mankind.

Chemical sciences are at the forefront of the green revolution which transformed India from a basket state to a food sufficient state. Chemistry has produced most materials used in clothing, building, car manufacture, and medicine to name just a few.

Chemical sciences will still be required for pest control, water purification, production of new materials for everyday life. Public image of chemistry must be positive. Africa requires uplifting the socio-economic standard of its people and I dare say this may not be done without chemical sciences.

Therefore, the image we portray to the public about the subject must be well reasoned out, project the correct picture without resorting to stage managed adverts. Chemical scientists must use only benign chemicals. Acceptable reactions should include not only conversion and selectivity but also efficiency, sustainability, recyclability, degradation, and elimination or reduction of hazards.

Students must understand the connectivity between the structure and compound activity.

Explicit understanding of chemical functionality (sterics, electronics, hydrophobicity/phillicity, toxicity) do provide basic understanding of how chemicals impact the environment.

Above all, students should be made aware of the transfer, transport and fate of chemicals in the environment. Chemical scientists have influence. Many chemists are employed in

position of influence. Remember that all industrial processes are imperfect and can always be improved to maximize economic and environmental benefits.

All industrial designs should put premium on sustainability, stressing minimal waste production, use of renewable and recycled resources, and highest possible energy saving efficiency. Valuation of chemical processes require assistance of chemical engineering, ecology, toxicology, biology, social sciences and environmental engineering/sciences

Only projects that avoid end-of-pipe treatment should be accepted and promoted. Assessment should consider renewable feedstock, feedstock acquisition, waste treatment, environmental persistence, energy requirements, and energy sources. Africa is a vast continent with abundant resources. Exploitation of resources has created a second scramble for the continent.

African countries aspire to be like developed countries and are opening the door for import of western technologies or any technology that would be used to exploit its resources, earn foreign currency and create jobs and wealth.

Developed and newly industrialized countries are looking for inexpensive and lax regulations, and low priced feedstock resources. They are keen on maximizing profits on technologies they already have, some of which are environmentally unfriendly.

ICT's Competitive Advantage

Information and Communications Technology (ICT) is the foundation for running businesses in the present digital economy. To survive, organizations must computerize. Productivity is a major area where ICT plays an important role.

If an organization is computerized, it will have a competitive edge over its rivals who are not computerized, for example, the amount of production of items will be much higher and faster. Through ICT high quality products are produced. For example, car bodies are welded more accurately by robots than they would be done by humans.

The robots use end effectors (the device at the end of a robotic arm, designed to interact with the environment). End effectors, are for example, a welding head, or a paint spray gun. A surgical robot's end effector could be a scalpel or other tools used in surgery.

Other possible end effectors are machine tools, like drills or milling cutters. These end effectors are very accurate and efficient.

Uchumi, Tuskys, Nakumatt

Many electrical items, such as mobile phones and video cameras, have become much smaller and hence attractive due to developments in technology. These make computerized organizations to attract customers and even lock them in.

In this digital age, organizations have developed loyalty cards that make users earn points. In the end a user can take advantage of the point system to get big bargains. If an organization is not computerized then it cannot compete with such a company. Supermarkets like Nakumatt, Tuskys and Uchumi have already developed an advanced system of loyalty cards.

Barclays

More recently, Nakumatt introduced the Nakumatt/Barclays credit card, an innovation that has attracted many customers. New services are also emerging with computerization, for example, the use of Point of Sale Systems,

Bar code systems that are controlled by users, for example, at Tesco supermarkets. This is a personalized service that not only attracts customers but also locks them in hence giving such a company a competitive advantage. This is in line with Michael Porter's model of competitive advantage, that is, the moment you have competitors, try to make your item cheap (lower the cost) and unique (differentiation). In that way, you ward off competition.

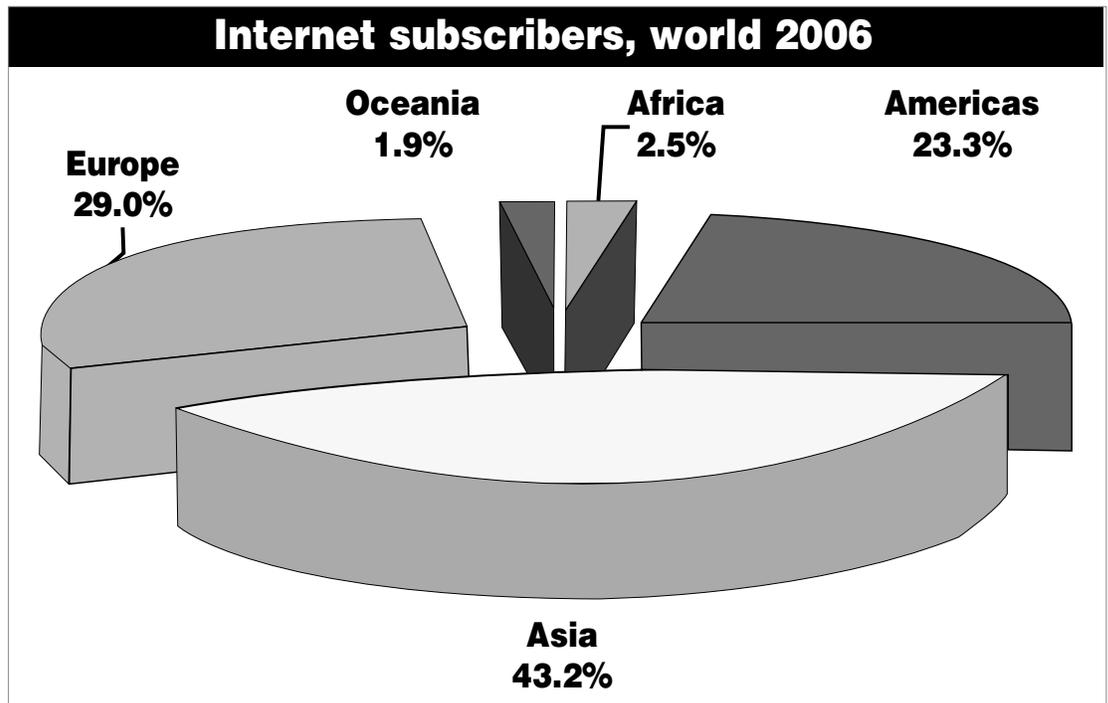
What is Competitive Advantage

"According to Professor Michael Porter (the Bishop William Lawrence University Professor, based at Harvard Business School), a Competitive Advantage exists when a firm is able to deliver the same benefits as competitors but at a lower cost and when a business delivers benefits that exceed those of competing products.

He technically calls this two the cost and differentiation advantages. Consequently, a competitive advantage enables the firm to create superior value for its customers and superior profits for itself.

Cost and differentiation advantages are known as positional advantages since they describe the firm's position in the industry as a leader in either cost or differentiation."

Organizations that are networked can do their transactions globally. Services can



be offered in any part of the world as long as there are branches. We even have on-line auctions being offered by companies like e-bay, on-line shopping by companies like fibre2fashion and amazon.com.

Such companies have majored in items that sell easily on-line like books, CD's, clothes etc. Customers are able to search the internet for the cheapest and the best quality items. This has resulted in these companies making great sales as opposed to the brick and mortar companies that are not easily reachable. Some companies even produce their items by targeting countries that offer cheap labour.

This translates into low production cost hence making such companies have a competitive advantage over the others. This is enhanced further by on line advertising using electronic cards and posters, multimedia presentations that are about with high quality audio and streaming video and dynamic web sites. ICT provides organisations with modern ways of communication which is fast and even real time thus giving such bodies the advantage of conveying information in good time. Many companies are able to chat, use email facilities with attachments and use video conferencing facilities – this helps such companies to organize meetings at any time in any part of the world thus coming up with just-in-time decisions.

Virtual University

One of the most recent developments is the incorporation of video conferencing into web based systems. If you visit the African Virtual University based at Kenyatta University, you will see this system in action. The University mainly receives lectures from other countries. The system uses a method called streaming video multi-casting.

Teachers and presenters sit in their own office or in a nearby studio and present a 'live' lecture in front of a camera attached

quoteunquote

a Competitive Advantage exists when a firm is able to deliver the same benefits as competitors but at a lower cost and when a business delivers benefits that exceed those of competing products.

He technically calls this two the cost and differentiation advantages. Consequently, a competitive advantage enables the firm to create superior value for its customers and superior profits for itself.

to a web server. Using a simple switching device and several cameras, the presenter can provide remote participants with graphics, whiteboard, flipchart and other visual aids as well as alternative views of the local classroom and lecture room.

The images and sound are subsequently 'webcast' - sent via the Internet to anyone who wishes to take part. Alongside the video images and sound is an Ms PowerPoint presentation or other graphical sequence transmitted in a gif file format.

Synchronising software enables the graphic images and presentation materials to reach the viewers at the same time the presenter verbally cues them. Beneath the tutor's video images is a text messaging box where students and participants can offer comments, ask questions, and receive responses from the presenter in real time.

