

IMPACTS Rooting out malnutrition in Malawi

Malnutrition is a major concern in Malawi, where 47% of children under the age of five are stunted, 13% are underweight, and 59% are at risk of vitamin A deficiency. CIP's Rooting Out Hunger project is promoting greater development and use of potatoes and orange-fleshed sweetpotatoes, or OFSPs, to diversify diets and boost nutrition. So far, the program is exceeding its goals of reaching target audiences, increasing food security, and improving lives. Maize is the most important staple crop in Malawi, but it is threatened by drought and late rains associated with climate change. Potatoes and sweetpotatoes are important complements. Sweetpotatoes are drought-tolerant, and OFSPs are rich in beta-carotene, a substance that can combat vitamin A deficiency. Potatoes are early maturing and a good source of vitamin C and iron.



The potato component of the project offers farmers training in seed selection, and is introducing more disease-resistant varieties to boost yields. After just one season, the results shown were higher yields and increased incomes. For participants like Doreen and Kumbukani Grevasio, this has meant not only more food and money for their family, but also the opportunity to do something that was previously unthinkable – to pay for their two children to attend secondary school.

The sweetpotato component is creating a network of primary, secondary, and tertiary seed multipliers, with each level reaching more broadly into farming communities. Multipliers are trained through a so-called 'train-the-trainer' model. The 'seed' consists of disease-free vine cuttings, each of which can be planted to produce three new plants.

By March 2012, the project had surpassed its three-year target by almost 50%, reaching nearly 35,000 households, which are now planting, consuming, and using OFSPs. The majority of the recipients are women, who tend to be the primary sweetpotato producers and the nutrition decision-makers for the family. Surplus planting material has been sold to private companies, consumers, and development programs, extending the reach of the project and increasing the expected income to multipliers by 23,500 US dollars.

An additional component is experimenting with the intercropping of sweetpotatoes with maize to produce more food on less space. Tests in experimental stations are showing great potential and a surprising added benefit. The intercropped sweetpotatoes are clear of weevils, a major crop pest which infests experimental fields that are not intercropped.

"We need to see results replicated over time," cautions Erna Abidin, a CIP sweetpotato production specialist based in Malawi, "but it is a promising finding."

As for other impacts, "for now, we have mid-term results and can gauge impacts only from anecdotal evidence," says Abidin. She can cite numerous success stories of producers and seed multipliers who are earning higher incomes, are able to invest in new resources, and are expanding their OFSP fields. She also sees small businesses attracting more customers with OFSP products, and larger ones interested in marketing OFSP chips and other processed products.



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Cracking the RNA silencing code to stamp out plant viruses

Eliminating a virus from a field of infected plants can take up to a year and cost more than 500 US dollars. CIP scientists are hoping to crack the RNA silencing code that will enable them to add modified RNA to a test tube and thus rid the plant of viral infections through a simple, one-step process.

"It's like a plant vaccine," says Jan Kreuze, Principal Virologist at CIP. Viruses are pieces of DNA or RNA (a variant of DNA) that fool the plant into copying and spreading them, causing diseases in the process. Plants can defend themselves against viruses using a class of RNA called small interfering RNA, or siRNA. The siRNA recognizes the viruses and destroys them by cutting their DNA or RNA into tiny pieces. This process is called RNA silencing. But the plant does not always win the battle, so CIP scientists are looking to find ways to boost the plant's defenses through its RNA silencing mechanism.

Crops such as sweetpotatoes, cassavas, yams, bananas, and potatoes are prone to virus infection. Because they are grown vegetatively (i.e. from plant cuttings and not from botanical seeds), infections can easily spread from one generation to the next. The only way to eliminate viruses from infected plants is through a laborious, time-consuming process that involves a combination of heat or cryotherapy treatment with meristem tip culture (i.e. using the ends of shoots or roots that contain the tissue that produces new cells). It is a process that has advanced little since its inception more than 60 years ago.

Kreuze is leading an innovative research project, which is being carried out by CIP and the Crop Research Institute of Norway.

"Basically we're going to add bullets, in the form of siRNA, to the plants' defense arsenal," says Kreuze. "It's science fiction right now. But if it works, then the lengthy, expensive clean-up process could be shortened from a year to a matter of minutes."

The purpose of the CIP project is to use new knowledge of RNA and plant defense mechanisms to fight off viral infections. Kreuze and his team will stimulate RNA silencing and Systemic Acquired Resistance, or SAR, in infected plants in vitro. The goal is to tip the delicate balance between the plant RNA silencing mechanism to combat the virus, and the virus' ability to avoid and suppress this mechanism, in favor of the plant.

