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Environment and Forestry Cabinet Secretary Keriako Tobiko with KEFRI acting Director Dr. Jane Njuguna (Centre) and Dr. James Ndufa at Kitui Tree Breeding Centre where Mukau (*Melia volkensii*) and *Acacia tortilis* are tested for drought tolerant and adaptation to climate change



Environment CS Mr. Keriako Tobiko launching the Forest Conservation and Management Plan during the 13th Forest Society of Kenya Annual Conference held at KEFRI-Kitui Centre. The CS called upon foresters and scientists to think beyond the moratorium indicating forest logging may be banned for ever

Environment CS opens forest conference

Foresters and scientists in Kenya will have to strengthen their engagement with policy makers in order to safeguard the environment and support socio-economic development.

The Cabinet Secretary for Environment and Forestry Mr. Keriako Tobiko made the remark during the official opening of the 13th Forest Society of Kenya (FSK) Annual Conference on 27th September 2018 at KEFRI Kitui Centre.

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The CS at the same event launched a management plan to guide in conservation of forests in Kenya. He stated that “The disconnect between research and policy is eminent, and is a key impediment to national development.”

He revealed that Environment is the bedrock of the four government pillars: affordable housing, food security, universal health and manufacturing, and all generic aspects of environment are devolved to counties. The Forest Society has to increase its membership, like the Law Society of Kenya, to offer professional services countrywide and enable the country achieve the 10 percent forest cover by 2022.

“The country needs to plant and grow at least 500 million trees each year to attain 2 billion trees by 2022,” said the CS.

He castigated foresters and scientists for conservatism, citing production of data and information which lie in shelves with no impact to the common citizen. Data from such experts play a key role in informing the policy makers, thus enabling strategies, policies and actions to be implemented.

Keriako called upon the foresters and scientist to be proactive, advocate for their legitimacy role in society, deviate from corruption and engage more with politicians so that together they can leverage actions to benefit the communities. He challenged scientists to study and co-opt successful traditional methods used by diverse communities in resilience to climate change. “Our communities have been in the forefront using traditional knowledge such as nomadism in resilience to climate change,” he said

“Development partners, companies, private and public corporates are obliged to support environment conservation efforts through growing trees as part of their corporate social responsibility (CSR) and this should not be viewed as philanthropy,” said Keriako.

The CS urged the foresters to think beyond the forest moratorium, hinting a total ban may be a decree in future. “The time is ripe for the forest sector to invent new business models to generate revenue. Prior to the suspension, the forestry sector was a haven of unscrupulous merchants who in complicity with organs of the government proliferated illegal harvesting of trees disregarding the wanton destruction of biodiversity, riparian lands and water towers,” said Tobiko.

“The Kenya Forest Service (KFS) is mandated to conserve the natural resource but not sell tree plantations. The agency should concentrate its effort on rehabilitating the 2.4 million hectares of natural forest and support private plantations instead of selling trees in plantations which only covers 135,000 hectares,” he said.

Speaking at the same event, the society patron Professor Fred Owino remarked that the conference was held at Kitui to expose members to some of the forestry challenges and intervention measures being undertaken by forestry researchers in the eastern dryland parts of Kenya.

Professor Owino also stated that for the country to effectively mitigate the environmental challenges, there is need for a clear management plan guided by scientific findings.

“Science is not well developed and gaps in protocol for developing seed germination, and information dissemination are prevalent and need urgent attention to encourage private forestry,” said Essau Omollo (senior deputy chief conservator of forests, field operations - KFS).

The Society Chairman Dr. Joram Kagombe reported that “FSK was established in 1979 to promote sustainable forest management practices through partnership and advocacy by its members who are drawn from private and public sectors.”

The forum under the theme ‘Enhancing Sustainable Forest Management in Kenya’ was set to deliberate on forest sector contribution to the president’s big 4 agendas, conservation of water towers and biodiversity, food security, climate change, commercialization and value addition within the forestry sector of Kenya, and forest certification in East African region.

Others who addressed the event included the acting KEFRI Director Dr. Jane Njuguna, Deputy Governor for Kitui County Mr. John Makau, Kenya Water Towers Chairman Dr. Isaac Kalua.



Dr. James Ndufa (left) briefing the CS Environment and Forestry Keriako Tobiko (in cap) during a field visit at Melia seed Orchard in Tiva, Kwa Vonza where KEFRI scientists are developing drought tolerant trees for adaptation to climate change

Visit to research sites

The CS toured Kitui facilities and planted a commemorative tree prior to excursion at (Tiva demonstration plot) where KEFRI scientists in collaboration with the Japan International Cooperation Agency (JICA) are developing drought tolerant trees for adaptation to climate change.

“The project is breeding Mukau (*Melia volkensii*) and *Acacia tortilis* tree species due to their socio-economic importance in timber, fodder and charcoal production,” said Dr. James Ndufa, regional director in-charge of dryland research programme.

Mr. Keriako commended KEFRI scientists for the great efforts, but pressed the scientist to rehabilitate natural forests using indigenous trees while improved commercial tree species and fruit trees be planted on farms.

He called upon KEFRI management to construct roof catchment to harvest water in its buildings, and document the successful research findings.