People in different places can link up to see and hear each other. This saves the time and cost of traveling to meetings; Meetings can take place without one leaving the office; Meetings can be arranged at a short notice; Participants can still attend a meeting even if they are physically unable to e.g. due to bad weather preventing them from traveling; One can even send text messages to a lecturer over

a long distance in real time.

The use of ICT has affected the direction of Gross National Product (GNP) for some countries. For example, an ICT-related export focus has had a positive impact on the balance of payments and GNP of some developing countries. In Costa Rica, ICT accounts for 38 percent of exports (mostly Intel) and contributed to a major increase in GNP. Costa Rica also leveraged the high profile investment from Intel to entice other ICT firms, such as Acer and Microsoft, to invest.

Jobs, Software Export

In India, the focus on software exports has also borne fruit - software exports have been increasing by over 50 percent per annum since the early 1990s. A 1999 Nasscom-McKinsey report estimates that by 2008, there will be 2.2 million additional jobs created, that foreign investment will rise to US\$5 billion and that software will account for 7.5 percent of India's gross domestic product.

Strategies that focus on development goals typically involve the adoption of comprehensive approaches to integrate ICT into broader development strategies, thereby gaining from the synergies between different elements of a holistic approach to development.

In the case of Estonia, the national ICT initiative, Tiger Leap, had a dramatic effect within a single sector - improving access and content in schools - and also a spillover effect in other sectors, such as health, banking and public administration, which have realized the importance of the role ICT can play as a tool for competitive advantage.

— The writer, Herman Oduor is the author of *Secondary Computer Studies Book 1-4*. He is also the Head of IT department, Hillcrest International Schools. ictmanager@hillcrest.ac.ke

Traditional ways of teaching and collaborating in chemistry

Book and paper - disadvantages: a lot of imagination is required for simulations etc.

Attending seminars can be very expensive unless sponsored.

Sending documents by postal mail – in Africa –and particularly Kenya, your mail may never arrive. Or it has been tampered with as someone somewhere tries to see whether there are valuables concealed.

Brief introduction to information superhighway

Around the eighties, the Personal Computer became readily available. It was easy to process information on your computer, then carry information in a floppy disk (double density), then high density, CD ROM, DVD, now flash disk.

The world wide web in the 1990's accelerated the sharing of information between people.

Email revolutionized the transfer of information between computers,

The Introduction of file attachments made it possible for any document (file) to be attached to an email, and be delivered to the intended recipient at minimum cost.

However, malicious programs have also been sent via world wide web

Your documents may contain the data you want, plus harmful additions (viruses) which would alter the data and the computer.

You may also get unwanted emails (junk) – generated by computer scripts with fake addresses.

Web hosting: Used to be done on expensive servers. Now it is possible to transform your laptop or PC into a webserver without computing knowledge.

Information and Communications Technology (ICT) is an umbrella term that includes all technologies for the manipulation and communication of information.

The term is sometimes used in preference to Information Technology (IT), particularly in two communities:

Education

Government (e.g. in Kenya www.ict.go.ke)

ICT in fact encompasses any medium to record information:

magnetic disk/tape, optical disks (CD/DVD), flash memory etc technology for broadcasting information - radio, television

Technology for communicating through voice and sound or images - microphone, camera, loudspeaker, telephone to cellular phones.

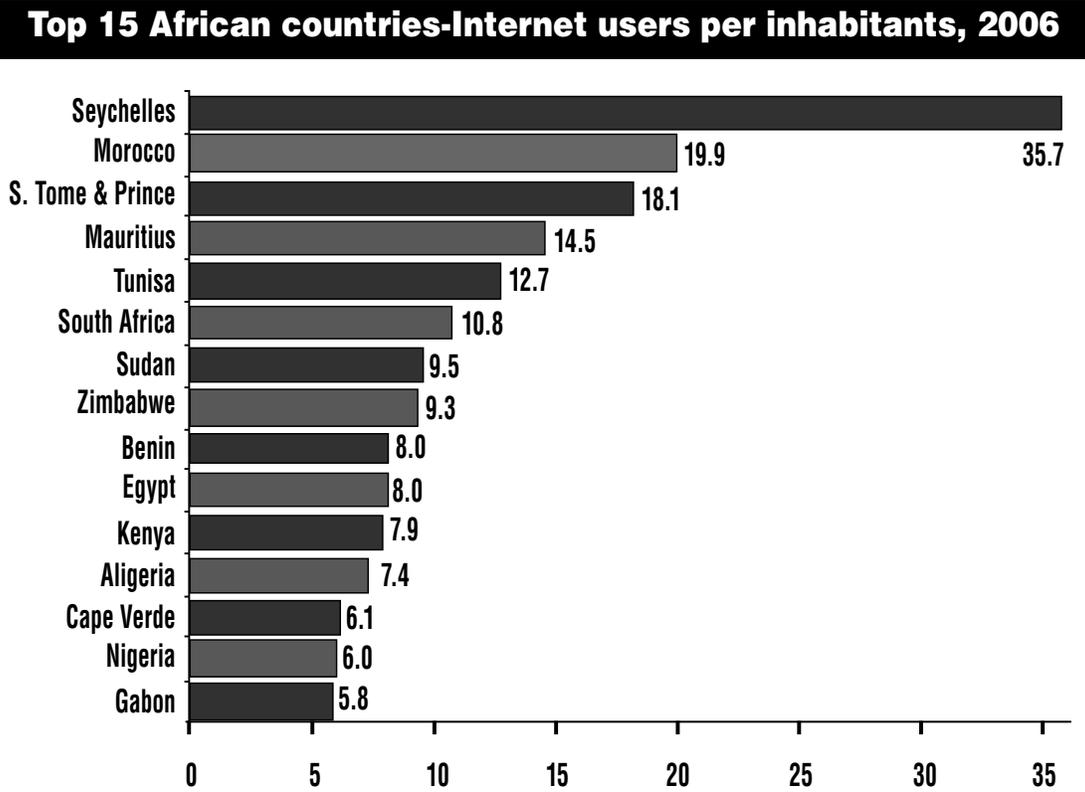
It includes the wide variety of computing hardware (PCs, servers, mainframes, networked storage);

The rapidly developing personal hardware market comprising mobile phones, personal devices such as the BlackBerry; MP3 players such as Apple's iPod.

Computer hardware: This is the physical part of a computer

Computer programs (software programs): These are instructions for

This is Part One of a summary extract from presentation by one of Kenya's ICT experts Dr Joseph M Mwaniki who is also lectures at the department of chemistry Univesity of Nairobi



ICT as a Tool for collaboration in Chemistry

computer.

The instructions are processed by a central processing unit within the computer hardware.

Computer programs may be categorized into:

System software Application software.

System software (operating system) manages and coordinates the activities and the sharing of the resources of the computer.

Many computer programs may run simultaneously on a single computer (multitasking).

- Common operating systems
- Microsoft Windows,
- Mac OS X,
- Linux
- Solaris

The Web

World Wide Web is one of the services accessible via the Internet, along with various others including e-mail and file sharing.

Distinctions between the items on the internet:

Web documents: (<http://www.webhost.tld> (or territory code)

File sharing: (ftp:// Email: yourname@webhost.tld (or territory code) In 1965 a TX-2 computer in Massachusetts to the Q-32 in California with a low speed dial-up telephone line.

In October 1972 a large, very successful demonstration of the Advanced Research Projects Agency Network (ARPANET, which started in 1969, as a set of four host computers were connected together) at the International Computer Communication Conference (ICCC).

This was the first public demonstration of this new network technology to the public.

It was also in 1972 that the initial "hot" application, electronic mail, was introduced.

Brief history of www

In 1980, Englishman Tim Berners-Lee, at CERN, Switzerland built, a personal database of people and software models known as ENQUIRE, as a way to play with hypertext.

It took 10 years (Christmas 1990), for Berners-Lee to build all the tools necessary for a working Web: the first Web browser, WorldWideWeb (which was also a Web editor), the first Web server (info.cern.ch), and the first Web pages that

described the project itself.

The turning point for the World Wide Web was the introduction of the Mosaic web browser in 1993.

By 1996 it became obvious to most publicly traded companies that a public Web presence was no longer optional.

By around 2000 emergence of don-com companies which later went bust accelerated the growth of www. Currently, search engines like Google, and e-commerce applications have once again made www a commercially viable information superhighway.

A local-area network is a computer network covering a small geographic area, like a home, office, or group of buildings e.g. a university.

Defining characteristics of LANs, in contrast to wide-area networks (WANs), include:

- much higher data-transfer rates,
- smaller geographic range,
- lack of a need for leased telecommunication lines.

Wireless LAN

This is the linking of two or more computers or devices without using wires.



