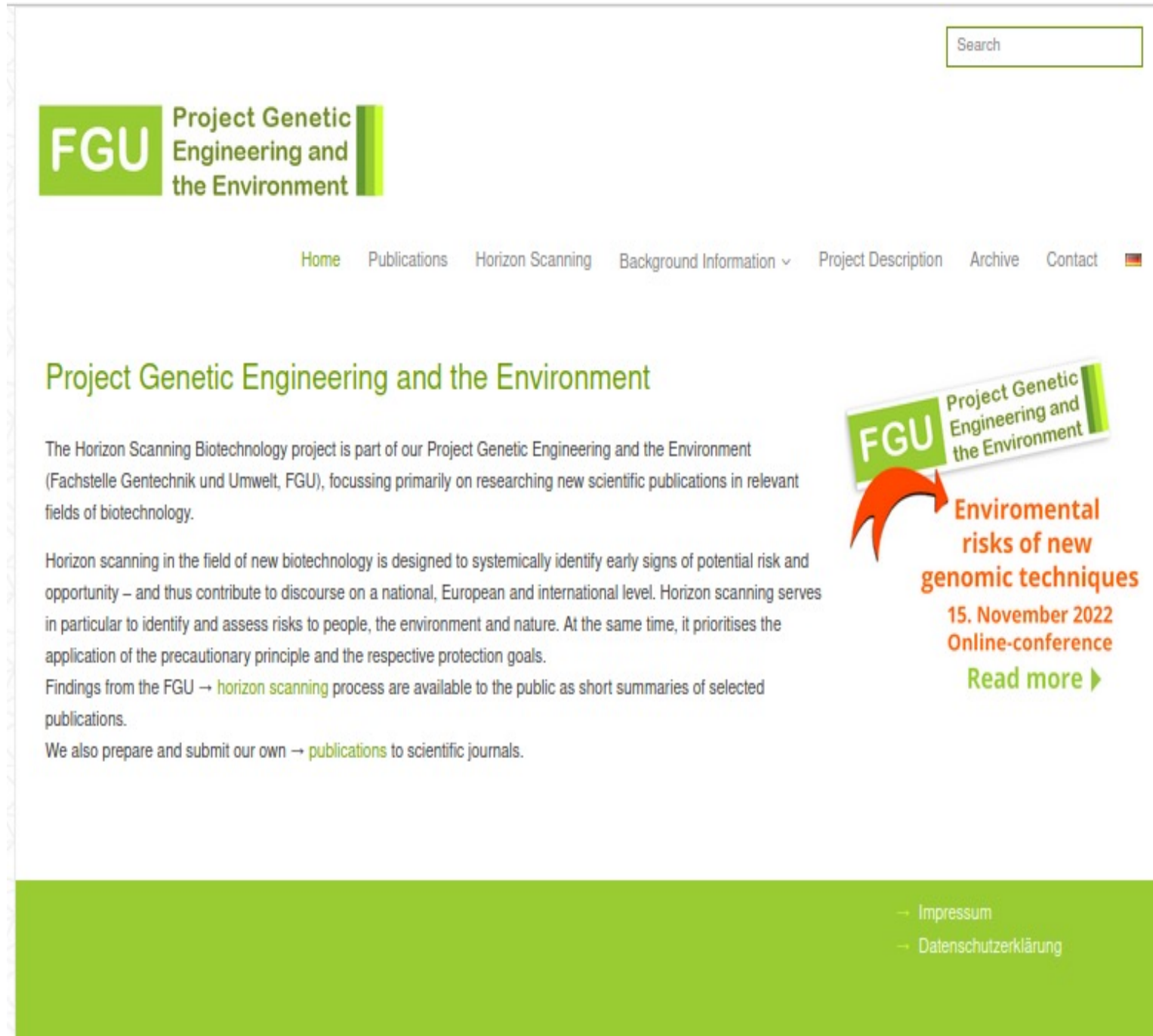



Environmental risks of new genomic techniques



The screenshot shows the website for the Project Genetic Engineering and the Environment (FGU). At the top right is a search bar. The main header features the FGU logo and the text 'Project Genetic Engineering and the Environment'. Below this is a navigation menu with links for Home, Publications, Horizon Scanning, Background Information, Project Description, Archive, and Contact. The main content area has a heading 'Project Genetic Engineering and the Environment' followed by a paragraph about the Horizon Scanning Biotechnology project. To the right of this text is a callout box with a red arrow pointing to the text: 'Environmental risks of new genomic techniques', '15. November 2022', 'Online-conference', and a 'Read more' link with a right-pointing arrow. At the bottom of the page, there are links for 'Impressum' and 'Datenschutzerklärung'.

