REGULATORY APPROACHES TO SUSTAINABILITY AND INNOVATION

REIMAGINE PLANET

RIE

REPORT

This report reflects the outcomes and discussions of the workshop organised by Re-Imagine Europa together with ALL European Academies (ALLEA), the European Institute for Agroecology and EU-SAGE in December 2022 held under the auspices of RIE's Task Force on Sustainable Food Systems and Innovation.

Foreword

President Ursula von der Leyen placed climate change and innovation at the top of the European agenda, initiating a much-needed re-evaluation of our economies and societies. Central to this are the Green Deal and the Farm to Fork Strategy, recognising the inextricable link between healthy people, healthy societies and a healthy planet and calling for the development of a European model for Sustainable Agriculture.

With the 2019-2024 mandate drawing to a close it will be more important than ever to ensure that the efforts to redefine a more sustainable model for European agriculture are secured through the passing of key legislative proposals in 2023 and ensuring a united vision in this domain ahead of the next European elections in 2024.

Despite the urgency of the task and many shared objectives of key stakeholders, the biggest risk for inaction on this agenda is the polarised nature of the debate around agriculture, food systems, sustainability and innovation. In fact, agriculture is often seen as one of the most dividing issues in European politics as outlined in the Re-Imagine Europa report Beyond the Apple of Discord: Existing Narratives and Ways Forward. This polarisation is the real challenge as it leads to a stalemate that makes it impossible to move forward and perpetuates the cycle of distrust between different stakeholders.

With the outbreak of the war in Ukraine, droughts and water shortages across large parts of Europe and an deepening “cost of living crisis” the need to move to a more sustainable and resilient food system and agriculture has taken centre-stage in the European public debate. However despite this increased sense of urgency the debate has become more polarised.

What we need today is to focus on urgent common policy objectives, break the cycle of distrust and build a more sustainable and resilient model of European agriculture.

For this reason, in December 2022, Re-Imagine Europa, together with EU-SAGE, the European Institute for Agroecology and ALL European Academies convened a regulatory workshop to focus on two of the most important legislative proposal scheduled for 2023: SFSF and NGT legislative proposal.

This two-day hybrid event brought together experts from across sectors, expertise and countries (see below for full list of participants) to go beyond existing polarisations and work on what a regulatory approach to the legislative proposals could look like that supports the broader objectives and concerns of all actors.

Despite differences of opinions, we were delighted to see that overarching policy objectives and underlying values were very similar. This focus allowed for a very productive discussion on concrete ways of thinking about a regulatory proposal that could work for the objectives set out in the F2F strategy.

This report gives an overview of the discussion, highlights key points of disagreement as well as ideas for concrete pathways forward to overcome key blocks. The report does not aim to represent an ideal framework, but rather reflects a realistic and possible pathway forward to overcome existing stalemates and allow Europe to develop a sustainable strategy for food and agriculture in the 21st century.

As the workshop has confirmed, different stakeholders and citizens in the end have similar values and fundamental interests. We all share places in the same boat on an increasingly stormy sea and only working together ensures that we can reach the next safe harbour. Re-Imagine sees the workshop and this report as a contribution to help the European Commission in their efforts to ensure a safe voyage for all European citizens.

INDEX

1.

EXECUTIVE SUMMARY

In light of the European Commission coming out with legislative proposals on Pesticides, New Genomic Techniques (NGTs) and the Sustainable Food Systems Framework (SFSF) the ultimate goal is to make sustainability central to all food-related policies. The purpose of the workshop in December, therefore, was to consider how sustainability might be incorporated or integrated with safety considerations involving both new and traditional breeding techniques within broader EU policies.

The starting point for the workshop recognized the need to reimagine the model for European Agriculture in order to deliver for all stakeholders involved whilst ensuring social, economic and environmental sustainability. Amongst others, the Commission is preparing a legislative proposal on New Genomic Techniques (NGTs) that was originally to be circulated in the second quarter of 2023, but has now be postponed to a later date.

Moreover, the event discussed aspects that are relevant to the legislative framework for sustainable food systems (FSFS) [European Commission (2022)] with the aim to accelerate and simplify the transition to sustainable food systems, mainstream sustainability in all food related policies and strengthen the resilience of food systems [European Commission (2019)]. At the same time, it is known that the European Commission wishes to include a sustainability clause in their proposal, which is an altogether different concept. In this way, the workshop aims to support the Commission in working to address sustainability in their forthcoming draft.

The Expert Workshop was organized as a hybrid event with twenty six participants over two days. Participants were from a diverse range of backgrounds, including academia, policy-making, industry, and farmers. Most participants were members of RIE's Task Force.

The Workshop addressed the themes:

- **Sustainability in agriculture in general in the session "Sustainability Criteria & Innovation"** (Day one); and
- **Sustainability with respect to new genomic techniques in the session "Anticipated NGT Law"** (Day two).

