



KEFRI *Newsletter*

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KEFRI staff observe WHO guidelines to curb spread of Covid-19



Kamtix Cleaners Ltd service providers in a clean-up exercise at KEFRI headquarters to control Covid-19 spread

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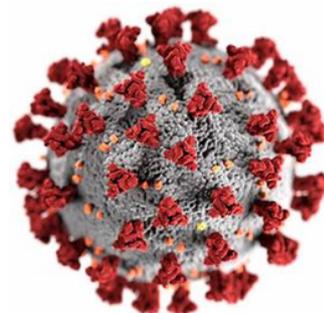
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Fighting COVID-19 Pandemic

Following the announcement of Corona Virus Disease (COVID-19) outbreak in Kenya, on March 7th 2020, KEFRI has committed to safeguarding the health and wellbeing of its staff, customers and other stakeholders in respect to guidelines provided by the Ministry of Health (MoH) and World Health Organisation (WHO).



Virus illustration of the ultrastructure of Covid 19 virus (source: CDC newscientists.com)

COVID-19, is a contagious respiratory disease whose symptoms include fever, cough, and shortness of breath, pneumonia, kidney failure, and death. The virus, which was first noted in China, in December 2019, is spreading globally through contact with droplets produced by an infected person, or contaminated surfaces or objects. Currently there is no cure. The virus affects mostly the aged and those suffering from chronic diseases.

Amidst, rising concerns are the continued announcements by the Cabinet Secretary for Health Hon. Mutahi Kagwe that more cases of infections are arising in the country as the virus has shifted its spread to community level. This shift deviate from past trend where majority of the diagnosed people were quarantined having travelled outside the country or their close contacts picked by the Ministry of Health surveillance team.

KEFRI management takes cognizance that despite the disruption the pandemic may have caused, delivery of essential services continue in all its centres. However, all members of staff, clients, and suppliers among other stakeholders are once more urged to protect themselves against infection and spread by implementing the following procedures:

- Sanitize hands with 70% alcohol-based solution or wash hands thoroughly with soap and running water provided at all entry points, offices and other service areas.
- Use of face masks, gloves and other personal protective equipment (PPEs) based on the level of risk in respective workstations.
- Maintain social distancing of at least, minimum 2 metres (6 feet), with the other person.
- Enhance cleanliness and sanitizing procedures in all the working places.
- Observe personal hygiene practices like covering nose and mouth with a disposable tissue, or use flexed elbow when sneezing or coughing
- Avoid touching eyes, nose, or mouth with unclean hands
- Stay home and self-isolate in case you feel unwell

- Be a good ambassador by creating awareness on measures to maintain high levels of safety, security and standard hygiene to curb the spread even at the family level.



KEFRI clinician Joshua Kyalo, demonstrating sanitizing as a measure to restraint spread of Covid -19

According to the WHO Corona Virus dashboard, the disease has claimed over 430,241 lives and infected more than 8 million people world over as reported in mid-June. In Kenya, 3,594 cases were recorded 103 deaths 1,253 recoveries.

WHO Chief Tedros Adhanom Ghebreyesus said that it is high time to act strongly towards containing the outbreak as it is spreading 17 times faster outside China. He also pointed out that several nations are not taking requisite measures to contain the virus.

“The high number of Covid-19 positive cases being recorded in the country has been attributed to Kenyans non-adherence to the measures put in place by the Ministry of Health,” said Dr Rashid Aman, Chief Administrative Secretary

According to Daily Nation, 17th June, the country recorded 184 positive cases, the highest ever since its first case was pronounced on March 13 bringing the case-load to 4,044. This was out of 2,518 samples tested in the last 24 hours pushing the cumulative samples to 124, 474.

Dr. Aman during a press briefing on wednesday said Kenyans have gone back to their normal ways which could be detrimental as it may increase infection rate.

KEFRI donates food to landslide victims in Elgeyo Marakwet



KEFRI Director Dr. Cheboiwo (second right) presenting foodstuff to county representatives for the landslide victims

KEFRI Director Dr. Joshua Cheboiwo together with representatives from the County Government of Elgeyo Marakwet donated food stuff to families displaced by recent landslides in Chesogoni.

The County Secretary Mr. Paul Chemut and the County Executive Committee Member (CEC) for Water, Lands, Environment and climate change Mr. Abraham Barsosio appreciated KEFRI for offering the foodstuff to families affected by the landslide.

