

AGROBIODIVERSITY NURTURES OUR FUTURE



CROPDIVA aims to make six currently underused crops more attractive to farmers and processors. An ambitious goal, but why is it even necessary? The project coordinator UGent (Ghent university) answered that question during the first CROPDIVA symposium. From the 4th to the 6th of December, scientists from across the globe gathered in the university's hometown Ghent (Belgium) to learn about the importance of agrobiodiversity in all aspects of the value chain.

Agrobiodiversity, or agricultural biodiversity in full, refers to the variety and variability of plants, animals and microorganisms that are used directly or indirectly for food and agriculture. We may not always notice it in our day to day lives, but the variety of crops that are grown and consumed by humans has decreased significantly over the last few years. "No wonder," project chairman Geert Haesaert starts off his talk, "agriculture these days is faced with a lot of challenges that do not make it easy to keep crop diversity up to par."

Green revolution

Agriculture has never produced as much food as it does today. The growing world population, along with the growing demand for biomass resources by non-food industries, is pushing our farms to their boundaries. Add to that elements like crop stress resulting from climate change and the decline in available farm land due to urbanization, and it becomes quite apparent.

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If our farmers are to produce the amount of food we need to feed the world, they have no other option but to intensify their land use. Sadly, intensification comes with a downside. Not only does it increase our food footprint, it also makes farmers and food producers lean towards crops that are high in demand and can easily be farmed. “10 plant species currently deliver 95 percent of our food. That means a lot of genetic diversity is in danger of being lost. This is a risk not only for the farmer but for every actor in the food chain. More diversity means more resilience all around. We are in dire need for a more sustainable intensification system that uses innovation to increase productivity, and that we can associate with positive environmental and social impacts”, professor Haesaert concludes.



Around the world

The idea of a more sustainable intensification system sounds great on paper, but the practical side of things might prove to be a bit more difficult. Professor Johan Six (ETH Zürich) keeps track of actual implementations of these sustainable farming systems around the globe. He finds solace in mixed cropping and intercropping systems, where one plot is populated not with one, but with multiple crops that have the potential to benefit each other. Mixed cropping and intercropping are applied globally in many different ways. All are associated with

their own upside and downside factors. A quite successful example is the Quesungual system that is currently used in Honduras. As most of the farmland in this part of the world can be found on hillsides, soil erosion and secure water provision are major problems. Instead of cutting down vegetation and then burning it, as is common in the slash-and-burn system, Honduran farmers thin and prune the forest on their farm lands. Tree branches that were cut, are put down on the maize field as mulch. When the harvest stage is near, maize stalks are cracked and used as support for a second crop, beans. This system has brought local farmers many benefits. It has allowed them to keep farming on the same land, where previously, relocating their plots – and burning additional forest in the process - was necessary. Nonetheless, professor Six emphasizes an important sidenote: “Alternative, more sustainable systems can be successful, but their effect depends in great lengths on where and how they are implemented. Socio-economic support, for example in the form of government aid or education, is key.”



Fotograph by Jorge Rubiano

From farm to fork

Even when intercropping and mixed cropping may give farmers the tools to diversify the crops they grow, those crops still need to end up on our plate to

come full circle. Prof Carl Lachat (UGent) knows that of all 390.000 plant species grown around the world, only 5538 are used for food at the moment. “We have transitioned from consuming a diverse set of food sources (both plant and animal) to highly processed food, which is limited in the components it sources from. We are in need of good metrics that show how agriculture can contribute to turning this around”, the professor adds. Today, we measure a balanced diet by looking at how many food groups we consume. This is not necessarily the best way to do so. Research shows that the more species we consume, the better our diet is and the longer we live. “Culture is an aspect that is not to be ignored. For example, we see that a real revolution is ongoing among restaurant chefs. The attention to diversity in terms of taste and species is definitely increasing in the sector. This trend needs to carry over to the regular kitchen table. Only if that happens, agriculture will be successful in the goal we discuss today: to increase agrobiodiversity along the value chain.” It indeed all starts on consumer end. Farmers can only grow a diverse set of crops, if, we, as a consumer, ask them to do so.



Preserving our future

One thing is clear: we have our work cut out for us if we are to bring back diversity to our lands and diets. But time is running out. Until new value chains around underutilized crops arise, we need to make sure these crops do not disappear altogether. Professor Andreas Börner (Leibniz Institute of Plant Genetics and Crop Plant Research) assures us that gene banks all over the world protect the genetic diversity our planet once harbored. Gene banks serve as repositories for different kinds of genetic material, such as seeds, tissues or DNA, that stem from a variety of plant and animal species. For seeds, the start of storage dates back to the 1920's, when it became clear that old landraces had started to disappear in favor of crops that can be grown and harvested in an industrial way. Through storage, we allow seeds to remain viable on long term and make sure that crops that are lost in the field can still be sown again. However, this does not mean we can rest on our laurels. When stored under ideal conditions, seed longevity is still limited and even within the same species, a lot of variance can be observed. This yet again proves that genetic diversity is a factor that is not to be overlooked. In a sense, it may even be the solution to the problem at hand. By taking a deep-dive in plant genetics, can we create new varieties of orphan plant species that better meet the needs of the contemporary farmer, processor and consumer, and thus make them attractive again to grow and eat? The (CROPDIVA) future will tell.



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