KEY FINDINGS
SUGGESTIONS AND RECOMMENDATIONS

1. The European Union (EU) Green Deal, the Farm-to-Fork strategy, which is part of the Green Deal, together with the Biodiversity strategy, have been key aspirations of EU policy. A common theme throughout remains sustainable food systems.
2. Agricultural practices and food systems comprise a complex and essential group of services. Agricultural systems are highly diverse in the EU, as they are in other regions and countries.
3. Diversity in agriculture should be encouraged in all its forms on equal standing, taking into account the multiple societal impacts. There should be no discrimination either for, or against, any specific form of agricultural practices. Co-existence is all important in terms of agricultural systems.
4. It is necessary to work with a mix of technology systems; the relative merits of different systems should be taken into account. It should not be the case that 'the best' should prevail or 'one size fits all'. It would be inefficient if the full range of innovative technologies are not considered and used in the EU, as appropriate, in terms of sustainability.
5. Rather than creating new sustainability indicators, those that currently exist should be taken into account and implemented as a priority, including the UN Sustainable Development Goals. Important existing indicators include the FAO's sustainability indicators and sub-indicators for measuring sustainability in relation to agriculture.
6. Not everything needs to be achieved through prescriptive rules and requirements. Much can remain voluntary and based on existing agricultural practices.
7. The reduction of food waste is an issue which should be addressed in more detail.
8. Innovation in its various forms is essential for efficient and sustainable food systems including efficient crop/ plant breeding programmes. It is important to avoid ideological approaches to innovation in agricultural practices. Each innovation needs to be considered based on its merits and its value to farmers in the light of existing evidence.
9. One form of innovation currently under consideration is that of new genomic techniques (NGTs). At the time of the workshop, the European Commission (EC) was expected to come up with legislative proposals related to such innovations in the second quarter of 2023. That has now been delayed.
10. It is recognised that a differentiated approach to NGTs is a valuable approach. In other words, those products of NGTs that do not involve exogenous DNA, "nature-inspired" NGTs, can be treated in a more proportionate manner than GMOs, especially those that can result from targeted mutagenesis and cisgenesis. It is important to note that such policy/ regulatory measures are sometimes incorrectly referred to as 'deregulation'.
11. There was a discussion related to labelling and its value to consumers in terms of transparency and choice. At the same time, it is clear that labelling does come at a significant cost. On this point, some experts suggested that when a GM/GE product has been approved for use in the EU there is no justification to require it to be labelled in a way that would imply that it is more dangerous than other approved products. How in the interests of allowing consumers to make an informed choice, positive labelling should be an option, as is the case for organic produce.
12. There was a further discussion as to whether the Common catalogue of varieties of agricultural crop plants approved for cultivation in the EU could serve as a means to provide transparency about the use of NGTs.

13. Some participants, based on historical discussions related to GMOs, pointed out that legislative proposals related to genetic technologies could lead to fractious and protracted discussions in the EU.

14. Additional EC initiatives are certain to be relevant, including those on: i) Plant Reproductive Material (an EC proposal originally expected on June 7th has been delayed); and ii) the Sustainable Food Systems Framework (an EC proposal is expected later in 2023). Both these proposals may involve linkages with the NGTs proposal in terms of sustainability which is expected to be an important consideration in the EU when crops derived from NGTs are deployed in agriculture.

2.

CHALLENGES FOR SUSTAINABILITY IN AGRICULTURE

2.1 INTRODUCTION

With the European Green Deal [European Commission (2019)], the European Commission (EC) aims to transform the EU's economy for a more sustainable future (EC, 2019a), focusing on climate, biodiversity, circularity as well as better protecting human health and the environment as part of an ambitious approach to tackle pollution from all sources and move towards a zero-pollution economy for a toxic-free environment.

To achieve these objectives, the EU aims to ensure that safety and sustainability considerations are integrated, when assessing existing chemicals and materials as well as when designing new ones, which might be alternative choices to already existing solutions. This new, holistic approach is closely related to and to a large extent informed and triggered by the 'Safe (and Sustainable) by Design' concepts that were initially championed and developed through EU-funded projects concerned with nanomaterials, and was later widened to be part of the new EU Chemical Strategy for Sustainability (CSS) [European Commission (2020)] and on the level of the OECD [OECD 2022]. Aiming to encompass all four dimensions of sustainability (safety, environmental, economic and social), a thorough review of different frameworks for the definitions of 'Safe and Sustainable by Design', as well as indicators and criteria pertaining to it has been drawn up European Commission (2022)]. An ethical perspective on this issue was published in 2008 by the European Group of Ethics of Science and New Technologies where the concept of sustainability is discussed at length. (EGE, 2008).

It is known that the European Commission is working on this concept of a sustainability clause and the aim of the workshop was to explore concrete ideas of how such a clause could be imagined.

2.2 THOUGHT-STARTER BY URS NIGGLI, INSTITUTE FOR AGROECOLOGY

Global challenges

Global food systems must be transformed to end hunger (SDG 1), and sustainable, diversified production and food patterns are key (SDG 12). In particular, global warming (SDG 13) and biodiversity loss (SDG 15), as well as many other factors such as poverty (SDG 1), hinder agricultural productivity and food security in the long term.

The scientific group of the United Nations Food System Summit (UNFSS 2021) has formulated three basic recommendations for future agriculture. First, natural ecosystems and protected areas must be preserved from conversion for food production. Second, existing food production systems must be managed sustainably and productively. Third, degraded systems need to be restored and rehabilitated to ensure sustainable food production and ecosystem services (Hodson de Jaramillo et al., 2023). A major concern of the scientific group was to significantly reduce negative impacts on the natural resources of soil, air, water, and biodiversity while maintaining and increasing productivity. Shifting environmental impacts, biodiversity loss, deforestation, and greenhouse gas emissions to lower-income countries, for example, when more food has to be imported into Europe, should be avoided.

The European challenges

The Farm-to-Fork Action Plan provides a legal framework for sustainable food systems. A proposal to this effect is to be presented in 2023. Recommendations from the participatory expert process (EU-JRC, 2022) include a sustainability assessment framework with indicators and metrics that contribute to more transparency to empower key stakeholders such as farmers, consumers and other key change agents (large retailers, large food and beverage producers, financial institutions, and international traders), and enable them to act. . In general, the experts i) called for a paradigm shift away from short-term economic gains towards a holistic sustainability orientation; ii) an urgent need for action that involves binding approaches with ambitious and effective rules. And finally, iii) the ability to act, empower, and act responsibly must be treated as a "package".

The role of science and innovation

Science and innovation are key to ensuring sustainable food security for a growing population (von Braun et al., 2023). Therefore, a comprehensive innovation strategy that is well coordinated and contextually integrated is key. The different categories of innovation are packages of measures that can be combined for success. First is social and institutional innovation, then ecological optimisation, which is also a type of innovation based on the wealth of agroecological research, and finally all types of technical and technological innovations that guarantee well-functioning, productive, and highly sustainable food systems. It is sustainability that reconciles economic, social, and environmental needs. The three-dimensional concept of sustainability is extended to include the way society views new technologies and the dimension of governance, which encompasses best management and responsibility and emphasises ethical values that are important for farmers and consumers (Schader et al. 2015).

One illustration of what such a combination of very different innovations could look like in the future is provided in the following example. Farmers can design and maintain an interconnected network of biodiversity support areas by using their historical knowledge of what the landscape once looked like. They diversify crop rotations in their fields and integrate legumes. They spray fungicides based on epidemiological models and forecasts and distribute fertilisers based on multispectral analysis of leaf green intensity. In such a system, disease-resistant cultivars drastically reduce the frequency of fungicide treatments. Resistance can come from conventional crossing, from biological breeding programmes, or from targeted mutagenesis with genome editing.