Search

FGU Project Genetic Engineering and the Environment

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Project Genetic Engineering and the Environment

The Horizon Scanning Biotechnology project is part of our Project Genetic Engineering and the Environment (Fachstelle Gentechnik und Umwelt, FGU), focussing primarily on researching new scientific publications in relevant fields of biotechnology.

Horizon scanning in the field of new biotechnology is designed to systemically identify early signs of potential risk and opportunity – and thus contribute to discourse on a national, European and international level. Horizon scanning serves in particular to identify and assess risks to people, the environment and nature. At the same time, it prioritises the application of the precautionary principle and the respective protection goals.

Findings from the FGU → [horizon scanning](#) process are available to the public as short summaries of selected publications.

We also prepare and submit our own → [publications](#) to scientific journals.

FGU Project Genetic Engineering and the Environment

Environmental risks of new genomic techniques
15. November 2022
Online-conference
[Read more](#) ▶

→ [Impressum](#)
→ [Datenschutzerklärung](#)

Christoph Then
Testbiotech
15 November
2022

Overview (I)

The FGU (FKZ 3519 84 0300) started the 'Horizon Scanning' project in November 2019. The project focussed on new genomic techniques, including their technical potential and possible adverse effects on nature and the environment.

The project was initiated to identify new technical applications and potential impacts at early stage. The FGU also monitored some regulatory aspects.

Overview (II)

The recent project (FKZ 3519 84 0300) benefited from the results of the previous FGU project (FKZ 3517841500): from the beginning of October 2017 until the end of February 2020, the FGU monitored scientific publications in this field, and summarized these for public communication.

During these projects, several publications were filed for peer review. In addition, factsheets and videos were made available in German and English on the FGU website.

Peer reviewed publications

Kawall, K. (2019) New Possibilities on the Horizon: Genome Editing Makes the Whole Genome Accessible for Changes. *Front Plant Sci* 10, 525. doi: 10.3389/fpls.2019.00525

Bauer-Panskus, A., Miyazaki, J., Kawall, K., Then, C. (2020) Risk assessment of genetically engineered plants that can persist and propagate in the environment. *Environ Sci Eur* 32, 32. doi: 10.1186/s12302-020-00301-0

Then, C. Kawall, K., Valenzuela, N. (2020) Spatio-temporal controllability and environmental risk assessment of genetically engineered gene drive organisms from the perspective of EU GMO Regulation. *Integr Environ Assess Manag.* doi: 10.1002/ieam.4278

Kawall, K., Cotter, J., Then, C. (2020) Broadening the EU GMO risk assessment in the EU for genome editing technologies in agriculture. *Environ Sci Eur*, 32(1), 1-24.

Kawall, K. (2021) Genome-edited *Camelina sativa* with a unique fatty acid content and its potential impact on ecosystems. *Environ Sci Eur*, 33(1), 1-12. <https://doi.org/10.1186/s12302-021-00482-2>

Kawall, K. The Generic Risks and the Potential of SDN-1 Applications in Crop Plants. *Plants* 2021, 10, 2259, doi: 10.3390/plants1011225

Koller F., Schulz M., Juhas M., Bauer-Panskus A., Then C. (2022) The need for risk assessment of interactions between NGT-GMOs before their release into the environment from the perspective of the EU regulation (filed for peer review).

New Possibilities on the Horizon: Genome Editing Makes the Whole Genome Accessible for Changes (<http://journal.frontiersin.org/article/10.3389/fpls.2019.00525>)