Heavy rains pounded Kipchumwa location on 18th April 2020 causing mudslide that cascaded to Chesogoni along Marakwet – Pokot border in Rift Valley. The aftermath saw 18 persons loose their lives, 17 missing and hundreds displaced according to reliable government source.

“KEFRI is committed to entrenching its corporate social responsibility values to save lives, supportive response specifically to individuals and communities in suffering and in need after natural disaster or other crisis,” said Dr. Cheboiwo.

Mr. Chemut while thanking KEFRI for donating the foodstuff, noted that from a humanistic perspective, organizations have an ethical duty to support those affected by crisis.

“The disaster has not only brought harm to individuals but has led to suffering and loss. The victims need medical assistance, food, shelter, counselling, and short-term financial assistance to re-establish their businesses,” Chemut said.

Dr. Cheboiwo together with the KEFRI Rift Valley Regional Director Dr. David Langat also conducted a fact finding mission to identify opportunities for forestry interventions in curbing the perennial landslides.

Due to its hilly ecological setup, Elgeyo Marakwet County experiences environmental challenges such as landslides which elevates poverty, depletion of natural resources, and food insecurity.

Both KEFRI and the County team appreciated the need to develop joint forestry projects for sustainable management of the fragile landscapes and halting biodiversity loss.

UNDP’s REDD+ report titled, ‘supports counties in forest conservation and management in Kenya’, advance forest degradation and deforestation has contributed up to 30 percent of climate calamities such as landslides, mudslides and floods in Kenya.

Elgeyo Marakwet County hosts the second largest forest cover in the country of 37.6% and home to two forest ecosystems and water towers namely Kaptagat and Cherangany. Unfortunately, these forests have been degraded due to illegal encroachments, agriculture and over grazing.

Sadly, massive deforestation of these forests in West Pokot and Elgeyo Marakwet has largely contributed to the landslides, mudslides and floods currently being experienced.



Dr. Cheboiwo with county executives and KEFRI team led by the Rift Valley Regional Director Dr. David Langat on a forestry fact finding mission at Chesogoni where people lost lives due to landslides

World Environment Day Celebration

On June 5th, the world marked World Environment Day 2020 themed 'Biodiversity for Sustainable Livelihoods - Time for Nature'. The celebration focused on protecting restoring and conserving biodiversity.



Biodiversity is very pertinent in a world that is today faced with daunting challenges occasioned by human interference, climate change and global warming.

According to the United Nation Environment Programme, action for nature is so critical that the government should entrench strong and committed environmental policy which is key to ending biodiversity loss and preserving nature for human wellbeing.

Governments have a central role in countering biodiversity loss and ecosystem degradation, and encouraging tree plantings at gatherings. Changing our current destructive course towards one of greater custodianship for the natural world by protecting and safeguarding wild spaces with ambition and accountability.

Kenya government so far has taken commendable steps in biodiversity conservation that include strict measures to protect marine areas/watersheds, forests, ban on single-use plastics - that posed a threat to the environment, restore degraded landscapes and provide subsidies and incentives that reward restoration and sustainable resource use.

Similarly, noticeable efforts are in protecting public lands and creating green spaces in the city, protect national parks and biodiversity hotspots, and national awareness campaign to sensitize the public about biodiversity and how to protect it in their everyday lives.

The Ministry of Environment and Forestry has been in the forefront rallying the public to appreciate and protect nature. Planting 2 billion trees to achieve 10% tree cover by 2022, innovations in clean energy, water and agribusiness sustainability have increasingly taken center stage as a national and business agenda.

KEFRI staff and stakeholders marked this year's World Environment Day by planting trees at KEFRI Muguga Arboretum.



KEFRI Staff and community member planting tree seedling at the Arboretum

The exercise led by KEFRI Director Dr. Joshua Cheboiwo, included participation from Muguga CFA, Nderi Youth Film Group, Kenya Plant Health Inspectorate Services (KEPHIS), KFS and Veterinary services.

KEFRI Deputy Directors for Socio-Economics Policy and Governance Dr. Joram Kagombe, thanked the community for coming out in large numbers to help KEFRI revive and conserve the Arboretum.

Regional Director CHERP, Dr. Eston Mutitu, under whose jurisdiction the Arboretum falls, pointed out that 49 trees species were at each of 6 plots for conservation and screening trials.

The trees in the Arboretum have suffered calamities that include wind fall, die back due to national, entomological and pathological challenges.

Muguga CFA chairman Mr. Simon Kamonde said the group will work closely with KEFRI and its partner institutions to re-establish the Arboretum to reclaim its lost glory.

