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Kenya

farmer

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On the inside

→ **Gains of passion
fruit farming**

→ *Shift to horticulture*

→ *Disruptive
agricultural
technology*

Improved Finger Millet Variety



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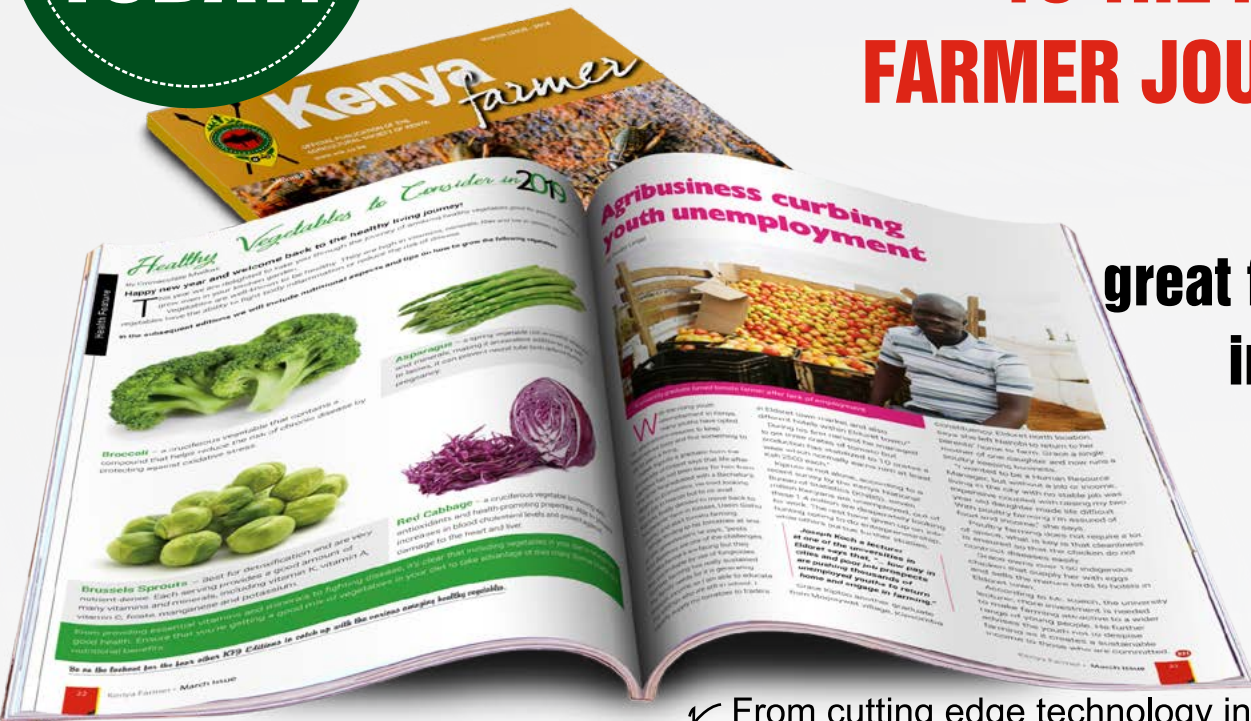


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Kenya farmer

Welcome to issue 200

Changing Weather and Climate Patterns: Blessing or Curse for Agriculture

The rains are here with us after a period of lack of rainfall in many parts of the country in the earlier part of the year. In some areas, farmers had started lamenting that the rains were not predictable anymore and hence making it difficult to prepare adequately for the crops to plant. Livestock keepers were also concerned about the decreasing pasture due to the dry season.

The changes in weather patterns and climate is something that cannot be ignored and it is important for all in the agricultural sector to concertedly, draw their efforts to come up with solutions. When predictions are made of expectations of lower or higher amounts of rainfall over a season it is important that agricultural and meteorological scientists provide advisories to farmers, livestock keepers and fisher folk to plan appropriately. This would go a long way towards ensuring that they are adapting effectively to the changing climate patterns and in the process resilient in ensuring, we have food security all year round.

In this issue, the writers have gone the extra mile to ensure they provide you with tips on how you can ensure that the crops you grow can be utilized in various stages to ensure you enjoy the benefits of value addition. In addition, there is a story of what scientists are doing towards addressing some of the challenges experienced by farmers when dealing with various pests that pose a threat to their agricultural productivity. There is also a story that embodies the strength of bringing farmers together and finding homegrown solutions that can help them ensure they not only keep the nation fed but also see the



Joseph W. Mugo
Editorial Board Chairman

value of investment. All these and many more stories are aimed at dealing with the innovative changes occurring in the agricultural sector in light of changing weather and climate patterns.

As we continue our commitment to you to bring these enlightening stories, I can't help but to pause and remember our colleague and brother the Late Antony Ngare, whose commitment to the editorial board over the past 12 years has helped in shaping the journal as you see it today. Check out the special tribute we have of him on page 7. We will miss you. However we shall soldier on to ensure we keep this journal as fresh and interesting in line with your passion for it.

We look forward to receiving your feedback on this journal.

Happy reading.



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"We must adopt science and technology to achieve inclusive agricultural growth, nutrition and food security in the country. Food security remains a priority in our development agenda, and to this end, we must make deliberate efforts to boost growth in the agricultural sector by addressing the major challenges facing the sector."

Patron,
Agricultural Society of Kenya
H.E. Hon. Uhuru Kenyatta, CGH

"Training on seed quality, soil testing and other best practices, including plant and animal health management; post-harvest handling and storage; crop diversification and value addition will boost production, enhance farmers' incomes and achieve food security."

Deputy Patron,
Agricultural Society of Kenya
H.E. Hon. William Ruto, EGH



"Women and youth play a major role in crop and animal production enterprises. My Ministry is committed to supporting women and youth by providing agribusiness opportunities along the sector so that they can earn an income, enhance food security and improve their livelihoods."

First Vice Patron,
Agricultural Society of Kenya
Hon. Mwangi Kiunjuri, EGH, MGH

Tribute to a True Friend from the Kenya Farmer Journal

For over 10 years we met every two months early in the morning to work on the magazine we loved – the Kenya Farmer Journal. We spent time writing, rewriting and deleting, headlining; what a word master and coiner you were.

At this point words, statements, sentences fail us as we write this tribute to you Tony Ngare. May be this writing will immortalize you brother, the words, and we want to get it just right as we remember how thorough you were in the wee hours of the mornings we met to render service to the farmers of our beloved country.

As the dust settle and as reality sink that you are gone forever, we gather the courage to write what only your hands would have perfected and made a wonderful read. Imperfect as it might be, we are sure you would not mind a brutal honesty and frank sharing of our lives.

KFJ Chairman: We lost a really nice person. Ngare was very focused and committed to his duties in the Board. Rest well comrade.

Mary Kio: It seems like it was just the other day when I joined the Kenya Farmer Journal Editorial team and I was listening to you and Edwin Limo critique the articles with precision and once in a while varying on opinions in a respectful manner. "We need a cross head here. This picture does not reflect this article well; can we ask the journalist if they have a better one." I was soon to observe that you were the master coiner of headlines for most of the articles. You had a way of making the blandest headlines suggested by the writers into sweet poetic language that would make me want to read the stories again when they were finally published despite having edited some of the stories myself.

As we took 'commercial breaks' while editing the journal, it was not lost on us your commitment to your family. You shared about your children and wife and was very proud of them. At times we had to move our editorial meetings despite looming deadlines because you would say, "I had already planned something with the girls." This did not need any further elaboration to the team as we all understood what it



must be like being the father of girls- it's never easy for fathers to say no especially to their young daughters.

You lovingly shared the pictures of them and your face would light up as you scrolled through your phone. But when the day of the meeting would take place, you would give the meeting your all and your energy would spur the team on and we would finish our editorial meeting in time and meet our deadline.

Edwin Limo: You were such an ally in the profession. We talked the same language and when you joined the world of public relations, I dutifully

answered your questions and you landed and did supper well. You were a good learner, I must say. You kept me posted of your professional advancement and changing of jobs. When you asked to have me as your professional referee, I didn't think twice. You were genuinely happy for me in my won professional career progress. You called me 'Balози' and when I was posted abroad you were elated. We had agreed I would host you and your family before the end of my tour of duty. Your departure hit me like a thunder bolt. Fare thee well buddy.

You spoke your mind but not in a hurtful way. Your aim was to correct, empower and encourage. You always went the extra mile despite your busy office schedule. In this issue, we have struggled with editing the articles in our various dockets. It's like by editing we would bring the day of the editorial meeting closer and we did not want to deal with not having you in the room with us. Your presence will be missed. Your sheer determination towards giving the Kenya Farmer Journal the very best will always inspire us to keep doing our best and keep the reader at the heart of all the articles. We will miss your sense of humor and insights. We will endeavor to keep editing and rewriting the headlines to the very best we can in our memory of you.

"You carve your name on hearts, not tombstones. A legacy is etched into the minds of others and the stories they share about you."

Rest well Tony Ngare. Till we meet again.

Need to Revitalize Rainfed Agriculture



Annabel Kiriinya (Mrs)
NATIONAL CHAIRMAN,
AGRICULTURAL SOCIETY OF KENYA

addressing agricultural issues and ensuring food security is achieved. It is therefore the moral responsibility of all stakeholders in the industry to work together and support the implementation of the National Government's projects on food security to improve the general well-being of Kenyans.

Kenya is dependent on rain-fed agriculture. As a country we are currently experiencing unpredictable weather, unreliable and insufficient rains, higher than normal temperatures and long drought periods due to climate change. This will disproportionately hurt our farmers making it difficult for the country to eliminate poverty, hunger and malnutrition.

Agriculture world over must become more resilient to climate change. Kenya should strive for more productivity, stability and sustainability. The solution lies in technology adaption including irrigation and innovative water conservation, use of drought and disease resistant crop varieties, planned land and forest conservation particularly water catchment areas and production of high value crops that have ready markets and fetch high market price.

There is dire need for concerted efforts to develop educational and advocacy programs to educate farmers on climate change, its impact and adaption options. The Society will continue advocating for adoption of irrigated agriculture as opposed to over reliance on rainfed agriculture to mitigate the effects of climate change. Visit our Shows countrywide to gain more insight on climate change.

Our platforms countrywide will endeavor to showcase technologies and innovations that our farmers can learn and exploit in order to create better services and systems that help mitigate climate change. This is evident in light of our current show theme, 'Promoting Innovation and Technology in Agriculture and Trade.'

Karibuni kwa Maonyeshe!

I am happy to welcome you to the Nanyuki Branch Show, Kakamega Branch Show, Meru National Show, Makueni Satellite Show and Machakos Branch Show.

The agricultural sector is the cornerstone of long-term sustainable development. Few countries have been able to grow their economies without a solid contribution from agriculture. It is for this reason, that stakeholders in the sector should continuously work harmoniously in

Embracing Agribusiness and Entrepreneurship For Food Security and National Growth



Batram M. Muthoka,
CHIEF EXECUTIVE OFFICER,
AGRICULTURAL SOCIETY OF KENYA

featuring the May/June Edition.

The government has continued to revolutionize agriculture in the country, moving it from subsistence to an agro-enterprise that employs and empowers Kenyans. The Society in support of the government will through her exhibitions continue to demonstrate projects and innovative ideas that serve to increase income streams for the farmer, enable value addition, improve farmers access to information and provide financial solutions.

In the recent past we have seen many Kenyans venture into farming with high hopes of raising their livelihoods. While it is true you can mint millions from farming, proper project planning at the initiation level, like any other established business is a must. Value addition is an integral part to successful farming.

Agribusiness has the potential to transform Kenya's economy, create jobs for the youth and accelerate the achievement of the Government's big four agenda, specifically the agenda on food security. Agribusiness is therefore a critical ingredient of our country's economic growth.

To this end, the Society supports the government's agricultural projects that appreciate entrepreneurship while endorsing agribusiness thus propelling the nation towards sustained agricultural growth, high standards of living and a rapid economic growth.

We appeal to farmers and entrepreneurs with innovative business ideas to attend and participate in most of the Agricultural Society of Kenya Shows and Trade Fairs. We shall also endeavor to continue providing forums for the exchange of agricultural information, technology and innovative ideas as stated in our theme, "**Promoting Innovation and Technology in Agriculture and Trade**".
Karibuni kwa maonyeshe!