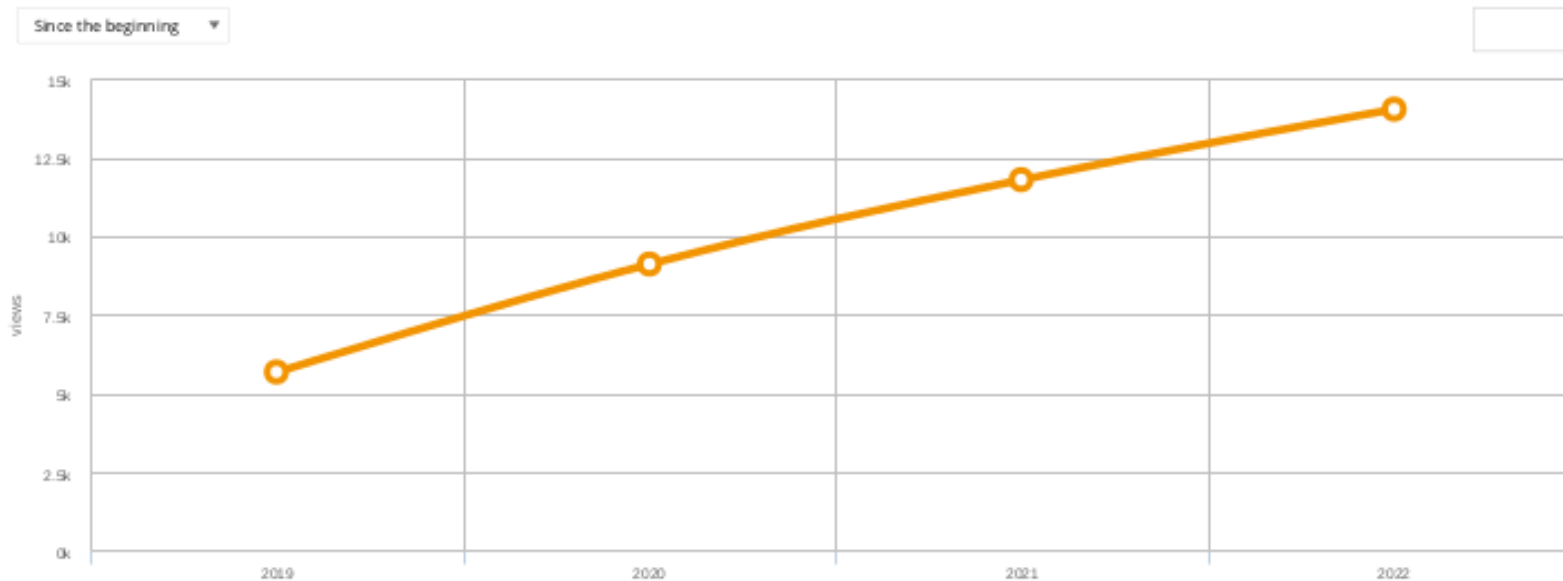
Frontiers in Plant Science (<http://journal.frontiersin.org/journal/373>)
Published on 24 Apr 2019

[View original article \(http://journal.frontiersin.org/article/10.3389/fpls.2019.00525\)](http://journal.frontiersin.org/article/10.3389/fpls.2019.00525)

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More than 50 reviews of scientific publications ('Horizon Scanning')

The following categories were taken into account:

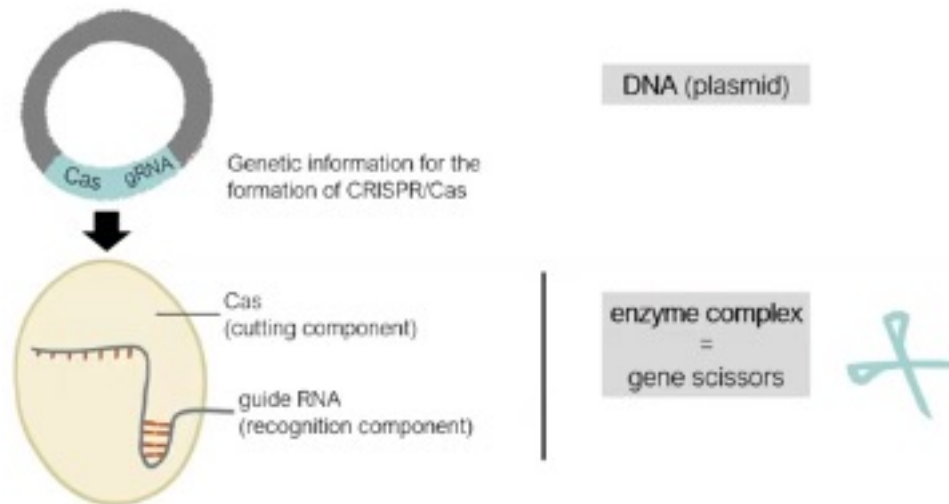
- Technical innovations and examples for applications of NGTs, especially on plants and animals
- New developments in the field of Synthetic Biology
- Research on applications for genetically engineering populations of non-domesticated species
- Impact on and interactions with the environment that can occur from releases of NGT organisms

The 'CRISPR/Cas video series'

Video 1: **CRISPR/Cas – Description of the technology**

How does CRISPR/Cas get into the cells?

CRISPR/Cas can be introduced in various conditions into plant cells.



