AFBV
Association Française
des Biotechnologies Végétales

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EUROPE MUST URGENTLY EMBRACE NEW BIOTECHNOLOGIES (NGT) TO SAFEGUARD ITS FOOD SOVEREIGNTY

In order to feed a world population of 10 billion in 2050, we must act on all the factors that can affect agricultural production potential. Indeed, there are considerable production losses from the field to the consumer's plate. One third of the food produced for consumers is lost or wasted according to the FAO. To this waste must be added production losses at the crop level, from sowing to harvesting.
Moreover, given the programmed reduction of authorized chemical means, in a context of climate change, the risks of production losses in the field could increase. How can we avoid this lack of resilience in our agricultural production?

For the AFBV, there are very promising margins for progress to secure and develop plant production. These margins are to be found in innovations in the field of genetics. Genetic engineering technologies are used to limit the loss of production potential during cultivation, thus allowing the yield, in quantity and quality of the crop, to come as close as possible, in a given environment, to its optimum genetic potential.
France and Europe, which have intervened at the regulatory level to limit waste at the distribution and consumption stage, must now urgently adapt the regulations in force to allow new genomic technologies (NGT) to make their contribution to limiting production losses at the crop level. The future resilience of our agriculture and thus the safeguarding of our production potential are at stake.

This adaptation of the European regulation on GMOs is therefore a strategic issue: ensuring food security for Europeans, one of the founding principles of the EU and the CAP. The EU cannot, without risking the loss of its food sovereignty and therefore also its economic sovereignty, refuse to allow farmers to benefit from these new biotechnologies.

EUROPE MUST EMBRACE NEW GENOMIC TECHNOLOGIES (NGT) TO REDUCE POTENTIAL PRODUCTION LOSSES IN AGRICULTURE

Faced with an increase in the world's population expected to reach 10 billion in 2050, we must act on all factors that can affect production and use of food products to ensure all human needs. Waste is cited as one of the factors reducing the availability of food. According to the FAO, one-third of food produced for human consumption each year is lost or wasted.

Limiting waste plays an important role in achieving food security

Waste is most often considered to occur either between harvest and marketing or at the consumption stage. At the consumption stage, around 20% of food is thrown away worldwide, i.e. almost 1 billion tons of food (931 million to be precise) (Source: UN Environment Program (UNEP) and the British NGO Wrap).

In addition to these losses, there are those measured upstream of consumption, from agricultural production to distribution. According to the Food and Agriculture Organization of the United Nations (FAO), about 14% of the food produced in the world is lost before it even reaches the market.

In France, each year, 10 million tons of food are lost or wasted throughout the food chain, of which 68% occur between harvest and marketing and 32% at the consumer level (Source: ADEME). In France, various actions and four laws have been taken to limit losses and waste at distribution and consumer levels. The objective of the authorities is to reduce food loss and waste by 50% by 2025.

Production losses that cannot be used to feed the world

In this analysis, we often neglect to consider production losses occuring in the field between planting and harvest and which do not show up in published statistics.

Indeed, the production of a crop can be more or less far from its potential, which depends on the variety and the environment in the broad sense. For example, in the case of wheat, production at sowing has an estimated potential of 13 tons per hectare (t/ha). At harvest production of 17 t/ha has been observed in Australia, while in France an average of 7.5 t/ha is harvested in conventional agriculture and half of that in organic agriculture. Losses are also significant in the case of maize, where a productivity of 20 t/ha was reached on a test plot, whereas the average harvest is around 11-12 t/ha (Source: Arvalis). During the crop’s production cycle, the plant is subject to numerous hazards that can be classified into two categories: first are the consequences of climatic hazards such as hail, frost, heat, floods, and drought. Second are the attacks on the crop by biological aggressors and weed competition.

Losses of up to 50% at crop level

If losses due to waste are around 30% between harvest and consumption, losses from failing to achieve production potential could reach around 50% at crop level. In some cases, these losses can go as far as the complete destruction of the crop. Biological aggressors are an important factor in crop losses: 30% in maize, 40% in potatoes, 50% in wheat and up to 80% in cotton. Climate change will only accentuate these yield losses. It is therefore important that all available means be used by the farmer to avoid potential production losses in the field.

What toolbox can be used to reduce losses in agricultural production?

To cope with this, the farmer will apply optimal agronomic practices (choice of a cultivar adapted to the environment, soil preparation, crop rotation, etc.) and use various means of control during the crop cycle, including the following:

Physical tools: for example, using protective nets against hail, heating the plot to fight against frost or applying robots to remove weeds. However, these methods can only be applied to small areas and require a high level of investment. In recent years farmers have also benefited from the data provided by digital applications, such as information on climate, risk of pathogens or aggressors, or soil composition.

Chemical and biological agents: Other means to control weeds, pathogens and pests involve the application of natural or synthetic chemical molecules and biological control. These tools which play an important and critical role in limiting the loss of the production potential, are often challenged today. Reduced use is an important objective for the farmer in order to limit their impact on the environment. Reduction of chemical and biological applications is only possible if alternative means are available to limit losses and waste and to secure production.

Genetic improvement: a third complementary way to protect crop production is genetic improvement of varieties. Such improvement has been occurring since the dawn of agriculture and has evolved with increased knowledge and new technologies. It was first carried out by farmers themselves and is now essentially the focus of public and private breeders. If the breeder's toolbox in the beginning was limited only to the genetic variability present in the species and the results of field evaluation, overtime new technologies became available such as induced mutagenesis and, since the 1970s, those linked to the analysis of genomes allowing the identification of genes and corresponding proteins responsible for an agronomic trait. Genetic markers are now routinely used by breeders to trace genes of interest generation after generation.

Since the 1980's the possibility of transferring genes into plants opened up new possibilities, in particular for controlling insect attacks or viruses. Plants having such genes, called Genetically Modified Plants, are cultivated throughout the world but not in Europe with the exception of Spain and Portugal. They have shown positive impact on crops such as cotton, maize, soybean, oilseed rape, papaya, potato and eggplant. Biotechnologies continue to evolve and the advent of genome editing (sometimes referred to as targeted or directed mutagenesis), permitting a targeted modification of the genome, opens up new prospects for plant improvement by providing new genetic variability and saving time in its transfer to new varieties, without introducing genes that are foreign to the species.

Conclusion: Improved genetics can both increase and make more secure agricultural production.

In view of the planned reduction in authorised chemical applications in the context of climate change, risks of losing production potential will increase in the future. Fortunately, there are very promising opportunities to secure and increase crop production through genetic innovation.

This is why, as mentioned above, breeders must be able to use all technologies, including those derived from genetic engineering, as they become available. Regulations must keep pace with these developments and must be adapted to take into account acquired knowledge. Development of these technologies will make it possible to limit potential production losses during cultivation, allowing quantitative and qualitative yield to reach as close as possible its optimum genetic potential in a given environment.

France and Europe, which have taken regulatory action to limit waste at the distribution and consumer levelse, must now rapidly adapt existing GMO regulations to enable new genomic technologies to make their contribution to limit potential production losses at the crop level.

Beyond this sustainable development issue, the reduction of losses in production potential is a strategic issue: ensuring food security for Europeans, one of the founding principles of the EU and the CAP. The EU cannot refuse to allow farmers to benefit from new biotechnologies without risking the loss of its food and economic sovereignty.

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