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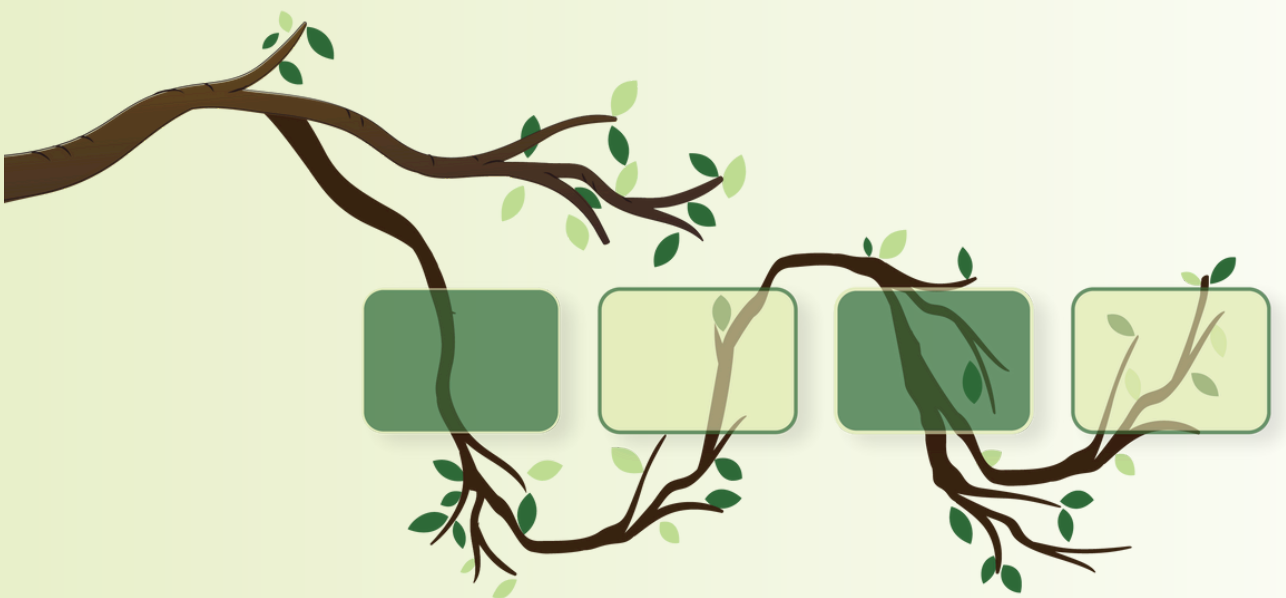
Farmers' Associations

Action Pathway towards New Genomic Techniques (NGTs)



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* based on stakeholder co-created statements

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Executive Summary

The Farmers' Associations Action Pathway is part of the GeneBEcon Transition Action Plan (TAP), designed to guide the responsible and informed integration of New Genomic Techniques (NGTs) into European agricultural practices. This roadmap supports Farmers' Associations in communicating scientific developments, combating misinformation, and enabling informed choices at the farm level.

Why NGTs based seeds and plants matter

NGTs have the potential to:

- Enhance food quality and nutrition.
- Increase crop yields and resilience to climate change.
- Reduce pesticide and fertiliser usage.
- Lower greenhouse gas emissions.
- Promote circular bioeconomy solutions.

The Need for a Transition Action Plan (TAP)

Despite their advantages, NGTs and NGT products face skepticism from consumers due to misinformation and fragmented regulatory landscapes. The change that the NGTs innovation brings needs to be better managed. The GeneBEcon project, with active stakeholder involvement, has worked to facilitate this change and improve public understanding.

Transition Action Plan (TAP) Development

A structured, Responsible Research and Innovation (RRI) approach was used to develop the TAP across three phases:

- Mapping the NGT Landscape – Identified barriers and stakeholder needs.
- Co-developing SMART Actions – Created actionable, measurable strategies.
- Validating and Finalising TAPs – Developed tailored plans for six stakeholder groups.