Important results

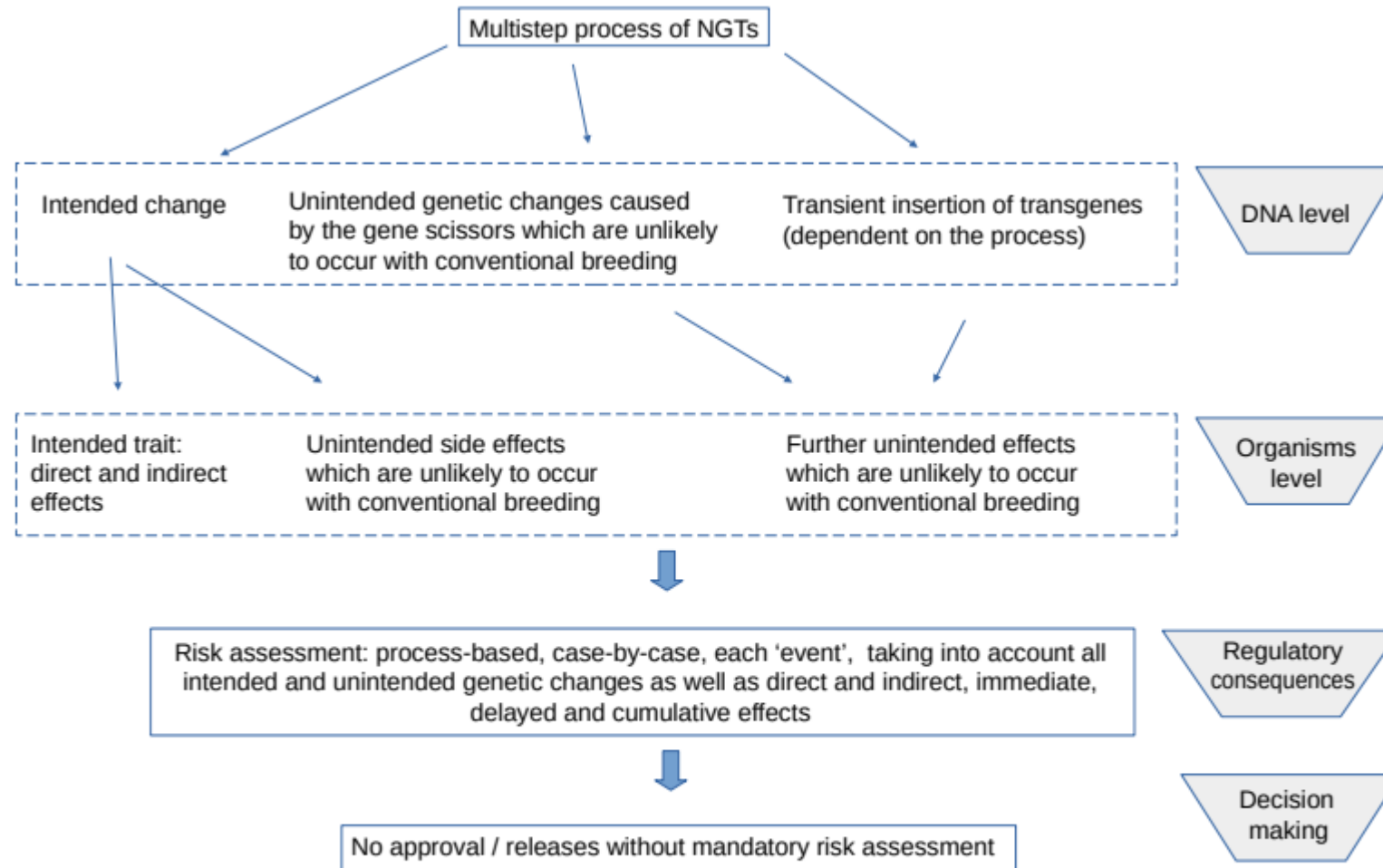
The technical potentials, especially those of the CRISPR/Cas tools, make the genomes of plants and animals more extensively available for changes compared to conventional breeding. As a result, the pattern of intended and unintended genetic alterations (genotypes) can differ from those which are likely to result from conventional breeding (including random mutagenesis).

Also the intended and unintended effects, observed on the level of the organisms (phenotype), can largely differ from those which are emerging from conventional breeding and natural processes. This is also true if no additional genes are inserted into the genome.

Consequently, the effects that NGT organisms have on the environment can also be very different to those which might be expected from conventional breeding or natural processes.

In conclusion, each NGT organism ('event') released into the environment needs to undergo detailed mandatory risk assessment, including also potential interactions between NGT organisms.

Regulatory aspects



Current regulation of NGTs: Intended traits, unintended side effects and unintended genetic changes triggering the need for risk assessment.

