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Seeds of hope: Crop diversity in the face of disaster

In the dry afternoon breeze, Clare Mukankusi, a bean breeder at the International Center for Tropical Agriculture, pulls on a light khaki lab coat. The 18 acre plot at Kawanda, part of Uganda's National Agricultural Research Organization, is remote and quiet.

A refuge of biodiversity, this plot is where bean seeds, saved and preserved from all over Africa, are prepared for safe keeping in the genebank at Kawanda – Africa's largest genebank for beans. The plot, carefully tended by more than ten dedicated field staff, is where beans with specific traits – like drought resilience or high iron – are cultivated, evaluated, and finally multiplied for farmers if they pass a gamut of tests.



As one of only two breeders in Africa regulating the flow of beans in and out of the continent's biggest bean genebank, a lot rests on her shoulders. "I knew studying beans would be a way for me to reach the poorest in Africa. Beans are so important – they are known as a poor man's meat. Whatever I do here will eventually get to these people – to improve livelihoods, nutrition, incomes."

"Even a woman with a very small piece of land will grow beans," she continues. "For a long time, they've been considered a woman's crop: they are food, and women are usually responsible for putting food on the table. Also, beans don't usually attract commercial attention. That's actually shifting now, men are growing and selling beans commercially – but we ensure that women also benefit," she says.

As a member of the Pan-Africa Bean Research Alliance (PABRA), Africa's largest network of bean researchers spanning more than 30 countries, safeguarding beans and tackling a myriad of challenges in the bean trade - she can reach a lot of women. With ten countries under her jurisdiction, Clare is directly responsible for seed collected from places where beans are not only a vital food, but they are in danger.

Beans in the crossfire

As Clare speaks, eight hours north fighting has erupted in the Juba, the capital of South Sudan – the world's newest country.

The last researcher from South Sudan to contact Clare and her team was involved in an accident and at the moment there is no one to continue the work. "We try to support but it's very difficult," she says. The situation is similar in other countries, but national partners still ask for help. In some countries, bean programs have survived some of the deepest conflict. "For example, our Seeds of Hope program in Rwanda," she says.

From April to July 1994, more than 800,000 people died during the brutal Rwandan genocide. During the conflict, a handful of bean breeders worked to collect a vast array of the country's bean seeds for fear they would be lost, preserving precious genetic diversity. The Seeds of Hope program was initiated before she joined CIAT, but Clare found the seeds on the shelves of the store room.

"We didn't have proper cold storage at that time; simple and effective methods were used to store the beans," she reflects.

"But once peace had been restored, Rwanda's beans were sent back – with a back-up copy kept here in our genebank. That's how Rwanda remains a center of diversity for beans in Africa." Researchers estimate that rescue operation saved Rwanda's breeding programs around 20 years of work.

And years later, in 2009, some 84 samples of these beans were planted and tested in the plots at Kawanda for their iron and zinc content. They have been used to breed new high-iron beans, now being tested across East Africa to tackle malnutrition and anemia.

"As breeders, we need diversity to make progress. If one of the bean varieties in the field behind me dies because of drought, we would never know what it could have been good for. It may not perform well now – but it might be good for something else in the future."

That's why the 3,000 plus bean collection at the Kawanda genebank and the collection of 36,000 or so samples at CIAT's headquarters in Colombia are so precious. "Our national partners ask us for seed to tackle particular challenges they are facing at that time, but the challenges change. As well as being nutritious and profitable, we need the beans to tackle drought, low soil fertility, diseases, and pests," she explains.

Facing the heat: backstopping food security

It's not only human conflict that threatens genetic diversity. "We are most likely going to lose a lot of diversity because of climate change," says Clare, taking a look around the green bean plot. "Varieties are already dying out slowly" she notes.

With the early morning mist still thick in the air, Clare and Stanley Nkalubo, head of the national bean program in Uganda, pack into a 4x4 for the three-hour journey northwest to visit a group of farmers they have been working with for the last three years.

Pulling up into the dusty driveway in Hoima, Sunny Mbeeta Abwooli, Chairwoman of the Kyamaleera Woman's Handicraft Association, is the first to welcome Clare out of the vehicle with a warm hug.

Diversity and the long path to keep it

Yet despite the jovial welcome, this has been a hard season. Gathered in a circle, around 30 women discuss what has been one of the driest that they can remember.

Yet these farmers have thrived despite the drought. An arrangement of beans of all colors – bright yellow, orange, black, brown, red, white beans – is collected in the middle. Each variety has a role in the home – some are for food, some are profitable at market; some can even be converted into school fees.

The small, black beans are known as NABE 2 – traditionally from Northern Uganda. They were introduced by CIAT as MCM1015 and released in 1995. The next year, the north was gripped by a civil war which lasted more than two decades.

While NABE 2 survived the conflict, they're not common here, or in demand at market. But they are hardy during excessive rainfall and drought – so the group chooses to grow them. This and other varieties, introduced to local communities here in Hoima, are helping buffer farmers against extreme weather.

By growing all these different kinds of beans, these farmers – and many others – are actively preserving crop diversity in their fields. And since copies are kept in the genebank at Kawanda, future generations will also reap the benefits for many years to come.



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