Transition Action Plans (TAPs)

Each TAP is an actionable pathway tailored to a key stakeholder group. Each pathway includes practical, specific and measurable strategy for awareness, education, collaboration, and communication, enabling a unified transition toward NGT desirability and integration.

Consumer Associations
National Policymakers
Breeder Associations
Farmer Associations
The Food Industry
NGO Associations

To access all Transition Action Plans, please visit the link https://genebecon.eu/transition-action-plans-taps/

The Role of Farmers' Associations

As trusted intermediaries between science, policy, and practice, Farmers' Associations are critical actors in building acceptance and awareness of NGTs, serving as a bridge between innovation and practice. The Farmers' Associations TAP, is structured in two phases and includes actions tailored to:

- Communicate NGT benefits to farmers and policymakers.
- Use consumer data to inform messaging.
- Increase EU Parliament awareness of NGT legislation.
- Collaborate with NGOs and allies for unified communication.
- Clarify differences between GMOs and NGTs.
- Monitor legislation and advocate for farmer autonomy in organic systems.
- Examine cost-benefits and IP issues related to NGT adoption.

Each TAP action includes Specific, Measurable, Achievable, Relevant, and Time-bound (SMART) steps to ensure impact and accountability. The SMART actions can be adjusted by Farmers' Associations to fit their goals and own information strategy.

Conclusion

This TAP empowers Farmers' Associations to champion innovation while upholding trust, transparency, and sustainability. Through informed advocacy and strategic outreach, farmers can become active contributors to a resilient and climate-smart food system; one that benefits producers, consumers, and the environment alike.

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Section I. General: Introduction and methodology

Why NGTs?

New Genomic Techniques (NGTs): A Path to Sustainable Agriculture & Food Security

New Genomic Techniques (NGTs) are modern breeding methods that allow scientists to precisely edit the genetic material of plants and other organisms to improve their traits. Unlike traditional breeding, which relies on crossbreeding and takes many years to develop improved crops, NGTs can speed up the process by making targeted, natural-like modifications. Unlike transgenic genetically modified organisms (GMOs), NGT-derived products do not carry transgenes. This helps develop crops that are more resistant to pests and diseases, require fewer chemicals, and are better suited to climate change, making food production more sustainable, efficient, and secure. Nevertheless, the NGTs method is one of the many tools used for breeding.

A Smarter Approach to Agriculture 🌱

New Genomic Techniques (NGTs) provide precise genetic improvements that can boost crop yields, enhance resistance to pests and diseases, and reduce reliance on chemical inputs. Unlike traditional breeding, NGTs allow targeted modifications that support climate-resilient, resource-efficient, and sustainable farming. As Europe transitions to a bio-based economy, NGTs offer a way to secure food production while minimizing environmental impact.

Better Food for Consumers 🥦

NGTs can improve food quality, sustainability, and affordability by increasing nutritional value and reducing the need for chemical treatments. Research from GeneBEcon shows that while public awareness of NGTs is still low, **consumers become more open to NGT-derived products when given clear, science-based information**[1]. This highlights the key role of consumer associations in bridging the information gap and ensuring informed choices.

Benefits for a Sustainable Food System 🌍

✅ **Farmers & Breeders:** Stronger crops, reduced pesticide and fertilizer use, and higher yields for more resilient farming in less breeding time.

✅ **Food Industry:** Longer shelf life, better product quality, and more efficient resource use, supporting a circular bioeconomy.

✅ **Consumers:** Access to healthier, sustainable food choices with reduced environmental impact.

To fully unlock the potential of NGTs, industry, policymakers, and the public shall align efforts to ensure these innovations are accessible, appropriately-regulated, reliably and widely accepted. With transparency and trust, NGTs can help shape a more sustainable, resilient, and efficient food system for the future.