It is a great pleasure to welcome you to Nanyuki Branch Show, Kakamega Branch Show, Meru National Show, Makueni Satellite Show and Machakos Branch Show



Mr. Francis Gitonga
Branch Chairman - Nanyuki

DEVELOPING RELATIONSHIPS WITH NEW PROSPECTS

farmers during the show period.

The agriculture sector, which is the backbone of our economy, showcases high standards of farming techniques and the professionals will be at hand to give advice. Our show theme this year remains- "Promoting Innovation and Technology in Agriculture and Trade"

Livestock parades have been planned this year, with entrants ranging from local small scale farmers, to the large scale farmers and ranchers. A livestock auction will be the key highlight of the livestock exhibition.

Just for your information only, according to a world bank report – Laikipia County is well recognized and recommended as a good beef production hub and we have a lot of beef cattle to sustain the market requirements.

At a glance, I would like to shed some light on our County no 31. Laikipia was founded by British settlers in 1907. 60% of Laikipia is owned by ranchers, horticulture and large scale farmers – pastoralists and subsistence farming, covers the other bit.

Nanyuki town is situated north of equator- along the Great North road making it strategically placed in terms of business potential. It hosts the Kenya Defence Forces (Laikipia Airbase) and the BATUK (British Army Training Unit in Kenya base)

Apart from farming, tourism is another activity that contributes towards its economy. We have game parks and wildlife conservancies within the perimeter of the town. The bases for climbing Mt. Kenya (second largest mountain in Africa, after Mt. Kilimanjaro) are just within

nanyuki town, Burgret and Kirimon routes are not far from the town.

The equator line passes barely a kilometre from the town.

The climate is quite favourable at an average of 24 degree centigrade high and low of 9 degree centigrade. That makes Laikipia County highly recommended for persons going on retirement because of its favourable climate.

Laikipia average life expectancy is 79 years. We have witnessed an influx of foreigners taking up opportunities to own plots in Laikipia. This makes Laikipia one of the best counties to invest in, mainly because of price affordability, good infrastructure and availability of water for consumption and irrigation.

The economy of Laikipia is vibrant, especially because of the large scale farms, ranches, game parks, BATUK, Armed Forces among others, which boosts the county's economy.

Tourism has seen nanyuki town and its environs register development of high class hotels with increase in bed capacity to cater for a larger number of guests. The charges for accommodation and meals are quite affordable.

Nanyuki is about 200kms from Nairobi, 80kms from Meru, 80kms from Isiolo, 60kms from Nyeri, 200kms from Nakuru and it is all tarmac for those who would be coming to Nanyuki for the first time.

Once again, I take this opportunity to welcome you all to this year's show to learn from the various exhibitions and to enjoy the entertainment that we have prepared for you.

Come one, come all



Mr. Stanley Mukaria Maingi
Branch Chairman - Meru

WELCOME TO MERU SHOW

assure all exhibitors of our resolution to improve the shows' standards and ensure that exhibitors get value for their participation in the show.

Since its inception in 1968, the Meru show has continued to grow tremendously. Today, the show is on National Category and a Regional premier event which attracts participants from Marsabit, Isiolo, Tharaka Nithi and Larger Meru counties. Considering its strategic location, the show is aimed at providing the perfect platform for various stakeholders in Agriculture, Education, Trade and Allied sectors to disseminate information, Market products and services to large population. The show has become a one-stop shop that brings together the stakeholders on a common platform to interact and conduct business transactions hence contributing to the development of the economy and wellbeing of the local people.

This year, we are delighted to host 120 exhibitors from various sectors that will be represented at show including Agriculture, Financial (banks & Sacco's), Education, Health, Manufacturing, Hospitality, Transport, Jua Kali among others. We wish to thank all these stakeholders for their continued partnership with us. We are also extremely impressed by the turn up of new exhibitors

from diversified sectors who have made us proud for creating variety and making this show a great event.

I wish to appeal to stakeholders and all well-wishers to partner with the ASK in the development of the show facilities to allow adequate utilization of these facilities. Some of the facilities needed include Perimeter Fence, floodlights, arena sheds with seating terraces and Modern Arena Pavillion. Companies are encouraged to contribute towards these projects on which they will be allowed to brand for an agreed period.

I wish also to inform the general show visitors and partners that apart from exhibitions, demonstration plots to be visited in the showground, there will be lots of entertainment in the Arena such as Merry go rounds, bouncing castles, police bands, choirs and tug of wars.

Lastly, in organizing Meru National show, we received tremendous support from the County Government of Meru, our National Chairman Madam Anabel Kiriinya and the Chief Executive Officer Mr. Batram Muthoka, show committee members and Members of staff to whom we are most grateful. God Bless ASK Fraternity. Karibuni Maonyesho

It is a great pleasure to welcome you once again to this year's A.S.K Mt. Kenya Branch Show, Nanyuki, that opens its doors on 23rd – 26th may, 2019.

This year's show will not be business as usual. Much preparations have been done with utmost caution.

The arena is packed with all sorts of entertainment ranging from police bands, acrobats, live bands, sports, and beauty contests among many others. Our funfair section is set with all sorts of fun to thrill our kids to the brim.

Exhibitors are more this year ready to show case what they have in form of new products, new services, innovations and technologies that will amaze you. Several companies have also offered to sponsor several groups of

It is a great pleasure that I welcome all the exhibitors and show visitors to this year's Meru National show.

The Show runs from 5th to 8th June 2019 at Gitoro showground, Meru.

The theme of the show "Promoting Innovation and Technology in Agriculture and Trade"

On behalf of show organizing committee, I wish to

WELCOME TO WESTERN KENYA BRANCH SHOW

Welcome to 2019 Western Kenya Agricultural Show. Thank you for reading the Kenya Farmer Journal. Western Kenya Branch Agricultural Show has been an annual event for over 52 years. We hope you will find what interests you in order to be part of the Western Kenya branch show.

In addition to exhibiting, the Western Kenya show is a gathering place to connect with professionals, friends and family. It is a place where we learn about new innovations, technologies and ideas. It contributes to our social-economic improvement individually and as a Western Kenya community.

This year's theme is "Promoting Innovation and Technology in Agriculture and Trade."

There is no doubt about the importance of agriculture. Technology and innovation is helping us change the way we do almost everything. Many of the new innovations and techniques are helping the farmers and community

to contribute towards food sufficiency and education. New ways are also being developed to help in animal husbandry and the care of the environment.

Our show has lots of moving parts; volunteers, Branch committee, show committee, exhibitors, vendors, visitors, show goers and other visitors.

No one does this alone, we work as a team. Thank you all, this couldn't happen without you. There is so much to see at this year's show; entertainment, livestock exhibition, amazing technologies and innovations. Experience shows that mid-way life is about stories and the show is part of many past of future great stories.

We invite you all to visit the show and have fun. On behalf of the Western Kenya Show Branch committee we look forward to seeing you.

Thanks.



Mr. Ludovicus Okitoi
Branch Chairman - Kakamega



Mr. John Nzala
Branch Chairman - Machakos

WELCOME TO MACHAKOS SHOW

I am happy to welcome you to the South Eastern Show that will be held from 26th- 29th June at Machakos Showground.

This year's show will provide a platform for the Agricultural, Manufacturing, Educational, Trade and other allied sectors to come together and provide an all under one roof information to the public. I am proud to mention that for the past years, Machakos Show has provided excellent avenue for showcasing modernized products and services, improved technologies as well as promote business to business interactions.

The South Eastern Branch Show-Machakos will this year run with the same theme "Promoting Innovation and Technological in Agriculture and Trade"

It also goes without saying that farmers should start embracing modern farming technologies, adopt water harvesting and irrigation in agriculture to ensure sustainability in the ever changing and unpredictable

weather conditions that have seen Kenya's food insecurity on the rise.

I would like to mention that this year's show promises to enrich you with new technologies as well as enlighten people on various entrepreneurship opportunities in the Southern Kenya region. Most exhibition stands and demonstration plots have been prepared and we are confident that we will have a successful show.

On behalf of the Show Organizing Committee, I want to take this opportunity to invite everyone to the show and extend my sincere gratitude to the Show Executive Committee who have worked tirelessly to make the show a success.

Lastly, I want to appreciate the County Government of Machakos for actively participating in our show, our esteemed exhibitors and the ASK National Office for their unending support. Karibuni Maonyesho.

WELCOME TO MAKUENI SHOW

the first show, there were many challenges regarding basic infrastructures and organization. However, the Agricultural Society of Kenya guided the process regarding show planning, mobilization of stakeholders and exhibitors and management of the event.

The second show was held between 14th - 16th June, 2018. The number of exhibitor categories were 23 with 97 exhibitors. The attendance also increased to 11,718 persons. The 2018 show offered a good opportunity to farmers, agricultural researchers, traders and services providers and relevant stakeholders to enhance trade and agribusiness. The show coordinating team learnt that the show is faced with challenges due to lack of key structures in the show ground. However, in 2019, we have done proper layout and found out areas to allocate different functions and we have enough space for all stakeholders and exhibitors.

The preparation of 2019 show began in earnest early this year. Key challenges encountered in the previous years are being addressed in readiness for the show. Major structural improvements include installation of electricity supply, the construction of the show office and a police post. Other improvements was the expansion of

water storage and the completion of perimeter fence all scheduled for completion before the show date scheduled for 13th-15th June 2019. Mobilization of stakeholders is top of the agenda.

Agricultural demo plots have been established by the department and relevant stakeholders and corporates including KEPHIS, KALRO, Kenya Seed, Dryland Seed Company among others. Livestock recruitment and relevant vaccinations has been done.

In the on-going preparation, we have expanded membership of show organizing committees by up scaling the role of stakeholders in the show organization. We have also reached to some of the stakeholders for specific support in staging the show. Sub committees to man the various areas are on course.

Finally, mobilization of the show is on-going. We are collaborating with media houses and local FM stations to publicize the event and sensitization of farmers and traders on the essence of the show. I therefore wish to welcome all the Makeni Residents and the entire public to attend in large numbers to benefit from the show

All are welcome.

County Patrons' Take

our people and the entire country will come to learn farming technologies, interact with various stakeholders and promote trade and agribusiness.

Since devolution our government has given agriculture top priority. Makeni lies in the arid and semi-arid southern rangelands. Our agricultural potential is, by and large, able to support fruit farming, dry land crops and livestock production. As a consequence, we identified fruit, grains, dairy and poultry value chains for development.

Our government has invested Ksh. 590 million to establish the Makeni Fruit Processing Plant in order to reduce post-harvest losses and increase farm gate prices. So far the plant has purchased 1,974 metric tons of fresh mangoes processing it to 4,682 drums of puree valued at Ksh. 62.5 million. I continue to encourage the farmers of Makeni to intensify mango production by increasing acreage and productivity. Further I urge farmers to diversify fruit production to other fruits like citrus, passion fruit, avocado, paw paw, watermelon for both processing and fresh market.

On grains value chain the main problem has been low farm gate prices. To stabilize the prices our government started the construction of an Integrated

Grain Processing Plant valued at Ksh 186 million. The plant will do sorting, grading, polishing and packaging of pulses.

On dairy production, the biggest problem was milk wastage during glut seasons. To counter the constraint and support growth in the value chain, our government supported all 18 dairy cooperatives with milk cooling tanks and the establishment of Kikima and Kathonzweni milk processing and packaging mini plants. To improve breeding services, our government introduced subsidized Artificial Insemination (AI) services where a farmer pays only Ksh. 300 per serving. Our government has invested Ksh. 127 million in the dairy value chain. The county has also established elaborate livestock disease control programmes.

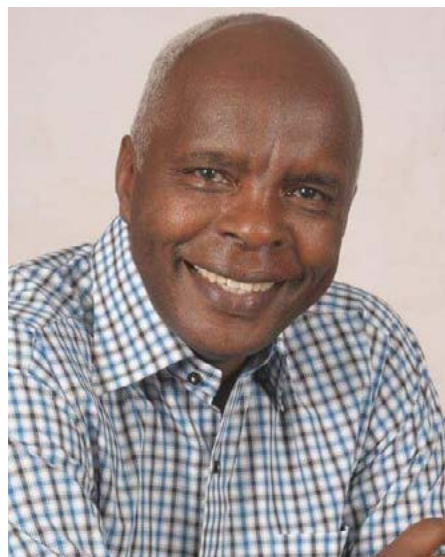
Our government has also been enhancing food security by investing in other extension services, amelioration of postharvest losses strategies and irrigated agriculture. We have equipped farmer groups with skills and offered subsidized agricultural machinery services. Farmers are planting high value crops for export and fresh market. Further, Our government has enhanced indigenous poultry, and sheep and goats production to enhance food security and household incomes.