The role of breeding

It is important to point out that cultivars with traits that support sustainable farming practices, such as disease and pest resistance, leaf structure that helps suppress weeds, or finely branched root systems that improve the exchange of water and nutrients with the soil matrix, are important for any type of farming. Breeding is always one of many different measures that a farmer applies. Therefore, the widespread assumption that breeding methods using genetic engineering are meant as a single solution ("silver-bullet") is incorrect. It is important to breed cultivars that support sustainable agricultural practices and promote the functioning and self-sufficiency of agricultural systems as a whole. Depending on the economic or non-material orientation of the producers, other breeding methods are in the foreground. Fueling fears, which are misused to impose bans on breeding methods that are not scientifically or ecologically justified, prevents fair competition for the best solutions and therefore slows progress.

Transformation of production and consumption

However, reducing the trade-off between productive agriculture and keeping the planet within safe limits is not just a question of agricultural practices. And it cannot be solved by agriculture alone (Willet et al. 2019). Society's purchasing and consumption patterns are, after all, the key trigger for sustainable development (see SDG 15). Issues such as increased food waste, the high consumption of meat protein and the amount of grain fed to animals are at the forefront. At the same time, there is no alternative to the use of permanent grassland, which accounts for well over 50 percent of the world's agricultural land and cannot be converted to arable land for geo-climatic reasons, by ruminants (cattle, sheep).

Sufficiency is therefore the most important narrative for sustainable food systems, as ecologically sustainable food systems such as organic farming otherwise tend to consume significantly more land per amount of food (Seufert and Ramankutty, 2017). Unfortunately, a sufficiency narrative does not correspond to reality since food waste has not significantly decreased in high-income countries despite public campaigns while in emerging economies meat consumption has increased with rising income. The shift from animal proteins to plant proteins has therefore not taken place; on the contrary, more meat continues to be consumed at the global level (Steinfeld et al., 2006). Moreover, global warming threatens to exacerbate land-use change, requiring more arable land for a strategy of expanding organic agriculture (Muller et al. 2017). But arable land is a scarce resource.

The role of diversification

Agricultural diversification is the most convincing recommendation when it comes to ensuring sustainability and productivity (Niggli et al. 2023; Tamburini et al. 2020; Davis et al. 2012). To improve this diversification at multiple levels, agroecological research findings have been merged with farmers' experiences, resulting in agroecological farm practices (Gliessmann, 2015; Altieri et al. 2015). Such practices include intercropping and mixed cropping with cereals and legumes, alley cropping with trees and shrubs in cereal fields, precise

management in narrow strips with GPS control and recycling of organic manure from livestock or composting facilities. diversification measures rapidly and massively increase the resilience and crises robustness of agricultural production systems. However, the issue of land use remains, which is why high-yielding cultivars are also necessary. New breeding techniques that can produce cultivars with disease and pest resistance in combination with a significantly better output/input ratio are therefore part of the diversification strategy of agroecological farming systems.

When it comes to national and sectoral levels of sustainability characteristics, the entire EU food system is characterised by various approaches and analyses. Where sustainability issues are addressed at those levels, they lack a unified strategy and are frequently incomplete. As a result, there are differences and contradictions that endanger the progress of the Sustainable Development Goals and the European Green Deal. As noted by the EC in 2021, despite the fact that the Union's food systems have achieved "high levels of food security, food safety, and a wide range of consumer choices, there is currently no horizontal regulatory instrument in place at the Union level that could act as a guiding framework instrument that coordinates and drives changes across the food systems as well as an operational tool within and across its different sectors to overall improve the sustainability of the EU food system".

2.3 CONCLUSIONS

In this workshop session, the challenges discussed when it came to defining sustainability criteria were mainly focused on the multifaceted interpretations of sustainability and the varying contexts within which the term could be used (e.g., different SDGs, different backgrounds, locations, crop types, and needs). The lack of a consensus definition of what "sustainable food systems" imply in legislation or in practice is one of the obstacles to supporting a move toward sustainability. What is usually considered one of the best approaches to making an operational definition is the creation of holistic criteria that would apply to all aspects of sustainability in food systems. Through procedures established by the upcoming SFSF, such as the adoption of metrics created to allow measurement of important traits, results, and changes over time, any definition and/or principles would have to be translated into more precise specifications taking into account a plethora of parameters.

Alternatively, some of the group's experts argued that trying to find a sustainability definition and/or new indicators or criteria will only lead to stalemate due to the complexity of the topic, particularly as sustainability is context-specific. Instead, the experts suggested making the existing indicators more operational, such as the 11 sub-indicators for SDG indicator 2.4.1 provided by the FAO (2023). Additionally, experts suggested a three-step-process that regulators could follow when making decisions in achieving sustainable food systems:

- The first step would be to determine the best strategies to adapt and adjust different farming systems. What technologies/ combinations of technologies (European or otherwise) and critical factors are to be considered in various types of systems.
- The second step would be to address how institutions need to reform to facilitate this change e.g. incentives, market functionalities, changes in regulatory systems.
- The third step would be to contextualise these issues from a sectoral perspective.

The main takeaway of this session included the need for different types of innovations to achieve the sustainable and productive management of the existing agricultural land. The key innovations identified consisted of four categories, namely, **social and institutional innovations** (e.g., farmer-consumer partnerships, living labs, food hubs, online food shops, urban agriculture, farmer-farmer coops), **ecological innovations** (e.g., better understanding of sustainably managing soil fertility and (functional) biodiversity), **technological innovations** (e.g., plant and livestock breeding, digitalization, materials science and engineering), and **economic innovations**.