Pure Politics Will Never Add a Grain of Maize

WHILE politicians worldwide tend to be a vicious lot unless controlled, there is need to remind Kenyans and indeed other Africans that only innovative research and development activities could save the county not just from famine from other aspects of devastating poverty.

One would have expected to hear the voice of top scientists including institutions to be clear and loud during such tragic times when million face starvation. But the politicization of famine with sharp exchanges understandably makes any self-respecting scientist keep his or her distance.

However, it has been realized in the final end it is science that will save the country from such situations because few people can predict when politicians will end their exchanges and promise to hold sober discussions aimed at sustainable food production.

Although the Kenyan Parliament also has some "former scientists" few suggested that research resulting in increased maize production and better storage of the harvests within homesteads or national silos as a way forward.

Still other experts like Prof Ratemo Michieka say that the solution lies in making farming attractive. "Those with degrees and other qualifications in agriculture could easily seek to stay on the farms if it pays, meaning it has to generate income that at least helps to adequately meet their basic human needs."

In some developed nations governments subsidise farmers inputs and incomes and even in Kenya farming should be a profitable activity in order to attract those with skills in agriculture, says Prof Michieka who has held important positions in the country including Vice-Chancellor of Jomo Kenyatta University of Agriculture and Technology apart from heading the National Environment Management Authority.

Above all, for now, according to the executive director of African Centre for Technology Studies (ACTS), Prof Judy Wakhungu, "there is an urgent need to for example use even the army to help rush food to remote places where Kenyans face severe malnutrition and starvation"

According to Prof Wakhungu Africa's greatest weakness is in implementation of various policies that could help deal with such situations. It is implementation that finally matters and this why ACTS plans to focus more on realization of tangible goals.

The need for more science is reflected by the fact there are credible reports of maize "being branded unfit for human consumption" due to various factors that could include mycotoxins or poisonous compounds from certain fungi.

Still Africa uses seeds that were developed over two decades ago meaning their is need for improved intake and utilization of research results. This according to Dr Marriane Banziger of CIMMYT, who is one of the world's top experts on maize.

Finally the famine should serve as a strong warning to national, regional and international research institutions dealing with various aspects of agriculture or food production including universities. They should streamline their activities to innovatively help curb such dehumanizing situations.

Kenyan also need to stop excessive dependence on maize as almost the only source of carbohydrate. It is amazing that in all hotels people shout even louder for "additional ugali" as was done before the famine.

Bananas, rice, wheat, sweet potatoes, cassava, sorghum, millet, arrowroots, yams and Irish potatoes are just some of the substitutes that could save lives.

RESEARCH

Project Targets Drought Tolerant Maize for Africa

MORE than 300 million Africans depend on it as their main food source. However it is severely affected by frequent drought. Drought leads to crop failure, hunger, and poverty making farming risky for millions of small-scale farmers who rely on rainfall.

Experts say climate change will only worsen the problem. Thus drought tolerance has been recognized as one of the most important targets of crop improvement programs.

Biotechnology has been identified as a powerful tool to achieve significant drought tolerance by the United Nation's Food and Agriculture Organization.

Still, African Agricultural Technology Foundation (AATF) is leading a public-private partnership called Water Efficient Maize for Africa (WEMA) to develop drought-tolerant African maize using conventional breeding, marker-assisted breeding and biotechnology.

The benefits and safety of the maize varieties will be assessed by national authorities according to the regulatory requirements in the partner countries, namely Kenya, Mozambique, South Africa, Tanzania and Uganda.

According to AATF, the partners in this five-year project will develop new drought-tolerant maize varieties, incorporating the best technology available internationally with the long-term goal being to make drought-tolerant maize available royalty-free to small-scale farmers in Sub-Saharan Africa.

The WEMA partnership was formed in response to a growing call by African farmers, leaders, and scientists to address the effects of

drought in a way that is cost effective to African smallholder farmers. Three-quarters of the world's severe droughts over the past 10 years have occurred in Africa.

AATF will work with the internationally funded non-profit International Maize and Wheat Improvement Center (CIMMYT), the private agricultural company Monsanto, and the agricultural research systems in eastern and southern Africa in this effort. AATF will contribute its leadership, unique experience in public-private partnership management, technology stewardship and project management expertise.

CIMMYT will provide high-yielding maize varieties that are adapted to African conditions and expertise in conventional breeding and testing for drought tolerance. Monsanto will provide proprietary germplasm, advanced breeding tools and expertise, and drought-tolerance transgenes developed in collaboration with BASF.

The varieties developed through the project will be distributed to African seed companies through AATF without royalty and made available to smallholder farmers as part of their seed business.

The national agricultural research systems, farmers' groups and seed companies participating in the project will contribute their expertise in field testing, seed multiplication, and distribution.

The project will involve local institutions, both public and private sector. It will improve and expand their capacity and experience in crop breeding, biotechnology and biosafety.



ScienceAfrica is Printed by Zealot Printers & Stationers and published by Africa Tomorrow

EDITORIAL TEAM

Editor: Otula Owuor; **Associate Editor:** Dick Agudah; **Advertising:** Clementine Osodo; **Operation & Co-ordination:** Leo Ogwago & Florence Choka; **Creative Design:** Eriqwe Nyachon & Dickson Masoo; **Writers:** Clementine Osodo, Henry Neondo & Naftali Mwaura, Elijah Bizibu, Getonga Njeru; Prof Turner Isoun, Dr Romain Murenzi & Abiose Adelaja.
www.scienceafrica.com, Email: info@scienceafrica.com

From Page 7

- Benefits
- Convenience
- Mobility
- Deployment
- Expandability
- Cost
- Disadvantages

Security: Wireless LAN transceivers are designed to serve computers throughout a structure with uninterrupted service using radio frequencies.

Range: The typical range of a standard equipment is on the order of tens of metres. While sufficient for a typical home, it will be insufficient in a larger structure. To obtain additional range, repeaters or additional access points will have to be purchased.

Reliability: Like any radio frequency transmission, wireless networking signals are subject to a wide variety of interference that are beyond the control of the network administrator.

Speed: The speed on most wireless networks (typically 1-108 Mbit/s) is reasonably slow compared to the slowest common wired networks (100 Mbit/s up to several Gbit/s).

Wireless networks are little more secure than wired ones; in many offices intruders can easily visit and hook up their own computer to the wired network without problems, gaining access to the network, and it's also often possible for remote intruders to gain access to the network through backdoors.

One general solution may be end-to-end encryption, with independent authentication on all resources that shouldn't be available to the public.

Different computing languages used to manage content on the web

HTML

HyperText Markup Language (HTML) It is the computer language used to create hypertext documents, allowing connections from one document or Internet page to numerous others. HTML is the primary language used to create pages on the World Wide Web.

It is a cross-platform text-formatting system for creating web pages, including copy, images, sounds, frames, animation and more.

It is a set of tags and rules used in developing hypertext documents to be presented on the World Wide Web.

Internet browsers read HTML to know what they should display.

JavaScript

JavaScript is a scripting language (list of commands within a program or an application that directs the program to perform specific tasks in a specific order) developed by Netscape.

It can make web pages more animated and dynamic in terms of graphics and navigation.

JavaScript code is inserted directly into the HTML page. It is also a programming

ICT and Chemistry



language for use in web pages that allows the use of dynamic content.

It can be used for example to respond to user actions such as button clicks or to run processes locally or validate data.

PHP (Hypertext Preprocessor) -an open source programming language that allows web developers to create dynamic content that interacts with databases.

PHP is basically used for developing web based software applications.

It is a scripting language that is executed on the web server (requires a PHP enabled web host).

PHP commands are embedded within the HTML of a Web page and is useful in the arena of dynamically generated pages.

PHP scripting can add numerous interactive elements to a website.

Database

A database is defined as an organized collection of data.

MySQL is a Database Management System (DBMS) for both Linux and Windows.

It is Database management software commonly used to store information for use on web sites.

MySQL is one of the most popular databases for use on the Internet.

Server side programming languages such as PHP are typically used in conjunction with MySQL to deliver database information over the web.

Webserver is a software that delivers Web pages and other documents to browsers using the HTTP protocol

Apache

It is the most popular HTTP web server used to serve both static and dynamic web pages on the internet.

Apache is an open source Web server that is distributed free.

Apache runs on Unix-based operating systems (including Linux and Solaris) and Windows 98/NT/XP.

Windows, Apache, MySQL, and PHP — a popular combination of software for use as a web server; Software for Microsoft Windows

WAMPs

WAMPs are packages of independently-created programs installed on computers that use a Microsoft Windows operating system.

A number of WAMP software exist for download. A convenient one is XAMPP.

Windows, Apache, MySQL, and PHP

-- a popular combination of software for use as a web server; Software for Microsoft Windows

WAMPs are packages of independently-created programs installed on computers that use a Microsoft Windows operating system.

A number of WAMP software exist for download. A convenient one is XAMPP.

Web security

Backups are a way of securing information; they are another copy of all the important computer files kept in another location. These files are kept on hard disks, CD-Rs, CD-RWs, DVD, flash disks and tapes.

