

## INTERNATIONAL YEAR OF MILLETS (IYM 2023)

Ensuring Food and Nutrition Security for Africa

# 'Forgotten foods' have answers to food security, nutrition question in Africa

Millets surpass other cereals in several ways, as they have elevated levels of iron and zinc, a low glycaemic index, good levels of protein and fibre and are gluten-free.

**EVANS ONGWAE**  
SPECIAL CORRESPONDENT

To many consumers, millets and some nutritious staple food are meant for poor households, and have no space on the serving table of the middle class. This has seen rice, wheat and maize account for about 50 percent of the world's consumption of calories. Yet, the world can do better by incorporating cereals, which are considered 'forgotten foods' or 'orphan crops' that are not only resilient to drought, but are also highly nutritious and help deal with the food security question in Africa.

Millets have been a staple food in many African and Asian countries for centuries, contributing to a third of the food basket. However, in recent times, the consumption has significantly declined due to reasons attributed to scarcity, convenience, taste and social perception. Unfortunately, millets have been labelled as "poor people's food,"



Millets have been a staple food in many African and Asian countries for centuries, contributing to a third of the food basket. Picture | ICRISAT.

which has further contributed to the decrease in demand for this nutritious grain.

However, 'Forgotten Foods' are not forgotten by the peoples who subsist on them.

In large parts of India and sub-Saharan Africa, millets were, and continue to be, a dietary staple in addition to crops such as cassava, yam, sweet potato, Bambara and nut.

They are high in nutritional value and grow in adverse conditions while contributing to food security in a sustainable manner. They make use of local agricultural biodiversity to provide nutritious and sustainable diets.

However, production of these crops are characterised by underfunding for research and development and little attention in agriculture extension services, weak and underdeveloped value chains, lack of awareness about their nutritional value and low interest among farmers due to lack of demand.

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) director general Dr Jacqueline Hughes says integrating millets into our diets can offer an array of nutritional benefits.

Millets, she asserts, are a healthy and sustainable choice, as they are "good for you, the farmer, and the planet."

She adds that millets surpass other cereals in several ways, as they have elevated levels of iron and zinc, a low glycaemic index (beneficial for diabetics), good levels of protein and fibre and are gluten-free.

Biofortified sorghum and pearl millet, which have been developed by ICRISAT in partnership with HarvestPlus, are crucial innovations for populations that consume millet. These varieties of millet are high in iron and zinc, making them essential for combating anaemia in pregnant and lactating women as well as young children.

In Kenya for instance, sorghum and millets grain demand is expected to rise once a new flour blending policy is actualised.

Dr Hughes points out that millets are highly adaptable to drought and heat, making them ideal for cultivation in semi-arid and arid regions with low rainfall. Compared with other cereals, they require minimal water and have a shorter growing season. This makes them a suitable crop for areas where water is scarce or unreliable.

Millets are also considered to be generally a low-input crop, meaning that they require minimal amounts of fertiliser and pesticides. This reduces the environmental impact of farming practices and helps to preserve soil fertility.

## With right crops it is possible to achieve SDGs and Zero Hunger campaign targets

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SPECIAL CORRESPONDENT

The journey to end hunger in the world is expected to terminate not too many years away. First, there are the Sustainable Development Goals (SDGs), that seek to end hunger by 2030. Then there is the campaign to attain Zero Hunger by 2050, which provoke a debate if the targets will be achieved or not.

Updated projections of the number of undernourished people suggest that nearly 670 million people will still be undernourished in 2030. This is according to a report titled, The State of Food Security and Nutrition in the World 2022 that was prepared by IFAD, the World Health Organisation (WHO) and World Food Programme (WFP).

The report states that, in 2021, an estimated 29.3 percent of the global population – 2.3 billion people – were moderately or severely food insecure, and 11.7 percent (923.7 million people) faced severe food insecurity.

The report presents the latest up-



Linus Owire a Sorghum farmer from Busia County, Kenya. Picture | ICRISAT.

dates of the food security and nutrition situation around the world, including updated estimates on the cost and affordability of a healthy diet.

In this context, the UN's designation of 2023 as the International Year of Millets gives the world the opportunity to consider millets as a potent weapon

against hunger.

Some UN agencies point out that there is more than enough food to feed the world, but the problem is the distribution.

An agricultural scientist notes that climate change has an impact on production. Moreover, countries in Africa

are experiencing population growth. So, there is pressure on land, yet not all lands are equally arable.

Apart from the general hunger, there is a hidden hunger which is about malnutrition (not having enough iron and zinc in our diet, for example). Women are anaemic in many parts of the world. Children suffer from wasting. They could be getting the calories need, but not the nutrition they need.