Karibu to your show.



Mr. Lawrence Nzunga
CEC Agriculture – Makeni County (Show Chairman)

Makeni County identified the need to establish an agricultural show as a forum to enhance agricultural development in the county. The first show which marked the ground breaking of Makeni ASK Satellite show was held at the Makindu show ground on 16th July, 2017. In this first show, we had 67 exhibitors and an attendance of 11 400 persons. Being



Governor,
Makeni County

H.E. Prof Kivutha Kibwana

Welcome to the Makeni Agricultural Show that will be held on 13th to 15th June 2019.

The Government of Makeni County set aside thirty (30) acres of public land for the purpose of establishing an Agricultural Show through which

2019 CALENDAR OF EVENTS

THEME: "Promoting innovation and technology in agriculture and trade"
"Ukuzaji wa uvumbuzi na teknolojia katika kilimo na biashara."

EVENT	DATE	VENUE
Eldoret National Show	March 6th - 9th	Eldoret
Eastern Kenya Branch Show	March 14th - 16th	Embu
A.S.K Annual General Meeting	March 29th	J/park
Y.F.C.K National Camp	April 8th - 12th	Nakuru
Y.F.C.K Tree Planting Day	May 18th	Nanyuki
Mt. Kenya Branch Show	May 23rd - 26th	Nanyuki
Western Kenya Branch Show	May 30th - 1st June	Kakamega
Meru National Show	June 5th - 8th	Meru
Makeni Satellite Show	June 13th - 15th	Makeni
Royal Highland Show	June 20st - 23rd	Edinburgh
Y.F.C.K National Rally	June 22nd	J/Park
S.E. Kenya Branch Show	June 26th - 29th	Machakos
Nakuru National Agricultural Show	July 3rd - 7th	Nakuru
Southern Kenya Branch Show	July 11th - 14th	Kisii
Kisumu Regional Show	July 24th - 28th	Kisumu
National Agriculture Teachers Conference	August 14th - 16th	JKUAT
Mombasa International Show	Sept 4th - 8th	Mombasa
Kabarnet Branch Show	Sept 12th - 14th	Kabarnet
Central Kenya National Show	Sept 11th - 14th	Nyeri
Kitale National Show	Sept 18th - 21st	Kitale
Bungoma Satellite Show	Sept 26th - 28th	Bungoma
Nairobi International Trade Fair	Sept 30th - 6th Oct	J/park
S. W. Kenya Branch Show	Oct 10th - 12th	Migori
National Ploughing Contest	Nov 22nd - 23rd	Kitale
N. E Kenya Branch Show	TBA	Garissa

Gains

of passion fruit farming

By Fred Omondi

A few years ago, Genesio Miriti was a casual laborer doing odd jobs in Tharaka Nithi to make a living. However, his tidings changed when he started passion fruits farming.

"I always have some money in my pocket, as long as I have passion fruits to harvest," he says.

The 38-year-old farmer from Iruma location, Mara, said it is now one year since he started growing passion fruits, and he is enjoying the fruits of his hard work.

Miriti has started harvesting the fruits, and this will continue for two months. In a good season, Miriti gets two crates in two days.

"During off-peak season, a kilo of passion fruits sells at Ksh 150. From one crate, I get about Ksh 3,000, and in a month, I can harvest 15 crates, which totals to Ksh 45,000," he said.

This is a remarked increase in his income considering he used to get less than Ksh 10,000 per month from his casual jobs.

Miriti also grows tomatoes and onions to supplement income, but he says they require more work, unlike passion fruits.

"Growing tomatoes and onions is risky. Anything can go wrong at any time. But with passion fruits, you only need to spray once to prevent wilting," Miriti said.

Market for passion fruits is readily available, but with tomatoes and onions, the farmer who harvests when there is a glut in the market can incur losses. This means a farmer has to sell at a throwaway price because these are perishable produce.

The price of a kilo of tomatoes is also low compared to that of passion fruits. A kilo is currently retailing as low as Ksh 20, unlike passion fruits, which are selling at Ksh150.

"If I go to the market and I'm not satisfied with the prices of passion fruits, I can always come back home with them to sell later, when the prices are better," Miriti said.

He also has fewer expenses as he uses manure, which is obtained, from his two dairy cows.

Appeal to youth

Miriti is a beneficiary of the Muringa Banana irrigation project, which was started four years ago by the National Irrigation Board (NIB) and draws water from Maara and Mutonga rivers. Each farm pays Ksh150 a month as maintenance fee for utilizing the river water.

Through the sprinkler method of irrigation, the father of two daughters is able to have a crop throughout the year.

"Without the water, the crop will dry and I will only harvest once, unlike now when I have harvest. I have money in my pocket every day and I cannot go

into farming when they are still energetic.

"You cannot do much when you are old, so take advantage of your youth. You can do so much with irrigation, but farming needs for one to make money," he advises.

He looks forward to recruiting more farmers, especially young people, to passion fruit farming. He has a nursery with 10,000 seedlings, which he will distribute to farmers at the onset of the rains.

"If one's seedlings were ready by April, the seedlings will be ready for transplanting and in December, farmers will start harvesting. I will then be able to look for market or even a contract to supply to the local supermarket because I will be confident that I can meet the demand," he said adding.

Miriti hopes that in the future he will start a company for value addition for his passion fruits and support other passion fruit farmers by buying from them.

Miriti also hopes to start a company for value addition and buy from other farmers. **KFJ**

ASPARAGUS

By KFJ Correspondent

Asparagus is a spring vegetable that's packed with nutrition. When you buy asparagus, either fresh from the market or grocery store, it's best to eat it right away. Asparagus pairs nicely with lots of other spring vegetables and flavours—think peas, garlic or new potatoes.

1 cup of cooked asparagus has 40 calories, 4 grams of protein, 4 grams of fiber and 404 milligrams of potassium which is good for blood pressure. It also contains asparaptine, which helps improve blood flow and in turn helps lower blood pressure. If you need more reasons to enjoy this yummy vegetable read on to see some surprising reasons, it's so good for you.

Explode with vitamins

Asparagus is a very good source of fiber, folate, vitamins A, C, E and K, as well as chromium, a trace mineral that enhances the ability of insulin to transport glucose from the bloodstream into cells. That's good news if you're watching your blood sugar.

Help fight cancer

This herbaceous plant—along with avocado and kale is particularly rich in glutathione, a detoxifying compound that helps break down carcinogens and other harmful compounds like free radicals. This is why eating asparagus may help protect against and fight certain forms of cancer, such as bone, breast, colon, larynx and lung cancers.

Full of Antioxidants

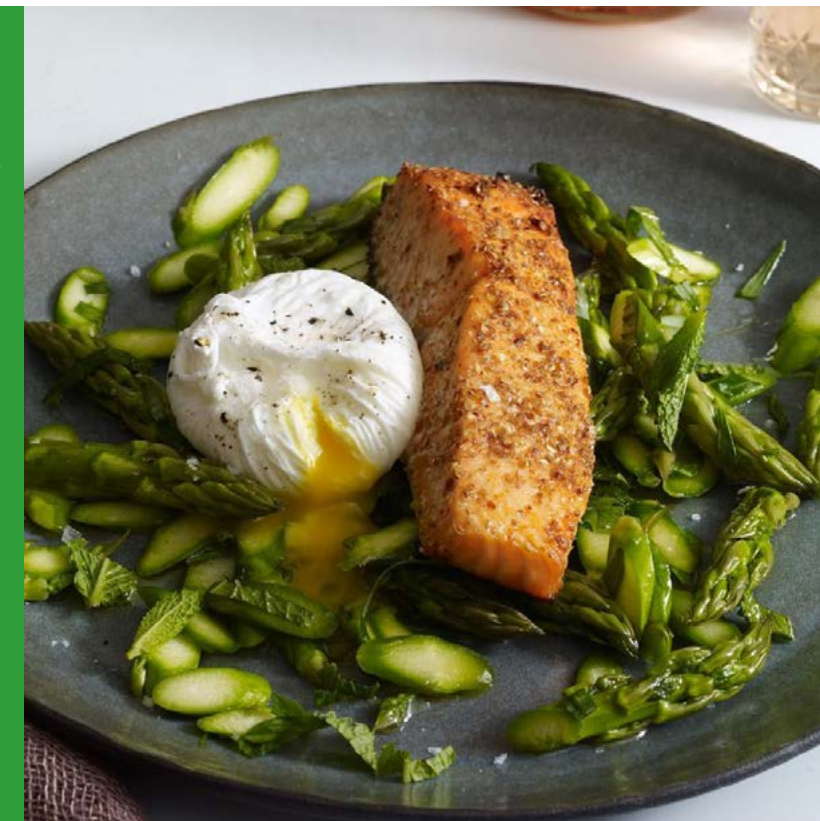
It's one of the top ranked fruits and vegetables for its ability to neutralize cell-damaging free radicals. This may help slow the aging process and reduce inflammation.

A Brain Booster

Another anti-aging property of this delicious spring veggie is that it may help our brains fight cognitive decline. Like leafy greens, asparagus delivers folate, which works with vitamin B12—found in fish, poultry, meat and dairy—to help prevent cognitive impairment.

A Natural Diuretic

It contains high levels of the amino acid asparagine, which



serves as a natural diuretic, and increased urination not only releases fluid but helps rid the body of excess salts. This is especially beneficial for people who suffer from oedema (an accumulation of fluids in the body's tissues) and those who have high blood pressure or other heart-related diseases. The most common type of asparagus is green, but you might see two others in supermarkets and restaurants: white, which is more delicate and difficult to harvest, and purple, which is smaller and fruitier in flavour.

No matter the type you choose, asparagus is a tasty, versatile vegetable that can be cooked in myriad ways or enjoyed raw in salads.

Keep in mind these cooking tips to preserve antioxidants and keep your preparation healthy:

- Roast, grill or stir-fry your asparagus. These quick-cooking, waterless methods will preserve the fabulous nutritional content and antioxidant power of asparagus. **KFJ**

Source:

<http://www.eatingwell.com/article/17129/5-powerful-health-benefits-of-asparagus-you-probably-didnt-know/>

By James Nzasi

Joshua Mutethia, a former Boda Boda rider, set up a team up with friends to set up a dairy farming group in Murathi village, Meru County, with the hope of earning more money.

Shortly after setting up the group, Upper Tana Natural Resources Management project (UtaNRMP) supported Mutethia's group with Ksh1,355,500 to promote the dairy farming and training.

"The support marked a turning point in my life and that of the group members. The group procured in-calf heifers meaning that the stock doubled in a short duration and we started selling milk," says Mutehia.

In addition, Mutehia is planning to buy a three-acre piece of land to expand his dairy farm, from the savings he makes by selling milk at Ksh 40 per liter. .

From the training the group received, they opened up accounts with on of the SACCO's based in their area, where they now make regular contribution from the milk proceeds to, further invest in their lives and farming ventures.

In a further twist to Mutehia's and his friends' good fortunes in dairy farming, the Governor of Meru, Kiraitu Murungi set up the Maziwa project. The aim of this initiative is to empower dairy farmers in the country to close the poverty gap and improve nutritional status of children.

The implementing partners of the project are Italian non-governmental organizations: AVSI and IPSIA, which will be the implementing partners of the project. The project is expected to boost milk production in which dairy farming has not been pleasant.

A survey done by Kenya Dairy Board and Egerton University in 20 counties showed that farmers in Meru had the lowest gross margin of Ksh 4.6 per liter of milk despite high net prices.

Failure to access cheaper and quality fodder has made dairy farming a loss-making venture for many farmers.

"Many farmers are now buying wheat



straw, maize stalks, grass and hay to feed their animals because they do not have land to grow their own fodder," Dr. David Mugambi, milk stakeholder said.

Dr. Mugambi further noted that due to high cost of production, many farmers preferred selling raw milk to earn more instead of delivering to processors.

"Only 35% of the milk produced in Meru goes for processing. Dairy animal feeds have a significant impact on the milk market," he said.

According to the survey, dairy farmers in Meru were spending Ksh 30.4 to produce a liter of milk, with the high cost blamed on hired labor in addition to substantial usage of

feed concentrates.

Mugambi noted the average dairy milk production per cow is about 8.3 liters because most farmers were relying on poor quality feeds.

The Maziwa project is expected to see production of milk double from the current 250,000 liters of milk to 500,000 liters per year. The project aims at adding value chain by empowering dairy cooperatives to improve the quality of milk, storage capacity, training farmers on the management of dairy farming and the cooperative movement.