In achieving the EC's objectives, the general concepts that were considered key priorities by the experts when it came to defining cross-cutting sustainability criteria included **Fairness, Clarity, Diversity, Integration, Sustainable Governance, Access, Citizen engagement and Transparency.**

Likewise, the group reached a consensus on several guiding principles including:

1. the need for an equal weight on different innovation strategies;
2. the need to recognise that criteria cannot be rigid (e.g. specific traits) due to context dependency and will need to take into account different parameters, such as topographical and geographical contexts, time of production etc;
3. the need for diversity in all parts of the food system, including soil biodiversity, agrobiodiversity, wild biodiversity, dietary diversity and diversity of knowledge;
4. the need to ensure a fair balance between winners and losers to mitigate the impact of the transition;
5. the need for flexible adaptation at all levels including governance; such as good information systems and tools to facilitate decision-making at different levels of the market chain
6. the need to reform trade and global trade agreements to integrate sustainability requirements;
7. the need for agreed language and terms to address the multitude of definitions;
8. the need to go beyond environmental and economic concerns in addressing aspects such as access to technology and distribution of benefits;
9. the need to ensure that farmers are not unduly burdened through the disproportionate introduction of new measures when existing requirements are sufficient.
10. the need to drastically update the sense of urgency in combating climate change; and
11. the need to put all those engaged, including EU farming and rural communities, consumers as EU citizens, together with policy-makers, decision-makes, CSOs and other stakeholders, at the centre of the debate; the implementation of targets related to sustainability should engage all involved whilst ensuring the freedom of choice for those involved in this transformation.

In contrast, more contentious topics included:

1. **The ways through which regulatory approaches can be funded** to alleviate the impact of the transition and ensure a fair balance between winners and losers. To this end, questions arose on whether markets and/or governments would have control over the transition, the ownership of technologies and the regulatory initiatives.
2. **The extent to which all technologies available should be employed to the optimum extent in combating climate change.** On the one hand, some experts suggested taking each farming system type to define the optimal combination of technologies to deliver the maximum climate change benefits, at a minimum timescale, whilst meeting the population's needs. In this sense, the experts argued that the main priority should be leveraging the sense of urgency in combating climate change through flexible governance structures to speed up the timescale. On the other hand, some experts counter argued that this sense of urgency remains confined to statements rather than actions. In addition, experts disputed that there is a need to define the degree of urgency for different priorities before setting targets. Such a measure would help regulators decide which combination of technologies can address the desired short- and long-term goals and alleviate the immense pressure on farmers.
3. **The need to focus on improving the ways through which farmers are supported, incentivised and encouraged in the target implementation process.** As such, farming experts supported there are many targets in place but farmers are lacking the tools and incentives to achieve them in the set timescales. In this sense, experts highlighted the need to ensure that the transition will compensate the losers that will be hit by stricter regulations and that all goals will follow the same speed in their implementation timeframe. In addressing this challenge, a possible solution is to articulate a toolbox for farmers that would include minimum threshold sustainability criteria as well as financial support that would apply to the enormous diversity of contexts in Europe. In parallel, experts advocated the need to go beyond economic incentives in giving credit to farmers as stewards of biodiversity. In the subsequent discussion, experts recognised the need to reform the institutional set-up of imbalanced terms of trade under which farmers operate in relation to multinational companies. Some argued that it would only be under this condition that farmers and citizens would be engaged and enabled to take the necessary steps towards sustainability.

3.

IMPROVING CROP RESILIENCE THROUGH PLANT BREEDING

3.1 INTRODUCTION

This session of the workshop considered the regulation of NGT plants and NGT-derived food products. At the time that the workshop was held in December 2022, it was anticipated that there would be a forthcoming legislative proposal on New Genomic Techniques (NGTs) in 2023 from the European Commission. The specific content of the proposal was unknown (and remains so), although it is anticipated to involve distinct or differentiated procedures in relation to certain genome editing types, especially those which do not contain exogenous DNA. It may also prioritise sustainability and fulfil Farm-to-Fork and the European Green Deal's objectives.

The workshop explored how sustainability could be incorporated into safety considerations, which apply to both new and traditional breeding techniques, within the broader EU policies. The workshop's starting point recognised the need to "Re-Imagine" a model for European agriculture that would deliver for all stakeholders while ensuring social, economic, and environmental sustainability.

Based on this premise, the experts considered NGTs and their potential for sustainability. The discussion demonstrated the perspectives of diverse stakeholder groups, including plant breeders, farmers, scientists, academia, and consumers, and their corresponding concerns regarding NGTs in light of the upcoming legislative proposal.

3.2 THOUGHT-STARTER BY RENÉ CUSTERS, VIB/ EU-SAGE

Dr Custers offered an overview on the Regulating NGT plants and derived foods in focusing on the areas of Sustainability, Risk Assessment and Traceability & Labelling.

Sustainability

Dr Custers highlighted that plant breeding can contribute to many aspects of the Farm to Fork and Biodiversity strategies, as well as provide products with characteristics that can contribute to increasing agricultural sustainability (for example, disease resistance, increased yield, and quality). NGTs are a tool, among other techniques, that can support sustainability in a shortened breeding time and in more targeted breeding approaches.

From the policy and regulatory perspective, it seems that the EC will initiate three policy developments:

- The Sustainable EU food system proposal aiming to make the EU food system sustainable and to integrate sustainability into all food-related policies. It will lay down general principles and objectives, responsibilities of all actors, rules for sustainability, labelling, governance and monitoring. This legislation has a very broad perspective on the whole food system – consumption, distribution, food processing or farming;
- A specific policy action on plants resulting from targeted mutagenesis and cisgenensis, which may introduce specific sustainability criteria at the level of the NGT trait; and
- An update of EU instruments related to Plant Reproductive Material which might also address sustainability.

Sustainability covers many aspects of the food chain, and therefore sustainability considerations should be independent of the breeding process, non-discriminatory, and scientifically sound.

There have been some critical remarks raised by the stakeholders on the sustainability criteria introduced specifically for targeted mutagenesis:

- Why introduce a specific sustainability assessment for NGT traits, if there is a sustainability framework for the whole food system?
- Is it not equitable to assess the sustainability of an NGT trait while there is no assessment of traits generated through other technologies?
- Sustainability depends much more on the applied agricultural practices and other downstream processes.

One of the motivations for the introduction of a sustainability assessment for traits introduced by NGTs is to limit the market introduction of herbicide-tolerant varieties. However, herbicide tolerance can be obtained in a variety of ways: conventional/NGTs/GMOs. The desire to deal with one politically sensitive sub-issue rarely leads to good policy.