The scientist argues that by 2050 our goal is not only about giving the calories to the people but it's really about giving nutritious food.

He says: "I think that is a challenge but it is a doable goal in my view. I think through this co-ordination and efforts between the nations and making sure that there is not emphasis on only one area of agriculture. So, agriculture is a system in which you work on different areas. So, there's a lot of work that needs to happen at the regional level and also at the global level. This is really about coordination. I would not say this is something impossible to chew but are we moving in that direction? Yes, we are moving in that direc-

tion. But is there enough emphasis in all the areas? Probably not and I think that is where opportunity exists for all of us to sort of relook at the agenda we didn't look at the regional level and international level."

Clearly, eliminating hunger requires a comprehensive and integrated approach comprising improved crop productivity.

That means the use of improved varieties, good quality seed, mechanization, application of good agricultural practices, improved soil and water management, good pest and disease management. It also entails processing and value addition unlocking crop nutrition benefits, improved farming systems (sustainable crop production systems and good natural resource management). It should also entail building improved market systems providing good market opportunities, sustainable crop-livestock production systems and enabling environment through good policy. All relevant stakeholders must come together to make it happen.



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# Millet: Drylands staple at the centre of food security

The International Year of Millets will provide a great opportunity to promote available technologies on millets and the benefits that come with millets to encourage consumption and utilisation of millets.

**EVANS ONGWAE**  
SPECIAL CORRESPONDENT

The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), a provider of agricultural solutions for dryland areas, hails the renewed focus on millets.

The International Year of Millets aims at recognising these benefits of millets and promote awareness to encourage the consumption and utilisation of millets.

Millets are staple crops of the drylands, where rainfall is low and soil fertility is poor. Moreover, millets have higher nutrient content compared to other major cereal crops.

Dr Jacqueline Hughes, Director General at ICRISAT says: "The narrative of food and nutrition security must be expanded to include the role that millets can play to move towards more nutritious and sustainable diets and agriculture. This calls for fresh thinking around transforming our current food systems towards healthier, sustainable, resilient and diverse food systems."

She adds that, "ICRISAT's goal is to create resilient, nutrition-sensitive, diverse and sustainable food systems, that ensure food and nutrition security and stable livelihoods and incomes today and in future in unison with our partners in Africa."

ICRISAT is taking the opportunity created by the UN declaration by joining partners such as FAO, AGRA, and FARA to demonstrate and showcase its work on millets as a world leader in providing solutions for dryland areas.

ICRISAT is a pioneering, international non-profit research for development organisation, specialising in improving dryland farming and agri-food systems. ICRISAT works with global partners to develop innovative science-backed solutions to overcoming hunger, malnutrition, poverty, and environmental degradation on behalf of the 2.1 billion people who reside in the drylands of Asia, Sub-Saharan Africa, and beyond.

In Eastern Africa, ICRISAT conducts agricultural research focusing on the following thematic areas:

- Crop improvement aiming at enhancing diversity, productivity, production, nutrition quality and profitability of grain legumes and cereals (sorghum, pearl millet,



Dr Jacqueline d'Arros Hughes  
Director General, ICRISAT



Dr Rebbie Harawa, Africa Regional  
Director and ICRISAT Kenya Country  
Representative

- finger millet, pigeonpea, chickpea and groundnut)
- Systems transformation aimed at providing empirical evidence and information for developing sustainable markets, policies, and regulations to create enabling conditions for transforming dryland agriculture from a subsistence-oriented livelihood to a market-oriented livelihood.
- Resilient farm and food systems working on rainfed crop and crop-livestock systems by developing innovative and collective approaches to managing landscapes for restoration, aggregating primary products for more effective marketing, employing digital means to exchange information and creating opportunities for agri-entrepreneurs.

Digital agriculture, empowering women and youth and promoting entrepreneurship are cross-cutting across all of ICRISAT's work. ICRISAT is a recipient of the Africa Food Prize 2021. In 2022, the Transforming Irrigation systems in Southern Africa (TISA) project, led by ICRISAT and partners, won the European Foundation for Management Development EFMD Excellence in Practice Gold Award.

Dr Rebbie Harawa, Africa Regional Director and ICRISAT Kenya Country Representative at ICRISAT Kenya, says: "ICRISAT primarily works in collaboration with the national agriculture research and extension system on the national priorities in every country that we work."

She adds: "We work in close collaboration with the national agriculture network from developing new varieties, doing multi-location testing, carrying out participatory varietal selection, assessing farmer and consumer requirements to ex-



Millets: Smart Food for You

tension support while cutting across policy, finance, technology, agribusiness, skill and capacity building, and a lot more."