1 https://genebecon.eu/wp-content/uploads/2024/10/GeneBEcon_Deliverable1.2.pdf

Advantages and Challenges

NNGTs: Unlocking a More Sustainable & Resilient Food System

🔹 **What are the benefits of NGTs?**

New Genomic Techniques (NGTs) offer a range of benefits for agriculture, the food industry, and consumers:

✅ Healthier & More Nutritious Crops – NGTs can improve the nutritional quality of food, making it more beneficial for consumers.

✅ Less Dependence on Chemicals – By making crops naturally more fertilizer efficient, or resistant to pests and diseases, NGTs reduce the need for pesticides, lowering agriculture's environmental footprint.

✅ Faster Adaptation to Climate Change – Plant breeding can take years, the NGTs may help plants to better respond to changing climate conditions and thus enhancing food production.

✅ Lower Greenhouse Gas Emissions – Reducing chemical inputs and improving resource efficiency can help cut emissions from farming, supporting EU climate goals.

✅ Higher yields – Increasing pest and disease resistance can contribute to increasing yields by reducing yield loss. For example, the virus resistant potato developed by GeneBEcon.

✅ Conserve biodiversity - Environmental benefits by enabling gene drives to control invasive species or disease vectors and providing tools to restore endangered species.

🔹 **Why is consumer desirability and acceptance important?**

Consumers stand to benefit from healthier and tastier food choices, better food security, and more sustainable production. However, studies from the GeneBEcon project show that many people are unfamiliar with NGTs or mistakenly associate them with traditional GMOs. Key concerns include:

🛑 Lack of Awareness – Without clear information, consumers may not understand the benefits of NGTs. In the GeneBEcon consumer survey, an explanatory video enabled consumer understanding.

🛑 Misinformation & Trust Issues – Skepticism remains high, partly due to misunderstandings about genetic modification.

🛑 Ethical & Safety Concerns – While scientific studies confirm the safety of NGTs, people need transparent communication and clear regulations to feel confident about them.

🛑 Regulatory Gridlock in the EU – Divided voting behaviour among EU countries for risk management makes it difficult for NGT products to reach the market.

🔹 **What needs to be done?**

🌍 Enabling regulations – Regulatory hurdles and uncertainty in the EU remains a significant barrier, creating difficulties in market access and product approval.

📢 Better public communication – Providing transparent, fact-based, easy to understand, information will help consumers distinguish more precisely NGTs from older genetic modification techniques.

🛒 Affordable & accessible products – Studies, including GeneBEcon's own consumer survey, show that price incentives can encourage consumers to choose NGT-derived foods.

🔬 Building trust in oversight – Strengthening regulatory transparency will help NGT-product users make informed choices.

For NGTs to succeed, farmers, policymakers, industry, and consumer groups must collaborate. Clear communication, strong governance, and public engagement are essential for a healthier, more sustainable, and resilient food system— the goal of this NGT Transition Action Plan.

Benefits of NGT-plants and products

New Genomic Techniques (NGTs), such as plant gene editing, offer major opportunities for agri-food systems and the bioeconomy.

The GeneBEcon project has demonstrated their potential with two key examples: virus-resistant potato with an optimized tuber starch quality and microalgae producing healthy carotenoids.

Healthier, More Sustainable Potato Production 🥔

NGT potatoes can help reduce pesticide use and increase crop resilience. For example, by introducing resistance to the potyvirus PVY, gene-edited potatoes limit disease spread by aphids, cutting pesticide use across 1.7 million hectares (equivalent to Switzerland area) of European potato production by approximately 850,000 kg of active ingredients. This not only protects the environment but also secures the livelihoods of 1.5 million potato farmers.

Beyond pest resistance, NGTs can improve the starch quality of potato tubers, eliminating the need for chemical modifications during processing. This innovation could save up to 75,000 tonnes of chemicals and 7.5GWh energy annually, lowering production costs and reducing environmental impact.