Risk Assessment

The scenarios presented by the Commission and the recent EFSA statement suggest a mandatory risk assessment step for all plants obtained by targeted mutagenesis, cisgenesis, and intragenesis. Such an approach is disproportionate and unworkable, specifically for SMEs. Under such conditions, NGTs will not deliver on the goals of the Farm to Fork and Biodiversity strategies. The considerations on risk assessment of NGT plants should start from a broader question: "Which plants should be subject to a pre-market risk assessment-based authorisation system?".

There are two critical aspects referring to the regulation of the safety of plants produced by targeted mutagenesis:

- The risks associated with a spontaneous mutation or a mutation resulting from conventional techniques or targeted mutagenesis do not differ;
- The level of uncertainties associated with conventional varieties is generally higher than the level of uncertainties associated with varieties resulting from targeted mutagenesis.

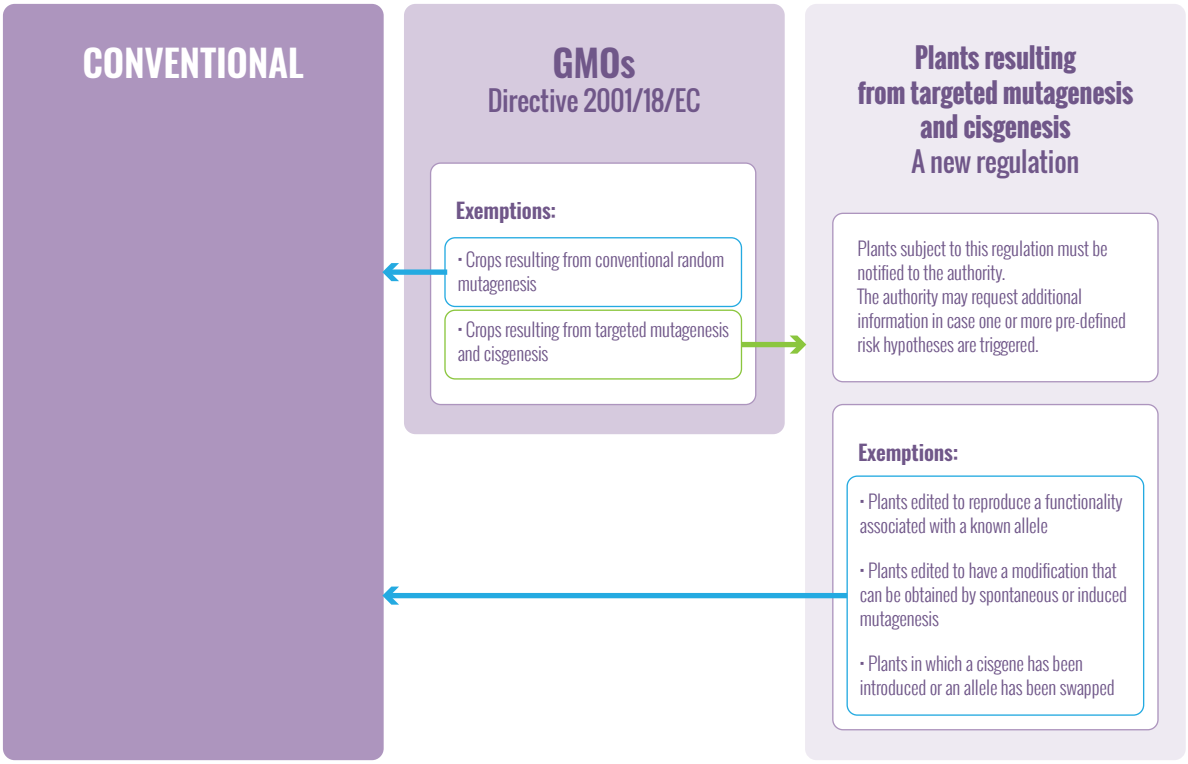
As a thought-starter to stimulate the discussions, René Custers from EU-SAGE/VIB presented a regulatory approach to NGT plants. The approach of EU-SAGE in forming a regulatory proposal on NGT plants derived from targeted mutagenesis and cisgenesis is to avoid regulating in different ways the plants which have the same genetic change but are obtained with a different technology.

In the current GM legislation, some plants are exempted and treated as conventional. EU-SAGE is opting for an additional exemption of a category from the GM system – plants derived from targeted mutagenesis and cisgenesis. Within this system, a notification procedure is proposed, as well as the ability to ask for additional information in certain specific cases. In some countries, such an approach already exists (notification based on a case-by-case basis), like Argentina, Brazil, and Japan. The exemption from that system would be those NGT plants that have the same genetic changes as plants obtained through conventional breeding methods.

The main principles of the EU-SAGE regulatory proposal for plants resulting from targeted mutagenesis and cisgenesis are as follows:

- Plants that result from targeted mutagenesis and cisgenesis are exempted from GMO directive 2001/18/EC;
- Plants that result from targeted mutagenesis and cisgenesis must be notified to the authority;
- The notification requirement does not apply to a pre-defined category of plants. This category of plants will be treated as conventional (just like plants resulting from conventional random mutagenesis); and
- Based on a limited number of pre-defined risk hypotheses, the authority may request additional information about the notified crop. The crops, derived food and feed are allowed to be placed on the market when the authority has no (further) questions within 3 months after having received the notification, or the additional information provided leads to the conclusion that the crop is not expected to lead to harm to human and animal health and/or the environment.

Figure 1: Schematic representation of the principles of the EU-SAGE regulatory proposal



Some countries implemented differentiated regulatory approaches, mostly based on a case-by-case approach and exempting or differently regulating plants resulting from NGTs which are conventional-like. These are most of the countries in South and North America, two African countries: Kenya and Nigeria, India, Australia, and south-east Asian countries — Japan and the Philippines. A country that is heading in a similar direction is for example, the UK.

Europe should join the increasing number of countries that follow a differentiated and efficient regulatory approach according to these product categories. Such an approach should provide a robust regulatory framework for plants resulting from NGTs:

Traceability and labelling

EU-SAGE is proposing that plants derived from targeted mutagenesis and cisgenesis should not be under the GMO regulatory system and do not have to be labelled.

It is based on a few considerations:

- The general public has little knowledge of the use of technology in plant breeding;
- The GM label does not provide qualitative information;
- The GM label has been turned into a stigma; and
- Transparency is a key issue.

