HORTICULTURE INNOVATION LAB PHOTO / STEPHEN WELLER, PURDUE UNIVERSITY

Farmers with the Nsongwe Women's Association in Zambia tend to a field of vegetables, including spiderplant, as part of a Horticulture Innovation Lab project in Zambia, Kenya and Tanzania.

GROWING THE SCIENCE BEHIND NUTRITIOUS, LEAFY VEGETABLES

As part of Feed the Future, an international team of researchers has been strengthening the value chain of African indigenous vegetables—with nutrition always in mind.

Their work began in western Kenya with a food and farm training program established by the AMPATH health system. Doctors there knew patients who were well-nourished would respond better to medical treatment for HIV/AIDS, so the program sought to encourage clients to grow, eat and sell nutritious crops.

Three common leafy African indigenous vegetables—amaranth, black nightshade and spider plant—were identified as promising crops for the training program.

"We realized the potential was enormous to expand African indigenous vegetable production and meet increasing consumer demand, while addressing important nutrition and income deficiencies," said Stephen Weller, project leader and horticulture professor at Purdue University.

Assumptions about these vegetables were many, but confirmed science was limited. With funding from USAID, the Feed the Future Innovation Lab for Collaborative Research on Horticulture built a project team to address research gaps in production practices, seed availability, storage, value addition, market linkages and nutritional evaluation. Led by Purdue University, the team includes partners from Rutgers University, ASNAPP, the World Vegetable Center, Eldoret University, Sokoine University, Kenya Agricultural Research Institute and Horti Tengeru.

To measure available nutrients, the team developed protocols for sampling the vegetables from field experiments at different stages of maturity, with testing at Sokoine University in Tanzania.

"Knowing the best stage to harvest these vegetables is crucial," said John Msuya, associate professor at Sokoine University. "While African indigenous vegetables are said to be rich in micronutrients, they also consist of substantial amounts of anti-nutritional factors—phytate, nitrate and oxalate—which can occur naturally."

Results showed most of the nutrients tested increased as plants aged from 21 to 35 days, and the anti-nutritional factors never reached critical thresholds. Dried leaf samples were also analyzed at Rutgers University for nutritional composition.

"We were pleased to find that nightshade, amaranth and spider plant are indeed rich in vitamins and minerals," said Jim Simon, professor at Rutgers University. "These leafy greens are as nutritionally dense as spinach in iron, calcium and potassium—and rich in vitamins such as provitamin A."

Food processing companies in Kenya and Zambia have used the results in nutrition labeling on packaging aimed at American and European markets, as they add these vegetables to their product lines.

Program results have been incorporated into training modules for more than 1,700 farmers, including USAID's Kenya Horticulture Competitiveness Project.

How to better grow more African indigenous vegetables—and the value of eating them too—has been shared continuously with AMPATH's clients.

"So many of the vulnerable AMPATH clients, who are both nutritionally and economically at risk, have had an opportunity to be directly involved in production, consumption and marketing of these crops," said Pam Obura, senior researcher with Purdue University and AMPATH. "Even the landless have been able to produce them in sack gardens for their own consumption."

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