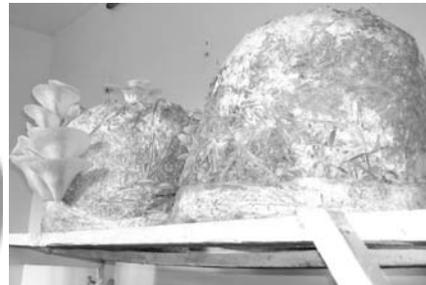
Anti-virus software consists of computer programs that attempt to identify, thwart and eliminate computer viruses and other malicious software (malware).

Firewalls are systems which help protect computers and computer networks from attack and subsequent intrusion by restricting the network traffic which can pass through them, based on a set of system administrator defined rules.

Access authorization restricts access to a computer to group of users through the use of authentication systems.

AGRICULTURE

Mushroom processing Technology



Mushroom: Training cost: Ksh 15, 000 per person

Gender, Innovation and Development

Micro and Small Enterprises (MSEs) are the foundation of national economy and job creation. Women entrepreneurs though owning 48% of the 1.3 million Kenyan MSMEs their enterprise are smaller than those of male counterparts and profitability is 43% lower than those owned by men.

However, widespread negative perceptions and stereotypes that women enterprises are only at subsistence levels and survivalists should be dispelled as the country strives to create enabling environment – especially education, technical training and financing- for women innovators and industrialists.

This is according to KIRDI's summary document on launching of Women Entrepreneurship Unit. It concludes that women enterprises should be effectively supported as create wealth, employment and help reduce poverty.

Innovations and Business Incubators

KIRDI's technology business incubators was established July in 2006 offering facilities and services needed to enhance survival of start-ups.

The aim is to help create and develop at least 300 technology based enterprises by the end of 2009.

Strategy – Upgrade 40-50 products by MSEs Arc-Welding machine (Kenya) made and launched.

AREAS FOR INCUBATION

- Food technology
- Chemical engineering
- Leather and leather goods
- Honey processing
- Essential oils
- Medicinal/herbal
- Mushroom
- Biopesticides
- Detergents/soaps
- ICT
- Others

MASTER MILL (ENGINE VERSION)



Prime: Kerosene engine (7hp)
Capacity: 3 bag/ hr (maize)
Cost: Ksh 130, 000

Groundnut Sheller



PHOTO: PEANUT SHELLER
CAPACITY: 100KG/ HOUR
Cost: Ksh 15, 000

Cassava Peeler / Grating Machine



CAPACITY: 50 Kg/Hour
Cost: Ksh 22, 000

Food Products



Some of the food products that have been researched in KIRDI and are available for sale at the KIRDI Shop in our South C Campus



KIRDI Takes Industrial Research to New Level

— *Speech Of Prof Henry Maritim, Chairman Board Of Directors During The Celebration of the month of Women Entrepreneurs in Development and the launch of Kirdi's Desk for women entrepreneurs*

Kenya Industrial Research and Development Institute was established in 1942 to undertake industrial research and develop technologies, processes and products that can support industrial development and is a strategic national institution designed to catalyse industrialisation.

In the past this role was not adequately fulfilled with the current emphasis on industrialisation, we are quickly changing to be able to meet the new expectations.

In its current strategic plan (2006-2009),

the board aimed to enhance the development of new technologies, products and process to support value addition; promote technology transfer; enhance regional presence; and create manufacturing enterprises

Enhancing regional presence is of utmost importance. For a long time KIRDI's services could only be accessed from Nairobi. The Board is making deliberate effort to ensure that the delivery of services is dispersed to the regional.

For this reason the Board has approved creation of KIRDI centers in all provinces. Currently the upgrading of Kisumu as a regional center for western Kenya is in top gear and groundwork is on for the establishment of a center in Mombasa.

Mini-centers will be established to support the pilot plants in Kwale, Chuka

Malindi, Garissa, Kisii, Bungoma, Eldama Ravine, Eldoret, Homabay, and Muranga, just to mention a few.

For the year 2008/2009, some 15 pilot plants will be established and all geared toward supporting entrepreneurship development particularly among women.

As a sign of commitment in promoting the development of Women Entrepreneurship, my Board approved management proposal to establish a unit for Women Entrepreneurship Development in KIRDI.

It is the desire of the Board that the unit will spearhead access to KIRDI's technologies, products and processes and support women enterprises through our incubation services. It is my hope that the Women Entrepreneurs will take advantage of the opportunity provided by KIRDI to improve on their business.

NUTRITION: Managing Specific HIV/AIDS Symptoms

By Maureen Awuor Okoth

NUTRITIONAL management of specific HIV/AIDS related symptoms.

Anaemia (pale hands and fingernails.)

Ensure they are treated for malaria and were dewormed in the last four to six.

If taking zidovudine or lamivudine, recommend hemoglobin assessment at least once a year.

Increase consumption of animal protein (red meat), dark green vegetables, and fruits rich in vitamin C.

Reduce consumption of tea, coffee after meals.

Iron/folate and B12 supplementation.

Anorexia (loss of appetite)

Recommend small frequent meals, energy and nutrient dense foods; eat favorite foods, plenty of fluids, eating in the company of friends and relatives.

Do simple exercise if possible.

Provide multivitamins.(e.g. vitamin B)

Depression or another psychological condition, refer to a counselor.

Constipation. (Irregular passage of stool or passing too small or hard stool)

Maintain regular eating schedule. No skipping meals.

Drink plenty of fluids especially if on diuretics.

Eat foods high in fiber and avoid highly refined foods.

Exercise as much as possible.

Avoid laxatives as they cause loss of fluids from the body.

Diarrhea

Drink plenty of fluids.

Asses and advice on food/water safety and personal hygiene to ensure it is not the cause of diarrhea.

Treat of bacteria, viral and fungal infections.

Identify whether diarrhea is an effect of drugs.

Take small frequent meals with plenty of fiber from fruits and vegetables.

Foods rich in potassium.e.g bananas.

Avoid alcohol.

If there is blood in the diarrhea or if

symptoms persist,advise to immediately seek medical care.

Fatigue (lethargy/general body weakness)

Discuss possible causes of fatigue.

Eat snacks between meals.

Eat high energy and protein foods.

Do some exercise to increase energy.

Stretch.

Rest with ready to eat food kept in closed containers next to the bed.

Drink plenty of safe water.

Mouth sores/thrush.

Recommend:

Good oral hygiene and gargling with a pinch of salt in warm water.

Eat garlic or drink raw garlic tea to relieve the pain.

Eat fermented foods like yoghurt.

Eat mashed, soft, smooth foods at room temperature.

Drink fluids with a straw to ease

swallowing.

Avoid spicy, sugary and acidic foods and drinks.

Avoid alcohol and cigarettes.

Muscle wasting/weight loss.

Refer for ARV assessment if body mass index is less than 16.5

If it's due to dietary intake, recommend: balanced meals and increase quantity of intake, improving nutrient density of food by adding peanut butter, skimmed milk or eggs in porridge or soups, taking snacks that are nutrient rich between meals.

Advise on simple exercise to improve muscle.

Weigh client at every 2 months.

Nausea and vomiting.

Recommend; Take small quantities of dry, bland or lightly salted foods and boiled foods at frequent intervals.

Take plenty of fluids after meals such as diluted fruit juice, or water especially with lemon.

Avoid greasy, fried foods and foods with strong odour.

Avoid coffee and alcohol.

If vomiting continues for more than a day; if there is blood in the vomit; or if there is fever, the client must seek medical care.

Relation between nutrition and HIV/AIDS

By Maureen A. Okoth

NUTRITION refers to how food is processed and utilized by the body for growth, reproduction and maintenance of health. Foods contain different nutrients that include water, Carbohydrates, proteins, fats, vitamins and minerals. Good nutrition is important to ensure survival and that critical functions operate, including:

- The body producing energy for survival, movement, work, and temperature Control.
- Growth, development, replacement and repair of cells and tissues.
- Chemical processes such as digestion, metabolism and maintenance.
- Protection from illness, fighting infections, and recovery from illness.

Malnutrition

Malnutrition is a state when the body does not have enough of the required nutrients (under-nutrition) or has excess of required nutrients (over-nutrition). In Kenya, under nutrition is widespread and often thought of as the same as malnutrition.

HIV Infection and the Immune System

HIV attacks and impairs the body's immune system. HIV infection progresses slowly and may take years before the infected person shows persistent signs of illness.

During this period, the virus attacks and

destroys the body's defense cells known as CD4's. CD4 cells are critical to the immune system functions of the body. Unlike other infections, it is Practically impossible for the body to naturally eliminate HIV.

The length of time it takes for untreated and asymptomatic HIV infection to become a symptomatic disease depends on several factors, including the general health and nutritional status of a person before and during the infection period.