PS Mochache visits KEFRI

The newly appointed Principal Secretary for Environment and Forestry Ms. Susan Mochache in her maiden visit to KEFRI headquarters in August 2018 acknowledged the strategic role KEFRI plays in developing forestry technologies and rehabilitation measures.

The PS visited tree seed bank, production unit and the laboratories supporting forestry research and development.

In her address to members of staff, the PS praised KEFRI management and informed staff the government reliance upon the scientists and support staff to fulfil the initiative of planting 2 billion trees by 2030.

Mochache acknowledged the staff effort towards service delivery and encouraged team work so that the institute's goal of delivering efficient services to the Kenyans is achieved.

Ms. Mochache who joined the Ministry from the State Department of Social Protection succeeded Mr. Charles Sunkuli who moved to State Department of Devolution in the same capacity.



Mr. Linus Mwangi, a Kefri scientist, briefing PS. Mochache on tree diseases and management during her visit at pathology laboratory in Muguga. Looking on is Dr. Jane Njuguna, the acting KEFRI Director

“Prudent use of forestry resources, timeliness and accountability will accelerate tree cover in the country by 2022,” she said. Ms. Mochache pledged an open door policy adding that she will encourage a consultative process in handling all matters in the environment sector.

She promised to champion for the institute's visibility, noting that its research undertaking and key achievements should be made known nationally, regionally and globally.

She added “KEFRI's role in research definitely determines the future of this nation as it works behind the scenes things unfold themselves as opposed to other entities who don't value the environment,” said Mochache

“The Institute should triple its efforts in raising quality seedlings that would enable the government plant the projected 2 billion trees by the year 2022,” she said.

The PS encouraged KEFRI fraternity to embrace integrity values as is expected of public servants, stating it is the only way to be above board and in attaining tangible research findings.

Mr. Robison Ng'ethe on behalf of KEFRI Board, thanked the PS for her visit. He said that the institute has always used the funds from the exchequer well, earning trust in National Treasury and development partners.

“The institute requires more funding and support from the ministry to carry out research and development of technologies in the five ecological zones and national programmes,” said Ng'ethe.

Mr. Ng'ethe assured staff of the Board's commitment in fast tracking the recruitment of the director to reduce anxiety within the institute.

The acting KEFRI Director Dr. Jane Njuguna applauded the CS visit and promised on behalf of the management to give her the necessary support and corporation in order to fulfil the institute's mandate.

Me-Forest signs accord with KEFRI

KEFRI and Me-Forest Initiative has signed a collaborative agreement to establish tree nurseries in primary schools country wide. The programme is also focused on coordinating and empowering youth, women groups and persons with disability in the country by offering training programs on alternative green fuel economy like briquette production from biomass to save the country's depleted tree cover.



KEFRI acting Director Dr. Jane Njuguna (right) and Harrison Wachira exchanging copies of agreement they endorsed on behalf of the two Institutions

Me-forest aims to inculcate a green culture in school going children by establishing tree nurseries and propagating the country's tree planting drives in primary schools nationwide.

"KEFRI is eager to partner with youth groups and other partners to spearhead the tree campaign for apt environment and national development," said Dr. Njuguna.

"The institute is mandated to conduct research in forest and allied natural resources, disseminate information and network with institutions of higher learning. It will drive best practices in tree nurseries establishment, tree planting and management. We will be happy to offer technical advice on tree seed and seedlings production, management as well as participate in awareness activities on matters of forestry development," she said.

Mr. Harrison Wachira of Me-Forest revealed that plans are underway to pilot the project in Machakos and Nyeri counties targeting to benefit women and youth who have special talents on environmental conservation and climate change mitigation.

Schools and public institutions especially around water towers have an advantage to fuel the national tree planting drives commissioned by the government 'Panda Miti, Penda Kenya'.

"So far key stakeholders that include KEFRI, Ministry of Education, Kenya Forest Service, Kenya Water Towers Agency, including green aligned companies and corporate entities have shown interest in Public Private Partnerships in restoring the national forest cover," Wachira said.

In addition, the initiative will network with institutions with innovative techniques such as space saving tree nursery beds, that will be used as a model for incubating the tree seedlings in schools with extension to industries and corporate entities. The objective is to improve our ecology and transform lives through the green awareness.

"Through collaboration, dedication and hard work, we want to form the supreme multi sectorial national partnership to spearhead environmental conservation and alternative green fuels and save our forests from depletion," said Mr. Douglas Kithyaka.

"The project will offer a great combination of synergies in establishing a culture of tree growing in pupils, supplemented by corporate players in the country. This will go a long way in enabling the school woodlots sequester carbon foot-prints and offer grounds for them to earn carbon credits as the world shifts to the next frontier as per the Paris Agreement," Mr. Wachira said.

KEFRI and Sandalwood Plantations (SP) pact to commercialize Sandalwood in Kenya



Sandalwood Plantations Limited Finance Director Bily Kimani, Loganathan Ayyakannu with KEFRI acting Director Dr. Jane Njuguna and Senior Deputy Director Research and Development Dr. Joshua Cheboiwo during the signing of the memorandum

Kenya Forestry Research Institute and Sandalwood Plantations Limited (SPL) have entered into partnership to commercialize sandalwood in Kenya.

