

# Plant biotechnology as an innovative response to social challenges - PD. Dr. Zerihun Tadele

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Regions with [recurring and devastating famines](#) like Ethiopia, could be supported by plant biotechnology to improve food and nutrition security. Thus, increasing the crop productivity by innovative plant breeding technologies would especially benefit the livelihood of small-scale farmers and consumers in these areas.

What are the current trends in plant biotechnology?

The current trends are more advanced and precise techniques in plant biotechnology. Previously, we could only hope for the random occurrence of desirable traits when applying conventional breeding techniques. Nowadays, plant scientists have the unprecedented opportunity to address major constraints in food production by developing desired benefits in crops in a much faster manner. The current trends, like CRISPR-Cas9 and marker-assisted selection outperform the older techniques in their precision and speed.

How do those new techniques benefit the society?

The different stakeholders agree that we are going to increasingly apply biotechnologies in the future to effectively respond to social challenges. My research focuses on specific traits which we want to improve. For instance, we try to tackle lodging, the collapse of plant stalks, which is the major yield-limiting factor in tef (a very important cereal crop in the Horn of Africa, particularly in Ethiopia). We also work on other disadvantaged crops that have not yet been improved by classical methods due to little attention given by the global scientific community. However, these crops play vital roles in the economy of countries in Asia and Africa.

## Do developing countries profit the most from plant biotechnology?

Once a technique is developed it has a great potential to be used globally. However, not every country grows the same crops, and some have a higher economic importance than others. Thus, especially developing countries need to develop relevant research in plant biotechnology to improve their native crops.

“As plant scientists, we have unique opportunities to address major constraints in food production.”

*Mr. PD. Dr. Zerihun Tadele - Group leader of the Tef Improvement Project at the University of Bern, Switzerland*

## What are the most interesting and promising techniques?

Two of the techniques we mainly apply in our research are CRISPR-Cas9 and marker-assisted selection. Both techniques help to introduce a desired trait in plants such as stress tolerance, quality improvement, and productivity enhancement. Moreover, we focus on the discovery of new techniques which can be applied in the field of plant biotechnology since the strengths of one technique may overcome the weaknesses of another. In general, plant scientists have to select the appropriate technique based on the desired trait, the crop, the consumer interests, and the regulations of the country or region the final product is used in.

## Is there a difference between the European debate and the one in developing countries?

The recently published opinion of [Advocate General Bobek](#) indicates that the debate over new breeding techniques might be changing in Europe. However, I mostly follow the global debate which primarily focuses on the final product, rather than the process through which it is obtained. For example, the process of CRISPR-Cas9 may result in the transfer of some undesired traits to the plant. However, these traits can be removed with high precision and efficiency at a later stage. The final product should be the focus of the discussion, as focusing on the process hampers possible developments in plant biotechnology. The debate in developing countries, especially Africa, largely resembles the European debate since a lot of agricultural products are exported to Europe.

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## What is plant breeding?

Plant breeding is the art and science of changing the traits of plants in order to produce desired characteristics to improve the overall function of various plants and crop systems.

With the predicted growth in the global population and the effects of climate change, varieties with increased yields and resistance to drought and disease are critical if we are to provide enough food for future generations. Plant breeding is one of the tools that will help us achieve sustainable crop production in the long term.

## About the NBT Platform

The NBT Platform is a coalition of SMEs, large industry representatives and members of prominent academic and research institutes. Its aim is to provide policy makers and stakeholders with clear and precise information on NBTs and to generate awareness about their benefits for the European economy and society.

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