For individuals with adequate food and health resources, the average time for an HIV-infected adult to develop to full-blown AIDS is approximately ten years.

In resource-poor settings, such as in Kenya, HIV's progression to full-blown AIDS may take a shorter time because a majority of people have various nutritional deficits and health problems. The emergence of opportunistic infections (OIs) marks entry into full-blown AIDS.

At this point, the body's ability to fight against infection from viruses, bacteria, and parasites, and against noninfectious diseases such as cancer and blood disorders, is significantly weakened.

When the immune system is functioning optimally, it helps slow the progression of HIV into AIDS, and increases survival. The development and full function of the immune system requires an array of essential micronutrients and adequate macronutrients, achieved through good nutrition. Generally, immune suppression responds rapidly to nutrition intervention.

Scholarship Opportunity-Aga Khan Foundation (East Africa)

The Aga Khan Foundation, in collaboration with the Institute of Education, University of London, is pleased to invite applications for the Commonwealth Distance Learning Scholarships, provided by the Commonwealth Scholarship Commission in the United Kingdom. The scholarships are open to prospective students from Kenya, Tanzania and Uganda wishing to undertake the Institute of Education's MA in Education and International Development, MA in Educational Planning and International Development, MA in Education, Health Promotion and International Development or MA in Education, Gender and International Development beginning in October 2009.

The scholarship is for 2 years of part-time study. Students will spend the first year and one term studying on-line followed by a three-month period study at the Institute of Education in London (January 2011) and a period to complete their dissertations in their home countries. The scholarship will cover the cost of tuition fees for the course, travel expenses for the period of study at the Institute.

Applications are available on-line at www.ioe.ac.uk/scholarships/cdls. The closing date for submission of scholarship applications is Friday, 27 March 2009. All applications should be submitted to the Aga Khan Foundation and not the Institute of Education or the Commonwealth Scholarship Commission.

Digital Publishing & Printing Services

For Creative Consultancy of Audio and Visual Communication Materials

Editing Content, Design and printing of Exhibition Banners • Brochures • Newsletters

Magazines • Annual Reports • Stationary Supply • Website Design, maintenance and Hosting

Video Production • Photography • Design of Company Logos

Kilimani Complex 2nd Floor Room 9, Opposite Yaya Centre

P.O. Box 20703, KNH, Nairobi • Call: +254733-267150, +254722-784390, +254710212170

Fast Delivery and on time.

Ethiopia: Maize Gains Popularity

Investment in Seed Sector

Villagers at Sororo, Ejere District, Oromia, speak about their experiences with improved maize varieties from Demissew Abakemal, maize breeder with the Ethiopian Institute of Agricultural Research (EIAR). There is need to invest in the seed sector along with supportive policies.

"It was a very dry year, and your maize is performing well," the farmers say. "We have a surplus for food and even some for taking to the market—something we'd not seen in all our lives."

They have been harvesting and piling sheaves of wheat from the bottom of the hill, but take the visitors to maize fields up near their dwellings, and proudly show the large ears of the hybrid Argene and a nearly-as-productive open-pollinated variety (OPV), Hora. Those varieties, and practices like using fertilizer, are part of an EIAR project to improve the incomes and food security of highland households, with technical and other support from the Ministry of Agriculture and Rural Development.

Demissew Abakemal works out of an EIAR research station at the highland location of Ambo, but has roamed the highlands far and wide to help farmers.

Fueled by high-yielding varieties and national initiatives to promote the crop in highland areas, maize's popularity is mounting rapidly in Ethiopia. Because farmers can get more food and income with the new varieties, they are calling out for seed. Suppliers—both private and government supported—are clamoring to meet the demand. "We began in 2006 trying to get more farmers to adopt practices—use of improved seed and fertilizer—that had previously been used in isolated pockets in the highlands," he says.

"The work is going on in six districts, and we've gotten through to thousands of farmers around Ambo alone." Sororo farmer Alemayehu Balcha had harvested enough in 2008 to take green ears by donkey to a market 5 kilometers away.

"With the money we earned, we bought things like coffee, salt, kerosene—household items—and even some school materials for our children."

Alemayehu has three children whom he supports by farming a mere half-hectare of land and share-cropping on other farmers' holdings, growing rye, wheat, maize, and diverse garden crops, with help from his wife and occasionally other relatives.

He admits that it takes hard work to make ends meet. "I've been head of the household for seven years, and even though it's not enough, I'm standing on my own," he says.

Later Demissew learns that Alemayehu and his wife also help support a recently-widowed neighbor and her six children. Roughly twice the size of France, Ethiopia has a population of 80 million ethnically and linguistically diverse inhabitants.

Many Ethiopians live in highland areas where good rainfall makes cropping possible. Even though only 1/10th of its land is arable, agriculture accounts for almost half of the gross domestic product, 60% of exports, and 80% of total employment in Ethiopia.

Farmers typically subdivide their land to leave each child a parcel, so over generations the average holding has shrunk to less than one hectare per household. Soil degradation, erosion, and deforestation are big problems.

Coffee is the chief cash crop, but for



Maize is becoming a major staple food in Africa.

food farmers grow teff—a robust ancient cereal used to make the favorite sourdough flatbread, injera—as well as wheat, sorghum, and the increasingly popular maize.

"Maize is the hunger-breaking crop for the highlands," says Strafford Twumasi Afriye, International Maize and Wheat Improvement Center (CIMMYT) maize breeder based in Ethiopia.

"The small-grain crops must be processed and cooked. Maize can be eaten with very simple preparation, and is simpler to grow and more productive than teff."

Farmers in remote areas also use the maize plant for fodder, for building fences, and as fuel for cooking fires.

The varieties used in the EIAR project derive from work begun by Twumasi around 1997, with help from partners including

Demissew Abakemal and other EIAR breeders, to address the pressing need for high-yielding maize for the tropical highlands of sub-Saharan Africa.

"The materials from CIMMYT's highland breeding program in Mexico are not well-adapted to Africa," he says, "so I began using midaltitude germplasm from CIMMYT-Zimbabwe's work, plus transition zone (between midaltitude and highland) varieties from the center's breeding efforts in Mexico."

Twumasi also chose highland sites in Burundi, Ethiopia, Kenya, Rwanda, Tanzania, and Uganda for use by him and national partners to cross, test, and select new varieties.

"By 2006, we had a good array of experimental varieties for the region,

including inbred lines for making hybrids." At harvest time that same year, Twumasi and colleagues showcased the materials to the region's stakeholders, including seed companies.

"Since then, there's been lots of demand," he says. "Ethiopia's national program has released two hybrids and one OPV, and will release another hybrid soon. Rwanda also released an OPV in 2008. Now our focus is to get small seed companies to develop hybrids." More recently, Twumasi and partners have also been working to create quality protein maize (QPM) versions of Ethiopia's most popular varieties.

QPM looks and grows like normal maize, but its grain provides protein with higher lysine and tryptophan content, two essential amino-acids for humans and farm animals like poultry and swine.

The heights and weights of preschool children whose diets included QPM as their main starchy staple increased more than 20% faster than those of children who ate conventional maize, according to a recent study in rural Ethiopia on the nutritional benefits of QPM and its acceptance as a food.

With the promise of the new, high-yielding varieties, farmers throughout the highlands are demanding seed, and supplies in recent years have fallen short. The main seed producer has been the government's Ethiopia Seed Enterprise.

"The government has been encouraging private companies to move into the market with maize hybrids, and providing them with the breeder's and foundation seed to do so," says Dennis Friesen, CIMMYT agronomist based in Ethiopia.

"The plan is for the Ethiopia Seed Enterprise eventually to leave hybrid seed production to private companies, and focus on producing seed of OPVs for farmers who can't afford the hybrids. But right now this is all in a transition phase."

Ethiopian maize scientists discussed the issue at a meeting in Addis Ababa in November 2008, according to Friesen, who helped coordinate the event.

Meanwhile, the need for seed is definitely on the radar screen of the country's policymakers, who are promoting maize production to help alleviate poverty and hunger.

Despite strong growth in the private seed sector in eastern and southern Africa over the last decade, most of region's millions of small-scale farmers lack easy access to affordable, quality seed of maize.

A major study by CIMMYT shows the need for active investments in the region's seed sector and for policies to support its development. (CIMMYT)

Striga-resistant Maize 'a Hit' with Nigerian Farmers

By ABIOSE ADELAJA, LAGOS, NIGERIA

Deadly beauty: Striga asiatica devastates crops by infecting roots

(LAGOS) Nigerian farmers who tested new maize crops resistant to the widespread Striga plant parasite are so enthusiastic about their increased crop yields that they are selling more seeds than the official distribution channels.

The crops were developed in the Nigerian laboratories of the International Institute for Agricultural Research (IITA). They dramatically cut maize losses from the root-infecting Striga, or witchweed, during two years of trial cultivation by farmers in Borno State in northern Nigeria.

Nigeria's Institute for Agricultural Research began distributing the new parasite-resistant maize seeds in December 2008.