The partnership is geared to enhancing the country green economy strategy and propel the country into the league of sandalwood oil exporters as well as contribution to the country's Big 4 agendas.

KEFRI acting Director Dr. Jane Njuguna and the SPL Managing Director Mr. Loganathan Ayyakannu signed the Memorandum of Understanding on 20th August, 2018 at KEFRI Headquarters, Muguga. The agreement will promote growing of both East Africa and Indian sandalwood.

Sandalwood, a fragrant wood, is the second most expensive wood in the world after African blackwood (*Dalbergia melanoxylon*). It is a threatened species due to its essential oil that is craved for by aromatherapists and perfumers.

The most commercialized variety is the Indian sandalwood (*Santalum album*) and Australia sandalwood (*Santalum spicatum*) unlike the indigenous East Africa sandalwood (*Osyris tenuifolia*) and African sandalwood (*Osyris lanceolata*) yet to be commercialized. Australia is the largest producer of sandalwood (*Santalum spicatum*) with an estimated 15,000 hectares under plantations in the western region.

In Kenya, heavy exploitation of the species has led to near extinction in Chyulu hills-Taita Taveta, Kitui county and other regions in the country. Studies at various localities reveal poor regeneration and populations decline since 2002.

Global trade in sandalwood oil is estimated at around 5000-6000 metric tonne per year with Australia producing 1,800 MT, India (400MT) and South Asian countries (350MT). The supply of sandalwood worldwide is far below the demand. The gap is filled by growing illegal trade which on the other hand portrays good market opportunities for many tree growers as the species can grow in many parts of the country.

The projects intend to plant 120 hectares (300 acres) for economic exploitation anticipated to produce 200MT worth USD 125,000 per MT at current market prices. The produce can earn the country USD 150million (KES 15 billion) in export value per harvest.

Nyeri County seeks KEFRI collaboration on environmental matters

The Nyeri County Government and KEFRI have agreed to engage in campaign to promote tree planting and train farmers and pupils on new technologies for tree growing.

The County Executive Committee Member for Water, Environment and Natural Resources Mr. Fredrick Kinyua together with KEFRI Deputy Regional Director for Central Highlands Eco-region Research Programme Dr. Joram Kagombe have entered into a discussion that will lead to the signing of memorandum of understanding at a later date.



Nyeri County Environment CEC Fredrick Kinyua (centre) in a discussion with Dr. Eston Mutitu, Stephen Ndungu and Dr. Joram Kagombe when they paid a courtesy call in his office

Mr. Kinyua said the county had embarked on a project targeting to plant over 500,000 tree seedlings in all public schools within the county. This, he said would also go a long way in inculcating a tree planting culture in children.

The County government plans to increase forest cover to 40 percent by the year 2022 an exercise that requires collaboration with stakeholders and development partners.

Mr. Kinyua said his county was among those leading with the highest tree cover in the country. However, there was need to plant more to add the current cover of 38.3 percent.

He said to attain the targeted ten percent cover, the county will plant and grow 3,000 hectares of trees annually targeting private lands, and fruit trees on farms.

Dr. Kagombe pledged his collaboration in tree planting exercises, and in marking the national and international tree-planting days to ensure the country achieves the 10 percent tree cover.

He said similar activities were taking place all over the county where they expected to plant 25,000 tree seedlings by the end of the short rain period.

Dr. Eston Mutitu who also accompanied the team called on locals to make tree planting a habit as it goes a long way in conserving the environment, which is an important ingredient in the attainment of the President Uhuru Kenyatta's big four agendas.

Kisumu ASK show

The Lake Basin Eco-Region Programme (LBERP) participated in Kisumu Trade Fair from 23rd July to 28th July 2018, at Mamboleo Show Grounds under the theme 'Promoting Technology and Innovation in Agriculture and Trade'.

The programme showcased technologies as well as displayed exhibits ranging from; agroforestry practices, tree nursery management, high value medicinal plants (ex-situ conservation), demonstrated techniques for rehabilitating natural forests, tree climbing techniques, application of biochar from sugarcane bagasse, energy conservation through improved charcoal production using drum kilns and manual briquetting machines, bamboo propagation techniques by cuttings, layering, various seeds types, and fancy bamboo products. High quality tree seeds management, pest and disease management, soil fertility status, bamboo utilization and propagation, bamboo products such as; bamboo pen holders, tooth picks, cooking sticks, aloe products, Marula jam, *Mondia whytei* and herbal medicinal products were showcased by collaborators.

Relevant Publications such as; guidelines for wood preservation using diffusion, high yielding *Eucalyptus grandis* as a commercial crop in Kenya, vegetative propagation of *Pinus patula*, pests and diseases associated with eucalyptus in Kenya among others were given out to stakeholders to reinforce information and technologies gathered and exhibited.

The region entered into five judgement categories and scooped first position as the stand that best interpreted the show theme. It won the 3rd best: in non-agricultural based statutory stand; in research and development; and in application of environmental quality standards.