World day for combating desertification and drought

The World Day to Combat Desertification and Drought is observed every year to promote public awareness of international efforts to combat desertification.

In Kenya, the 2020 celebration, held at Nairobi City Park on 17th June, themed Food, Feed, Fibre - seeks to educate individuals on how to reduce their personal impact, a key link between sustainable production and consumption.

The CS Environment and Forestry Keriako Tobiko led the public in a cleanup exercise and tree planting to protect the park, adding that the government will soon fence off City Park to secure, restore, and protect it as a people's park that will be accessible to all members of public.

CS Keriako Tobiko took the moment to remind everyone that land degradation neutrality is achievable through problem-solving, strong community involvement and co-operation at all levels.



CS Tobiko (right) and state officers in the Ministry in a cleanup exercise at City Park (picture by KFS)

Tobiko announced that the government was taking back the entire park and reverting every green space to the public for prosperity of Nairobians.

Tobiko said that every part of the park that had been grabbed would be repossessed. City Park was originally 90 acres but has been illegally reduced to 63 acres through land grabbing

The event was attended by Environment and Forestry CAS Hon. Mohamed Elmi, PS Dr. Chris Kiptoo, CEO's of the agencies under the Ministry and other stakeholders.

KEFRI's tree planting activities during the long rains season

KEFRI joined other state agencies under the Ministry of Environment and Forestry in a tree planting exercise held on 29th May, 2020 at the Kenya Meteorological Department (KMD) in Kibiku-Ngong, Kajiado County.



KEFRI Director Dr. Cheboiwo (Left), KDF Lt. Col. Frank Otiso, CAS Environment and Forestry Hon. Mohammed Elmi and CAS Hon. Hassan Noor Hassan during tree planting event

Speaking during the event, the Chief Administrative Secretary Ministry of Sports, Culture and Heritage Hon. Hassan Noor Hassan, the Chief Guest, thanked the department for spear heading the event where 6000 indigenous tree seedlings were planted in the complex housing the Kenya Defence Forces sports team.

Hon. Noor was hosted by his counterpart CAS in the Ministry of Environment and Forestry Hon. Mohammed Elmi.

"I encourage all of you to continue with this noble exercise of planting trees to conserve Ngong forest and its environs. "Nature will support you once you support it," said Hon. Noor.

The CAS for Environment and Forestry Hon. Mohammed Elmi commended the KMD efforts in contributing to the national campaign for 10% tree cover in the Country by 2022.

He urged participants to continue in planting trees for assurance of a healthy environment and in mitigation of climate related disasters.

"Planting trees is imperative because of the role the forest plays in restoring water bodies such as rivers and lakes, noting that environmental conservation is a sacrifice that all has to make," said Hon. Noor.

The CAS Hon. Elmi thanked the over 500 participants led by directors: KMD, KEFRI, KFS, NETFUND, Deputy County Commissioner, staff from Ngong Livestock Station, KDF, Moi AirBase Commander and the University of Nairobi for participating in the activity.

KEFRI Director Dr. Joshua Cheboiwo said the Institute is eager to collaborate with other partners in conserving Ngong forest and the surrounding ecosystem.

“KEFRI is eager to provide quality seeds for growing appropriate seedlings required in attainment of 10% tree cover by the year 2022,” said Dr. Cheboiwo.

Tree Planting at Ondiri Wetland



Dr. Jane Njuguna addressing volunteers during a tree planting exercise at Ondiri swamp

KEFRI staff led by Director Dr. Joshua Cheboiwo and Senior Deputy Director Research and Development Dr. Jane Njuguna joined hands with representatives from Kiambu County in a tree planting activity at Ondiri swamp in Kikuyu, Kiambu County.

During the event, a total of 240 indigenous trees and 40 bamboo seedlings were planted to protect the swamp and its ecosystem.

Volunteers from the Ministry of Environment and Forestry and some of its agencies: KWTA, NEMA and KFS, Water Resource Users Association (WRUA), Muguga Community Forest Association, Friends of Ondiri Wetlands and Rotary club also took part in the activity.

Kiambu County Executive Committee member for Environment Mr. David Kuria, thanked KEFRI for its continued support in rehabilitating the wetland and urged the neighbouring community to step up their conservation efforts.

KEFRI and Nyandarua County roll out 2020-2021 activities

KEFRI Central Highlands Eco-region Research Programme (CHERP) Director Dr. Eston Mutitu,



Dr. Eston Mutitu, together with KEFRI and County staff planting trees at Nyandarua County

held a planning meeting with members of Nyandarua County Government led by County Executive Committee Member Hon. Milka Wanjiru.