Regulatory threshold has consequences for:

- Market access by public institutions and SMEs;
- International trade;
- Competition; and
- The way diversity of the EU agricultural system can be served.

3.3 CONCLUSIONS

During the workshop, the discourse surrounding the proposal for New Genomic Techniques (NGTs) brought to light various concerns regarding their implementation and the measures that could be taken to address them.

European Commission

The European Commission is currently engaged in an ongoing dialogue concerning NGTs and its corresponding legislation. A notable concern has been raised regarding the potential impact of NGT legislation on the organic sector and how safe NGTs are for consumers. To address this concern, the European Commission intends to exercise a level of control over NGT practices. However, there are challenges associated with removing the NGT category from GMO legislation due to the existing disproportionate and dysfunctional implementation system.

1. A possible solution to this issue could be achieved through a compromise that allows for the coexistence of NGTs with other agricultural practices, including organic and conventional techniques. To facilitate this, a regulatory approach could be introduced to provide guidance on NGT procedures and information disclosure to consumers.

2. A framework could also be established that outlines the trade-offs and step-by-step procedures necessary to achieve sustainability.

3. There was a general agreement of the need for proportionality. I.e. new varieties should not only be judged by the technology used but by how many changes have been made. Thus an Argentinian approach was mentioned as a positive approach in the expert discussions.

4. Lastly, an economic and enabling environment could be created to ensure that farmers are able to meet minimum requirements.

5. The EU Farm to Food strategy stresses the support for small and medium sized farmers and companies. Any regulatory approach for NGTs should benefit SME. Argentina offers positive example how this could be achieved.

Companies/Plant breeders

It is the responsibility of companies and plant breeders to produce safe NGTs that enhance food production, improve the economic wellbeing of farmers, and safeguard the environment. However, concerns have been raised regarding the transparency of NGTs production and the limited information provided to consumers on sustainability.

6. To address this challenge, companies and plant breeders involved in the production of NGTs should be subject to similar regulations as other agricultural practices.

7. There should be transparency in the procedures used to create NGTs, and labelling should be included on products to facilitate transparency and traceability of the technology.

8. This approach will enable consumers to make informed decisions and promote accountability among companies and plant breeders in the NGTs sector.

Farmers

The discussion focused on how NGTs can contribute to sustainable agriculture practices by enhancing production, reducing the use of pesticides and herbicides, and mitigating the impacts of climate change. However, concerns were raised about the sustainability of NGTs for farmers, as it could potentially lead to dependence on companies for technology procurement and polarisation among farmers. Furthermore, fears were expressed that NGT could restrict farmers' rights to choose their preferred agricultural practices.

9. To address these challenges, it is crucial to respect farmers' right to choose their preferred agricultural practices. Additionally, awareness-raising efforts should be intensified to provide farmers with comprehensive information to make informed decisions. This information should not only focus on the positive aspects of NGT, but also include its negative impacts.

10. It is vital for governments, companies, and plant breeders to adopt transparent practices to build trust with farmers.

11. It was also suggested that the use the catalogue of varieties of agricultural plant species as a way to approve new varieties could avoid another layer of complexity for farmers whilst ensuring that sustainability criteria are respected.

12. Lastly, it is important to create an economic and enabling environment that helps farmers meet their necessary needs. By adopting this compromise approach, farmers can effectively harness the benefits of NGTs while safeguarding their interests and maintaining sustainable agricultural practices.

Consumers

The European Commission aims to prioritise citizen safety by implementing measures that meet sustainability criteria. However, consumers' limited access to information hinders their ability to identify sustainable options. Additionally, insufficient information on product labelling creates confusion for consumers when making purchasing decisions, similar to the challenges faced by organic farming products due to their higher price point.

13. A viable solution would require transparency from the government, companies, plant breeders, and farmers to build consumer trust. NGT products should feature clear labelling, and information on both their positive and negative aspects should be widely available to ensure informed decision-making.

14. Furthermore, creating an enabling environment that encourages the use of NGT products and technological solutions to tackle climate change, boost production, and minimise land use would be beneficial for consumers.

To summarise, it is recommended that the coexistence of diverse agricultural practices be embraced without infringing on the rights of farmers and consumers. Existing labelling mechanisms should be utilised instead of creating new ones, while promoting transparency and raising awareness among relevant stakeholders.

4.

CONCLUSIONS AND NEXT STEPS

The workshop highlighted the need of a thorough discussion between stakeholders to address the societal challenges of agriculture, but also the opportunities to overcome the often dramatic polarisations in the debate, once the stakeholders understand that they share similar values and concerns.

The underlying issue of polarisation, results in a deadlock that prevents progress and feeds the cycle of distrust between the various parties. Even so, public discourse has polarised further as a result of the increasing sense of urgency as a result of the onset of the war in Ukraine, the droughts and water shortages that have affected vast areas of Europe, and the worsening "cost of the living crisis."

Nevertheless, the experts' fundamental values and broad policy aims were relatively similar notwithstanding variations in opinion. Shared principles as such include consensus on the coexistence of different agricultural approaches, respect to the rights of farmers and consumers and prominence of different stakeholders at the forefront of the target implementation process. Our most pressing challenge now is to break the circle of distrust and to concentrate on the shared policy goals between different stakeholders to facilitate the creation of a more resilient and sustainable model of European agriculture.

It is important that the lessons are not limited to the workshop but carried further in an ambitious, but focused follow-up. The following next steps can contribute to develop concrete solutions:

- An important task is to combine farmers' experiences, local knowledge passed down over generations, and agro-ecological knowledge from agricultural and environmental sciences with the best technical and technological tools, without excluding novel breeding techniques. Such a combination of sustainability and innovation strengthens the agricultural community and contributes to global food security

  The Commission should strengthen efforts for dialogue and cooperation between key stakeholders that advances the combination of agro-ecological knowledge with the best available technologies.

- The EU Commission should support a broad approach to advancing innovation in agriculture, encompassing social and institutional innovation, ecological innovation, technological and economic innovation.

- The EU institutions should further new methodologies, sustainable use of data and the development of new narrative that enhance cooperation between the key stakeholders in agriculture and reduce polarization.