This year's Lake Basin Programme sterling performance was attributed to a well elaborated immense team work, proper coordination, positive attitude and able leadership that was showcased throughout the trade fair.



Norah Adero, Oketch Omondi and John Otwoma stand next to the awards offered KEFRI at Kisumu ASK show

Mombasa ASK show

The Coast Eco-region Research Programme (CERP) in collaboration with National Forest Product Research Programme (NFPRP) and Corporate Affairs and Quality Assurance (CA&QA) exhibited at the Mombasa International Agricultural show held from August 28th to 2nd September 2018 at Mkomani grounds, Nyali, North Coast.



The stand was ranked second best in seed production and marketing

The objective was to disseminate information to stakeholders, network, and market and transfer technologies. The show under the theme "Promoting Innovation and technology in Agriculture and Trade" was meant to exhibit technologies that would contribute to the achievement of the Big 4 Government agendas of; affordable housing, food security, universal health and manufacturing.

The exhibitors were mainly from agricultural related sectors, the county government, as well as relevant ministries in National Government, sectorial government agencies, non-governmental organizations and corporate institutions, international agencies, universities, associations and relevant institutes professional and industry groups, farmers, students among others.

KEFRI showcased application of various forestry technologies, utilization and value addition to forest products, tree improvement, integrated pest management, shared information to guide varied stakeholders.

Corporate office interacted with diverse stakeholders, provided branding, promotional and publicity materials to support the CERP in promoting the institute technologies and image.

Nyeri ASK show



Cabinet Secretary for Agriculture, Livestock and Fisheries Hon. Mwangi Kiunjuri presenting a trophy to Muriithi Ndungu, OIC-KEFRI Nyeri sub-region centre for the Best Non-Agricultural Based Statutory Board

The Agriculture Society of Kenya show Central Region opened its gates to the public on 12th September and closed on 15th September 2018.

The show theme was “Promoting Innovation and Technology in Agriculture and Trade” (Ukuzaji wa Uvumbuzi na Teknolojia katika Kilimo na Biashara).

KEFRI showcased land system management through a model of ecosystems between the Aberdares and Mt. Kenya. In addition, seed collection methods, demonstration of tree climbing gadgets, different types of seed types, seed extraction, pre-treatment drying and packing techniques.

Tree improvement techniques using Sandalwood (*Osyris lanceolata*), an exploited tree species known for its essential oil.

The exhibitors also demonstrated the potential of forestry biotechnology to improve on the traits of trees through genetic engineering, as well as bamboo propagation and utilization.

Under integrated pest management (IPM)-forest pathology and entomology, displayed pathogens and insect pest and vectors that affects the health of forest ecosystems.

Non-wood forest products (NWFP) display included herbal medicines, honey and other nutritional and cosmetic products. On-farm timber sowing techniques was demonstrated using improved chain saw mill for high timber recovery.

The stand entered into five categories and was awarded the trophy for the Best Non-Agricultural Based Statutory Board Stand, second position in Seed producing and Marketing Stand. The Cabinet Secretary for Agriculture Hon. Mwangi Kiunjuri presented the trophy to the officer in charge Mr. Stephen Ndung'u.

Farmers Field day Wambugu ATC 2018

KEFRI staff from CHERP, FPRP and exhibited farmer's field day at Wambugu Agriculture Training Center (ATC) in Nyeri County on 27th and 28th July, 2018. The staff displayed various technologies and products covering tree seeds production, tree production improvement, bamboo propagation and utilization, value addition to wood and non-wood forest products, and timber recovery using chainsaw.

Nyeri County Deputy Governor Ms. Caroline Wanjiru Karugu, accompanied by CEC for Agriculture Henry Kinyua and his Kiambu County Counterpart Mr. Joseph Kamau graced the event, which recorded attendance of over 18,000 farmers.

The field day is organized by the County department of Ministry of agriculture in collaboration with other stakeholders



Farmers exchanging ideas at KEFRI tree stands at Wambugu ATC

Colloquium: Antimicrobial activity, toxicity and Phytochemical analysis of medicinal plants in Kenya

Antibiotics have saved the lives of millions of people thus contributing to the increase in life expectancy of human population in the last century.

However, the clinical efficacy of many existing antibiotics is being diminished by the emergence of multi-drug resistant (MDR) pathogens, the recent appearance of strains with reduced susceptibility as well as undesirable side effects of certain commercial antibiotics.

Ms. Margaret Kaigongi, a taxonomist at KEFRI noted drug resistance is a vexing problem for people with impaired immune systems, such as HIV/AIDS, cancer patients and recipients of organ transplants- thus prompted her to study ‘Antimicrobial activity, Toxicity and Phytochemical Analysis of four medicinal plants traditionally used in Kenya’.

In her presentation at the institute’s auditorium on 29th August 2018, the taxonomist stated that she collected plant samples from Msambweni Sub-County in Kwale County which she analysed in 2013/2014 at the University of Nairobi, School of Biological Sciences during her study of MSc degree in Plant Taxonomy and Economic Botany.

The objective of the study was to determine in vitro antimicrobial activity, toxicity and phytochemical screening of both organic and aqueous crude extracts from *Zanthoxylum chalybeum*, *Adansonia digitata*, *Launaea cornuta* and *Grewia trichocarpa*.