The meeting was aimed at outlining activities that KEFRI and the County will undertake in the upcoming financial year (2020/2021).

KEFRI had signed an agreement with the County focusing on increasing forest cover and protecting water catchment areas.

The team also carried out a tree planting exercise to conserve Gwa Kiongo Community Dam, which is one of the largest man-made dams in North Kinangop.

Simon Mwangi from Voluntary Service Overseas (VSO) an international development organisation that works through volunteers to empower communities in developing countries, commented that in 2007 during his school holidays, he visited the area and was amazed by the huge forest cover. But in 2012, the forest cover in the area had reduced greatly due to logging.

“I will be grateful if KEFRI and Nyandarua County government honors this agreement to restore the lost glory of this area. A strategy should be formulated to involve the local community in the planning process, so as to ensure accountability and ownership at different levels,” he said.

Evaluating *Melia* performance in Central highlands

Central Highlands Eco-region Research Programme (CHERP) Regional Director Dr. Eston Mutitu led a team inspecting the growth performance of *Melia volkensii* at Nachu Primary and Secondary school, in Kiambu County.

Melia is a drought and termite tolerant commercial tree grown for timber majorly in eastern drylands.



Dr. Mutitu and Jane Chepkonga KFS assistant ecosystem forest conservator for Kiambu County examining *Melia volkensii* in Nachu, Kiambu County

“The plantation at Central drylands which is a pioneer trial has registered 78% survival rate with some trees achieving 3 metres growth in two years,” said Dr. Mutitu.

The team also planted 360 seedlings at Nachu Technical Vocational Education and Training College.

In all the above tree planting ceremonies, participants adhered to preventive measures including wearing masks, keeping social distance, sanitizing hands and devices as required in the crusade against the spread of Corona Virus Disease (COVID-19).

KEFRI trains Muguga CFA on Bamboo Value Chain

Building capacity of community adjacent forest associations (CFAs) to enhance forest rehabilitation and sustainable utilization of non-wood forest products is one viable strategies of achieving the national 10% forest cover by 2022.

It is on this realization that KEFRI National Forest Product Research Programme organized a bamboo value addition training to members of Muguga Ecosystem Research Community Forest Association (MERCFA).

The 5-day training at Nguriunditu Primary School benefited only 15 members due to the Government regulation on COVID 19 guideline.

The Programme Director Nelly Oduor urged the group to adopt bamboo as a nature based solution and for generating alternative income.



“KEFRI scientists are studying performance of 22 bamboo species introduced in the country in various ecological zones, adding that the trials also act as demonstration sites for farmers,” said Ms. Oduor.

Ms. Nelly Oduor and Dr. Joram Kagombe-KEFRI in a bamboo planting event (file picture)

Bamboo is a fast growing grass and provides quick returns. Its current global market is valued at 60 billion US Dollars thus contributing greatly to livelihood improvement among other sustainable development matters. Bamboo is used as alternate to wood in construction, energy sector, in environmental conservation and food for both human and animals.

“Muguga CFA, set up in 2009, jointly with other stakeholders is involved in conservation of Muguga forests, a remnant of Aberdare range and Ngong forest,” CFA Chairman, Simon Kamonde said.



Muguga CFA members training on value addition skills to bamboo, a task expected to increase bamboo planting, management and utilization at community level

Kamonde said the value addition skills will supplement the main group’s activities of seedling production, energy conservation and rehabilitation of degraded areas among others.

Rehabilitation of Michuki Memorial Park

The Cabinet Secretary for Environment and Forestry Mr. Keriako Tobiko on 27th April, 2020, commended the progress of rehabilitating the Michuki Memorial Park.



Dr. Cheboiwo (centre) and volunteers in a bamboo planting exercise at Michuki Memorial Park

The rehabilitation exercise as directed by the Ministry of Environment and Forestry includes; landscaping, planting suitable trees, fencing, renovation of walking trails and other infrastructure, reclaiming of the encroached riparian land, stabilisation of the eroded river banks, and cleaning up of waste along the riverine.

The CS who has visited the park severally to monitor the restoration progress, initially planted trees at the site accompanied by the Chief Conservator of Forests Mr. Julius Kamau, KEFRI Director Dr. Joshua Cheboiwo and Senior Deputy Director for Research and Development Dr. Jane Njuguna, the National Environment Management Authority (NEMA) acting Director General, Mamo B. Mamo.