Gene-Edited Microalgae: A Sustainable Bioeconomy Booster 🌿

NGTs can also enhance microalgae's ability to produce high-value compounds, such as:
✅ Omega-3 fatty acids for food and nutrition.
✅ Antioxidant pigments, such as carotenoid lutein, for cosmetics and pharmaceuticals.

Microalgae also act as natural CO_2 absorbers, turning atmospheric CO_2 into valuable organic compounds. This makes them a climate-friendly production system, reducing greenhouse gas emissions while promoting sustainable innovation.

A Circular Approach: Zero Waste, More Value ♻️
NGT microalgae can maximize resource use by repurposing residual biomass as a high-quality poultry feed. This provides a sustainable alternative to legume-based feed ingredients, reducing reliance on traditional crops while enhancing animal nutrition and health. Increased microalgae production could generate economic gains of €11.2 million across Europe.

Conclusion
These examples from GeneBEcon show how NGTs can improve food and industrial production by enhancing crop resilience, reducing environmental impact, and supporting a circular bioeconomy. By integrating NGT innovations, Europe can achieve sustainable, resource-efficient agriculture while fostering economic growth. To realise these benefits though, it is necessary to either develop new enabling legislation or to modify the implementation of existing legislation. Under the current circumstances, NGT-derived potato and microalgae have an extremely low chance of getting commercialized in the EU.

Relevance to European Policies

NGTs offer a significant opportunity to enhance **food security, sustainability, and consumer benefits** in Europe. These advanced breeding methods improve **crop resilience**, reduce the need for **chemical inputs**, and support **environmentally friendly food production**. For consumers, this means access to healthier, more sustainable, and potentially more affordable food products.

NGT products can support the newly defined **Vision for Agriculture and Food** for a competitive, resilient, future-oriented, and fair EU food production system contributing to EU's food security. NGTs also align with key EU policies, including the **European Green Deal** and the **Farm to Fork Strategy**, by ensuring that food systems are resilient, resource-efficient, and capable of mitigating climate change.

NGTs support the EU's target of halving pesticide use by 2030 by reducing dependency on chemical pesticides and fertilisers. Enhancing plant resilience through NGTs also lowers agricultural emissions, mitigates climate change impacts, and strengthens food security. However, consumer desirability and acceptance remain critical for market integration, requiring clear communication about the benefits and safety of NGT-derived products.

NGTs promote resource efficiency and waste reduction, aligning with the **EU Circular Economy Action Plan**. Enhanced plant traits can extend shelf life, improve durability and optimise the use of agricultural by-products, supporting circularity across food and industrial value chains. However, farmer and public awareness campaigns are necessary to inform about these environmental and economic benefits of NGT-derived products.

NGTs contribute further, to the **EU Zero Pollution Action Plan**, by minimising pollution from agriculture and industry. NGT-bred crops may require fewer synthetic inputs, reducing soil, water, and air contamination. As with other policies, gaining consumer confidence is crucial.

NGTs can drive progress in the **EU Bioeconomy Strategy**, facilitating the development of bio-based materials, sustainable biofuels, and innovative bioproducts. By improving microbial strains and plant-based resources, NGTs boost resource efficiency, reduce fossil fuel dependency, and contribute to a more sustainable bioeconomy. Ensuring market acceptance of bio-based innovations through regulatory clarity is essential for the European bioeconomy.

NGTs can also provide solutions in the context of the EU biotechnology and biomanufacturing initiative. Innovation in biotechnology can be an important building block in the efforts to reduce the overall environmental footprint of agri-food production systems making them more resilient and supportive to reach the EU's climate neutrality goal and to provide more sustainable and some healthier foodstuffs[2].

Overall, NGTs align with EU sustainability goals by fostering innovation, reducing environmental footprints, and supporting resilient and resource-efficient systems across agriculture, industry, and the bioeconomy. To unlock their full potential, transparent communication, trust, and regulatory clarity will be essential for their successful integration into the European agricultural, industrial and bioeconomy strategies.