Some of the dairy cooperatives identified in the pilot project are: Ngushishi, Kiburine, Mikinduri, Mutuati and North Imenti. **(KF)**



Meru Governor Kiraitu launches the maziwa project

Tea Tree Farming Gaining Popularity in Nanyuki

By James Nzasi

Joseph King'ori's fortunes changed after he started planting tea trees on his piece of land in Nanyuki, Laikipia County, instead of depending on maize and beans farming.

Earth Oil and Kenya Organic Agriculture Network (KOAN) introduced him to tea tree farming and is now among the farmers in the area that earning not less than Ksh 75,000 from an acre piece of land in the area. This income is much higher compared to what they obtain from growing maize or beans

This new crop introduction in the Laikipia County is a project that is supported by a grant from the Global Environment Facility (GEF), administered by the United Nations Development Programme (UNDP) and implemented by a local charity, Kenya Organic Agriculture Network (KOAN), which partnered with Earth Oil.

Alice Kome started tea tree farming following a visit by a team from Earth Oil on a mission to Mirere Village, Laikipia to educate farmers on the benefits of tea trees.

To start off, farmers were given seedlings to plant and the company committed to buy plants at Ksh 20 per kilo once they were mature. Ms. Kome started off by planting 500 seedlings in a section of her five acres farm. The plants took one year to mature for first time harvests and six months during subsequent harvests. Tea trees she says are low maintenance.

Ms. Kome sells them between Ksh 40,000 and Ksh 80,000 after six months. Their weight increases as the plant grows taller and bigger.

The tea tree thrives in the volcanic soil and high altitudes in this region near Mount Kenya, Wainaina said. According to Kome, a single plant can



Inset: cattle in tea tree

yield 10 kilos of tea.

"I like this project because the buyer is already in waiting end and the plant is low cost and maintenance. All I need to do is water it maybe once a week and add manure for good development," she says.

Drought-resistance nature of tea trees and low maintenance cost are among the aspects the farmers in the locality like about planting the trees.

"Other plants like maize need water but tea trees are drought resistant. I don't have to water all the time but the yields are good," Kome says.

Tea trees are harvested when they are four feet tall by cutting the branches and leaves. The farmers then avail them at collection points where field officers from Earth Oil weigh them and pay instantly.

Tea tree matures within 15 to 18 months after establishment and harvested twice per year under good management.

The tree requires low labor inputs and less field management since it is not affected by pests and diseases and is not eaten by domestic animals. Tea tree can only be inter cropped with desmodium to enhance soil

fertility but not any other crop to prevent contamination

During harvesting time, the whole stem is cut down around 15cm-20cm above the ground at an angle using bending saw.

The central stem is then removed. Branches and leaves are then sold for oil extraction. After some time, new shoots will emerge from where the tree was cut. All the shoots are left to grow, and the farmer is advised to cut them back after 6 months.

This is a continuing cycle and Tea Tree is expected to be highly productive for 25 years under good management.

The KOAN project and Earth oil Company have been working in several areas of Laikipia County, supporting farmers to engage in tea tree farming.

According to the popular website known as Web MD, tea tree (*Melaleuca alternifolia*) has been used traditionally as a tropical antiseptic and antifungal treatment. Additional uses include treating skin infections and warts.

The plants are processed locally to produce oil that is exported to the UK for further processing to manufacture cosmetics such as deodorant, hydrant, body spray, and perfumes, among others. **(KF)**

DRONE TECHNOLOGY ASSISTS FARMERS IN MERU

By Wahinya Henry

Horticulture farmer Patrick Gikunda from Githongo Village, Meru County, like farmers elsewhere, had continued to grapple with challenges that hamper productivity.

At the beginning all was well until availability of water for farming in the village became a reality over time. The quantities of farm produce dwindled as the water levels dropped due to changing weather patterns.

A researcher at the Jomo Kenyatta University of Agriculture and Technology (JKUAT), Simon Mogere, in collaboration with SNV of the Netherlands stationed in the area noted:

"For farmers in Meru, extreme weather conditions have been a notable

hindrance; a condition that has driven growers to adapt small scale irrigation techniques to boost production."

The approach that has been practiced in Meru for more than three decades has had a toll on streams in the county, forcing farmers to turn to scientists to find solutions to the problems affecting farming in the area, similar to what Mr. Gikunda has been through.

But the introduction of a unique farming technology by the JKUAT's Water Research and Resource Centre (WARREC) enabled him to reap more benefits from his farming venture

Gikunda who had just harvested cabbages became confident that the data obtained from the flying sensor technology applied in the area was

critical in his increased yield in the current season.

Flying Sensors project, implemented in Marimba, Githongo and Kibirichia villages in Meru county, uses drones, to assess water management and crop health in irrigated fields of cabbage, potatoes and other vegetables.

What the drones do

A flying sensor is a small drone that can fly up to 200m above the ground and take high resolution images utilizing the Near-Infra Red (NIR) spectrums of light. The images are later decoded and the information shared with farmers.

"Using this technology, farmers can discover diseases on plants and stress indicators which are impossible to see

with the naked eye thus encouraging precision farming," explains Prof Bancy Mati, WARREC Director and the project team leader.

Researcher Mogere says the information obtained from the sensors can also help farmers make prompt decision regarding application of irrigation water in various sections of the field without over-application or under-application thus ensuring optimal water usage.

The Rota Sprayer technology project involves a sprinkler that sprays water in a larger area compared to the conventional sprinklers.

The project is being implemented in Kaguru and Meru Central. So far, the innovation has proven popular with small and medium-sized entrepreneurial farmers.

Towards this end, Jomo Kenyatta University of Agriculture and Technology's (JKUAT) Water Research and Resource Centre (WARREC) in collaboration with SNV-Netherlands is implementing two smart water projects for agricultural purposes in Meru County.

The projects

The project provided partial scholarships to two JKUAT post-graduate students; Simon Mogere and Sarah Nagami who worked with Flying Sensors and Rota Sprayers, respectively.

The projects aimed at assessing water productivity of crops grown under irrigation for smallholder farms besides evaluating the technical performance of the Rota Sprayer irrigation system with regards to water application uniformity.

Another technology is the Rota Sprayer project.

This involves a new type of sprinkler that sprays water in a larger area compared to the conventional sprinklers.

Initially, the project was to be implemented in Kaguru and Meru Central, an innovation that turned to be



Sarah explains how the Rota Sprayer irrigation system. Source:www.jkuat.ac.ke



The researchers with the drone that helps gather information that in turn helps farmers as regards land irrigation,

popular with small and medium-sized entrepreneurial farmers.

According to researcher Nagami, the Rota Sprayer system operates at low pressure and applies water uniformly within the wetted perimeter and can cover an area of 100m² in one application.

In addition, the system is simplified, easy to assemble, light in weight and affordable by the SME farmers.

"The design considerations of the Rota Sprayer irrigation system makes it a better option especially for the SME farmers who have limited resources. For instance, the low operating pressure will help the farmers reduce the pumping cost. Instead of using a pump, the farmer can irrigate by gravity, using a raised tank at approximately 3m high," says Nagami.

Nathan Muthamia, a farmer in Tirimiti, Meru says the system has made him work efficiently in the relatively dry area.

"With this system, I work for two hours straight without getting worried about moving my sprinkler system for irrigation," says Muthamia.

The benefits

In comparison to the drip system, regularly used in Kenya, the Rota Sprayer system is less susceptible to clogging since the boom is made of aluminum pipes and the outlets are easy to unblock either by flushing the pipes or by using a sharp object to pierce the outlets.

"The drip system is highly susceptible to clogging of the emitters which renders the system non-functional whenever the emitters are clogged," says Nagami.

Although the system has proven popular with SME farmers, Nagami admits it is a new innovation and needs technical performance evaluation to help the farmers achieve optimum agricultural production through irrigation. **KFI**



1

Agriculture & Irrigation CS, Hon. Mwangi Kiunjuri when he toured the Ministry of Health stand at this year's Eldoret National show. He is accompanied by the governor Uasin Gishu County H.E Hon. Jackson Mandago, Agriculture CAS, Dr. Andrew Tuimur among other County and Society officials.



5

Agriculture, Livestock, Fisheries & Irrigation CS Hon. Mwangi Kiunjuri when he toured the KEBS stand during last year's Meru National Show. Looking on is the Meru Branch Chairman Mr. Stanley Mukaria among other officials.

PIC T RIAL



2

Embu Governor, H.E Hon. Martin Wambora is given insights on value added products at the AFA stand during the 2019 Embu Branch Show. He is accompanied by the Society Chief Executive Mr. Batram Muthoka, Embu Branch Chairman, Mr. John Mukundi among other Society and County officials.



6

Machakos County Governor, H.E Hon. Dr. Alfred Mutua during his tour of the Judiciary stand at last year's Machakos Branch show. He is accompanied by the Society Deputy National Chairman Mr. Jackson Tuwei among other officials.



7

The Governor Nairobi County, H.E Hon. Mike Sonko during his tour of the Nairobi City County Stand at last year's NITF. Looking on is the Society Deputy National Chairman, Madam Edith Onzere among other officials.



3

Governor Laikipia County, Hon. Ndiritu Muriithi during his tour of the Nanyuki innovations and enterprises development stand observes a walking tractor. Looking on is the Society National Chairman Mrs. Annabella Kiriinya, A.S.K Chief Executive Officer Mr. Batram Muthoka among other officials.



4

Kakamega County Governor H.E Hon. Wycliffe Oparanya during his tour of the Department of Agriculture stand – Fisheries section at a past Kakamega Branch show. Looking on are County and Society officials.



8

The CEC, Agriculture, Livestock and Fisheries Dr. Richard Rotich is given insight on new AgroZ fertilizer packaging bags during his tour of the Department of Agriculture stand at a past Kabarnet Branch show. Accompanying him is Mr. Joel Maina, Chief Officer, Agriculture, Mr. Henry Wafula, County Commissioner, Mr. Silverno Cheptarus, Branch Chairman among other officials.

Farmers in Tharaka Nithi Shifting from Bananas to Horticulture Farming

By Fred Omondi



How Irrigation management and system has improved water availability

Farmers in Meru and Tharaka Nithi Counties are shifting from bananas to horticulture farming. This is because many are now able to access water for irrigation and this has doubled their income.

James Mwenda is one man that has been smiling all the way to the bank thanks to his eggplant or commonly know as biringanya farming.

"I have been planting egg plants for five years and compared to bananas, the eggplants fetch better prices. I also get higher yields from a small portion of land," he said.

He also grows water melon, butter nuts and has a few bananas at his farm in Iringa location. But its is the latter has turned his fortunes.

Mwenda is a beneficiary of the Ithitwe-Iraru Water irrigation project in Imenti South Sub County which is being implemented by the National Irrigation Board. He is able to harvest his crop throughout the season.

He has planted eggplants in half an acre and since he started harvesting in January, he has fetched made nearly Sh130, 000 from the sale of egg plants.

"By the time I finish harvesting in March, I will have made a total of Sh200, 000," he said to journalists who had visited his farm in Meru last week.

Mwenda sells the eggplants to traders that then export the commodity to Egypt. He is selling a cartoon of egg plant at Sh300 but he says the price can go as high as Sh700 to Sh600 per cartoon.

"In a week, I harvest at least three times a day and so far I have harvested about 120 cartoons," he spoke while sorting out the produce ready for the export market.

Mwenda shifted from maize farming to banana farming before shifting to horticulture when the irrigation project was established in 2015 and he has never looked back.

He uses sprinkle irrigation. Mwenda

starts by preparing a nursery and after two months replants the eggplants in the farm and they are ready to harvest after one month.

He says the price of the eggplants depends on the shape and colour, the straight one that are purple in colour are more preferred in the market.

"I have not really exploited the local market because since I started planting eggplant, I have been selling them to traders who export the produce. But I believe there is a demand in the local market that farmers can exploit," said Mwenda.

There are a few challenges including diseases but besides planting with fertiliser and spraying pesticides to control frost, the eggplants are labour intensive and have good returns.

The father of two said that rainfed agriculture is frustrating but with irrigation, a farmer can have a crop all through the year.

He has been able to buy one care



Mwenda sells the eggplants to traders that then export the commodity to Egypt.

of land with the proceeds from the eggplants hence his future plan to expand the acreage under eggplants to two acres.