Other key ministers including Cabinet Secretary Ministry of Sports, Culture and Heritage Amina Mohamed also participated in the rehabilitation activity which saw 900 bamboo seedlings planted along the Nairobi river.

The rehabilitation of the park is led by Kenya Forest Service with support from NEMA, KEFRI, Kenya Water Towers Agency as well as Nairobi Metropolitan Services.

The intent for the rehabilitation is to change the park from a dumpsite to an attractive nature park in line with the aspirations of the late Minister Hon. John Michuki.

KEFRI establish a tree nursery for restoring Michuki Memorial Park

KEFRI is establishing a tree nursery for sustenance of Michuki Memorial Park in Nairobi County.

The nursery, with biannual capacity to produce 150,000 to 200,000 seedlings, will nurture indigenous trees (including endangered, medicinal and fruits) for maintaining the park's biodiversity and support urban forestry. The seedlings will also be sold to the public.

The nursery is located in the park which stretches along Nairobi River between the Globe Cinema roundabout and the National Museum of Kenya bridge at the far end of Uhuru Highway.



KEFRI Staff transplanting seedlings at Michuki Park

The park was established in 2012 in honour of the then Minister of Environment the late Hon. John Michuki for his initiative to clean and preserve the environment. However, it was neglected soon after he was moved from the environment docket.

The neglect gave way to parking boys, traders such as hawkers, jua kali, garage owners, mechanics, matatu operators, street families and drug dealers who intruded the space.

Some of the neighbouring businesses encroached the park converting the space into parking bay, while others extended their boundary thus suppressing the riparian land.

The Ministry of Environment and Forestry jointly with its state agencies (NEMA, KFS, KEFRI, KWTA), National Museums of Kenya and Nairobi Metropolitan Services has enriched the park with 1,400 assorted bamboo and 450 indigenous trees using biological interventions.

According to James Maua, a KEFRI scientist, recent assessments show over 4,000 trees are growing in the park which has high diversity with 88 species so far identified.

KEFRI will also show case technologies on bamboo utilization and for biodiversity protection. It is anticipated once Michuki Memorial Park is rehabilitated, the public will have another recreation park in the city, managed by Kenya Forest Service, similar to Arboretum and Karura forests.



A bamboo cane structure to serve as a tree nursery office and exhibition room for KEFRI

The restoration of the park is proceeding with astounding speed. Hopes are high that it will open to the public at the end of June, reports Star Daily. With funds from the treasury, 4200 seedlings have so far been planted, a perimeter fence and 2.4 km of walkway constructed, new toilets, and laid out a large nursery, which will supply indigenous trees to Nairobi.

Many stakeholders are visiting the park to cheer it on. On 15 June, Dr Susan Chomba and Cathy Watson of World Agroforestry (ICRAF) donated seedlings of three Kenyan trees *Mutati*, *Muguchua* and *Mwerere*

Hon. Balala encourage planting Moringa in coastal region

KEFRI Coast Eco-region Research Programme (CERRP) hosted the Cabinet Secretary for Tourism and Wildlife Hon. Najib Balala who was accompanied by the Chairman of Vipingo Ridge Ltd in Kilifi County Mr. Alastair Cavenegh.

The CS visit on 15th May, 2020 aimed at acquainting himself with the centre’s activities and specifically cultivation of *Moringa oleifera* commonly known as Moringa (English) or Mzunze (Swahili).



Hon. Balala visting the tree nursery and planting a commemorative tree at KEFRI Gede

KEFRI Coast Regional Programme Director Dr. Linus Wekesa, who welcomed the CS pointed out the economic value of Moringa explaining its propagation, establishment, management practices and utilization.

“Moringa is increasingly being grown in the coast and neighbouring regions due to its many benefits. The tree is used as food, fodder, medicine, cooking oil and stimulant. Industrially, the tree is used in the manufacturing of paints, lubricants and perfumes. Moringa seed is conventionally used in water purification and extracting essential oil,” said Dr. Wekesa.

During his tour of the centre and the nursery, the CS requested KEFRI to set up a Moringa woodlot on his farm in Vipingo, Kilifi County which would also serve as a demo-plot for like-minded farmers in the region.

KEFRI has been promoting *Moringa oleifera* as suitable agroforestry tree for the mitigating climate change, drought-resistant and fast growing in many parts of drylands.

The tree has many nutritional and medicinal benefits which KEFRI believes will help tackle malnutrition, reduce poverty and improve livelihood.



Moringa - drumstick pods
Source:care@creativefarmer.in

The leaves are a good source of protein, vitamins A, B and C, minerals such as calcium and iron, and amino acids. The pods, green peas and seeds can also be eaten, and the flowers either eaten or used to make beverage.