Results from the analysis showed *Zanthoxylum chalybeum* had the highest antimicrobial activity against *Bacillus cereus* as well as inhibition zones in comparison to standard antibiotic (*gentamicin*) which was used as the positive control.

Zanthoxylum chalybeum organic (CHCl₃: MeOH) extract also showed high activity against *Pseudomonas aeruginosa* and moderate activity against methicillin resistant *Staphylococcus aureus* (MRSA) and *Candida albicans* but failed to inhibit the growth of *Escherichia coli* (*E.coli*) at all tested concentrations.

Grewia trichocarpa organic extract showed high activity against *P. aeruginosa* and moderate activity against *C. albicans*, *B. cereus* and MRSA.

Both the organic and aqueous extracts of *A. digitata* and *G. trichocarpa* were non-toxic to brine shrimp larvae since their extracts had LC₅₀ > 1000 µg/ml. *Z. chalybeum* and *L. cornuta* extracts especially (CHCl₃: MeOH) for *Z. chalybeum* was highly toxic which calls upon cautious use of the plant through dose adjustment amongst communities using this plant for preparation of herbal decoctions.

“Alkaloids, flavonoids, sesquiterpene- lactones and saponins were present in all the plants in different quantities especially in organic extracts,” said Kaigongi.

The development of extended-spectrum β-lactamases (ESBLs) and carbapenemases that target Gram-negative bacteria has resulted in infections that can be extremely difficult to treat leading to substantial increased illnesses and death rate.

The effect is pronounced in third world as the costly replacement drugs for treating the highly resistant infectious diseases are unaffordable. This calls for renewed efforts to solve this menace.

In her conclusion Kaigongi stated that laboratory and clinical studies of medicinal plants are crucial to better understand their antimicrobial activities. Plant studies also allow the scientific community to recommend their uses as an accessible alternative to synthetic antibiotics, as well as be protected and domesticated for commercial exploitation in large scale.

Effects of Air Pollution on Tomato Plant



Jesse Lugadiru measuring stress on *Lycopersicon esculentum* leaves along Waiyaki highway

The air in Nairobi is heavily polluted and may be a major cause of respiratory and heart diseases.

According to Mr. Jesse Lugadiru, a KEFRI research scientist, air pollution in Nairobi exceeds 500 µgm (at highly polluted sites), a figure which is ten times higher than the World Health Organization (WHO) recommended level of 50 µgm /3.

Mr. Lugadiru made public his findings during an internal scientific presentation at KEFRI headquarters on 29th August, 2018.

“These findings are deduced from a study conducted to evaluate the underlying effects of air pollution on *Lycopersicon esculentum* (tomato) plant along Nairobi -Nakuru highway in Nairobi County,” said Lugadiru.

The main objective of the study was to evaluate the effects of air pollution on *L. esculentum* plant from motor vehicle fumes.

“Plants growing along roads are susceptible to heavy pollution because they are exposed constantly to carbon and particulate matters from engines of vehicles. Their darkened stems and leaves are explicit indicators of heavy pollution in that habitat,” said Lugadiru

Although no study has been undertaken to determine levels and effects of air pollution caused by exhaust fumes on germination growth levels and development of vegetables growing along the major highways, other studies have indicated consumption of such plants eroded with carbon fumes from vehicles can lead to cancer in human beings.

The study monitored the effect of pollution on three varieties of *Lycopersicon esculentum* Mill (1768) for a period of three month - from seed germination to maturity. The plants were grown on Waiyaki highway in a well-placed structure containing soil in polythene bags with randomized layout. The control was set in a national research laboratory

Parameters used in both tests entailed; germination rate, plant height, leaf length, number of flowers, biomass, plant stress, and a number of stomata and qualitative issues.

According to (UNEP, 2010) one billion people are exposed to air pollution resulting in one million premature deaths and one million prenatal deaths in the world. Over 90 percent of air pollution is attributed to fumes from vehicle exhaust.

Mr. Lugadiru recommended that because plants are viable indicators of air pollution they should therefore be used during impact assessment exercise as well as for trapping of particulate matter.

“In order to play safe, long term comprehensive studies should be undertaken with other plant species so that results can enhance concerted efforts of managing air pollution menace before it reaches dangerous levels,” he concluded.

KEFRI support National Polio Campaign

In the spirit of situational corporate social responsibility (CSR) initiative, KEFRI supported the Ministry of Health - Kiambu County ‘Kick Polio Out of Kenya Campaign held in August and September 2018.



Ms. Catherine Gitonga, KEFRI nurse, administering polio vaccines at Gichuru Dispensary during the five-day polio vaccination campaign in Kiambu County

The Ministry of Health embarked on a polio Campaign within Nairobi and neighboring counties to protect children below five years following confirmed polio cases in a neighbouring country.

Acute flaccid Paralysis (*Poliomyelins*) Polio is characterised by rapid onset of weakness or floppiness of the limbs, the muscles of respiration and swallowing, or sudden trauma in children less than five years or in any other person of any age progressing to maximum severity within 1-10 days.

