

GLOBE



SMART FOOD

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to produce food more sustainably

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A transdisciplinary approach to the food crisis

Food supply chains are at risk from economic, political and climate shocks – especially in developing countries. That’s why Johan Six and his team are searching for ways to make food systems more resilient.

TEXT Samuel Schlaefli

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During our interview via Skype, Johan Six, Professor of Sustainable Agroecosystems, is sitting in a bland office in Nairobi, the capital of Kenya. That’s where Six, a soil scientist, is spending his sabbatical – close to his project partners in Kenya and several other African countries. He is experiencing firsthand how climate change is increasingly threatening farmers’ ability to ensure food security: “In western Kenya, the short rainy season was almost non-existent last year,” he explains. “Many fields lay fallow, with serious consequences for the supply of food staples.” Six’s research topic is resilience – in other words, a system’s ability to return to equilibrium after an extreme event – and he insists on the

need for a shift in focus: “In the discussion surrounding sustainable food supplies, people often pay too little attention to the resilience of the overall food system.”

Research involving those affected

As part of the AERTCvc project, funded through the Coop Research Program of the World Food System Center and the ETH Zurich Foundation, Six and his team analysed the value chains of teff in Ethiopia and cocoa in Ghana. Teff is the most important food staple in Ethiopia, while cocoa is Ghana’s key export commodity. The team of researchers looked for factors that could enhance the resilience of the teff and cocoa value chains. They conducted

several hundred interviews and focus group discussions with farmers, seed manufacturers, transport companies, agricultural service providers, lenders, government authorities, insurers, NGOs, distributors and consumers – because shocks affect not just farmers, but all the stakeholders in the value chain. A lack of communication between these stakeholders is one of the causes of inadequate resilience to factors such as droughts and fluctuations in global cocoa prices.

On the basis of their analysis, Six and his team drew up action plans together with the stakeholders. Responsibility for the interactions with the stakeholders was shared by the Transdisciplinarity Lab (TdLab). At TdLab, natural scientists and social scientists from the Department of Environmental Systems Science work hand in hand to develop solutions for sustainable development in close cooperation with the relevant stakeholders. “The objective of our research is not only to achieve a better understanding of sustainable development, but also to make a real difference on the ground,” explains co-director Pius Krütli. “But we can only do that by involving local stakeholders in the research process at a very early stage.”

To this end, the team used techniques such as the rich picture method. This method requires stakeholders to record the everyday challenges they face as well as potential solutions, in order to gain a clear overview of both the problem and the available scope for action. It is a promising tool, especially in cases where illiteracy rates are high and education levels low. The AERTCvc team also deployed the design thinking method, encouraging workshop participants to come up with creative solutions in a structured process. While that worked well in Ghana, it was less successful in Ethiopia, where

many of the stakeholders spoke only Amharic. Six and Krütli had to work together with interpreters, which made the process more complex. “It’s all part of the intercultural learning process,” says Krütli.

Do organic methods promise greater resilience?

The experience the AERTCvc team have gained is proving to be a useful resource for researchers on the OrRes project (funded through the Mercator Research Program of the World Food System Center and the ETH Zurich Foundation), which aims to discover whether the value chains of organic products are more resilient to weather extremes than those of conventional ones. To answer this question, William Thompson, a doctoral student, is analysing the value chain linking small-scale cocoa producers in Ghana with chocolate manufacturers in Switzerland. Last year, Thompson carried out drought resistance assessments together with more than 500 cocoa farmers from two different regions of Ghana. The assessments were based on data from the period 2015–2016, when Ghana was stricken by severe drought. In addition to conducting interviews, focus group discussions and workshops, he measured soil conditions, available shade for the cocoa plants, biodiversity and planting density at 70 different farms. Thompson is currently evaluating the data, but says it is still too early to draw any conclusions with regard to resilience. He does, however, point to a dramatic drop in the number of bees and other pollinators in Ghana. In 2018, this led to the unprecedented deployment of thousands of workers to pollinate the cocoa plants by hand. The decline in bee populations is most probably due to the use of pesticides that are banned in organic agriculture. Still, Six consid-

ers it questionable whether organic production methods can make the system as a whole more resilient, since organic and fair trade labels rarely provide farmers with the significantly higher incomes they need to ensure a sustainable, resilient livelihood.

Less waste and more productive soil Six’s latest project – his most complex and ambitious to date – is entitled RUNRES. In collaboration with the TdLab and supported by the Swiss Agency for Development and Cooperation (SDC), a transdisciplinary team is working across four African countries to analyse the flow of valuable nutrients between rural areas and cities, the goal being to reduce the accumulation of nutrients in cities and instead use them in agriculture. Thus, the analysis will serve as a basis for constructing a circular economy based on nutrient recycling. “Organic waste – like kitchen scraps, for example – account for around 70 percent of all refuse in African cities,” explains Six. “At the moment, this waste ends up in unofficial garbage dumps or in rivers, and is a breeding ground for disease.” Organic

waste of this kind could be returned to rural areas as compost or animal feed. The same goes for human excrement: urine and faeces can be used to make biological fertiliser. That would keep cities cleaner and help enhance the productivity of agricultural land.

Six is currently coordinating this multi-year project from Nairobi, where he is spending his sabbatical, and he will continue in this role once he returns to Zurich. The four research locations – Rwanda, Ethiopia, Democratic Republic of the Congo and South Africa – are represented by professors, postdoctoral students, local project coordinators and a variety of different stakeholders. Six is delighted: “With SDC and our local research partners and stakeholders on board, we have partners who will help put our research into practice on a wide scale. That’s a unique opportunity.” ○

Further information:
→ <https://resilientfoodsystems.ethz.ch>



Cocoa

Owing to the dramatic decline in the bee population, thousands of workers had to be deployed in Ghana in 2018 to pollinate cocoa plants by hand.