Genetically modified crops: a moral imperative?

McPhoto/Blickwinkel/Specialist Stock

Jürgen Mittelstrass

Based on the achievements of science and technology, our world is becoming more and more the product of humankind. This product includes nature. Natural structures recede and artificial structures take precedence. And with this, many of the problems that we have with ourselves and with our world are also on the rise – especially environmental problems that are characterised by the problematical interweaving of natural and artificial developments, that is, technological developments. The investigation of these developments, insofar as it involves research on the earth and its climate, already presents a difficult scientific task. As formulated by the Max Planck Society in Germany, it includes the investigation of spatial and temporal variations in

... the expected addition of more than 2 billion people ... together with the predicted impact of climate change, will have dramatic consequences

*… nature is always creative nature (*natura naturans*) or created nature (*natura naturata*). The first is the nature we cannot live without; the other is the nature that we increasingly appropriate*

structures and in composition of all terrestrial systems from the inner core to the outer atmosphere; the investigation of the connections between physical and chemical processes, which takes account of the energy transfer between the components of the earth–sun system; the investigation of marine and terrestrial ecosystems and their evolution; and the interactions of the biosphere with the processes of the 'system of the earth' – and on top of that must also consider the feedback between the physical, chemical, geological, biological and social systems of the earth, their development and their effects on the metabolism of organisms and the biological complexity of the planet earth.[1]

An important part of this task – from the point of view not only of research but also of intervention – is presented by agriculture. Here we are dealing with feeding a rapidly growing world population and with the sheer survival of our poorest people, who are suffering the consequences of the climate and of difficult economic structures, for instance, in Africa. About 1 billion of the world's population of some 7 billion people, among them one-third of the population of Africa (about 1 billion people), are currently undernourished; and the expected addition of more than 2 billion people within the next two to four decades, together with the predicted impact of climate change, will have dramatic consequences. Above all, population growth leads to a situation in which ever more people in Africa have to live on the product of ever smaller areas of land, which climate-dependently provide ever smaller harvests due to drought, soil degradation, erosion and water scarcity.

In this situation, genetic modification technology, that is, the production of genetically modified food plants, has come into the foreground because of its potential to enhance calorific and nutritional quality (as in the case of pro-vitamin-A-fortified 'Golden Rice' which is pertinent to the treatment of childhood blindness) and to increase resistance of plants to pests and diseases, as well as improving tolerance to environmental stress.

A report from the Pontifical Academy of Sciences provides examples of how transgenic plants could contribute to food security in the context of development.[2] Here, the often-heard objection that by messing around with nature, genetic engineering means 'playing God' is fundamentally misleading. It overlooks the fact that the genetic technologies of plant breeding are merely the continuation of breeding techniques which have been pursued for thousands of years – now with different, more effective means. Furthermore, the fact is usually overlooked that nature, too, is experimenting every day and every night. Some effects cannot be foreseen, as in the emergence of new diseases, but others are a feature of evolution and entirely predictable, as in the appearance of resistance to chemical intervention in medicine and agriculture. They are part of life and nature. This also means that the possible evolutionary risks of genetic engineering are not greater than the risks of the natural process of biological evolution. This is already stated in a report published in 1989 by the US National Research Council (NRC): '*As the molecular methods are more specific, users of these methods will be more certain about the traits they introduce into the plants and hence less liable to produce untoward effects than other methods of plant breeding.*'

Generally speaking, without the application of new technologies as part of the galaxy of other essential changes required in terms of practices, inputs and policies, we will not be able to cope with hunger on this earth, with hunger in

Africa, a continent that struggles not only with climate problems but also with difficult political and social circumstances. In light of this, such application is not only possible and scientifically and economically suggested, but also imperative. Or as the above-mentioned study reports: '*There is a moral imperative to make the benefits of genetic engineering technology available on a larger scale to poor and vulnerable populations who want them and on terms that will enable them to raise the standard of living, improve their health and protect their environments*'.[2] In this sense, particularly if even mere survival depends on the application of these and other technologies coupled with access to fair markets, infrastructure, communications, etc. (which are beyond the scope of this essay), these new technologies must be seen as a global public good – just as hunger is a public challenge. And we should not make a business of hunger. That means that measures must be taken to provide poor farmers in the developing world, as in Africa, with improved crops produced by advanced conventional breeding and, where appropriate, with access to improved genetically engineered crop varieties that fit the local conditions, and to push governments and international aid agencies to invest further in this enterprise. This holds especially for international organisations like the FAO (Food and Agriculture Organization of the United Nations), UNDP (United Nations Development Programme), CGIAR (Consultative Group on International Agricultural Research) and UNESCO (United Nations Educational, Scientific and Cultural Organization), which all bear a special responsibility for the nourishment and physical well-being of the world population.

To return to my starting point: nature is always creative nature (*natura naturans*) or created nature (*natura naturata*). The first is the nature we cannot live without; the other is the nature that we increasingly appropriate, that we seek to optimise for justified purposes, but that we also destroy both knowingly and unwittingly.

With regard to the first sense (creative nature) the point in the future will be to give back to nature a piece of independence, to view it once again more in the sense of the ancient Greek philosopher, Aristotle. This task is supported by ecological points of view and measures. With regard to the second sense (created nature) the point will be to adapt natural developments to the solution of urgent problems of nourishment. This task is served by the new genetic technologies of plant breeding. What is important is that this is done judiciously so as to grant nature its own value, so that nature does not completely become an artifact and at the same time can provide that basis for life that is urgently needed by a growing world population, especially its poor and poorest – and thus most vulnerable – parts.

References

1 www.mpg.de/forschungsgebiete/CPT/GEO/Geo_Klimaforschung/index.html (27.07.2007).

2 Pontifical Academy of Sciences (2010) Report of Conference, Vatican City, 15–19 May. *New Biotechnology* **27**: 445–718.

Professor Dr Jürgen Mittelstrass *is at the Department of Philosophy, University of Konstanz, Germany, and is Chairman of the Austrian Science Council (Vienna).*
Fachbereich Philosophie, Universität Konstanz, D-78457 Konstanz, Germany.
juergen.mittelstrass@uni-konstanz.de