Abebe Menkir, the lead scientist on the research project at IITA, told SciDev. Net that some farmers in Borno state were already producing large quantities of resistant seeds and selling them on to farmers in and outside the region. He was unable to say how many seeds are being — and will be — distributed through official channels.

"The farmers say they couldn't wait for the official release of seedlings because the variety is successful, cutting losses," says Menkir.

Menkir said the next step was to

distribute the parasite-resistant maize in other countries in West and Central Africa.

The varieties, known as Sammaz 15 and 16 contain genes that diminish the growth of parasitic flowering plants such as Striga, which attaches to the maize root. Both Sammaz varieties tolerate heavy Striga infestations without suffering crop losses.

"A normal maize variety without resistance to Striga can sustain from 60 per cent to 100 per cent grain yield loss in farmers' fields that are severely infested," Menkir told SciDev.Net. Sammaz 16 loses just ten per cent of yield in an extreme invasion.

Sammaz 16 is a late-maturing variety requiring 110 to 120 days of growth, whereas Sammaz 15 can often be harvested at 100 days and is more suitable for regions with short growing periods or unpredictable water supplies.

Agronomy researcher Michael Aken'Ova from the faculty of agriculture at the University of Ibadan, said that producing resistant and tolerant cultivars such as Sammaz is the most economically feasible, easily accessible, safe and sustainable approach to combat losses due to Striga, particularly compared to labour-intensive methods such as weeding.

He added that he is sure that the resistant crops will soon make it to the farmers who need them, with the aid of leaflets, radio magazine programmes and messages in local languages. — *SciDev.net*

briefs

Maize Seeds Bred 20 years ago

One of the major limitations to food production in Africa is the use of maize cultivars bred over 20 years ago says Marianne Banziger the director of Maize Program at International Maize and Wheat Improvement Center (CIMMYT)

\$12,000 Grants Available

The Sweden based International Science Foundation does its best to facilitate science education in Africa. It has grants for up to \$12,000 dollars for those seeking help in doing research work for their doctorate degree or PHDs.. This is according to the director Dr Michael Stohl the executive of the IFS. Who was in Nairobi attending the the launching of strategic plan of the African Centre for Technology Studies(SCTS).

Quotable

“We want to stay as close as possible to our vision: knowledge for better livelihoods and act on our mission: to strengthen the capacity and policies of African countries and institutions to harness science and technology for sustainable development.” Chair African Centre for Technology Prof. Mohamed Abdel Aal, of Egypt. when launching Strategic Plan 2009-2013.

AGRA

More countries could join Malawi in improving food production by using modern agricultural inputs especially fertilizers. The Alliance for Green Revolution in Africa, collaborating with other institutions launched \$2.5 m Ghana Agro-Dealer Development project to increase food production and income among rural farmer by availing appropriate seeds and fertilizers.

Science not Politics

Sad Story of NEMA, KEPHIS, Government Chemist.

Unless the media got it wrong, then there is need to remind Kenyan scientists that their respect is linked evidence based utterances. Kenya Bureau of Standards says that the 6000 tons of maize that was still the port of Mombasa were unfit for human consumption. But what have the highly respected Government Chemist and Kenyan Plant Health Inspectorate Service (KEPHIS) found that make the maize edible. They should at least compare their notes before pushing science into the “make believe world of politics when nothing is ever exact.

Training on Biosafety

Within the University of Nairobi Chiromo Campus is an organization known as Biosafe Train focusing on biosafety and ecological risk assessment. It collaborates with scientists from both the University of Nairobi and Kenya Agricultural Research Institute in Kenya; Makerere University in Kampala, Uganda; University of Dar es Salaam in Tanzania; universities of Aarhus and Copenhagen in Denmark. Biosafe train enhances research capacity by offering MSc and PhD fellowships on agricultural and environmental impacts of GM plants. (www.biosafetrain.dk)



Kenya's President Mwai Kibaki is a confirmed supporter of biotechnology.

Kenya's 2008 Biosafety Bill Passed, Signed

Kenya's Parliament finally passed the Biosafety Bill which President Mwai Kibaki signed on 13th February 2009. The special issue of ScienceAfrica on Biosafety Bill sold out with most members of Parliament getting a copy.

However, it is now for stakeholders to begin letting Kenyans see the benefits of biotechnology as soon as possible. It has been almost of a decade of really hard work for the teams that believed Kenya needed a biosafety law with a credible regulatory authority to facilitate the handling of GMOs in a transparent and responsible manner.

President Kibaki's signing of the 2008 Biosafety Bill was received with joy and much relief by biotech stakeholders who had seen things change for the worst just when it was assumed they had crossed major hurdles.

The final efforts to enact the much awaited Biosafety Bill was spearheaded by the ministry of higher education, science and technology with the National Council for Science and Technology serving as the focal point.

However, there were a team of a dozen

highly committed stakeholder who believed that the Bill was bound to create an enabling environment because it would allow for the formation of a regulatory agency capable of detecting, rejecting or allowing GMOs into the Kenyan market.

The situation before was such that the country seem to have had minimal legal teeth even if GMOs or GM products were smuggled into Kenya.

The Act will help Kenya to be an active participant in acquisition and utilization of biotechnology which is a major socioeconomic cornerstone of the 21st century.

Apart from the NCST, other national and international organizations that played key roles included African Biotechnology Stakeholders Forum, Kenya Agricultural research Institute, A HARVEST, ISAAA, BTA, AATF, KEPHIS, KEBS, CIMMYT, NEMA, ICRISAT University of Nairobi Faculty of Agriculture and Veterinary Science and others.

The university team led by the dean Prof John Nderitu, took the debate to the public and explained to them the benefits and the real or perceived dangers.

CGIAR Focuses on Africa

THE Consultative Group on International Agricultural Research (CGIAR) held its Annual General Meeting (AGM08) in Maputo, Mozambique, from December 1 to 5, 2008. AGM08 brought together over 700 of the world's leading food and environmental scientists and civil society to strengthen and expand partnerships that stimulate economic growth in Africa, Asia and Latin America.

Through dialogue and the sharing of experiences, participants explored how agricultural research, science and technology, and food policy initiatives can better improve the lives and livelihoods of poor people, and launch new initiatives that bring the benefits of modern science quicker and faster to poor farmers.

Recent AGMs have been held in China, Washington, Morocco, Mexico, Kenya and the Philippines.

The meeting and associated events

offered excellent opportunities to interact with world-class scientists and to learn how new knowledge – developed and applied within a public goods framework – is reducing poverty, hunger and environmental degradation.

At the invitation of the Minister of Science and Technology, Mozambique, the CGIAR AGM08 was held in Maputo at the Joaquim Chissano Conference Center. The Stakeholder meetings on December 1 and 2 were followed by a field visit day to the International Institute of Agricultural Research (IIAM), DCA (livestock station) and the Umbeluzo Research Station where participants had an opportunity to review field trials currently being undertaken by CG Centers in Mozambique.

The field visits were followed by the CGIAR Business Meetings which were held on December 4 and 5. The Stakeholders meeting and the Field Visit Day were open.

Burkina Faso's 10,000 Hectares of Biotech Cotton

Burkina Faso has successfully harvested 10,000 hectares of biotech cotton while India, has for the sixth time led the world with the largest area devoted to GM cotton. The country has had an unprecedented sixth consecutive seasons of increased production after the introduction of biotech varieties in 2002.

These were some of the highlights of the recent International Cotton Advisory Committee meeting in Ouagadougou, Burkina Faso which was attended by over 429 participants from 35 countries and nine international organizations. The Committee was informed that cotton varieties developed with the application of biotechnology accounted for more than half of world production last season, that the biotech proportion continues to grow.

GMOs Future Trends

Most living things that destroy or cause diseases in crops can finally develop mechanisms that resist, tolerate or cope with attacks by natural enemies or man made innovations designed to eradicate them.

Genetic engineers are using single Bt genes but second and third generation innovations – with different Bt genes or synthetic variants – could be available.

ISAAA 2008 REPORT:

Biotech Crops Poised for Second Wave of Growth

POLITICAL Will Strengthens Globally Biotech crops, on the heels of a robust 2008 and bolstered by increased political will to meet food demands, are poised for a second wave of strong adoption that will drive sustained global growth through the end of the second decade of commercialization 2006 to 2015, according to the International Service for the Acquisition of Agri-Biotech Applications (ISAAA).

An additional 1.3 million farmers planted 10.7 million new hectares of biotech crops in three new countries in 2008, according to the ISAAA brief Global Status of Commercialized Biotech/GM Crops 2008. ISAAA has been tracking global biotech crop adoption trends since 1996.

13.3 million farmers in 25 countries planted 125 million hectares of biotech crops last year, the sixth largest growth spurt in 13 years of reporting. The 2 billionth cumulative acre of biotech crops also was planted in 2008, just three years after the first billionth acre, a milestone which required a decade to reach.