ICRISAT is currently partnering on important projects in Kenya, Zimbabwe, Malawi, Zambia, Tanzania, Ethiopia and Sudan, in addition to working in many countries in West and Central Africa, that promote the adoption of drought-tolerant crops for better livelihoods, climate-smart innovations, water and soil conservation, and development of better agri-food systems.

Through ICRISAT's intensive testing and evaluation process, several promising resilient varieties of dryland crops have been released in Eastern and Southern Africa. Aflatoxin control in groundnut and fall armyworm resistance in sorghum are among the impactful research initiatives of ICRISAT.

ICRISAT has some suggestions on how farming in Africa can be made more resilient. There is a need to deliver climate-smart agricultural technologies that include the following:

## HIGHLIGHTS

- Digital agriculture, empowering women and youth and promoting entrepreneurship are cross-cutting across all ICRISAT's work. ICRISAT is a recipient of the Africa Food Prize 2021. In 2022, the Transforming Irrigation systems in Southern Africa (TISA) project, led by ICRISAT and partners, won the European Foundation for Management Development EFMD Excellence in Practice Gold Award.

- Use of improved and stress-resilient crop varieties supported by the application of good agricultural practices, sustainable crop production practices through good natural resource management, more efficient irrigation technologies/systems that reduce water wastage, good plant protection practices (good pest and disease management practices)
- Sustainable farming or crop production systems that embrace sustainable use of natural resources, reduce land degradation, improve soil structure, soil fertility and soil health
- Improved climate information systems that provide real-time early warning
- Enabling environment (policy support)

ICRISAT notes that the productivity of many crops under smallholder agricultural systems is below 1 ton per hectare in most countries in the region. The average yields of main cereals are 25 percent of attainable yields. This is because farmers do not have access to improved varieties, quality seed, knowledge of improved agronomic practices, lack of resources to provide irrigation support, poor natural resource management practices that reduce the productivity of the production systems, and poor pest and disease management practices.

Through various initiatives, ICRISAT is supporting African farmers to achieve higher yields.

Together with its partners, ICRISAT has developed high yielding, stress resilient and nutrient-dense varieties that have been released in many countries.

ICRISAT and partners have also developed seed systems and delivery networks both with public and pri-

vate organizations to improve access to quality seed of improved varieties. Again, ICRISAT, with its partners, have developed sustainable natural resource management technologies to improve crop production systems.

Additionally, ICRISAT provides capacity building to deliver information and provide technical support to the National Agriculture Research Systems, seed companies, farmer organizations and farmers through training and technical support.

ICRISAT promotes natural resource management technologies including water conservation measures, soil improvement measures (soil structure, soil fertility and soil health), innovative and collective approaches to managing landscapes for restoration, and good agricultural practices that reduce degradation of land and environmental pollution.

Over the years, ICRISAT and partners have developed many agricultural technologies that are available to support communities in dryland areas as well as other areas. Strong partnerships with public and private organisations will help promote these technologies through many channels, training, demonstration plots, field days, digital information systems and media outlets.

The International Year of Millets will provide a great opportunity to promote available technologies on millets and the benefits that come with millets to encourage consumption and utilisation of millets. ICRISAT is happy to join hands with all key players to launch and recognize the importance of millets and continue the promotion of millets in 2023 and onwards. Please join us in this effort!



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# Joining hands to breed highly productive varieties of dryland legumes and cereals

CIMMYT and national agricultural research and extension institutes are working together on understanding the key constraints faced by small-holder farmers and value chain network for sorghum and millets.

EVANS ONGWAE  
SPECIAL CORRESPONDENT

The International Maize and Wheat Improvement Center (CIMMYT) is working with several national agricultural research and extension institutes in Africa to breed improved varieties of millets, which includes sorghum. CIMMYT in partnership with the national research institutions is establishing each nation's research priorities, gaps and jointly working to breed improved varieties of millets and other dryland legumes and cereal crops. Dr Harish Gandhi, Breeding Lead for Dryland Legumes and Cereals at CIMMYT's Genetic Resources Programme in Kenya, notes that through collaboration, scientists are able to deliver highly productive varieties of millet and sorghum. Gandhi observes that this is important because the seed's genetic material accounts a major part of its productivity. The environment, such as rain and soil, and crop husbandry practices, such as fertilizer applica-



Prof. Paul Bosu of Council for Scientific & Industrial Research – Ghana makes remarks at the Dryland Legumes and Cereals Planning Meeting in Accra, Ghana in January 2023.

tion and planting methods, account for the rest.

Thus, developing the new crop varieties through modern technologies is key to unlocking higher millet and sorghum yields, says Gandhi.

He explains: "So, really, what we are after is getting improved seed varieties in the hands of the farmer."