"I want to uproot the bananas that I have planted in my one acre land and plant eggplants and butter nuts. I get about sh30, 000 in a month from the sale of bananas yet I can get the same from the sale of eggplants in a week. I started harvesting in December 5 and harvesting will continue till March," said Mwenda.

Irrigation scheme

Eng John Wairangu, from the National Irrigation Board in Embu said the Ithitwe Iraru irrigation project was constructed from July 2013 to June 2015 at cost of Sh67 million.

300 farmer families have benefited and they irrigate a total of 400 acres. The project is located in Iraru and Ithitwe villages, Kiringa Location in

Imenti South Sub county.

He said; "Before the project was started in 2012, most farmers depend on rainfed agriculture and many planted maize and beans. We limit a farmer to one acre of irrigation and each farmers pays Sh300 for maintenance."

The main components of the project include construction of diversion weir, construction of intake box, laying of Main Line approximately 23km and installation of sprinkler system at farm level (infield system).

"The project was aimed at enhancing food security and self-sufficiency, increase the incomes of farmers, and create employment," he said.

"This was a dry area but now many have shifted to horticulture thanks to irrigation. Most of the farmers use sprinkle irrigation but in future we want them to change to drip irrigation to reduce water waste especially for those

doing banana farming," he said.

Wairangu said the Muringa banana irrigation project in Tharaka Nithi County Maara Sub County has three phases.

"Phase one of the project provides irrigation to 1400 farm families irrigating approximately 1500 acres. The project cost a total of Sh207 million and abstracts water from Maara River," he said.

The Phase two of the project provides irrigation to 1000 farm families irrigating approximately 1000 acres. The project was completed at cost of Sh507 million with water from Mutonga River.

Phase three, he said, is currently under construction and is expected to be completed by the end of the year at a cost of Sh224 million. "This is expected to increase area under irrigation by 700 acres," said Wairangu. **KFI**

Kenya's premier tea packer, Ketepa, has introduced five new varieties of tea under the "Ketepa Pride" brand, to meet the ever-changing taste and preference of tea drinkers.

Targeted at the youth, the new varieties - Sleep Easy, Digestive Tea, Immuntea, Heart Chai and Vitalitea add on to the wide array of flavoured Ketepa teas that are already in the market.

"Our product innovations are driven by the changing consumer taste and preference. The new products are trendy and customized for personal styles especially among the youth," Ketepa MD Mr Albert Otochi said.

"We also want to encourage more consumption of tea among our youth, who, according to statistics, prefer other beverages other than tea. We want to make tea cool again," he added.

The new varieties come in the form of herbal infusions that promise to treat the drinker's taste buds with scintillating flavors, for an irresistible

KETEPA Releases New Varieties of Blended Teas

feel-good effect. Vilalitea, for instance, is prepared from a variety of forest berries including blackberry, blueberry, cherry and strawberry, and promises to instantly lift the drinker's mood.

Kenya consumes about 5 percent of the total tea produced in the country with 95 percent being exported. As a traditional beverage, tea faces stiff competition from other beverages such as coffee and cocoa.

Ketepa hopes to boost its revenues with the new products, while further increasing its market share on the country. Other household Ketepa brands include Fahariya Kenya, Safari Pure, Ketepa Pride black tea and flavoured teas and Maisha purified drinking water.

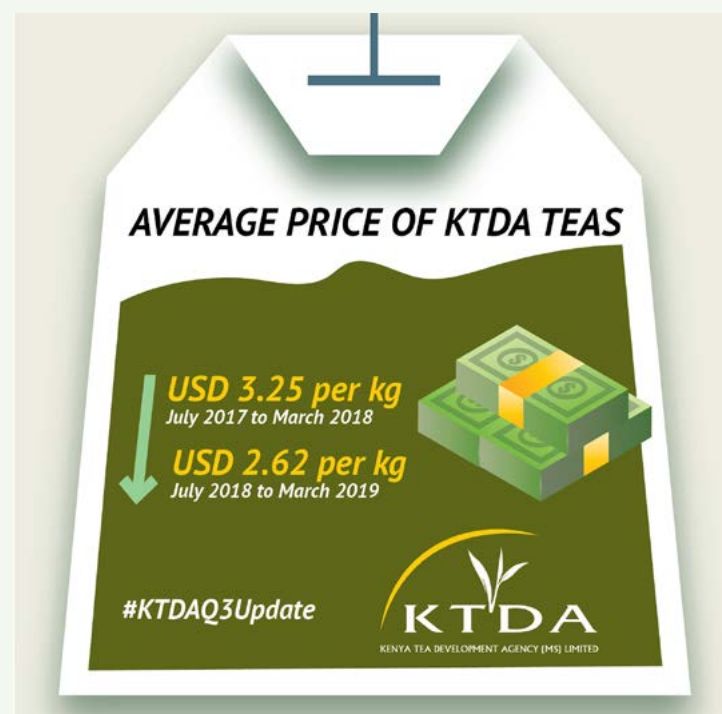


Cumulative green leaf production for smallholder tea farmers under Kenya Tea Development Agency (KTDA) rose to 868.9 million kilos in the first nine months of the 2018/19 financial year (July 2018 to March 2019), amid a 19.5% drop in tea prices over the same period.

This compares to 824.8 million kilos of green leaf delivered to KTDA-managed factories in the first nine months of the previous year FY (July 2017 to March 2018). However, the month of March 2019 recorded a decline of 25% compared to a similar month in 2018.

"The increased production during the nine-month period was largely attributed to the reliable rainfall experienced in tea growing areas late into 2018, as well as intensified sustainable agricultural practices such as fertilizer application," KTDA Group

KTDA Tea Production Rises as Prices Hit 5-Year Low



CEO, Lerionka Tiampati said.

"Despite the drought experienced in the last several months, high production of tea towards the end of last year continued to dampen the prices. The drought has recently led to reduced production and we anticipate this reduction could see prices improve as less tea volumes are offered for sale" he added.

The average price of KTDA teas in the first nine months of 2018/19 sharply dropped to USD 2.62 per kg from USD 3.25 for the corresponding period of 2017/18.

Turbulence in the international markets such as economic sanctions imposed on Iran by the USA and high inflation rates in Egypt also negatively impacted the tea market. Compared to last year, the exchange rate dropped 1.6% as the Kenya Shilling strengthened against the dollar. Tea is traded in the US Dollar, which is then converted to KES.

Other tea producing countries such as India also reported higher tea production in 2018 adding to global tea stocks which pushed prices down.

"Despite the reduction in production

due to drought, it is not anticipated that prices will improve significantly between now and the close of the financial year in June 2019. Farmers should therefore expect to receive lower total earnings for their produce this year," Tiampati added.

In October 2018, KTDA announced record income of Kshs85.74 million from the sale of tea supplied by smallholder tea farmers. A total of Kshs62.35 billion (representing 74% of income) was paid out to farmers as monthly and second payments.

KTDA Inks Ksh3.5bn Fertilizer Financing Deal with StanChart

KTDA has signed a Ksh3.5 billion financing deal with Standard Chartered Bank Kenya for purchase of 95,000 tonnes of NPK fertilizer to be distributed to smallholder tea farmers across the country.

The deal will see over 650,000 farmers who own the 69 factories that KTDA manages benefit from supply of NPK 26:5:5 fertilizer through the arrangement.

KTDA Group Chief Executive Officer, Lerionka Tiampati, said that the move will help farmers access affordable fertilizer that will go towards improving the quality and yield of their tea.

"This partnership will enable us acquire fertilizer which will be distributed to our farmers at the most competitive rates we can obtain. The fertilizer will assist farmers improve the yield and quality of their green leaf."

Procurement of the fertilizer in bulk has enabled KTDA-affiliated farmers to access the key input at significantly lower prices below market rates as they leverage on economies of scale. In 2018, the small scale farmers purchased the fertilizer at Ksh1774 for a 50kg bag against the prevailing



KTDA Group Chief Executive Officer, Lerionka Tiampati (left) exchanges documents with Standard Chartered Bank Kenya Limited chief executive officer, Kariuki Ngari following the signing of a fertilizer purchase financing agreement on 14th May, 2019. The deal will see over 650,000 farmers benefit from supply of fertilizer by ktada at the most competitive rates.

market of Ksh2700.

The quantity of fertilizer a tea farmer gets is dependent on the number of tea

bushes owned. On average, a 50kg bag of fertilizer is applied to 700 bushes at the onset of short rains.

Rejuvenating Vital Sectors

in Rural Economies



By Danyell Odhiambo

The once under productive rural landscapes of the lower eastern region of Kenya are rapidly transforming into magnets of thriving agribusiness and land restoration activity. This is through an ongoing initiative by the Drylands Development (Dry) Programme, that is hinged on farmer organizations, seeking to enhance food and water security in Machakos, Kitui and Makueni Counties.

Why adopt a farmer organization model?

Farmer organizations provide the 'missing cog' required to drive sustainable rural development, particularly, in the agricultural-based economies. They are essential institutions for the empowerment and advancement of farmers and the rural poor. Moreover, being associated with farmer organizations increases the likelihood that the community needs and opinions are heard by policy makers and development partners.

The farmer organizations in the

three counties, have been instrumental in supporting centralized marketing which is essential for reducing market transaction costs per individual and collective land management activities. This is expected to enhance the resource base for increased and sustainable production.

Integrated participatory planning

On account of this, the Dry Dev programme has adopted farmer organizations as the heart of the delivery model for promoting innovations. This is by closely working with farmer organizations to identify agribusiness options that are both market and community-driven for ease of upscaling.

The first step towards realizing this began with the community action planning (CAP) exercise in 2015. This comprised of series of multi-stakeholder engagement forums where context-specific interventions about sub-catchment and on-farm soil and water management, value chain options and learning priorities were identified. This initiative targeted to develop Sub-catchment Action Plans with a specific focus on the needs, challenges, and opportunities within project intervention sub locations.

Collaborative land restoration

Water scarcity and rapid land degradation is a major impediment to development in the three dryland counties, hence current efforts have been geared towards the conservation and protection of riparian land through collaborative policy

enforcement. Riparian lands remain relatively unprotected from poor agricultural practices, infrastructural development, and logging.

In Kenya, the Water Act 2016 advocates for local level participation in water management to ensure sustainable water use. Water conservation activities within the sub-catchments are implemented by Water Resources Users' Associations (WRUAs) under the supervision of the Water Resources Authority (WRA). WRUAs are associations constituting of water users and riparian land owners who have come together for the purposes of cooperatively sharing, managing and conserving a common water resource.

Helping secure the future for WRUA communities

Through the CAP process, DryDev has plugged into the ongoing government efforts to protect natural resources by embarking on capacity building initiatives that support communities to develop action plans. This joint process has inspired the review and development of sub-catchment management plans addressing the needs identified in the action plans. This strategy presents a sustainable option of fostering a greater sense of communal responsibility, to improve river ecosystem health.

Miindu is one of the WRUA's incorporated in this community-driven integrated framework. Like other WRUAs spread across the region, Miindu remains under the constant

threat of human activities and encroachment of riparian land. This is a major cause of drying river beds in the area. In response to this situation, the DryDev has partnered with Miindu to roll out several key activities aimed at reversing this worrying trend.

Daniel Mbithi is the chairman of the association which comprises of over 800 members, drawn from different groups, covering approximately 100km² of agricultural land. He is confident that the interventions put in place by the programme will not only help in the restoration of ecosystem health but also stimulate growth in the agribusiness sector.

"By walking hand in hand with the DryDev, we have partnered on several initiatives. These include: the construction of sand dams, terraces and the planting of indigenous tree species and pasture to protect riparian lands. With the help of the community and local administration, commercial sand harvesting has been banned on

riverbeds. The result is the widespread availability of clean water," Mbithi mentions.

Collaborative investment and collective gains

Community members are now venturing into bee keeping and cultivation of high-value food crops like tomatoes and kales. Besides, the once flourishing livestock sector is set to make a comeback after receiving a major boost from the growing of pasture on once bare river banks and community livestock watering points.

According to the latest data provided by World Vision Kenya, 5.5 hectares of riverine land has been reclaimed within Machakos County. Furthermore, over 1219 farmers were supported to develop nine Sub Catchment Management Plans (SCAPs) providing guidelines for restoration and conservation of water resources. Subsequently, 16 and storage dams, serving approximately 3200 farmers, have been constructed and 1546

farmers trained on climate smart production of priority value chain commodities.