If successful, Kreuze and his team will produce 'kits' containing appropriate cocktails for different crop viruses. The project will be tested on potatoes initially, but the technique will be applicable to a wide range of viruses and crops.



RESEARCH Closing of Olympic Games opens door for sweet fight against malnutrition

The innovative work of the International Potato Center (CIP) and its partners, which use sweetpotatoes to combat child malnutrition, reached 10 Downing Street on August 12, during the Global Hunger Event. Hosted by Britain's Prime Minister, David Cameron, and Brazil's Vice President, Michel Temer, on the closing day of the Olympic Games, the event convened heads of states and government, NGOs and private-sector leaders to kick-start a global effort to combat hunger and malnutrition. The attendees of the summit pledged to significantly improve nutrition worldwide by the next Olympics in Rio de Janeiro.

CIP scientist Maria Andrade traveled from Mozambique to share insights about her work at the Sweetpotato for Profit and Health Initiative (SPHI), which aims to improve the lives of 10 million households across 17 Sub-Saharan Africa countries over the next 10 years through the widespread uptake of sweetpotatoes.

She explained how orange-fleshed sweetpotatoes can play a vital role in the global effort. “(They) are packed with vitamin A and other vital nutrients,” she said. “A sweetpotato a day can supply malnourished children with the recommended amount of vitamin A. This is especially important in regions like Sub-Saharan Africa where 43 million children are stunted and suffer from vitamin A deficiency, which is a significant contributor to early childhood mortality.”

The effectiveness of orange-fleshed sweetpotatoes in improving nutrition was recently confirmed by two studies which were published by the British Journal of Nutrition in November 2011 and by the Journal of Nutrition in August 2012.

In addition to boosting nutrition, CIP’s SPHI multi-stakeholder partnership program also seeks to improve the incomes and livelihoods of smallholder farmers through the effective production and expanded use of sweetpotatoes. These roots are ideal because they grow in marginal conditions and require little labor and few chemical fertilizers, making them a cheap and effective crop in developing countries that need to grow more food on less area. Sweetpotatoes are also particularly suitable in households that are affected by migration, civil disorder, and/or diseases such as AIDS.

CIP’s genebank in Lima houses an extensive collection of over 8,000 accessions from the Americas, Asia, and Africa. They represent more than 80 percent of the world’s sweetpotato cultivars. This genetic diversity has helped CIP scientists develop and distribute nutrient-rich varieties.

“We join Prime Minister Cameron’s and Vice President Temer’s call to end global hunger and childhood malnutrition,” said Pamela Anderson, CIP’s Director General. “Concerted action to promote agricultural research and innovative, pro-poor agricultural strategies are vital.”



Stakeholders setting research priorities for RTB

Squinting at the small type and carefully considering their responses, more than 200 cassava experts from all over the world filled out a survey to gather their input on research priorities for the CGIAR Research Program on Roots, Tubers, and Bananas, or RTBs. The experts were attending a special session for RTBs, as part of the triennial Global Cassava Partnership Conference that was held June 18-22 in Kampala, Uganda. Their responses represented the launch of the RTB priority setting exercise, and they will help to evaluate ‘best bets’ for the RTB research program, identifying which research options are expected to yield the highest impacts.

“Priority setting is one of the most important activities this year for RTBs,” explains Graham Thiele, the program’s Director. “But it is not easy. It involves a high degree of collaboration and compromise, bringing together perspectives and expertise from across four partner CGIAR Centers, six crops, disparate disciplines, and many stakeholder groups.”