Most notably, in 2008 biotech farming began in the African nations of Egypt and Burkina Faso. Africa is considered the “final frontier” for biotech crops as it has perhaps the greatest need and most to gain.

In 2008, Egypt planted 700 hectares of Bt maize and Burkina Faso planted 8,500 hectares of Bt cotton. They join South Africa, which since 1998 has benefited from biotech cotton, maize and soybean.

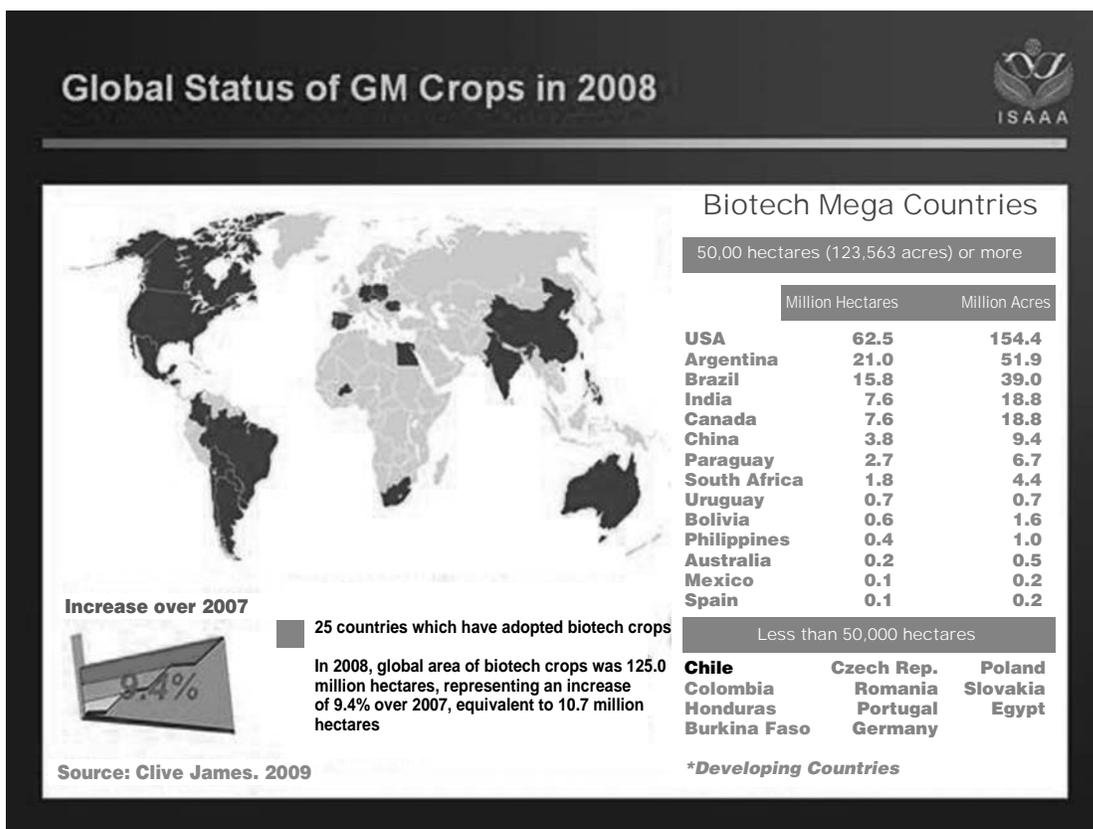
G-8 leaders in 2008 for the first time recognized the significance of biotech crops and called to “accelerate research and development and increase access to new agricultural technologies to boost agriculture production; we will promote science-based risk analysis, including on the contribution of seed varieties developed through biotechnology.”

The European Union also has acknowledged that biotech crops “can play an important role in mitigating the effects of the food crises.”

In China, Premier Wen Jiabao has said “to solve the food problem, we have

quoteunquote

Accelerate research and development and increase access to new agricultural technologies to boost agriculture production; we will promote science-based risk analysis, including on the contribution of seed varieties developed through biotechnology.



to rely on big science and technology measures, rely on biotechnology, rely on GM.” As a result, China has committed an additional US\$3.5 billion over 12 years for continued research and development.

“Biotech crops make two important contributions to global food security,” James said. “First, they increase yields, which increase food availability and supply. Second, they reduce production costs.”

A new biotech crop, herbicide-tolerant sugar beet was planted in the United States and Canada for the first time in 2008.

Nearly 258,000 hectares or 59 percent of the U.S. crop was planted to the herbicide-tolerant variety, the highest launch adoption level ever signaling a strong desire among growers for the technology.

Brazil and Australia planted new biotech crops previously approved in other countries.

Brazil, the world’s third largest maize producer, planted up to 1.3 million hectares of Bt maize in 2008, while Australia grew herbicide-tolerant canola for the first time.

Seven EU countries increased their planting 21 percent to again total more than 100,000 hectares, a milestone reached for the first time in 2007. The seven EU countries in order of biotech hectareage of Bt maize were Spain, Czech Republic, Romania, Portugal, Germany, Poland and Slovakia. Biotechnology’s Role in Sustainability

Biotech crops contribute to increased food availability and affordability, increasing production by 141 million metric tons in the 12 years, 1996 to 2007.

Biotech crops help conserve biodiversity by saving land. Forty-three million additional hectares of land would have been required to create the production gain of 141 million tonnes generated by biotech crops.

With 70 percent of the world’s poorest dependent on agriculture and with income as low as US \$1 a day, biotech crops can also contribute to economic sustainability and alleviation of poverty.

In developing nations and transforming economies, agriculture is responsible for a substantial part of the GDP. Increases in agriculture

productivity from biotech crops are evident, for example:

Research in India, China, South Africa and the Philippines shows biotech crops have already increased incomes \$115 to \$250 per hectare. Globally over 12 million resource poor farmers benefited from biotech crops in 2008.

Approval of insect-resistant rice has the potential to benefit more than 250 million rice households in Asia, or approximately 1 billion people.

Further, the global net economic benefit to biotech crop farmers in 2007 alone was \$10 billion (\$6 billion in developing countries and \$4 billion in industrialized nations.) For the period 1996 to 2007 the economic benefit was \$44 billion, equally divided between developing and industrial countries

Biotech crops have already substantially reduced agriculture’s environmental footprint by reducing pesticides, saving on fossil fuel use and decreasing carbon dioxide emissions and soil loss through less plowing. In particular, from 1996 to 2007 biotech crops saved 359,000 metric tons of pesticides (active ingredient).

CLIMATE

Impact of Climate Change on Agriculture

The ongoing famine in Kenya is linked to drought that is associated with the global climate change that has altered seasonal weather patterns. The situation is worse in Kenya where the minimal forest cover that served as water catchments have been depleted.

It means that the whole country – with two thirds already classified as dry land- could soon be classified as arid and semi-arid lands. For agricultural researchers the concept of breeding maize varieties for “traditional dry lands” has to be expanded in ways never imagined before.

Annual maize loss in the country

due to drought often approaches 60 to even 100 percent in severe drought, according to researchers at Kenya Agricultural Research Institute.

There are ongoing efforts to develop fast maturing maize varieties with genetic tolerance for drought under KARI's Maize Research Programme in collaboration with the International Centre for the Improvement of Maize and Wheat.

Since 2000 the research has resulted in six extra-early varieties pre-released through the KARI-Katumani and CIMMYT Programme.

Maize is grown under rain-fed conditions and the proportion of grown



Drought is the major threat to maize production in Africa.

crop in marginal areas increasing.

Thus according to KARI breeding for maize varieties with high and stable grain yields under drought is an important priority. The activities include:

- Development of germplasm with genetic resistance to moisture stress and drought
- Development of germplasm with genetic resistance foliar diseases, stem borers and storage pests
- Develop low-cost soil moisture conservation practices (e.g water harvesting, mulching, minimum tillage).
- Encourage early planting, dry

planting, and response farming technologies.

- Evaluate underground water availability and suitability for irrigation of drier areas Increase maize productivity through
- Development of maize varieties suitable for existing farming systems (Intercropping and fodder feed)
- Agronomy research in soil fertility management in semi-arid lands
- Increase yields in drought-prone environments through:
 - KARI's other collaborators include seed companies and Kenya Plant Health Inspectorate Service for variety testing,

SUMMARY PROFILE

African Technology Policy Studies(ATPS)

Vision: To be the leading international centre of excellence and reference in science, technology and innovation systems research, training and capacity building, communication and sensitization, knowledge brokerage, policy advocacy and outreach in Africa.

Mission: To improve the quality of science, technology and innovation systems research and policy making in Africa by strengthening capacity for science and technology knowledge generation, communication and dissemination, use and mastery for sustainable development in Africa.

Overall Objectives: To develop Africa's STI capacity (knowledge basis & infrastructure, knowledge circulation & networks, knowledge conditions & policies) today for sustainable

African development tomorrow.