Farmers in coast and north eastern region are embracing the Moringa tree through agroforestry intervention.

In search of *Melia volkensii* bio-pesticide for potato weevils management



Victor Jaoko and Fredrick Ajuala examining the effects of *Melia volkensii* bio-pesticide on potatoes

KEFRI scientists are evaluating the potential of bio-pesticide extracted from Mukau (*Melia volkensii*) in the management of *Cylas puncticollis*, *C. brunneus* and *C. formicarius*, invasive pests that attack African sweet potatoes - *Ipomoea batatas*.

The study according to scientist Victor Jaoko, currently pursuing a P.h.D at Ghent University in Belgium, alludes sweet potato which is rich in nutrients, is an important staple food crop in sub-Saharan Africa.

However, infestation by the sweet potato weevil is a limiting production factor. Most researchers estimate the yield losses at times can be as high as 97%, especially during extended dry seasons.

Cylas puncticollis is a major quarantine pest that damages leaves, stems, and roots of sweet potato and has been officially listed in East and Southern Africa, as an A2 pest since 2001.

Cylas brunneus is prevalent in West and Central Africa and some countries in East Africa (Rwanda, Burundi and Kenya).

Cylas formicarius is another serious destructive insect pest of sweet potato worldwide. It occurs throughout most of the tropical and subtropical regions and since its occurrence in several African countries its control has been problematic.

From the renewable *Melia volkensii* parts including nuts, tree bark, leaf and pulp, potential biopesticides have been formulated for efficacy against sweet potato weevils and fall armyworms, both in the laboratory and glasshouse.

“The extract from *M. volkensii* is being tested against commercial pesticides,” says Jaoko.

Jaoko further says the investigation seeks to develop a botanical pesticide that is environmentally friendly and cost effective - which small scale farmers can adopt as opposed to commercial pesticides.

“So far the results are showing positive response to majority of the subjects put on trial,” Jaoko said.



No extract applied Media

Nut extract applied Media

Pulp extract applied

Synthetic pesticides are known to destroy even non target organisms, such as soil micro organisms responsible for aeration and improvement, thus ineffective in managing the sweet potato invasive pests.

KEFRI and Nagaad to upscale production of gums and resins in Kenya

Nagaad Resins and Gums Company Limited signed a Memorandum of Understanding (MoU) with KEFRI on 28th May, 2020 to upscale production of gums and resins in the country.



KEFRI senior management with Nagaad officials during the signing of the MoU at KEFRI headquarters

KEFRI Director Dr. Joshua Cheboiwo and Nagaad's Chief Executive Officer Dahir Kulmiye signed the agreement with the objective of collaborating to gain in research and technology development on gums and resins in the region.

Nagaad's Chief Executive Officer Dahir Kulmiye, stated that the Company operates within East Africa as a producer and exporter of natural gums and resins products.

“The company is keen on gums and resins naturally harvested from wild forests and aims to upscale the production, thus curbing deforestation,” said Kulmiye.

The Director KEFRI, Dr. Joshua Cheboiwo emphasized on the importance of long term initiatives to widen gums and resins resource base.

“This collaboration is key as the activities include establishing gums and resins plantations while enriching those already in natural habitats,” said Dr. Cheboiwo.

KEFRI's Senior Deputy Director, Research and Development, Dr. Jane Njuguna noted that gums and resins are crucial bio-enterprises in Arid and Semi-Arid Lands (ASALs) thereby the collaboration will guarantee quality products.

“Nagaad Gums use ‘Go Get the Gum’ (3G) principle that enables communities to obtain a sustainable income, conserve the environment, and at the same time preserve the trees,” said Abdi Mohamed, the company's director for operations.

KEFRI and Nagaad agreed to work on previous project sites and incorporate target groups to upscale commercialization of gums and resins in the country.

“New export linkages will be explored to increase incomes among pastoral communities - especially women and youth,” said Nagaad's Marketing Director, Rod Charters.

A research previously conducted by KEFRI and Noragric, Norwegian University of Life Sciences, found that many households in north eastern collect and sell plant gums and resins as alternative to livestock production.

These include gum arabic from *Acacia senegal* and *Acacia seyal*; myrrh from *Commiphora myrrha*; hagar from *Commiphora holtziana*; and frankincense from *Boswellia neglecta*.



Yellow Frankincense / Olibanum Resin (*Boswellia carterii*)
Source: naggadgum.com

Collectors include poor people, women and children and some opportunists.