Re-Imagine Europa held a follow-up event, 23rd - 24th May, Global Conference on Sustainability in Agriculture & Innovation – Innovation, Indicators & Implementation. This was a further opportunity to reflect on current developments related to sustainability in agriculture in general as well as sustainability in respect of the use of products of genome editing specifically. It involved participants from the EU and beyond.

As an additional step, RIE together with its partners EU SAGE, will host an exhibition in the European Parliament (Strasbourg) during the week of 12th June under the title, What's New in the Farmers' Market? It will address the various problems that farmers currently face whilst exploring some the solutions that innovative measures, such as NGTs, could offer.

Annexes

About Re-Imagine Europa

Re-Imagine Europa (RIE) is a non-partisan 'think tank' that delivers world-class research to address some of the most challenging issues we face as a society. Founded by President Giscard d'Estaing to honour his friendship with Chancellor Helmut Schmidt, the organisation works with an innovative methodology based on narratives to look for shared values and solutions that go beyond personal, national, or political interests.

Working with a strategic and pragmatic approach, Re-Imagine Europa focuses on issues that are considered of strategic importance for Europe. The current priority areas are democracy in a digital society; a fair and competitive economic system; as well as analysing narratives on climate change, migration, vaccines and the future of Europe.

A key aspect of RIE is its 'narratives' approach which, amongst other things, is at the heart of its work to identify shared values and solutions on topics where there are conflicting opinions.

RIE's Task Force on Sustainable Food Systems and Innovation

The Task Force was created as a forum that facilitates dialogue among a wide range of stakeholders with different viewpoints, with the primary goal of going beyond political stalemates and finding new, shared pathways forward.

Food and food security are central to all societies. The relationship between food security and socio-political stability has been well documented and has become painstakingly clear since the beginning of 2022. Add to this the effects of climate change, with increasingly unstable weather patterns, and we can understand why this is going to be one of the most important challenges of our time.

Unfortunately, whilst the stakes get higher, the debate around food, agriculture, sustainability and innovation seem to get evermore polarised, as documented in the Report produced by the Task Force on "Beyond the Apple of Discord: Existing Narratives and Ways Forward"

https://re-imagine.eu/publication/beyond-the-apple-of-discord-existing-narratives-and-ways-forward

The current polarisation of the debate on food systems prevents the creation of effective solutions to the intricate issues we are currently dealing with. The shifting global context and framing surrounding food systems and innovation underline the need for a thorough rethinking of the operation of our global agricultural systems, the development of resilience to both climate change and geopolitical shocks, and the incorporation of innovation in such settings.

In addition, the absence of a unified strategy based on shared principles has encouraged a return to old concepts, increasing the likelihood of bias entrenchment and social polarisation among communities. Noting the current diversity of interpretations of "sustainable food systems", the aim of the Task Force is two-fold:

- To develop a shared understanding of what is meant by sustainable food systems, including which values and goals should be prioritised.
- To assess how innovations can support the transition to a European model for sustainable agriculture promoting social, environmental, and economic sustainability, going beyond the debate on NGTs (New Genomic Techniques).

The target audience of RIE work are policy-makers, including both at the European and national levels (European Commission, MEPs, International organisations and ministers) as well as key stakeholders. In fact, the Task Force brings together over 80 key experts from academia, policy, farmers, NGOs, industry, and other key stakeholders.

At the time of writing, there are less than two years until the next European elections, so the agenda for 2023 will focus on the key legislative proposals to be tabled by the Commission's proposals as expected in June 2023 on New Genomic Techniques (NGTs) and Plant Reproductive Material. A proposal on Sustainable Food Systems Framework is expected later in the year (September).

An overview of the Task Force's objectives and timing is available here:

RIE-Planet-Task-Force_Sustainable-Agriculture-and-Innovation.pdf (re-imagine.eu);

https://re-imagine.eu/wp-content/uploads/2022/12/RIE-Planet-Task-Force_Sustainable-Agriculture-and-Innovation.pdf

Participants of the Workshop

Surname	Name	Organisation
Custers	René	VIB
Dima	Oana	VIB & EU-SAGE
Dimitrakopoulou	Adamantia-Aimilia	RIE
Dzelzkaleja	Maira	NGO Farmers Parliament
Fehér	Judit	Bionext
Friedrichs	Steffi	RIE
Heirbaut	Kris	Kris & Ginny Heirbaut
Jorasch	Petra	Euroseeds
Kearns	Peter	RIE
Kleter	Gijs	Microbiology and Novel Foods,Wageningen University & Research
Mehta	Devang	KU Leuven
Nanda	Amrit	Plants for the Future (ETP)
Napiórkowski	Marcin	Contemporary Mythologies Scholar
Neofytou	Grigoris	RIE
Niggli	Urs	Agroecology Science
Novillo	Conchi	Bayer
Nowak	Andrzej	Chief Narrative Scientist
Puigdomènech	Pere	Allea
Pythoud	Francois	Independent Adviser Food, Biodiversity & Sustainable Development
Saidi	Younousse	BASF
Stäel von Holstein	Erika	RIE
ait	Joyce	University of Edinburgh, Innogen Institute
Thomas	Pat	A Bigger Conversation
Van der Meer	Piet	VUB, Ghent University
Vleugel	Mathijs	Allea
Woodward	Lawrence	A Bigger Conversation

Key References/ Documents/ Background material cited during the Workshop

Key background material, referenced during the Workshop, can be found in the following documentation:

Altieri M.A. et al. (2015) Agroecology and the design of climate resilient agricultural systems. Agron. Sustain. Dev. doi:10.1007/s13593-015-0285-2

Codex Alimentarius (2022) Biotechnology Related Codex Texts, Biotechnology | CODEXALIMENTARIUS FAO-WHO. Available at: https://www.fao.org/fao-who-codexalimentarius/thematic-areas/-biotechnology/en/

Davis A.S. et al. (2012) Increasing Cropping System Diversity Balances Productivity, Profitability and Environmental Health. PLoS ONE 7(10): e47149. https://doi.org/10.1371/journal.pone.0047149

EASAC (2022) Regenerative agriculture in Europe. A critical analysis of contributions to European Union Farm to Fork and Biodiversity Strategies. Available at: https://easac.eu/publications/details/regenerative-agriculture-in-europe/

EFSA (2022) Stakeholder event on 'the safety of plants derived from new genomic techniques: Looking into future risk assessment challenges', European Food Safety Authority. Available at: https://www.efsa.europa.eu/en/events/stakeholder-event-safety-plants-derived-new-genomic-techniques-looking-future-risk

Eidt C. M. et al. (2020) Platform, Participation, and Power: How Dominant and Minority Stakeholders Shape Agricultural Innovation. Sustainability. 2020; 12: 461.