2 Nature-based solutions - European Commission (europa.eu) COM(2024) 137 Building the future with nature: Boosting Biotechnology and Biomanufacturing in the EU

About GeneBEcon

GeneBEcon: Advancing Sustainable Agriculture & Bioeconomy with NGTs

The **GeneBEcon project** (2023-2025), funded by the Horizon Europe Research & Innovation Programme under the Clean Environment Zero Pollution Initiative, focuses on **sustainable, bio-based solutions** for agriculture and industry. The GeneBEcon consortium is multidisciplinary bringing together experts from agricultural research, biotechnology, economy, food law, policy, social sciences and representatives of the whole agro-food value chain.

The Challenge and Solutions:
NGTs have great innovation potential, but their success depends on balanced regulations, economic support, and public trust. GeneBEcon tackled this by:

- ✅ **Developing virus-resistant potatoes** to improve starch quality and reduce chemical processing.
- ✅ **Enhancing microalgae-based production** of valuable compounds while repurposing biomass as animal feed.
- ✅ **Using precise gene-editing techniques** to create targeted modifications with minimal unintended effects.
- ✅ **Advancing molecular analytical tools** to support risk assessment and regulation.
- ✅ **Collaborating with businesses** to bridge research and real-world implementation, promoting **low-input, energy-efficient agriculture** and streamlined industrial processing.

Evaluating Regulatory & Economic Impact:
GeneBEcon **evaluated different regulatory options** to assess their impact on European agriculture, the economy, and biosafety. The project demonstrated how s**cientific knowledge can inform better policies** by comparing NGT plants with conventional varieties in terms of biosafety requirements.
To understand the **economic and social impact of NGTs**, the project:

- 📊 **Used an investment evaluation method** to assess the economic impact of regulating NGTs on the investment decisions of plant breeders in the EU.
- 📊 **Applied a socio-economic model** to calculate the global cost of delaying the adoption of NGTs.
- 🛒 **Surveyed 5,000 consumers**, finding that once people understood the benefits of NGTs, they were more willing to purchase NGT-based products.

An indirect but significant impact of the GeneBEcon project lies in its potential to enhance consumer trust. When consumers are presented with NGT products that demonstrably offer improvements over conventional alternatives, their willingness to consider and adopt such products is likely to increase.

Responsible Research & Public Engagement
GeneBEcon applied **Responsible Research and Innovation (RRI)** by prioritising **ethics, inclusivity, and transparency**. Through six stakeholder workshops, the project:

- 🤝 Fostered open discussions and **built trust** in science and innovation.
- 📢 Gave a voice to **underrepresented stakeholders** in research and policy debates.
- 🔍 Ensured that research remains **socially relevant, sustainable, and aligned with public values.**

With its pioneering work in potatoes and microalgae, GeneBEcon has demonstrated how **precision breeding can drive sustainable agriculture and bio-based industries**, shaping a resilient and forward-thinking European bioeconomy.

Why do we need a TAP in EU?

The introduction and acceptance of New Genomic Techniques (NGTs) in the European Union requires a comprehensive and coordinated **Transition Action Plan (TAP)** to guide and align the diverse range of stakeholders, including consumers, farmers, breeders, the food industry, NGOs, and policymakers. Such a plan is essential to bridge the gap between scientific advancements and societal expectations, ensuring that innovation supports the EU's sustainability goals while maintaining public trust and regulatory coherence. TAP goals are:

Consumer Guidance and Trust Building
Public acceptance is pivotal for the success of NGTs. Many consumers do not have a clear attitude to biotechnology due to concerns around safety, ethics, and potential environmental impacts. A Transition Action Plan would facilitate transparent communication and provide science-based information. Educational campaigns and dialogue with citizens are crucial to building trust and demonstrating how NGTs align with health, sustainability, and climate resilience goals.