Incomes are relatively low, however, and several factors constrain the activity. The case of gums and resins illustrates that key principles of sustainable adaptation are related: supporting local knowledge and adaptation strategies

Mbeere Community to propagate and conserve East African Sandalwood

KEFRI staff from Dryland Eco-region Research Program (DERP) held a field day at Ithura Location, Mbeere North in Embu County, on 27th May, 2020 to sensitize the community on the conservation and propagation of the East African Sandalwood (*Osyris lanceolata*).



KEFRI staff train community in Mbeere North, Embu County on conservation of Sandal wood

DERP Regional Director Dr. Albert Luvanda pointed out that Sandalwood has been exploited for extraction of essential oils threatening its survival in the wild and thus making it an endangered species in Kenya.

“Domestication of Sandalwood offers great potential for conservation and availability of its products on a sustainable basis,” he emphasized.

He further added that Sandalwood propagation is constrained due to lack of adequate seeds and difficulties in raising seedlings in the nursery.

“Sandalwood is a hemi-parasite and must attach its roots to roots of an appropriate host plant,” Dr. Luvanda stated.

In a bid to curb these challenges, KEFRI has identified several seed sources for seed collection, developed a seed collection, handling and germination protocol.

The East African Sandalwood is among the worlds’ Sandalwoods known for producing fragrance-scented wood and essential oils. Sandalwood oil is used in various cosmetics and fragrance industries and has also gained popularity in medicine. The excellent blending and antiseptic properties of sandalwood oil makes it also valuable as a fixative for other fragrances.

Traditionally, the tree has various uses among different tribes in Kenya, including making of red dye, smoking milk containers, use of bark powder to heal wounds, treating stomach-ache, tonsils, diarrhoea, ulcers, snake bites and rashes.

Osyris lanceolata is known by various local names; Msandali (Swahili), Muthithii (Kikuyu), Mberegese (Chaga), Olseyeayyesi (Maasai) and Kithawa, Munyunga mai (Kamba), Kepurwet (Kipsigis), Kijulu (Taita), Muchai (Meru) and Mutero (Mbeere). The tree is dioecious and is indigenous to East and South African.

The field day was carried out in collaboration with KFS and Green Searchers Community Group which established a Sandalwood nursery in the area 10 years ago.

“The global demand for Sandalwood has outstripped supply and the current demand stands at 7000 tons and supply is about 3000 tons. The projected demand by 2025 is 20,000 tons. This demand can only be met from plantation grown Sandalwood. The current prices for East African Sandalwood oil in the international market varies between Ksh 60 000.00 to 100 000.00 per litre,” says Dr. Luvanda.

Training on *Vitex payos* value addition

KEFRI staff then went on and trained farmers on value addition on black plum (*Vitex payos*) fruits at Irabari village in Mbeere South, Embu County.

The objectives of the field day was to train eighteen participants on value addition, specifically juice and jam making from *Vitex payos* (chocolate berry).

Additionally, to demonstrate to the public that tree growing has some potential to improve livelihood in the dry land.

The anticipated output was to create awareness on the potential existence for livelihood improvement even with little rain as well as enhance knowledge on value addition of *Vitex payos* fruits such as juice and jam making.



KEFRI staff train community in Mbeere South, Embu County on value addition of *Vitex payos* fruit

Vitex payos known as Muu in Kamba, belongs to the verbanaceae family and comprises 300 species of trees and shrubs most of which are indigenous. In Kenya, different species of *vitex genera* are found naturally from the coast through the dry woodland to Mt. Kenya areas across Rift valley to shores of the Lake Victoria.

The tree is about 10m high with low sparsely branched and rounded crown with square branchlets. Its fruits are utilized heavily for herbal medicine while others produce edible fruits that are consumed and sold on local markets among some communities. It could also be used in control of malaria infection, a serious health problem in most areas where the species grow naturally.

Anti-larval compounds extracted from *V. payos* were found to inhibit emergence of anopheles mosquito larva and caused morphological deformation in some pupae.

According to a previous report by KEFRI scientist Dr. James Kimondo, 5Kg of fruits can yield 7- 400grams container of jam processed manually. He further notes that a single tree could generate a gross income of Ksh 1750 per year of jam.

Dr. Kimondo's recommends promotion and utilization of *V. payos* fruits through initiating processing activities to add value - improve their shelf life and income at the farm level.

The eighteen participants, initially trained through CADEP project from 2018-2019 on nursery and tree growing, were trained on processing of fruits into high value products like jam and juices.