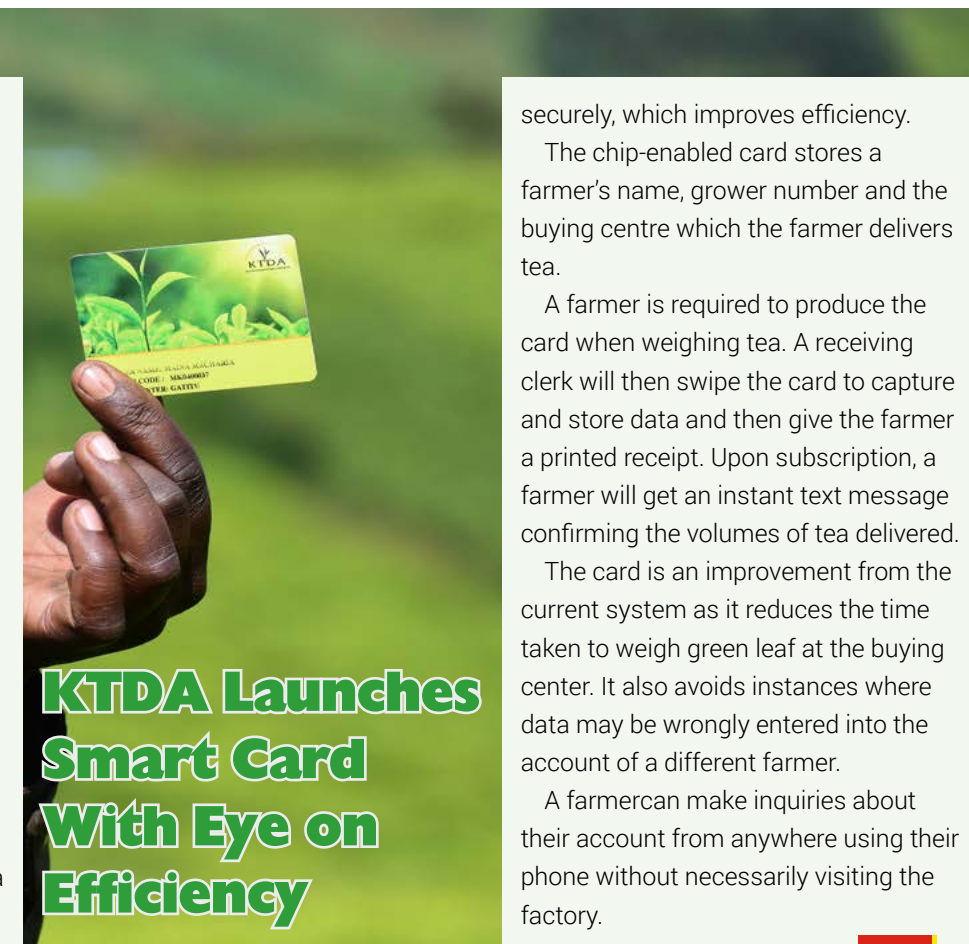
With the farmer organization approach in place, successful implementation of programme interventions is expected to create a production system likened to a 'conveyor belt' that converts farms into food production sites seamlessly linked to markets and vice-versa. This way, the rural drylands will attract significant agricultural, commercial and environmental conservation investment.

DryDev is a five year initiative that began in the year 2013. It is implemented in Kitui, Makueni and Machakos counties of Kenya and four other countries in Africa. The programme is funded by the Ministry of Foreign Affairs of the Netherlands with supplementary support from World Vision Australia (WVA) with the World Agroforestry Centre (ICRAF) being the lead implementing agency. 

KTDA has launched a smart card for farmers to curb theft and weight falsification as it promotes efficiency in its managed factories.

The smart card, part of ongoing innovations dubbed "Electronic Weighing Solutions Phase 2 (EWS Phase 2)", provides growers and the factory with a secure way of storing data when used at the buying centre. Using the card, a farmer is able to the exact weight of tea that delivered at the buying centre, as well as total weight of tea delivered on a daily and monthly basis.

The card is connected to secure servers at the factory which safely store each farmer's data on tea weights, which ensures that farmers are paid for the exact volumes of tea delivered. Data is also transmitted faster and more



KTDA Launches Smart Card With Eye on Efficiency

securely, which improves efficiency.

The chip-enabled card stores a farmer's name, grower number and the buying centre which the farmer delivers tea.

A farmer is required to produce the card when weighing tea. A receiving clerk will then swipe the card to capture and store data and then give the farmer a printed receipt. Upon subscription, a farmer will get an instant text message confirming the volumes of tea delivered.

The card is an improvement from the current system as it reduces the time taken to weigh green leaf at the buying center. It also avoids instances where data may be wrongly entered into the account of a different farmer.

A farmer can make inquiries about their account from anywhere using their phone without necessarily visiting the factory.

Smart Crops Cushion Farmers Against Being Food Insecure

By Wahinya Henry

Josephat Mavindya Kiio is a farmer in Lower Eastern parts of the three counties of Machakos, Kitui and Makueni - the expansive and dry region of greater Ukambani and he is not moved by the current ravaging drought conditions. The reason is because he chose to plant traditional crops that do well in the dry region.

Rainfall levels in December were too low to reverse the dry spell and these counties in Arid and Semi-Arid Lands (ASALs) will bear the brunt of the drought.

Despite escalating food shortage being reported in lower eastern region caused by strained rains, it is bumper harvest for farmers of smart crops that are drought tolerant.

Farmers who planted traditional crops like sorghum, millet, pigeon peas and green grams have received high yields compared to those who planted maize and beans which dried up before reaching maturity.

Mr. Kiio of Kiomo-Kyethani village says he expects to harvest 20 bags of sorghum this season in addition to improved variety of pigeon peas.

"The maize and beans crops which I had inter-cropped with sorghum and pigeon peas withered long time ago after the rains disappeared but the sorghum and millet persevered and I will be harvesting the produce anytime from now", he told farmers who had visited his farm during a field day that was organized by International Crops Research Institute for Semi-Arid Tropics (ICRISAT).

He said, after studying the weather pattern in the area, he started paying more attention to drought resistant crops and he does not fail to make good



Farmers admire sorghum crops in Josephat Mavindya's farm in Mwingi West Sub-county.

harvest every season which he sells to buy maize and beans for domestic consumption.

"Continued farming of conventional crops which require much rain in this area only helps in marginalizing us in food security but traditional food production is the way to go as one must harvest something even if the rains are short", says Kiio.

The story is the same in Makueni and Tharaka-Nithi counties where ICRISAT

has been promoting production of smart crops under 'feed the future' programme with a funding from United States Agency for International Development (USAID).

"The aim is to bring the farmers out of the cocoon of conventional farming of maize and beans that have failed due to unpredictable weather pattern and encourages them to plant nutritious 'orphan crops' that withstand drought", says Geoffrey Mutai.



ICRISAT Breeder Dr. Henry Ojalong admire sorghum plants in Kitui county. The organization is promoting production of smart crops in lower eastern region

stressed.

The production of these crops has over time declined due to the inadequate availability of planting materials, low interest by seed companies to multiply the seeds due to low demand and change of eating habits among other reasons.

ICRISAT has so far reached an estimated 6,000 farmers and hope to reach 10,000 farmers in the project area before the end of the programme in two years.

"Farmers adaption rate is very encouraging as they are sure of getting enough food for consumption and sale", said Mutai adding that the farmers are being educated on different ways of adding value to the traditional food to improve their levels of income.

Farmers are trained not only to role

model farmers but also to produce high value traditional crops since drought tolerant crops have proved to be one of the best ways of mitigating effects of climate change

"It is up to Kenyan agricultural stakeholders to remove cultural myths which impede production of 'orphan crops' especially sorghum, millet and pearl millet since the food from the produce is no longer for the poor", said Dr. H. Ojalong.

In Wote, the headquarters of Makueni County, Africa Harvest has been promoting a similar initiative with Cecilia Kyalo, a mother, farmer and the chairlady of a self-help group within Wote taking the lead.

Mbukilye Ngukilye brings together more than 35 women and has been in existence for nearly 20 years. Members meet to share ideas on sustainable farming and also, from time to time, get trained by the Ministry of Agriculture.

"Ukambani was not always as dry as it is today," says Cecilia. "There was a time the rains never failed. Today, the rains sometimes come once or twice a year. Even then, they are not sufficient for farming. Ukambani is associated with the tough time. We are known for drought and food aid", Cecilia said

Although she does not say it, deforestation has definitely fueled the negative effects of climate change. "Still, farmers insist on planting maize. Even when they get nothing from maize, they still plant maize," she says. "Although everyone knows sorghum does better in this area, I don't know why everyone insists on maize. Maybe sorghum is seen as a poor-man's crop".

What about Cecilia, does she plant sorghum. She smiles. "When I started farming sorghum it was for chicken feed. Ugali made from maize has been a staple food for as long as I can remember and change did not come easily".

The perceptions towards sorghum are now changing because of the extra income farmers got from sorghum. **KF**

Laikipia Farmers Doubling Their Yields Thanks To Conservation Agriculture

By Fred Omondi



It is a rough murky ride to Mitero village, in Laikipia County where Mzee Simon Githaiga lives with his wife and young daughter.

His homestead is abuzz with workers constructing a stone house, and the change of livelihood is obvious from the old-looking wooden house to the beautiful modern stone-house. Mzee proudly tells us that it is the fruit of his handwork in the farm.

He grows maize and beans in his three acre farm, and until 2014, Mzee Githaiga could only harvest half a bag or one bag of 90kg maize from his farm. He says he had to rely on his tree nursery venture to sustain his family and pay school fees for his seven

children.

"I could barely get enough food for my family. I had to rely on my dairy farming and tree nursery to to buy food and educate my children," he says.

Low-cost farming technique

But this changed thanks to conservation agriculture, a low-cost farming technique. In 2014, Mzee was among farmers that were trained on conservation agriculture by the African Conservation Tillage Network with support from the Alliance for a Green Revolution in Africa.

Conservation agriculture is based on three principles; minimal tillage, permanent soil cover and crop rotation.

Unlike other farmers in his

neighbourhood, Mzee Githaiga decided to adopt conservation agriculture after the training in 2014.

"I wanted to try out something new to see if I could increase my yields. I had started giving up on growing maize and during the training we had been assured of better yields if you go the conservation agriculture way," he says.

Mzee Githaiga can now harvest two bags of maize from the ten by ten feet potion and even during a bad season, he still gets some yields unlike his neighbours who are yet to adopt the technology.

"You would rather grow maize in a small potion and get good yields than grow maize in a big farm and get little

or no yields at all."

He says the technology is also labour intensive and he spends less time preparing his farm using a hand ripper and this takes less time compared to the conventional method of farming. He has more time to to work on his tree nursery income generating venture which is also a hobby.

Capacity building

Peter Kuria from the African Conservation Tillage Network says farmers in Laikipia County are multiplying their yields and doubling their profits thanks to conservation agriculture. The technology, Kuria says, has also enhanced soil fertility.

Laikipia County is found between Mt. Kenya and the Aberdare ranges and it is among the arid and semi-arid counties

in Kenya, covering an area of 9,462 km square.

"We introduced the farming technique because this is a dry area which is water scarce and prone to soil erosion hence low production. But through conservation agriculture, farmers have been able to improve the soil fertility and enhance production," says Kuria.

About 2,400 farmers have been trained since 2013 with focus on 12 farmer groups each with an average of 20 farmers. Through a four-year project on Conservation Agriculture for Resilient Food Security and Profitability in Machakos and Laikipia Counties of Kenya, another 8,000 farmers have been reached indirectly through farmer field days.

The adoption rate was at 40% when

the project stated but it dropped to 30% when the project ended in 2016 due to competition of crops and livestock and the lack of trust from farmers.

"Another major contributing factor was the lack of conservation agriculture farming equipment as they are not readily available in the local market. But this has since been addressed by a service provider-Kendat Agrimech Business Hub who supplies modern CA equipment to farmers at an affordable fee.

The project has been working closely with the County Governments through the extension officers for sustainability of the project and they are targeting to reach about 10,000 farmers in Lakipia County. **KFJ**

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By Wahinya Henry

As a child growing up in Kakamega County, Western Kenya, Dr. Damaris Achieng Odeny ate finger millet 'uji' and 'ugali' but only on special occasions

"We weren't able to eat it daily, because it was scarce and therefore expensive. That's unfortunate, because it is a traditional crop."

During the first two decades after Kenya's independence in 1963, the Kenyan government singled out maize as a major food staple and started providing incentives to farmers to plant it. The farmers followed the government's advice and soon finger millet became a minor crop.