Farmer and Breeder Support
Farmers and breeders need clear frameworks for NGTs to enhance productivity, reduce input costs, and support climate adaptation. The Transition Action Plan can offer access to tailored training, financial incentives, and knowledge-sharing platforms to ensure that these stakeholders will have the necessary tools and confidence to adopt NGTs responsibly and effectively.

Engaging the Agri-Food Value Chain
The agri-food industry plays a key role in the NGT transition by incorporating NGT-derived ingredients and products into the supply chain. The Transition Action Plan would outline strategies to foster cooperation between producers and retailers, ensuring that NGT products meet quality, safety, and sustainability standards, while addressing evolving consumer preferences and ethical concerns.

Addressing NGO Concerns
Environmental and consumer protection NGOs often express caution or opposition towards NGTs. A structured Transition Action Plan would promote ongoing dialogue, transparency in risk assessment, and independent scientific evaluations to address concerns related to biodiversity, ecosystem health, and corporate control over genetic resources.

Policy Coordination, Regulatory Clarity and Legal Certainty
Policymakers need a coherent framework and legal certainty to align NGT adoption with EU agri-food strategies. A Transition Action Plan would streamline regulatory processes, ensure alignment with sustainability targets, and foster harmonized policies across Member States, balancing innovation with precautionary principles.

In sum, a well-structured Transition Action Plan is key to create a shared vision for NGT acceptance across all sectors, ensuring that innovation serves public good, environmental sustainability, and economic resilience while fostering trust and transparency in the EU's food and agricultural systems.

Methodology for developing the NGTs Transition Action Plans

Every innovation to succeed requires an effective change management approach and a clear transition plan to address stakeholder's values and interests. As part of of Responsible Research and Innovation (RRI), the GeneBEcon project developed the NGTs Transition Action Plan (TAP), enabling agri-food and feed stakeholders to navigate the changes brought by NGTs. This structured, participatory approach was led by XPRO Consulting Limited, applying its proprietary RRI Roadmap©™ methodology.

Developing the NGTs Transition Action Plans: A Phase-Oriented, Inclusive Approach

The GeneBEcon project followed a structured, multi-stakeholder approach to develop actionable NGTs Transition Action Plans, ensuring broad engagement across policymakers, industry, food and feed producers/traders, and consumer groups. This process unfolded in four key phases, each refining strategies for responsible NGT adoption.

Phase 1: Understanding the NGT Landscape – 1st RRI Workshop (Nov 2023)

After an internal workshop, the first stakeholder workshop mapped the state of NGTs in Europe and examined key challenges and opportunities in the agri-food sector. Stakeholders conducted a SWOT analysis (Strengths, Weaknesses, Opportunities, and Threats) to assess regulatory, technological, and societal factors impacting NGT adoption.

Key Outcomes:

✅ Identified six key stakeholder groups: 1) policymakers, 2) consumer associations, 3) the food industry, 4) breeder associations, 5) farmer associations, and 6) NGOs, along with their specific needs and concerns.

✅ Recognized misinformation and regulatory uncertainty as two major barriers to public acceptance.

✅ Brainstormed potential transition pathways, laying the foundation for the next phase.

Methodology for developing the NGTs Transition Action Plans

Phase 3: Co-Developing SMART Actions – 2nd RRI Workshop (Mar 2024)
Building on insights from the first workshop, this session took a solution-oriented approach, using the I-SMART framework (Impactful, Specific, Measurable, Attainable, Realistic, Time-bound) to design targeted actions addressing barriers to NGT adoption.
Key Outcomes:
✅ Defined stakeholder-specific transition pathways tailored to policymakers, industry, farmers, breeders, NGOs and consumers.
✅ Prioritized empowerment actions, such as targeted awareness campaigns, regulatory alignment strategies, and investment in detection technologies.
✅ Established an initial Stakeholder NGT Transition Action Plan, outlining concrete actions for transitioning towards responsible NGT adoption.