To achieve *poliomyelitis* eradication, the World Health Organization (WHO) recommends that countries conduct surveillance for cases of Acute Flaccid Paralysis (AFP) so that appropriate and timely public health measures are instituted to achieve polio-free countries.

In Kenya, the Ministry of Health under the National Vaccines and Immunization Program Rapid Results Initiative, targets to reduce the numbers of unvaccinated children aged below one year from 500,000 to less than 100,000 within 100 days by the end of October 2018. Precisely 13 high risk counties namely; Nairobi, Kajiado, Kiambu, Kitui, Machakos, Meru, Isiolo, Tana River, Lamu, Garissa, Wajir and Mandera were chosen to carry out the polio vaccination.

KEFRI offered a vehicle and a nursing officer to facilitate the campaign in Kikuyu sub-county, Kiambu West County, with a total population of 150,063 people as per the 2009 national census.

The immunization was conducted through house to house visits, schools and other public institutions. A total of 15,921 children under 5 years were immunized in the county assembly wards of Karai, Nachu, Sigona, Kikuyu and Kinoo during the campaign.

Health Cabinet Secretary, Sicily Kariuki said that the government of Kenya through the Ministry of Health and partners plan to reach over 2.8 children below five years of age in 12 high risk counties with the life-saving vaccine from 15th to 19th September, 2018. The CS advised the community to ensure all children are vaccinated when she launched the synchronized polio vaccination campaign for the Horn of Africa in Garissa County.

The ongoing polio outbreak has been declared a regional public health emergency of international concern in line with the International Health Regulations (2005) with a call for governments within the IGAD region to initiate cross-border polio vaccination campaigns aimed at identifying high risk populations at border points, mitigating the risk of importation and transmission, enhancing surveillance and synchronizing prevention activities.

Mathenge tree turns to be food

Kenya Forest Research Institute (KEFRI) researchers have established that pods of the weed mathenge tree (*Prosopis juliflora*) are highly nutritious and fit for human consumption, according to Caroline Chebet and Julius Chepkwony article published Sat, July 28th 2018 <https://www.standardmedia.co.ke/article/2001289755/noxious-mathenge-finds-way-on-plates>.

The scientists who have been studying best methods to utilise and minimize the spread of the noxious weed in Baringo County, have found that pods can be finely ground, sifted and mixed with wheat flour to make chapatis. The pods can also be mixed with molasses and used as cattle feeds.

KEFRI Marigat officer in charge Mr. Simon Choge said the researches are seeking ways to curb further spread of mathenge by destroying prosopis seeds through grinding.

“We are trying means of controlling further spread of the weed. In Marigat alone, the weed has covered over 10,000 hectares of land. It is a stubborn weed but we have come up with some research findings that we have shared with the locals.

For instance, Prosopis pods have high sugar concentration and if consumed by goats and cows makes the teeth to rot and fall off.



Prosopis pods which can be milled into flour for both human and animal feeds

“The spreading of prosopis has been so profuse and the only way to manage the thickets is through thinning, uprooting and cutting for production of charcoal.

“The seed bank in the soil is so huge and remains dormant for a long time - upto five years. That is why researchers are exploring other means of controlling it such as maximizing the positives,” he said.

Choge said other countries like South America, Australia and Yemen are using bio-agents insects to feed on pods while others are using chemicals to curb spread of the weed.

“We are trying several approaches and we are also looking into introducing insects and testing on chemicals that can work,” he said.

Prosopis currently occupies hundreds of acres in Turkana, Isiolo, Baringo, Wajir, Marsabit, Garissa and Tana River counties where it is mostly used for production of fuelwood.

Energy saving stoves to save Kenyan forests

KEFRI scientists and field workers have provided guidance to community adjacent the forest on the best practices to conserve the forest through sustainable use of wood and non-wood forest products and incorporating income generating activities, thus protecting the biodiversity.

Kagondu Njagi, writing for Thomson Reuters Foundation in a recent article, highlighted the advancing use of efficient cooking stoves by community groups in Central Kenya.

The stove is preferred for its multiple use of providing energy for cooking and warming up the room in the evening,” Kagondu states.

Muguga FAG (MERCFA) a community-based organisation, is a stakeholder in the management of the Muguga natural forest, a remnant of transit forest of Ngong and Aberdares ranges in Kenya.

The group is promoting use of the energy saving stove - known locally as ‘jiko okoa,’ a Swahili phrase that means a cooker that saves energy, in order to protect the forest and reduce loss of tree cover on farms.

“Since I replaced the traditional open fire hearth with an energy-saving stove, it has proved its efficiency, using less firewood and shortening cooking times,” said Joyce Njenga, a (CFA) member.

“When I finish cooking I carry the stove to the living room where my family keeps warm for the rest of the evening,” the mother-of-five said.

Mrs. Njenga says the stove is very useful during the cold season as it keeps her family warm in cold weather.

“Before going to bed, Mrs. Njenga puts water on the stove so a warm bath is ready by the time the sun rises over Nguriunditu village in central Kenya,” states Kagondu.



