



NEW ZEALAND
FOREIGN AFFAIRS & TRADE
Manatū Aorere

EXIT

STORIES ACROSS THE MOANA

The Centre for Pacific Crops and Trees

Suva, Fiji

At a facility in Fiji's capital, Suva, scientists are nurturing green shoots of hope for the region's food security. The Centre for Pacific Crops and Trees (CePaCT) is the Pacific's main plant gene bank, safeguarding key crops and tree species of the region in the face of climate change and the proliferation of pests and diseases.

Guardians of the region's unique plant resources

Established in 1998 by science and development agency SPC (The Pacific Community), the Centre conserves over 2400 crop and tree varieties, including the world's largest taro collection. Some of the plants have been in the Centre's care for 20 years and may no longer exist in their country of origin.

The Centre has a crucial role as guardian of the region's plant genetic resources. In 2022 New Zealand allocated NZ\$10 million through its climate financing to help the Centre scale up its vital work. This includes research into new climate resilient varieties of crops that are resistant to drought, pests and diseases.

The Centre is female-led and has a majority women team. This aligns with a key strategic objective of the New Zealand climate financing: the promotion of women's leadership in climate change adaptation and governance.

The Centre acts quite literally like a bank, with SPC member countries making deposits and withdrawals. They entrust the Centre with samples of crops they want to protect, and the Centre propagates and re-propagates these cuttings. From one small sample, the lab can generate hundreds of thousands of plants. Countries can request plants for research and training but also for direct use, to send out to farmers, or to increase diversity at national level. When propagated plants are distributed to countries, the Centre always retains plantlets in its collection to ensure the variety is conserved and safeguarded.





Ensuring safe, sustainable, and strong plants

Sustainability is key so it's not just about banking existing crops but also enriching the gene pool. Sometimes two or three varieties are combined to create plants that are climate resilient. The Centre also sources planting materials from other international plant gene banks to bolster its collection.

“We have a lot of requests for varieties that are salt or drought tolerant, as well as those that are tolerant to heat,” says Logotonu Meleisea Waqainabete, SPC Program Leader for Genetic Resources.

A small minority of plants are held as seeds and in the field, but most are kept as tissue culture. This involves growing one small plant cutting in a ‘media’ – an artificial plant-nutrient – under highly sterile conditions.

A crucial focus of the Centre's work is ensuring planting materials and seeds are free of disease, rot or anything that could spread across farms when they are distributed to member countries. In recent years, the Centre has been collaborating with New Zealand's Manaaki Whenua Landcare Research (MWLR) under the New Zealand-funded Pacific Seeds for Life Programme, testing taro samples for viruses at its Christchurch laboratories before the Centre proceeds with distributing the

healthy taro seedling to growers across the Pacific.

Traditional plant varieties – which many countries have let go in favour of market crops – can also play a critical role in resilience-building. “These varieties may hold key traits that could help us build resilience to climate change and pest and disease incursions. The uniqueness of the Centre's lab is that it is the only facility that holds most of the traditional varieties of the region in terms of main staple food crops,” says Waqainabete.

The need for technical expertise

For the past 10 years the Centre has distributed 5000-6000 plant tissue cultures of staple crops like banana, cassava, yam, and breadfruit.

Once the Centre gets a request from a member country, they start to multiply the plant, unless they have enough of that material in stock.

The work that goes into maintenance and propagation is painstaking – not least in the ‘subculture’ room, the only space where plants leave their sterilised tube to have their food refreshed and/or to be multiplied.

“The air is sterilised so when the plant comes out of its tube to chop it into smaller parts and

put it in new media, it remains sterile. It's a continuous process and labour intensive," says Waqainabete.

More hands-on expertise is needed to maintain the collection, meet countries' requests for plants and carry out crucial research. Added to that is the recent setting up of a molecular laboratory, funded under the Pacific Seeds for Life Programme.

Here technicians conduct germplasm health testing to ensure plants are clear of pests and diseases. Plants must also meet the requirements of food and nutrition security; and pest, disease and climate resilience.

The Centre also carries out genotyping to enable more efficient plant conservation. "If you know the unique molecular identity of a variety, you are able to conserve just that one, and this saves you the resources of conserving all of them," explains Waqainabete. "We believe crop diversity is a tool to build resilience to climate change. Not just at crop level, but variety level. For example, we

encourage you to not only plant taro but taro, banana and breadfruit. And to make sure you are planting 10, 12, 15 varieties of taro to improve diversity at national level. Through molecular means we are able to identify whether diversity at the national level is good, and if not we need to inject new materials from the lab to broaden that crop diversity."

Molecular technicians from Suva spent a month at MWLR's laboratories, working collaboratively to extend their molecular analysis skills. This has greatly helped to speed up the work, says Waqainabete. "We have some very big targets to meet on an annual basis.

"It's a very good relationship with MWLR. They verify what we do so we know our protocols, procedures and results are robust. It's part of trying to build the quality aspects into the work that we do, making sure people trust whatever results we give out. If we don't test the plants properly, we risk introducing a new pest into a country and that can have catastrophic consequences."



This professional development and collaboration delivers on another key goal of New Zealand's International Climate Finance Strategy – to grow the number and capability of future climate change researchers.

In addition, the climate financing is helping to equip the Centre with the resources to work faster and to a higher standard – for example providing an automatic washer to support the technicians' sterilisation work. Before any plant material leaves the lab it has to be sterilised at 120 degrees, as do culture vessels and test tubes, so a washer is especially critical at times of high demand.

“If a cyclone affects four or five countries in one go, we will get requests for so many planting materials and then with those kind of requests we have a lot of bottles to wash!”

The new climate financing from New Zealand is also supporting the establishment of a much-needed cryopreservation laboratory, with construction starting soon.

“That is very good for us. Cryopreservation is a method to conserve hard-to- conserve crops like coconuts, but we are also looking at it as our long-term strategy for all collections,” says Waqainabete. “It came from a lesson we learned in the Covid lockdowns. With tissue culture you need people monitoring the collections constantly. But, for almost one and a half years, only four or five of us were allowed to come in to the Centre. So it was a huge risk to the collections. So I thank our partners like New Zealand for recognising these strategies that will help us now but which are also a long-term investment.”

Improving resilience of plants and communities

“The whole essence of the New Zealand funding is to make sure we are making an impact in the lives of the people that we send these materials to. Investing in the capacities of the Centre itself will ensure the materials are put to good use.”

Ultimately, the Centre wants to empower countries to do their own plant breeding so they can generate new varieties of their own.

“With the issue of climate change, we are really focusing on building up capacity around breeding because in our region we currently have a shortage of experienced plant breeders,” says Waqainabete.

“Thankfully, with the support of New Zealand's climate financing, we are recruiting additional scientists, as well as planning some key capacity building initiatives in the next few years.”