Production of *Vitex payos* juice

Production of *Vitex payos* juice entails soaking fruits in clean water for 20-30 minutes, squeezing the fruits to separate the pulp from the stony seed.

Then sieving the pulp to separate it from the seeds and pulpy cover to obtain fine pulp.

To make one liter of juice add a liter of water to the pulp. Heat for 5-7 minutes and add sweetener 1/2 kilo honey or sugar and stir. After boiling, add 3 spoonful of gum Arabic in powder form.

Add preservative (about 50ml lemon juice only when sugar is used as honey is a preservative), stir and leave to cool.

According to County Integrated Development Plan 2018-2022 report, the main forest products in the county include timber, poles, firewood, carvings, charcoal, posts, seedlings and honey.

The high dependency on firewood and charcoal may result to depletion of forest cover in the county which is also aggravated by increased land subdivision.

Farmers have been trained on improved farming practices through farmer field extensions, seed bulking of drought tolerant crops and soil fertility improvement practices.

The promotion of kitchen garden establishments and promotion of tree crops continue to provide an extra income for households.

Vitex payos and other trees planted in the county have helped to control soil erosion, improve nutrition, water infiltration, provided land cover and acted as windbreaks.

Environmental conservation and rehabilitation in the areas adjacent to rivers has greatly controlled siltation into the rivers.

Tools for Lake Victoria Basin tree nurseries

With a realization that every great tree starts from a healthy seedling, and successful tree nursery goes well beyond building infrastructure and staff training, KEFRI has donated tools to community tree nurseries to enhance production of tree seedlings in Lake Victoria basin.

The tools were donated to: Marera ACK Church tree nursery, Rural Organization for a Just Environment (ROJA), Harambee and Kolik Tree Nursery all situated at Katito-Kendu Bay road; Kanyaroho, Ahero tree Nursery (KaJakisii) and Nyathi Carwash Tree Nursery in Ahero, on 14th and 15th May to enhance the nurseries' capacity for optimum seedling production.



Dr. Jared Amwattah (right) presenting nursery equipment's for Marera ACK tree nursery

“The nurseries had passed an assessment that was based on parameters; (number of seedlings, species type, average annual turnover, optimum capacity of the nursery, and challenges),” said Dr. Amwatta KEFRI Lake Victoria basin regional director.

Each nursery received a wheelbarrow, watering can, hose pipe, 2 pangas, 2 slashers, 2 shovels and 2 secateurs.

“We have optimized seedling production technologies including propagation protocols for various species and exposed tree nurseries entrepreneurs to basic nursery operational requirements for the region. These nurseries will produce adequate seedlings for attainment of the national 10% tree cover,” said Dr. Amwatta.

Bamboo training for Sauti Kuu Youth

LVBERP organized a training on bamboo propagation for Sauti Kuu Youth Group at Pap Nyadiel Chief's camp in Siaya on 11th June 2020. The training purpose was to impact skills on bamboo propagation. Eventually create employment reduce poverty and hunger, improve the health of young farmers and consumers.



Mr. Ochito, nursery headman at maseno demonstrating preparation of bamboo culm for mass propagation

"The area Chief and 4 assistant Chiefs joined the training that benefited 12 youths with skills to propagate bamboo," said Dr. Amwattah.

Globally, though there is sharp decline of forests, a steady increase in bamboo cover is being realised with China recording 3% increase annually. The World has a total of over 20 million Hectares of bamboo and out of this China contributes 30% yield.

"In Kenya, exploitation of *Yushania alpina*, the only indigenous bamboo led to an intensive research and introduction of other species to increase the genetic base, and ensure sustainable production," says Dr. Amwattah.

Pension: Staff movement from January to Mid June 2020

Name	P/No.	Date of Exit	Mode of Exit
Peter Busera	5580	16.4.2020	Rt
John Ngugi Njoroge	5668	27.5.2020	Rt
Boaz Otieno Ng'ong'a	5090	3.6.2020	Rt
Peter Muniu Kamau	6664	10.6.2020	Rt
Joseph Wakhungu Simiyu	6706	14.6.2020	Rt
Demise			
Jane Omwansu	6839	10.4.2020	De
Simon Waweru Gathumbi	6868	22.4.2020	De
Nancy Wanjiku Njeri	6936	30.5.2020	De

Key: Rt - Retirement, De - Death



JICA donated instruments for provision of effective and efficient solutions in micro-biology research activities



Construction of bamboo shade for tree nursery at Michuki Memorial Park

BLACK LIVES MATTER

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