Mrs. Njenga preparing meal using the energy saving stove. (photo by: Simon Kamonde)

“Around one million households in Kenya use the modern stove due to its multiple uses,” says Nelly Mugure, a scientist working at KEFRI National Forests Products Programme

Major source of energy in Kenya, is in forms of fuel wood, charcoal and agricultural wastes. The use of charcoal is about 47% at the national level and about 82% and 34% of urban and rural households respectively. Charcoal is produced mainly from the natural forested areas and woodlands.

With increasing populations, high poverty levels and rapid urbanization in the local markets, demand for fuelwood energy, calls for alternative energy sources such as briquettes, biogas and use of modern energy cooking stove.

Burning biomass energy in form of fuelwood, charcoal and agricultural wastes provide around 70% of Kenya’s national energy needs.

Globally over 2.8 billion use biomass energy – fuelwood for cooking every day (World Bank, 2016). The International Energy Agency (IEA) reports this can be highly dangerous.

The health burden, which includes fire incidents, strokes, heart disease, breathing disorders and lung cancer, falls mainly on women and young children, according to the World Health Organization.

In order to address the energy and environmental crisis as well as reduce health risks, the government of Kenya in collaboration with development partners developed and disseminated information and skills on biomass energy conservation and adoption of modern energy saving stoves.

The United Nations Foundation in 2010 launched Global Alliance for Clean Cookstoves project to reduce respiratory illness, incidents and deaths arising from indoors cooking. The Clean Cookstoves project is a worldwide program which aims to provide 100 million homes with clean and efficient stoves and fuels by 2020.

By 2017, the alliance said it had distributed about 81 million stoves worldwide - including in Kenya - that were clean or efficient or both. Mr. Simon Kamonde, MERCFA chairman, said demand for the stoves under a project funded by the African Development Bank in partnership with Kenya Government - is high due to its multiple uses.

“The stove has a clay lining to retain heat, uses two firewood sticks at a time, is very quick to cook with, and does not release a lot of smoke, making it ideal for warming in modern homes,” he said.

Drill for a major Chemical spill

An intern attached at one of the laboratories was handling a highly toxic chemical – Fluorine, when the bottle fell on the floor and shattered. The chemical splashed on the student while the toxic fumes spread in the air covering the floor and endangering the lives of other workers.

In their efforts to contain the situation, one casualty sustained injuries from the sharp pieces of glass while another inhaled the toxins leading to convulsion. The situation was getting out of control.

Dazed by the incident, the laboratory supervisor promptly reported the matter to the Laboratory Manager who identified the spill as major one.

The experienced lab manager, following the procedures in containing the spill, notified the first aiders as well as the fire marshals who activated the alarm systems, secured safety of the injured and evacuating the staff from the building.

This was the setup of mimic fire and chemical spill drill held at Central Highlands Eco-region Research Programme (CHERP) on 26th July 2018. The drill simulated Fluorine, a poisonous chemical.

Spillage of Fluorine is categorized under major chemical spills as high risk and warrant prompt action by emergency rescue team and first Aiders. Professional and special equipment are required to handle such an incidence.



A Laboratory Manager assisting a casualty during the drill

Dr. Jackson Mulatya, the Management Representative Integrated Management Systems (IMS) said the drill was carried out to determine the level of emergency preparedness and response of employees towards a major chemical spill procedures as part of the preparedness and conformity to the quality standard.

“The Chemical Spill Response Plan is conducted in accordance with six basic steps; Correct Assessment where lab manager assesses the category of the spill and decides if it require the Fire Marshals and First Aiders,” said Dr. Mulatya.

The random drill also defines necessary changes that can be made to enhance staff performance while dealing with emergency situations.

During the planning stage, the normal routine work was adhered to. Inventory of both staff present in the research block on that day was recorded.

Likewise, an inventory of chemicals plus their storage arrangement was done in accordance with the risk assessment tool for spills and in consideration their chemical properties and hazardous levels,” said Milton Situbi a fire Marshal.

“A few technicians were tipped of the drill and prepared to facilitate in evacuation and administering first aid in case of emergence,” adds Situbi.

So immediately the incident occurred, the supervisor was alerted, all alarm systems were activated and evacuation commenced. The two casualties were moved from danger and first aid administered. Fire Marshals evacuated the rest of staff from the building.

Fire Mashal Chairman Mr. Simon Wairungu says,”In such an accident, all electrical appliances are switched off and windows opened to enhance ventilation. The spillage area is tape marked and isolated”.

The alarm systems is continued as workers are evacuated from their offices to the Fire Assembly Point. The casualties are rushed to the hospital. At the Fire Assembly Point roll call is conducted to account and compared to the record already in the morning. Workers are allowed back to the building after the Fire Marshal team leader declares it is safe to do so.

“The Unannounced drills was meant to assess the skills and experience of the staff working with chemicals,” said the Centre Region Director Mr. Ely Mwanza who reminded staff to respond to alarms instantly and exit building in the shortest and safest way.

Mr. Mwanza cautions that clean-up of chemical spills, flammable, explosive, corrosive or highly toxic should be handled by trained personnel.

Communication using alarm and siren system. Preparation, involves engaging the professionals (Fire Marshals and first aiders) to contain the spill and evacuate the building Containment of the spill, clean-up and reporting to the management.