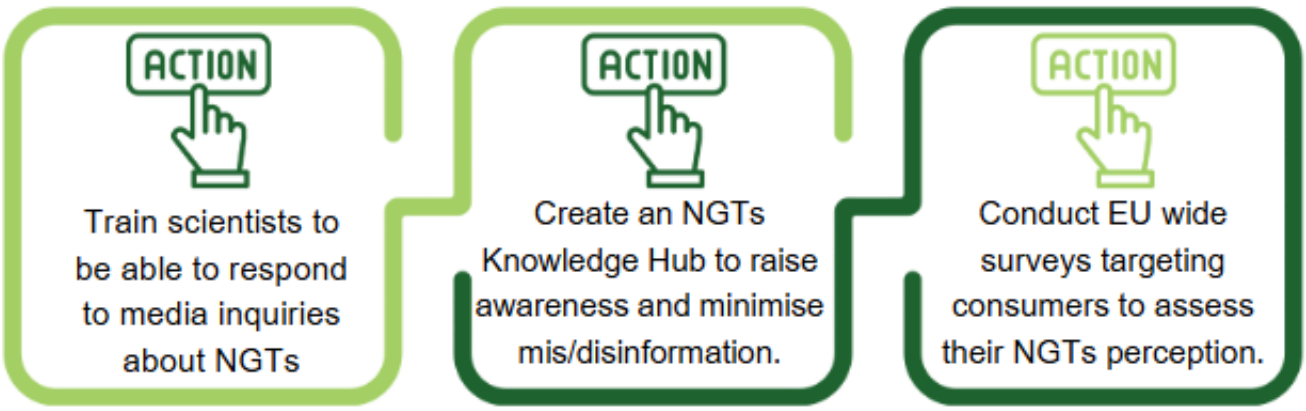
Phase 4: Finalising the Transition Action Plans – 3rd RRI Workshop (Oct 2024) until May 2025
The third workshop validated and refined the proposed Transition Action Plans, ensuring their feasibility, alignment with EU policy goals, and concrete implementation steps. A major focus was on building trust and multi-stakeholder collaboration. To strengthen the credibility and applicability of the plans, they were reviewed by external stakeholder groups, including regulatory bodies, industry representatives and consumer organizations.

Key Outcomes:
✅ Finalized six distinct Transition Action Plans, one for each stakeholder group, with I-SMART actions to address regulatory, social, and economic challenges.
✅ Developed strategies for dissemination and policy integration, ensuring that the results contribute to shaping future EU regulatory frameworks on NGTs.

Conclusion: A Responsible and Inclusive Transition
By applying a phase-oriented, co-creative approach, the GeneBEcon project ensured that the NGTs Transition Action Plans were stakeholder-driven, scientifically grounded, and policy-relevant. The iterative engagement process across the three RRI workshops allowed for the progressive refinement of strategies, resulting to a set of actionable and widely supported pathways for the responsible adoption of NGTs in the European agri-food sector.

Core Actions

The core actions serve as the foundation of the NGT Transition Action Plan, outlining initiatives to be carried out by NGT specialists that are relevant across all NGTs Transition Action Plans. These actions provide the essential foundation for the commencement and execution of the six NGTs Transition Action Plans.



The three actions shall be implemented in parallel!

Train scientists to be able to respond to media inquiries about NGTs

S

Step: Develop and deliver a tailored training program for scientists, focusing on science communication, handling media interviews, and crafting clear, non-technical messages about NGTs.
Objective: Equip scientists with the skills and confidence to effectively engage with journalists and the public.

M

Step: Conduct four training workshops for 30 scientists within six months, with at least 10 participants per session.
Objective: Achieve an 85% satisfaction rate based on post-training feedback and ensure 75% of participants demonstrate improved media communication skills in a simulated interview assessment.