The scarcity disappointed Odeny, an annoyance that pushed her to do something to restore cultivation of finger millet in a big way, a determination that now has placed her in a position to ensure farmers who grow finger millet in the lake region reap benefits of increased incomes from an improved finger millet variety.

Odeny, a plant geneticist and the daughter of a sugarcane grower, is now leading the effort to bring finger millet back.

She is leading the finger millet pre breeding project which aims to re-introduce genetic diversity into the cultivated crop which has been lost from its wild relatives.

It's the finger millet on the plate which attracted another farmer of Kakamega County. Finger millet is a very healthy food, a fact that farmer Margaret Kubende learned 25 years ago the hard way.

"In 1993, I became a diabetic," said Margaret. "I had to change my diet to keep my blood sugar levels down. Maize and wheat were not good for me, but I knew I could improve my health if I

Researchers Promise Farmers Improved Finger Millet Variety

ate finger millet."

"Finger millet really is a powerhouse of health-benefiting nutrients," Odeny said. "We're very committed to getting it back into the daily diet of East Africans and not just as a food for special occasions. "The finger millet project is focusing on screening wild finger millet and traditional land races for resistance to Striga, blast disease and tolerance to drought," Odeny said.

Finger millet can be grown at altitudes ranging from sea level to over 2000 metres above sea level, can withstand drought, and has high levels of essential amino acids and micronutrients

Wild finger millet is native to the Ethiopian and Ugandan highlands.

She says the variety will at the same time contribute to reduction of high poverty levels when a new variety she and a team of researchers working on is released into the market in four years time.

The variety will be released at the conclusion of an eight-year multi million study launched in Western and Nyanza regions of the country.

Researchers involved in the study say

the variety will be drought, striga and tolerant to blast disease.

"We still do not have a good variety of finger millet that is resistant to Striga, said the senior scientist and global theme leader biotechnology in Eastern and Southern Africa ICRISAT headquarters at Gigiri, Nairobi, Dr Damaris Achieng Odeny adding:

"But we have identified wild relatives of finger millet that are resistant to Striga. We will use them to introduce this trait into farmer-preferred varieties."

Finger millet is highly valued for its nutritional qualities and recognized as a smart food yet production of finger millet remains below its potential.

Farmers claim that the two key constraints to increased production are the blast disease and a parasitic weed called Striga. "Blast is the most destructive disease of finger millet" said Dr Henry Ojulong, a cereals breeder at ICRISAT.

"Blast can occur at all stages of plant growth and can affect the leaves, neck, and fingers." In Kenya, blast can cause an estimated average yield loss of about 30 percent.

Striga, a sap-sucking weed, can

lead to a complete loss of crops and once it's in a farmer's field, it is nearly impossible to eradicate.

In an interview, Dr Odeny said the Sh78 million project started in 2015.

The first phase of the project was undertaken at a budget of US\$430,000 said Odeny. The next phase will be undertaken in two years – until September 2020 at a cost of US\$350,000, she said.

According to Odeny, the finger millet is adapted to several ecological zones and is widely grown in Tanzania, Ethiopia, Rwanda, Zaire, Zambia, Zimbabwe, Eritrea and Somalia.

Outside Africa, the millet is grown in Asia, China, Myanmar, Nepal, Bhutan and Sri Lanka.

A farmer can harvest three tons on acre piece of land but an average farmer typically harvests an average of 1.5

Most Kenyans eat finger millet primarily as ugali.

But farmer Pascilisa Wanyonyi from Kakamega has been working to create other finger millet food products and is marketing a snack called "crackies".

"I started planting finger millet in 2009," Pascilisa said. "It is much more nutritious than maize and good not only for humans but for our livestock."

Wanyonyi wanted to go beyond the traditional uses of finger millet and create value-added processed products than can be sustainably produced.

After some experimentation in the kitchen, she adopted "crackies" from the diverse products she was exposed to.

Crackies are deep-fried crispy noodles made primarily of finger millet but supplemented with soy and wheat flour. "Crackies is a very nutritious snack. The children love them," Wanyonyi said. In fact, a very important Kenyan loves them as well

In April of 2018 she served her crackies to President Uhuru Kenyatta who campaigned on a platform that no Kenyan should ever go hungry.

Wanyonyi has developed packaging and branding for her crackies, which

is generating some extra income for her family. Farmers like Wanyonyi have developed value-added processed products and that has helped to increase the demand for finger millet. However, supply isn't keeping pace, as there remain a few barriers to overcome before more farmers' plant finger millet.

The project Dr Odeny has been working on is a collaborative effort by scientists drawn from International Crops Research Institute for the Semi-Arid Tropics (ICRISAT, Maseno University and Kenya Agricultural Livestock Research Organization (KALRO)

It's funded by the Crop Wild Relatives (CWR) initiative, a global, 10-year project, supported by the Government of Norway.

The Crop Trust, an international non-profit organization charged with conserving and making available crop diversity in gene banks, manages the initiative. "This project involves working with crop wild relatives (CWR) of finger millet since some of those have developed tolerance to either blast or Striga," said Odeny, who is the principal investigator of the finger millet pre-breeding project.

"We are delighted with the progress shown by the team during Phase 1," said Dr Benjamin Kilian, the Crop Wild Relatives Crop improvement work of finger millet is important due to the millet's high nutritional and health qualities. The high levels of calcium, iron and amino acids in finger millet make it exceptionally nutritious.

It is an ideal food for diabetics since it has high amounts of slowly digestible starch and resistant starch that contribute to a slow release of sugar in to the bloodstream.

Odeny has been working closely with Dr. Chrispus Oduori, a finger millet breeder and the director of the Kisii Centre of Food Crops Research Institute (FCRI) of KALRO, the Kenya Agricultural and Livestock Research Organisation.

Like Damaris, Oduori hails from Western Kenya and has spent a lifetime

advocating for finger millet.

"We've been working hard to promote finger millet. We think it's an ideal crop, particularly because of its nutritional value and the unfolding negative impacts of climate change," Oduori says said.

Most finger millet varieties are susceptible to blast disease, which can infect the crop at any stage of growth from the seedling to the grain formation stage, and Striga, which is a sap-sucking parasite.

"Our improved varieties like Maridadi are less vulnerable to blast and Striga, but they are not fully resistant yet," said Dr Oduori.

Dr Oduori hopes that losses due to blast and Striga can be minimized by finding wild relatives of finger millet that have resistance to them.

"Finger millet is one of 19 crops we are supporting via our pre-breeding projects," says Dr. Benjamin Kilian, a scientist with the Crop Trust. "Our aim is to introduce beneficial traits from their wild relatives into cultivated crops so they are more resilient to climate change."

"With climate change we will see even greater outbreaks of pests and diseases due to weather extremes. We'll see more Striga, for example, if climate change leads to drier conditions," Oduori says.

Oduori hopes that losses due to Striga can be minimized by finding wild relatives of finger millet that have resistance to this as well as pests and diseases.

In Kenya, it is used for making foods like ugali, a thin stiff porridge, and busaa, a local brew.

Oduori hopes that soon the crop will stage a comeback in Kenya after being largely replaced by maize and sorghum.

"Finger millet is extremely nutritious and grows well in a wide range of locations, including marginal environments," Oduori says. "Many farmers are recognizing finger millet as a smart food and are now planting it again." 

Sand Dams Guarantee Machakos

Farmers Water and Food

By Leopold Obi

Drying rivers and undulating fields of fruits trees and thickets stretching far into the distance are a common sight in the hilly Machakos County.

But about 15 years ago, the rivers were not as degraded as they are today locals say. Instead, they used to flow uninterrupted all year round, until droughts and uncontrolled sand harvesting became rampant, robbing the streams of their capacity to hold water.

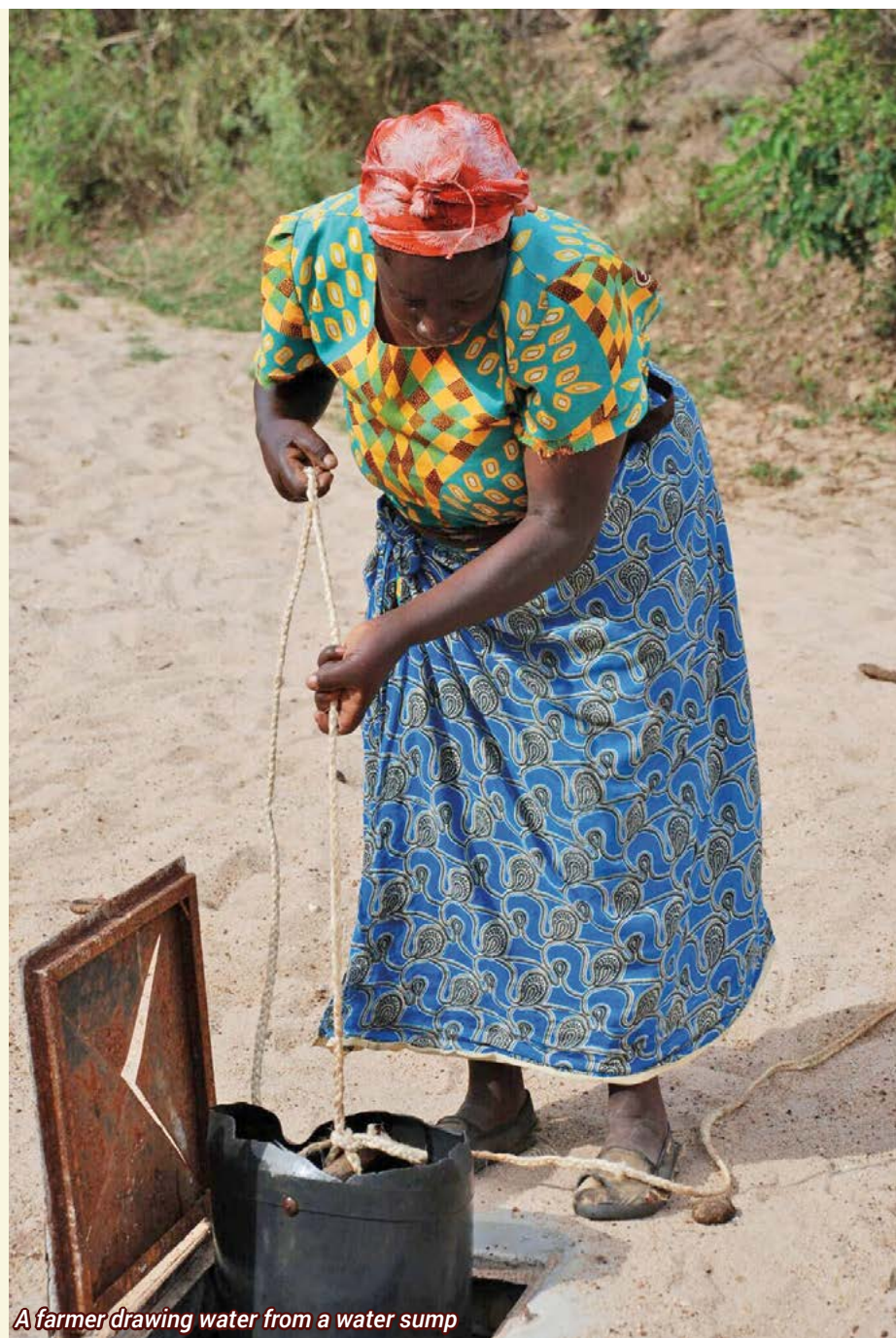
Since life had to go on, the residents of the drought stricken county had to rely on their own indigenous knowledge to quench their thirst by drilling water in the beds of dead rivers.

The biggest challenge however was that the drilled water trickled out faintly forcing locals to strictly ration it for everyone to have a share.

"We would dig about a 2 metre deep hole into the sand before we could strike water," explains Dorcas Musyoka, a farmer in Machakos, "after the water was found, one had to endure long queues before he could tap a 20 litre jerry can."

After years of water scarcity, which worsened during drought seasons, several innovations came up to address the crisis by building on the community's existing indigenous knowledge of harvesting water under the sandy riverbed.

Construction of underground pits which are sank in a river to collect underground water –also known as 'mivuko'– are among the technologies which the locals are now relying on for getting domestic and irrigation water. This technology is one component of sand damming. Others include construction of sand dams across the streams, and sinking of shallow wells.