Some of the lessons learnt were siren system is handy, therefore, random check and repair of the faulty one is vital. There is information gap between staff at CHERP and headquarters, of whom the latter are disadvantaged.

Staff may panic and trigger other ailments such as high blood pressure or serious physical and psychological injuries.

Most labs require the Chemical Spill Kit and the risk assessment tools. Safety work place inspection should be carried out soon as it is long overdue, maintenance of shower in the laboratory corridor, communication gadgets, and awareness of safely measures.

Repair of the main inbuilt siren alarm system in the research block, emergency response team should take a refresher course, servicing of the fire fighting equipment and provision of chemical spill kit in all the laboratories.

The labs should design and prepare a risk assessment tool for spills. Safety work place inspection should be regularly conducted.

Exits from KEFRI Scheme

The following members exited KEFRI between April and September 2018 through the mode indicated in the table below.

The Management and entire KEFRI fraternity acknowledge their commitment in duty and appreciate the cordial relationship and time we spent together in service.

Name	P/No.	Date of Exit	Mode of Exit
Daniel Wambugu Theuri	6092	12.4.2018	Retirement
Allan Kariuki Mbuti	6381	21.4.2018	Retirement
William Ochieng Odiaga	5407	3.6.2018	Retirement
Joash Nalo Ombewa	5230	1.7.2018	Retirement
Nicholas Ngatia Kuria	5288	4.7.2018	Retirement
Rodgers Kiproop Kipturgo	7111	4.7.2018	Retirement
Antony Mutisya Kituku	6896	12.7.2018	Retirement
William Mucheke	5732	20.7.2018	Retirement
Aineah Lumwagi Ludenyo	5411	17.8.2018	Retirement
Benson Amboka Muchelule	5236	27.8.2018	Retirement
Kennedy Obadha Obago	6282	10.8.2018	Death
Dismas Omwega Orwaru	6200	23.9.2018	Death

Retiring Confidently...

Retirement - transition from a life of work to one of retirement, has both emotional and practical implications. Perception of retirement is subjective, to some it is time to rest, withdrawal from active formal employment or a way to serve the society.

Retirement should be treated as another opportune time to do what one may have desired doing while in active employment, to avoid idleness. The level of preparedness during pre-retirement increases confidence during retirement period.

In Kenya, for instance, a senior judge contested constitutional retirement at age 70 years arguing she was appointed under the old constitutional dispensation when the retirement age was 74 years.

Such fear of retirement though varying from one person to the other may arise due to unpreparedness to face the future. Procrastination, a fall back mechanism to avoid proceeding to retirement, seem the way out. But is it the resolution?. No, definitely one will have to retire. According to Retirement Benefits Authority (RBA) Pensioners' Survey Report 2016, recently released to the pension industry, findings indicated men 79% of the sample had the highest number of dependents compared to the female 21%.

The survey found out that about 35% of retiree used the cash lump sum at retirement to pay school fees for dependants, 23% invested in farming while 22% built a house. Majority spent the monthly pension on household goods, school fees and medical insurance.

Based on 25 years of service, 52% engaged in farming while 14% sought employment. Before retirement, a paltry 35% earned extra income from either farming, business or investments other than salary.

John F. Kennedy, former United States of America President in his special message to the Congress on 'the needs of the Nation's senior citizens' in 1963 said: "It is not enough for a nation to have added years of life. Our object must be to add new life to those years".

In view of the above survey and sentiment, preparedness for retirement is imperative for those in service.

As the adage says, "gather hay while the sun is still shining" it is advisable for the employee to structure a well-organized plan for saving and investing while at work, for self and dependants upkeep, medical care and vision of how to spend quality time while in retirement.

While in retirement, engage in full time occupational such as farming, investment in entities like real estate, and maintain a medical scheme. These measures cushion one from challenges encountered during retirement.

Lay out your road to retirement in confidence now and avoid frustrations, denial and premature death after retirement.

Demise

Bernard Kigomo

KEFRI fraternity joined the family of the Late Bernard Ngure in giving him an honorable farewell during his final journey on 4th July 2018. Humility and simplicity is the legacy Bernard left behind. Let's be passionate and realistic about our aspirations as well as limitations of human nature. Seeking, desiring, or gathering wellness, comfort and prosperity is all vanity ... that's what Bernard portrayed.



Kennedy Obadha Obago

KEFRI fraternity condoled with the family of Kennedy Obadha Obago who passed on 10th August, 2018 at Nairobi Womens Hospital. Kennedy worked at Headquarters security section and was a representative of staff at ASILI SACCO. Burial was held on 25th August 2018 in Kodewo Village, Nyahera sub-location in Kisumu County.



Dismas Orwaru

KEFRI fraternity console the family of Dismas Omwega Orwaru who died on 23rd September at PCEA Hospital Kikuyu. Untill his death, Orwaru worked at KEFRI headquarters but previously served at DERP in Kitui. Dismas body was laid to rest on 5th October 2018, at Nyagenge village, Masaba in Nyamira County .

Fare-thee well our brothers and your soul rest in peace. Amen



*Marula juice
Prepared at KEFRI Forest Product Development Centre - Karura*



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