To set research directions and ultimately boost demand, CIMMYT and national agricultural research and extension institutes are working together on understanding the key constraints faced by small-holder farmers and value chain network for sorghum and millets. They are working with socio-economists, breeders and millers, the entire crop value chain, the millet and sorghum networks that will develop from the close collaboration of research bodies will help boost demands for these crops.

For more than 50 years, CIMMYT has been working on improving maize and wheat seed varieties, registering tremendous success over the years.

Since 2021, CIMMYT, a member of

the CGIAR group, expanded their cropping systems work including research in dryland legumes and cereals that are key for food and livelihood security. The cereals are: pearl millet, finger millet and sorghum and the legumes are groundnut, chickpea and pigeon pea.

Says Gandhi: "These crops are quite critical for long-term food security and sustainability of our agricultural systems."

CIMMYT is establishing collaborative breeding programs for these crops with partners in East and Southern Africa and in West and Central Africa.

It therefore began discussions with countries that are keen on promoting the production and marketing of millets and sorghums. In East Africa, these countries include Kenya, Ethiopia, Sudan, Tanzania and Uganda. CIMMYT scientists have initiated

consultations with the different national agricultural research programmes in East, Southern, West and Central Africa.

Gandhi and CGIAR colleagues aim to add value to existing, or participate in forming research networks in these networks, he says, "colleagues from the different regions in Africa would come together and identify what the priorities are, which areas we need to focus on and how do we really advance the research in those countries."

He adds: "What CIMMYT is doing is, really coming together as a network of partners. We know there are never enough resources to do everything we want to do. But if we come together as institutions with complementary strengths, we can do a lot more, we can be more targeted and ultimately that will improve the output, that is seed varieties and also development of capacities of all network partners."

CIMMYT and NARO recently hosted a workshop in Uganda for eight countries from East and Southern Africa to discuss market segments, needed characteristics of seed for which breeders should breed, for millets.

The forum looked at what the different priorities are on a regional level and how to coordinate and work together as one network in support of millets.

CIMMYT, explained Gandhi, is currently playing the role of coordination and catalyzing the formation of this network in East and Southern Africa, and also in West and Central Africa. Within East Africa, CIMMYT will conduct research on millets, sorghum and groundnut at the KALRO Kiboko station in Kenya and with network partners at their sites across the region. CIMMYT also works with ISRA, Senegal's agricultural research agency, at their research sites including Bambey and Thies, and with partners across West Africa.

## Nutritious and climate-smart options all rolled into one crop

EVANS ONGWAE  
SPECIAL CORRESPONDENT

The United Nation's declaration of 2023 as the International Year of Millets is timely. This is according to Dr Harish Gandhi, Breeding Lead for Dryland Legumes and Cereals at the International Maize and Wheat Improvement Center's (CIMMYT) Genetic Resources Programme in Kenya.

Gandhi lauds the UN's move, saying this shines a spotlight on millets, in these times of rapid climate change. Millets, are drought tolerant to compared to other crops.

"The declaration is such a timely thing," declares Gandhi, who, in a wide-ranging interview, spoke about the importance of millets and why farmers should be supported to produce higher yields.



A variety of millets on display at the Ethiopian Institute of Agricultural Research  
Picture Susan Otieno CIMMYT.

Noting that temperatures have risen in many countries over the last several decades, Gandhi says climate change "is no longer a distant thing."

He adds: "This is already happening, and the millets are actually quite versatile in withstanding high temperatures and other climate extremes such

as low rainfalls. We, therefore, need strategies that enable us to mitigate the impact of climate change.

Gandhi points out that millets are an option in the food security drive in the midst of climate change.

He says as research scientists working in agriculture, a major focus of their work is on how they can mitigate the effects of climate change by developing appropriate technologies or products. "Our aim is to use acceptable technologies to get the right seeds to the hand of farmers, thus diversifying their choices," he said.

"Millets offer farmers options that are climate smart as they tolerate extreme weather better than other crops. Apart from that, millets are nutritious and have good grain fibre content. As we champion the consumption of these crops in the face of increasing urbanisation around the world, millets will help us manage

many lifestyle diseases, such as diabetes and obesity.

Other than providing diversity in our meals, Gandhi also points out the dual value and use of millets and sorghum, as food for both households, and fodder for livestock.

He says: "Millets are critical part of mix for climate resilience, for food and as fodder for livestock."

Dr Gandhi believes there will be increased awareness about millets following the UN's declaration of 2023 as the International Year of Millets.

He says an article titled '*Biases in plant sciences*' that offers a critical analysis of plant science literature, reveals how millet and sorghum have not received enough emphasis in research. Only sorghum features in the list of top 20 plant species that have been studied intensively. "This just emphasises the need to invest in these crops." Adds Dr Gandhi.