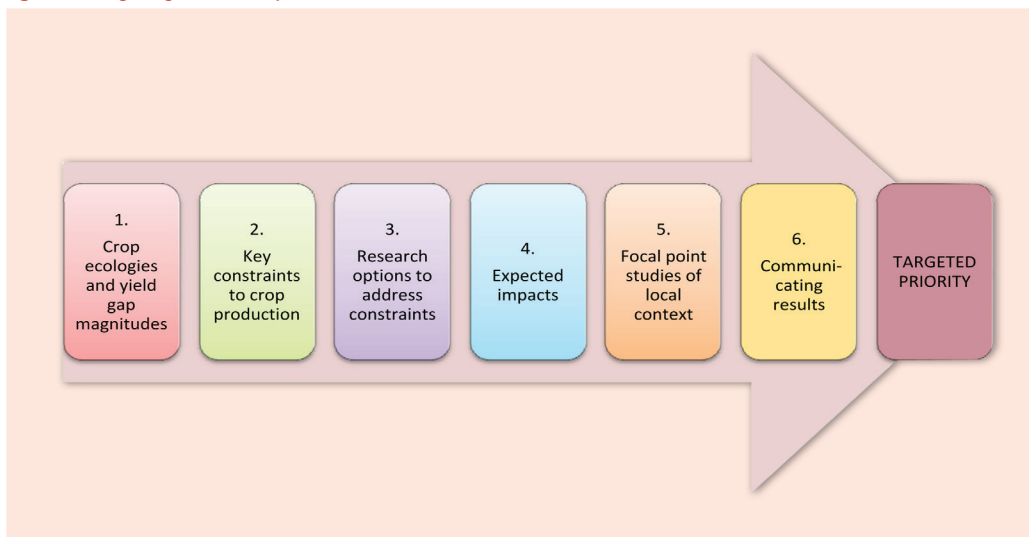
The research priority survey tool is itself an accomplishment, and was developed collaboratively by social scientists and crop experts from CIP, CIAT, IITA, and Bioversity. The survey is the first step of a method designed to take into consideration opportunities, expectations, and obstacles regarding research

outcomes and uptake, and assess potential impacts on poverty, food security, nutrition and health, gender equity, and environmental sustainability. Its six-stage process is depicted in figure one.

“Priority setting will include identifying constraints to improved productivity and the ‘best bet’ new technologies, to give us the highest impact,” says Thiele. It also includes analytic processes to increase the odds of success by spreading the bets across a wide portfolio of research priorities, using a dynamic approach to continually review and update them.

The priority setting survey will be circulated at further upcoming meetings of RTB stakeholders and through other forums in which each of the target crops will be discussed. The hope is to not only identify priorities, but also to build on the synergies being created by RTBs, sharing methodological approaches, engaging in dialogue, building ownership, and spurring joint implementation of the RTB research activities.

Figure 1: Targeting Process Steps



EVENTS Integrating orange with high-level policymakers

In Chipata, Zambia, the Minister of State and Permanent Secretary for Eastern Province attended a field day that took place on April 5 at the Msekera Research Station. CIP scientist Emily Mueller was on hand to present demonstration trials of orange-fleshed sweetpotato varieties, or OFSPs, that were being tested for a project called ‘Integrating Orange’. The event drew television and radio coverage and also featured colorful ‘chitenge’ (long pieces of cloth used as a skirt, bag, or baby carrier) designed by CIP’s art department.

National Potato Day celebrations



The establishment of National Potato Days in Ecuador and Peru are policy successes which bring high-level attention to the role and socio-economic importance of potatoes in these countries.

CIP’s IssAndes program was publicly unveiled in Ecuador as part of the celebrations for its National Potato Day. The event was actually commemorated over several days in Quito and Ambato on June 28-30. In Quito, the festivities included food tastings, informational presentations by participating organizations, and various cultural events. There was also an open-air exhibition of photographs by Jean-Louis Gonterre, who has worked extensively with CIP to document and display the cultural heritage and economic contribution of potatoes in the Andes. Gastronomic activities included the creation of the world’s biggest ‘locro’ (a traditional potato soup of Ecuador), uniting the expertise of 80 culinary

students and raising money for the Potato Seed Program, which is sponsored by Ecuador's Agricultural Ministry.

In Peru, the annual National Potato Day was celebrated on May 30. Festivities were held around the country, but the main focus was in the highland area of Huancavelica, where CIP has a longstanding history of collaborative research with local communities to preserve potato biodiversity, conduct participatory selections of improved varieties, and promote food security. The special attention given to the nutritional value of native potatoes in this year's national celebration was closely aligned with the work CIP is conducting to combat iron deficiency through biofortification.

RECOGNITION

CIP's Jürgen Kroschel took part in 'Recognition of the Huancavelica Region as a Potential Zone for Organic Farming, Production, and Global Distribution', an event which took place on July 5. The meeting drew more than 600 producers from the area along with public figures, including the Peruvian First Lady Nadine Heredia, the Regional President of Huancavelica, the President of Peru's Caritas organization, and a representative from the Food and Agriculture Organization of the United Nations. Kroschel was invited in recognition of the work that CIP's Entomology department has done in collaboration with Peru's Caritas to promote the use of plastic barriers in Andean potato fields to prevent pest infestation and enable organic certification.



J.Kroschel joins other dignitaries in the Tribune of Honor, wearing a traditional Andean hat and scarf.

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