

GENEBANK

World Vegetable Center identifies, collects, and conserves genetic resources of traditional African vegetables, including endangered species from across the continent to maintain biological diversity



Africa racing against time to save genetic resources for food security



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In many African communities, the outbreak of the Coronavirus Covid-19 has resulted in a considerable interest in medicinal plants and some neglected traditional vegetables and fruits.

Species that were not of particular daily importance have all of a sudden gained popularity, and their usage has increased. But because of lack of interest in growing and preserving them over the years, many of the now much sought after species are nearly extinct or available in small quantities.

The above scenario highlights just one small part of the problem on a continent faced with significant loss of biodiversity or rather, plant genetic resources for food and commercial agriculture.

Today, Africa is said to be a continent with the lowest dietary diversity - - diets that contains the least variety of food items - - a significant cause of malnutrition and stunted growth.

Climate change, rapid urbanisation, and neglect of indigenous food crops are likely to worsen the situation.

Africa needs to up its game in the conservation of plant genetic resources, not only to reduce the risk of extinction of underutilised species, but also to ensure that they contribute to healthy diets and poverty alleviation.

One of the centres dedicated to addressing this problem is the World Vegetable Center in Arusha, Tanzania.

The centre, among other things, identifies, collects, and conserves genetic resources of traditional African vegetables, including endangered vegetables from across Africa to maintain the continent's biological diversity as well as to improve food crops for future generations.

Currently, the centre's gene bank curates over 3,000 vegetable accessions, vegetable varieties and their wild relatives, most of which are traditional African vegetables. The ambition is to curate up to 25,000 vegetable accessions by the year 2025.

All the year round, the gene bank (a cold room) is kept at between five and 10 degrees centigrade. At this temperature range, the facility can keep seeds for up to five years before another round of sowing to test germination and seed regeneration.

Nearly every country in Africa has a plant genetic resources centre (gene bank) in which crop varieties are



Current genebank with 3000 vegetable accessions

conserved.

Most of these national gene banks lack resources to do the job very well and often they curate cereals and legumes, not vegetables.

At global level, the biggest gene bank is in Svalbard, Norway; it curates nearly a million accessions, and they can stay viable for a 1,000 years.

The biggest vegetable gene bank is situated in Taiwan and curates about 75,000 accessions many of which are Asian vegetables.

At the World Vegetable Center in Arusha, varieties of vegetables such as Amaranth, jute mallow, African eggplant, African nightshade, spider plant, gallant soldier, and many others, some of which are considered as weeds, are grown in carefully tended demonstration plots.

"Whoever controls your genetic re-

sources controls you today and will control you tomorrow," says Dr Gabriel Rugalema, the regional director for Eastern and Southern Africa at the World Vegetable Centre.

Dr Rugalema, who has over 30 years of experience in international development and diplomacy, says; "Africa needs a strong strategy for the conservation of its genetic resources for food and agriculture.

"Genetic resources are a foundation for crop improvement for increased production and productivity, but also for posterity. In a continent plagued by food insecurity, conservation of plant genetic resources is imperative."

It is important for Africa to have a strong, independent and high quality gene banks that meet international standards as Dr Rugalema and adds:

"For Africa, it's good to pull resources to manage a few genebanks that meets international standards."

Improved seeds are in high demand and could contribute to strong continental trade in which millions of jobs could be created and sustained.

"A large and modern gene bank is critical for the achievement of the African Continental Free Trade Area agreement," Dr Regalema says.

Just recently, the World Vegetable Center has played an important role in the establishment of the African Vegetable Breeding Consortium that brings together public and private sector partners to strengthen vegetable research and development in the region.

Apart from curating thousands of accessions, the World Vegetable Center encourages farmers to utilise its germ plasm. In recent years, its amaranth germ plasm was sent out to 231,000 smallholder farmers in Tanzania and Kenya.

According to the data collected from private companies, 58 per cent of the 4.9 tonnes of amaranth seeds sold in eastern Africa in 2017, were based on varieties developed by the World Vegetable Center.

Currently, about 50 per cent of tomato seeds and 98 per cent of African eggplant produced commercially in Eastern and Southern Africa are based on varieties developed by the World Vegetable Centre.

The World Vegetable Centre coupled with Tanzania Horticultural Association' (Taha) business skills drive are attracting many youngsters who want to engage in horticulture.

The young farmers rely on market trends of certain vegetable varieties to ascertain the right time to plant so that they can supply the vegetables even when it's traditionally off season.

"I've constructed a house for my mother at Maisaka suburb and I have just bought a plot at Sinai area where I will build my own house," says Shaaban Ramadhan, 33, a resident of Babati Municipality in Manayara Region.

His tomato farm produces an average of 700 crates a season, earning

him Tsh21 million (about \$9,211). Labour costs him Tsh10,000 (about \$4.4) a day since the crop needs tending.

Horticulture earns Tanzania over \$700 million annually, up from \$60 million in 2004, making it a nascent sector, for the provision of jobs and wealth creation.

With an annual growth rate of 12 per cent, the sector has turned into a driver of the Tanzania's entire agricultural sector with an average growth rate of 4 per cent only.

As the global appetite for fresh pro-

The genebank currently curates over 3000 vegetable accessions with an ambition to curate up to 25,000 accessions by the year 2025.

duces rises, demand from overseas is growing for Tanzanian grown avocados, raspberries, lime, French beans, peas, baby carrots, sweet melon and spices as well as herbs such as ginger, assorted chilies, chives and mint.

With the increasing demand for the vegetables and a conducive environment, the country is attracting higher learning institutions and large investors such as Rijk Zwan, an international vegetable breeding company from The Netherlands.

WorldVeg also collaborates with Tanzania Agricultural Research Institute (Tari) at Tengeru and Kibaha, private sector companies and Multiflower and TPC situated outside Moshi Municipality in Kilimanjaro Region in carrying out research.

Partners from tertiary education institutions include the University of Dar es Salaam, Sokoine University of Agriculture, Nelson Mandela Institution of Science and Technology and many others from inside and outside the Southern and Eastern Africa region.

Taha Fresh Handling Ltd, a subsidiary logistic company of Taha, handling Tanzania's horticultural exports, also offers opportunities for local vegetable farmers and exporters.

"A gene bank is not a museum but a resource which with the right investment and good utilisation of the genetic resources can be a money spinner now and in the future," Dr Rugalema says.

Given the reality of loss of biodiversity and resultant poor diets, it is extremely important for the region to increase investment in genebanking. "Who knows, today's germ plasm may produce tomorrow's wonder food," Dr Rugalema says.



Amaranth variety being tested on the field.



Dr Rugalema on a tour of the Center.