

# **Strategic Necessity of Biotechnology, Nano-Biotechnology, Gene Editing, and Gene-Drive in Future Crop Production – Vision 2025/2050**

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Between 2015 and 2050 more than a doubling of crop production, a tripling of plant based protein production (food & feed), and a tripling of fruit and vegetable production is necessary to feed 9.3 billion people living on earth.

Considered key factors are: loss of arable land caused by urbanization, industrialization, desertification, water shortages, shrinking resources, climate change, species extinction, economic disparities, political instabilities, migration, global trade, new cutting edge technologies and digital information systems.

The actual modern biotechnology methods are fully in line with the vision: "To understand the dialogue of genes and carry it on further, to decipher the primary language of nature, to marvel at it, to understand it, to open up its possibilities with a sense of responsibility, and to use it in an ethically acceptable way. Because without genes there can be no seeing, speaking, hearing, feeling or smelling, there can be no language, no communication, no dialogue, no art, no ethics, no morality, and no life.

To use the primary language of Nature, or: *How can we find the way from the secrets of life to ethically acceptable innovations for the future?*"

Evolution takes place by billions of new combinations of A and T and C and G, which on one side should be protected by man and on the other side, can or must be used.

The use of modern biotechnology methods raises complex questions relevant for humans, societies and ecosystems – today and in future. An adequate authorization or regulation of 'synthetic biology' of plants/crops in time will be necessary so that the societies do not lose the positive and essential potential.

Therefore:

- 1.** The world needs leaders looking ahead and not reacting easily, which are inspired and not only the feasible, who think long term for future generations of which we have only lent the present.
- 2.** The world needs leaders who are empowered by a vision, inspired by ethical considerations and possess the political courage to look beyond the box of the next elections.
- 3.** The world needs leaders who make accountable and responsible decisions, although there is discontinuity, instability, uncertainty, incalculability and unpredictability in order to avoid chaos, anxiety and to safeguard a positive future.

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