A farmer drawing water from a water sump

The sand dam technology is believed to be indigenous to Kenya, though it is now being used in other countries around the world, from Zimbabwe to Brazil and Thailand among other places. The technology is believed to offer a cost-effective and sustainable solution to mitigate the impacts of climate change, desertification of drylands and

enable green economic growth in the Arid and Semi-Arid Lands (ASALs)

Ms Musyoka notes that, with the adoption of the sand dam technologies, locals no longer have to scramble for water since the commodity is abundantly available at any hour of the day.

Kioko Kitenga, a farmer in Masii



Dorcas Musyoka, a farmer in Machakos

location, observed that they can comfortably produce vegetables despite prolonged droughts, thanks to the sand dams' water harvesting technologies.

About two years ago they started a farmers group where they grow vegetable such as kales and tomatoes in a green house. They bought a water tank, drip irrigation kits and a generator which pumps the water to the tank before it flows from the tanks into the drip kit via gravity to water the vegetables. They also planted the crops on the open fields both as a group and individuals.

The farm produce are locally sold in the fast growing neighboring Masii Town.

"No one could dream of growing vegetables here due to scarcity of water. But with the support from Utooni Development Organization, a local NGO, and APA Insurance company we constructed a sand dam, a water sump and a shallow well which now carter for our water needs," explained the farmer.

He also added that they have since become very strict on sand harvesting after knowing that the sand keeps the water, he says.

The farmer who grows tomatoes and kales on small scale irrigation explains that whereas some rivers might look dry and filled with sand on the surface, there is a lot of water underneath the

sandy surface

The farmers use generators to pump the water out of the water sump into their crop fields or use containers to draw the water for domestic use.

"In some cases where sand dams have been constructed across a river one can see heaps of sand and a pool of water, but in others one only sees heaps of sand yet water is underneath them," the farmer explained.

Joseph Muli, a water engineers at Utooni Development Organization, says they have so far done 1,655 sand dams in the expansive Ukambani region over the last 10 years, with funding from different stakeholders including APA Insurance.

He explains that a water sump is a

kind of water tank, constructed under the sand to harvest water from a sand dam. He adds that once sand begins heaping up on the river course, the water table begins to rise which make it easier to sink a shallow well on the upstream for users who cannot access the sand dams.

He however notes that one does not just wake and start building a sand dam across a river.

The engineer says that after a dam is designed on paper it is taken to Water Resources Authority (WRA) for approval. The design, he further says, should only retains 2 per cent of the water so that downstream users do not go without the water.

"For every sand dam we have a shallow well. But compared to sand dam which has poor water quality, a shallow well and a water sump have very clean water, can be used directly for domestic use. The only chlorination or boiling to be used is for drinking water," explains Muli.

He however reckoned that water sanitation and hygiene has been missing in the water provision process.

"Sand dams are open to water pollution and contamination because locals bathe and do their laundries and also directly water their livestock in the rivers. The local communities still need sensitization on water, sanitation and hygiene," he says. **KFJ**



Francis Kaunda irrigating vegetables. He draws water a shallow well at the bed of Enguli River.

Disruptive Agricultural Technology

By Wesley Lang'at

In Kenya, Agriculture is the main contributor to the attainment of the Big 4 Agenda which include: housing, manufacturing, food nutrition and security and universal healthcare that are spearheaded by the government.

Smallholder farming provides employment of up to 75% of Kenya's population and 80% of the food production but still faces enormous challenges ranging from climate change, inadequate market information and lack of access to farm inputs, among others

Kenya is the leading innovation hub in the Sub Sahara Africa with approximately 30% of AgriTech start-ups in the continent operating in Kenya. Despite Kenya being in the centre of all these technological innovations, many



Disruptive Agricultural Technology challenge participants



small scale farmers are yet to utilize the opportunities that come with such technologies.

There is need to fully utilize this promising technological capacity in order to offer agricultural solutions in terms of farms input supplies, off-farm activities, logistic processing and packaging among other processes within the various value chains. The World Bank Group and other development partners organized a technological challenge competition to identify Kenya's most promising AgriTech innovations with the aim of getting one million Kenyan farmers onto a digital platform in the next three years.


The "One Million Farmer Initiative" valued approximately at US \$ 500 million, will be part of the World Bank's two major agriculture development initiatives in Kenya, the Kenya Climate

Smart Agriculture Project and the National Agricultural and Rural Inclusive Growth Project. "We hope all these technologies will make farming easier and increase productivity", Dina Umali-Deininger, Practice Manager at World Bank Said.

In this regard, agricultural innovation technology is a vital tool towards providing solutions to the problems that are bedeviling the agriculture sector in Kenya as its population is expected to grow to about 85 million people by the year 2030. In his welcoming remarks at disruptive agricultural technology challenge and conference that was organized by World Bank in Nairobi early May, 2018, World Bank Country director said that AgriTech innovations offer a unique opportunity to create high quality jobs all along the agri food value chains, stimulate farmers' centred technological innovations and enhance agricultural productivity.

"Quite simply, new technology has the ability to transform Kenya's agricultural sector," said Jeehye Kim, Agricultural Economist at the World Bank Group. "Other industries like telecoms and transportation have already shown technology's ability to radically disrupt the status quo, and now it is time for Kenya's farmers to harness this potential also."

Disruptive Agricultural technology has a great potential in engaging actively on practical and going forward actionable solutions for transforming Kenya's agriculture and addressing the challenges that are faced by the farmers in Kenya, in particular and the entire Africa, in general.

"We need to bring the creative type of tech-savvy youths to run these systems", Prof. Micheni Ntiba, the Principal Secretary-Fisheries, Ministry of Agriculture, Livestock, Fisheries and Irrigation commented. 

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Scientists Discover New Remedy For Fall of Armyworms

By Leopold Obi

Farmers might no longer have to worry about the invasive fall army worm after scientists discovered an efficient method to combat the deadly caterpillars.

Thousands of maize farmers in Kenya and across 12 African maize-producing countries incurred massive losses after the ravenous pest, which had no known control mechanism, descended on their fields.

Farmers in Kakamega, Bungoma, Busia, Trans-Nzoia, Uasin Gishu, Kisumu and Nandi counties were among the most affected by the pests.

Once the caterpillars invaded a farm, they would tuck themselves inside the plants' pith, munch the crops and easily wipe out an entire field due to their massive population.

But after months of tireless research, scientists have discovered that the pests whose devastations caused Kenya an annual loss of 40 million bags of maize valued at Ksh120 billion –between 2017 and 2018 –could be eliminated using *Telenomus remus*, an egg parasitoid.

An egg parasitoid is basically an insect that completes its larval development within the body of another insect leading to the host's death.

The technology is already being used successfully to tackle fall armyworms in America according to experts .

Scientists are optimistic that local farmers stand to benefit significantly by cutting back on poor yields and pesticides purchases should the bio-control technology against the pest succeed in the country.

Dr Marc Kenis, head of risk analysis and invasion ecology at the Centre for Agriculture and Bioscience International (CABI), who led an international team of researchers from seven countries, believes that *Telenomus remus* provides a 'great opportunity for the rapid



Maize infested with armyworm.

deployment of a biological control agent' for fall armyworm in Africa.

"Many teams in Africa are looking for natural enemies of fall armyworm in several African countries. Of particular interest are parasitoids," says Dr. Kenis, "our discovery showed that the parasitoid is already in West, East and Southern Africa and can readily be used as a biological control agent."

The international team of researchers have used DNA analysis and morphological observations to confirm the presence of *Telenomus remus* in Benin, Cote d'Ivoire, Kenya, Niger and South Africa, according to a study published in the journal *Insects* last week.

"It is important to discourage the use of highly hazardous synthetic pesticides, and to develop, promote and deploy proven, sustainable integrated pest management technologies against fall armyworm," he says.

Meanwhile, other forms of biological control methods are already been used in parts of the country, like in Laikipia County for , where a sap-sucking bug called *Dactylopius opuntiae*, commonly known as cochineal is being used to control the invasive cactus weed, *Opuntia stricta*. The bug was also introduced in the area by CABI after being imported from South Africa where it is being used to control the cactus weed in Kruger National Park.

The main challenge is the new

discovery according to Dr Kenis will be to develop a production method specific to the African situation besides being economically viable for local farmers.

He believes African policy makers should facilitate the use of *Telenomus remus* as a biological control agent by allowing it to be registered.

Prof Mathew Dida, a crop scientist at Maseno University , terms the use of insect predators to biologically control other pests as 'a best move if it works' since it is quite environmentally friendly compared to chemical spraying.

Prof Dida explains that biological approaches do not require a long registration process especially when the predators already exist locally.

"If the insect is new insect into the environment, then it will need the government's approval before its use it accepted and used in the country. This also does not take long," he further added.

In this kind of pest management, the predator is multiplied and then released into the environment to attack the target pest.

"Once the pest predator is released into the environment the farmer might see the effect without necessarily acquiring or being in charge of the technology," Prof Dida explained

Once this measure is adapted in the country, many farmers will be able to save their crops from further destruction from the fall armyworm. **KFI**



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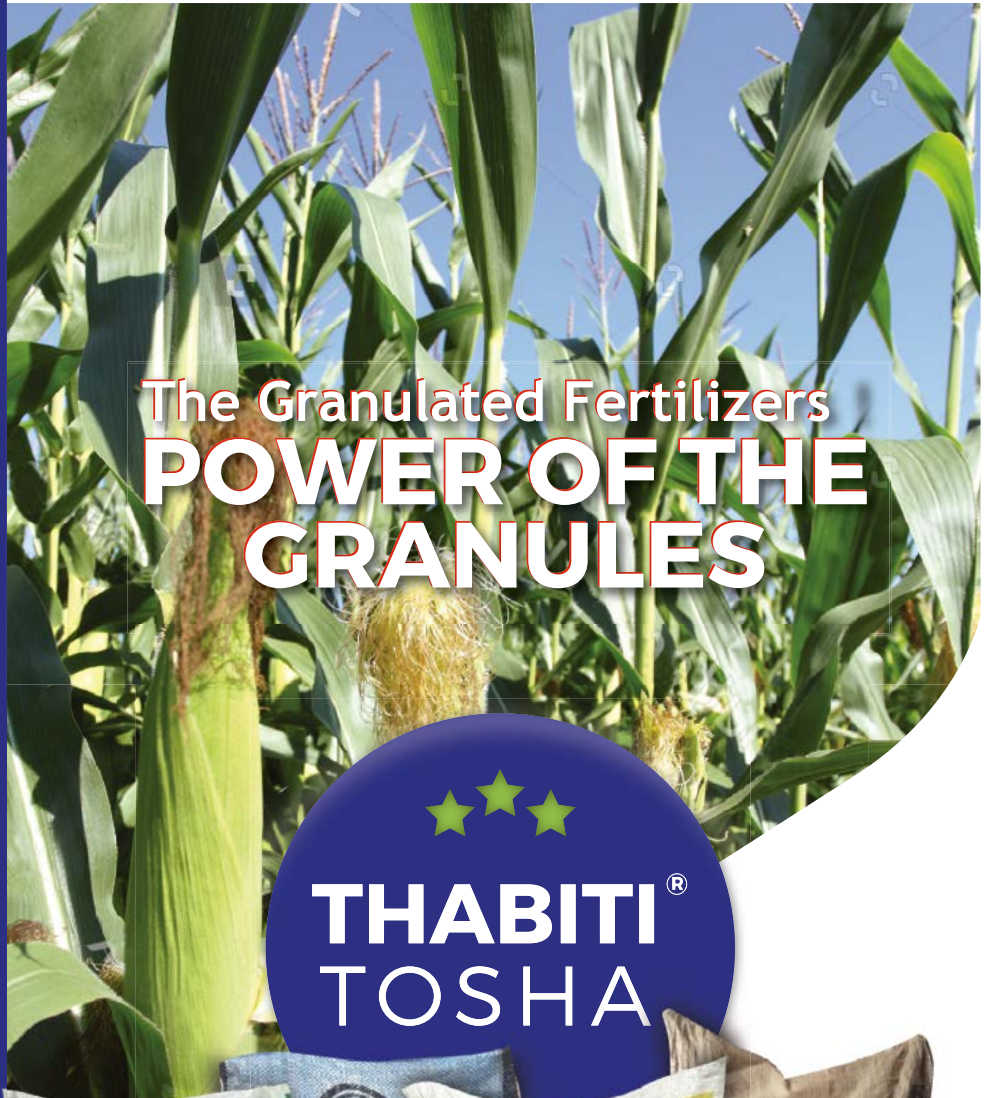
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