EU JRC (2022) Legal framework for sustainable food systems. https://food.ec.europa.eu/horizontal-topics/-farm-fork-strategy/legislative-framework_en

European Commission (2020) Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. A Farm to Fork Strategy for a fair, healthy and environmentally-friendly food system. Available at: https://eur-lex.europa.eu/resource.html?uri=cellar:ea0f9f73-9ab2-11ea-9d2d-01aa75ed71a1.0001.02/DOC_1&format=PDF

European Commission (2021) Commission staff working document. Study on the status of new genomic techniques under Union law and in light of the Court of Justice ruling in Case C-528/16. Available at: https://food.ec.europa.eu/system/files/2021-04/gmo_mod-bio_ngt_eu-study.pdf

European Commission (2022) Legislative Framework for sustainable food systems, Food Safety. Available at: https://food.ec.europa.eu/horizontal-topics/farm-fork-strategy/legislative-framework_en

European Group of Ethics of Sciences and New Technologies (2008) Ethics of modern developments in agricultural technologies. Available at: https://research-and-innovation.ec.europa.eu/knowledge-publications-tools-and-data/publications/all-publications/ege-opinions_en

EU-SAGE (2022) Genome search: EU-SAGE Database, European Sustainable Agriculture through Genome Editing. Available at: https://www.eu-sage.eu/index.php/genome-search

Food and Agricultural Organization of the United Nations Factsheets on the 21 SDG Indicators under FAO Custodianship: A Highlight of the Main Indicators with the Greatest Gaps in in Country Reporting (accessed 21/03/2023) https://www.fao.org/fileadmin/user_upload/en/XXX-0520-9/SDG_Factsheets_11May.pdf

Food and Agriculture Organization of the United Nations (2023) Indicators under FAO custodianship, Indicators | Sustainable Development Goals | Food and Agriculture Organization of the United Nations. Available at: https://www.fao.org/sustainable-development-goals/indicators/en/

Hodson de Jaramillo E. et al. (2023) Boost Nature-Positive Production. In: Von Braun J., Afsana K., Fresco L. O., Hassan M.H.A. and Torero M. (eds.) (2023): Science and Innovations for Food Systems Transformation, Springer Open Access. https://doi.org/10.1007/978-3-031-15703-5_2

Liebman M.Z. and Schulte-Moore L.A. (2015) Improving performance and resilience of agroecosystems through increased diversification of landscapes and cropping systems. Elementa: Science of the Anthropocene 3:41.

Mottet A. et al. (2020) Assessing Transitions to Sustainable Agricultural and Food Systems: a tool for agro-ecological performance evaluation (TAPE). Front. Sustain. Food Syst. 4:579154. doi: 10.3389/fsufs.2020.579154

Muller A. et al. (2017) Strategies for feeding the world more sustained with organic agriculture, Nature Communications October/2017.

Niggli U., Sonnevelt M. and Kummer S. (2023) Ways to promote agroecology for a successful transformation to sustainable food systems. In: Von Braun J. et al. (eds.) (2023) Science and Innovations for Food Systems Transformation, Springer Open Access. https://doi.org/10.1007/978-3-031-15703-5_2

OECD (2022) Declaration on Transformative Solutions for Sustainable Agriculture and Food Systems, OECD/LEGAL/0483. Available at: https://www.oecd.org/agriculture/ministerial/documents/OECD%20Agriculture%20Ministerial%20DECLARATION%20EN.pdf

OECD (2022) Sustainability and Safe and Sustainable by Design: Working Descriptions for the Safer Innovation Approach. Available at: https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ENV-CBC-MONO(2022)30%20&doclanguage=en

Royal Society (2009) Reaping the benefits: Science and the sustainable intensification of global agriculture. Available at: https://royalsociety.org/-/media/Royal_Society_Content/policy/publications/2009/4294967719.pdf

Schader C. et al. (2015) Impacts of feeding less food-competitive feedstuffs to livestock on global food system sustainability. Journal of the Royal Society Interface 12(113): 20150891.

Seufert V. and Ramankutty N. (2017) Many shades of grey - The contextual performance of organic agriculture. Sci. Adv. 2017;3:e1602638

Steinfeld H. et al. (2006) Livestock's Long Shadow: Environmental Issues and Options. https://www.researchgate.net/publication/239524071_Livestock's_Long_Shadow_Environmental_Issues_and_Options/download

Tamburini G. et al. (2020) Agricultural diversification promotes multiple ecosystem services without compromising yield. Science Advances 6.

Triboulet P. et al. (2019) Towards an Integrated Framework for the Governance of a Territorialised Agroecological Transition. In: Bergez J.E., Audouin E. and Therond O. (eds) Agroecological Transitions: From Theory to Practice in Local Participatory Design. Springer, Cham. https://doi.org/10.1007/978-3-030-01953-2_7

UK Regulatory Horizons Council (2022) Report on Genetic Technologies. Available at: Regulatory Horizons Council report on Genetic Technologies (publishing.service.gov.uk)

Von Braun J. et al. (eds.) (2023) Science and Innovations for Food Systems Transformation, Springer Open Access. https://doi.org/10.1007/978-3-031-15703-5_2

Wezel A. et al. (2009) Agroecology as a science, a movement or a practice. A review. Agron Sustain Dev 29. doi:10.1051/agro/2009004, pp. 503-515.

Willett W. et al. (2019) Food in the Anthropocene: the EAT-Lancet Commission on healthy diets from sustainable food systems. The Lancet. 393(10170):447-492. doi: 10.1016/S0140-6736(18)31788-4.

REIMAGINE EUROPA

Building solutions together

RE-IMAGINE EUROPA | Rue du Congrès 1 | 1000 Brussels | Belgium

Tel. +32 (0)2 203 75 37 | secretariat@re-imagine.eu
www.re-imagine.eu | Numéro d'entreprise: 0680.783.711