Our Motto: Building Africa's Science, Technology and Innovation (STI) Capacity Today for Sustainable African Development Tomorrow.

Chief Executive Dr Kevin Urama:

ATPS organizes and implements STI capacity building programs at regional and national levels. All programs address STI capacity building priorities of African countries identified by network members and stakeholders.

ATPS activities are organized in four interrelated functional domains: STI knowledge generation; STI knowledge brokerage; STI knowledge dissemination; STI outreach & policy advocacy; and STI knowledge valorization. These functions are performed through three

cross-cutting thematic research capacity building programs and three cross-cutting non-thematic facilitative programs. The thematic and facilitative programs are intertwined and together they form the six medium term strategic priorities of the ATPS. "http://www.atpsnet.org/about/Thematic_priorities.pdf"

The Regional Secretariat based in Nairobi, Kenya coordinates the region-wide programs, while national chapters are responsible for identification, prioritization and implementation of country specific initiatives in liaison with stakeholders at the grassroots. All ATPS thematic research programs are coordinated by international experts in the subject area (Resource Persons) who provide independent expert supervision and peer review of the program activities. Depending on the nature of activity, peer review and stakeholder workshops are organized at regular intervals at

both regional and national levels. In addition, the ATPS responsible STI Advisory Committee provides independent advice on the quality of STI outputs and policy outcomes of the network activities.

The general membership of the network meets annually to review activities of the Network and prioritize programs for the year based on felt needs of the country chapters. The ATPS Board, with professor Norah Olembo, as the current chairperson, meets twice each year to monitor progress towards stated strategic program objectives and approve program plans.

Finally Daily activities of the Network are guided by a set of policy manuals designed to ensure effective implementation of activities in line with international network management policies "<http://www.atpsnet.org/about/manuals.htm>"

DataEase Softwares Ltd

Kilimani Complex 2nd Floor Room 9, Opp. Yaya Centre
P.O. Box 76336 – 00508. Tel: 254-020-3877935 / 3861635 Nairobi – Kenya.

What Top African Scientists Say-Part One

First Part of Edited Extracts from the Supplement on the 25th anniversary of the Third World Academy of Sciences TWAS. ScienceAfrica could not verify whether the supplement, carried by London based and internationally respected science journal Nature, was also placed in any other journal or publication in the developing nations.

By Romain Murenzi, In Rwanda's Minister For Science & Technology

RWANDA'S success has depended on sustained politico-economic commitments from the top leadership. Secondly on a strategic vision allowing the nation to transform the commitments into policies and programmes that have had a positive impact on peoples' lives.

We have also received support from donors. When the genocide ended in 1994, the government initially focused on rebuilding the nation's educational systems.

Student enrolment in primary education more than doubled from 940,000 to 2 million, enrolment in secondary education increased sevenfold from 50,000 to 350,000 while enrolment in higher education has increased more than tenfold from 3,000 to 40,000.

The goal is to create a more educated and skilled labour force. We have also sought to implement simple, appropriate technologies, especially those that can provide immediate

benefits to the most impoverished citizens.

For example we have a programme to distribute biogas stoves using human waste to generate heat more efficiently than wood stoves and over half of all households have these stoves and all households should have them by 2012.

This might sound like a small measure, yet improved stoves have a dramatic positive impact on the lives of people, particularly in rural areas.

Thus children no longer spend long hours gathering wood and, as a result, spend more time in school. The measure reduces stress on forests therefore helping improve the environment.

The government provides opportunities for farmers to adopt land-management practices including terracing and encourages them to work on their land as cooperatives thus increasing prospects for producing crops for market.

In the past, farm families tilled small plots often, one-quarter hectare. They grew small amounts of a wide variety of crops, largely for



their consumption.

Today, many farmers, as members of farm cooperatives, grow maize and produce milk for sale. Their efforts are aided by government agencies that provide training and carry out free demonstrations. This is science-based development at its best. Simply put, we are turning to science to help improve peoples' lives. Romain Murenzi is also TWAS Fellow 2005



By Prof Turner Isoun, Former Minister for Science & Technology in Nigeria

FOR more than 50 years, the developed world, led by the USA and the former Soviet Union, dominated space science and space exploration, spearheading manned space flights, moon landings, travel to distant planets, the construction of a multinational space station, and the launch of some 4,000 communication and surveillance satellites.

Over the past few decades, the gap between the space ambitions and achievements of developed and developing nations has begun to close. China, for example, has embarked on a broad space science programme, conducted manned space flights, and built satellite launch sites and vehicles. It has announced plans for a permanent space station, possibly in cooperation with other developing countries, and an unmanned robotic mission to the Moon to explore the prospects of lunar mining. Other plans involve astrophysics research, including the launch of the world's largest solar space telescope and a deep-space tracking network involving the world's largest radio antennae.

Other developing countries are following, although on a smaller scale. A growing number now own and operate satellites (for example, Algeria, Argentina, Egypt, Indonesia, Iran, Malaysia, Nigeria and Pakistan), which they use

in their efforts to improve agriculture, communications, environmental protection and national defence. India and Brazil also have satellite launch capabilities. Others, including Chile, Peru, Kenya and South Africa, have initiated space policies and programmes that are moving ahead at different rates.

Critics of space programmes in developing countries typically argue that funding could be better spent on more immediate concerns, such as health care, the building of infrastructure and universities. They fail to acknowledge that space science and technology can make significant contributions to a country's most pressing social and economic needs, and catalyse industrialization.

Nigeria, where I served as minister of science and technology from 2000 to 2007, offers examples of a systematic space programme in the developing world that is succeeding.

In 1999, Nigeria adopted a 30-year strategic space-policy agenda that led to the creation of the National Space Research and Development Agency (NASRDA). The country's first venture into space took place in 2003 with the lift-off of NigeriaSat-1, a remote-sensing satellite built in partnership with Surrey Satellite Technologies of the UK and launched from Plesetsk, Russia.

Last year, in partnership with China, we launched NigcomSat-1, a communications satellite. NigeriaSat-2, a higher resolution remote-sensing satellite, is due to be sent into orbit in 2009, again with help from the UK. There are also plans to send a Nigerian astronaut into space by 2015 and to launch a Nigerian-made satellite by 2018, taking advantage of Nigeria's geographic location to launch into near-equatorial orbit.

How has the country gained

from these endeavours?

Among the benefits are the creation of new research and development (R&D) institutions that include a National Space Centre with a receiving station for information transmitted by Earth observation satellites, a ground control station for gathering signals from communication satellites, a satellite design and assembly centre, a soon-to-be completed planetarium, and the development of R&D centres in disciplines such as satellite technology and development, remote sensing, geodynamics, space transportation and propulsion, basic space science research and education. Many of these efforts will contribute to education at all levels, curb the migration of skilled manpower, and help to improve public awareness of science and technology.

The benefits are also monetary. Local and international private companies, government agencies and non-governmental organizations have paid for images created by the Sat-1 remote sensing satellite for environmental and disaster monitoring; and telecommunication companies across Africa and outside the continent have leased most of NigcomSat-1's 40 transponders, generating significant revenue.

Satellite technology has brought other advantages. Mobile phones, which depend on it, have been a great success in Africa. In 2000, the Nigerian national telephone company (NITEL) had fewer than 1 million landline subscribers. Today, Nigeria has over 40 million telephone subscribers, most of whom use cell phones. The use of locally owned satellites reduces the cost of bandwidth and network connectivity.

Investing in satellite technology is expensive. Yet, buying satellite-related products and services from others is

even more so. It also increases the risk of services being interrupted by limited supplies, or by concerns of suppliers or recipient countries over national security. Moreover, countries that pay only to use the products of advanced technologies are prohibited from drawing on proprietary knowledge for local production or for developing skills and innovations.

It is not just about technology and profits. Satellite technology has encouraged many more young people to pursue higher education and careers in mathematics, science and engineering. More than 100 Nigerian space science and engineering graduates are working on national satellite projects.

The launch of NigcomSat-1 was broadcast on television across Nigeria and received front-page coverage in national and international newspapers and magazines. The brief, non-orbital flight of Stella Onyiyechi Uzumma Felix, a 17-year old Nigerian student, from the Kennedy Space Centre in the USA in September 2006, inspired celebrations across Nigeria. Felix has since become a role model for young Nigerian students interested in science and technology. These space activities build national confidence within the Nigerian scientific community and the public, leading to continuing political support and commitment to a sustainable space programme.

If developing countries are to be competitive in a globalized world, they must devise strategies that lead to the frontiers of space technology. To achieve the cherished goals of equity and peace, they must contribute fully to international discussions about the future management and exploitation of space.

To paraphrase Socrates, we must rise above the clouds to master the world in which we live.

quoteunquote

It is not just about technology and profits. Satellite technology has encouraged many more young people to pursue higher education and careers in mathematics, science and engineering. More than 100 Nigerian space science and engineering graduates are working on national satellite projects.