A

Step: Partner with experienced media trainers and science communicators to deliver the training sessions.
Objective: Certify at least 30 scientists as "Media-Ready Experts on NGTs" by the end of the training program.

R

Step: Focus the training on **addressing common public misconceptions, emphasizing the societal benefits of NGTs** (e.g., sustainable agriculture, food security, climate resilience).
Objective: Ensure that 50% of trained scientists participate in media interviews, public forums, or outreach events within six months of completing the program.

T

Step: Launch the training program within two months and complete all workshops within six months.
Objective: Publish a directory of "Media-Ready Scientists" by the end of Q4 to facilitate media engagement and promote public understanding of NGTs.

SMART (Specific, Measurable, Achievable, Relevant, Time-Bound) is defined and explained in the next section under the paragraph “How to use the Pathway”.

Create an NGTs Knowledge Hub to raise awareness and minimise misinformation/disinformation.

S **Step: Develop an online NGTs Knowledge Hub** that serves as a centralized platform offering accurate, up-to-date information on NGTs, including scientific studies, international and EU policy briefs, EU-funded projects, FAQs, videos, and infographics.
Objective: Provide a reliable resource for policymakers, farmer, breeder and consumer associations, NGOs and the food industry to access verified information and counter misinformation about NGTs.

M **Step: Populate the hub** with at least 50 high-quality content pieces (e.g., scientific studies, international and EU policy briefs, EU-funded projects, FAQs, videos, and infographics) within six months of launch.
Objective: Achieve 10,000 unique visitors and a 20% increase in time spent on the site within six months, with 80% of users reporting the content as "helpful" or "very helpful" in post-visit surveys.

A **Step: Collaborate with experts, research institutions, and communication professionals** to curate and create content.
Objective: Ensure that 90% of the hub's content is peer-reviewed or verified by subject-matter experts before publication.

R **Step: Align the hub's content with current debates, societal concerns, and EU priorities** such as food security, climate change, bio-economy strategy paper and sustainability.
Objective: Ensure the Knowledge Hub is cited in at least five key policy discussions, media articles, or scientific forums within six months of launch.

T **Step: Launch the NGTs Knowledge Hub within four months**, with ongoing updates and content additions every two weeks.
Objective: Evaluate the hub's impact through analytics and user feedback, producing a report on its effectiveness in countering misinformation by the end of the first year.

Conduct EU-wide surveys targeting the public to assess their NGTs' perception.

S **Step: Design and execute a survey that targets the public** across all 27 EU member states to evaluate their awareness, understanding, and opinions about NGTs.
Objective: Collect data on the public's knowledge, perceived benefits, concerns, and trust in NGT-related applications.

M **Step: Gather responses from at least 10,000 people across the EU**, ensuring a representative sample by including a diverse range of demographics such as age, gender, education, and geographic location.
Objective: Achieve a minimum 80% completion rate for the survey and analyze data by the end of the campaign.

A **Step: Collaborate with professional survey organizations and local partners** to translate and distribute the survey in all official EU languages.
Objective: Launch the survey within two months and ensure at least 90% of EU member states meet their target response quota within four months.

R **Step: Include questions that align with the EU's current debates on NGTs**, such as sustainability, food safety, and ethical concerns, to gather insights that can inform policy and communication strategies.
Objective: Use survey results to create a report with actionable insights to be presented to stakeholders (e.g., policymakers, industry leaders) within two months of survey completion.

T **Step: Roll out the survey within three months** and collect all responses within six months.
Objective: Deliver a comprehensive analysis and publish findings by the end of Q3, ensuring the data is timely for ongoing legislative discussions on NGTs.

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Section II: Specific Action Pathways for Farmers Associations

Transitioning Farmers towards NGTs

Farmers play a vital role in shaping public perception and ensuring accurate, accessible information on New Genomic Techniques (NGTs). Farmers' Associations have an ethical responsibility to avoid spreading misinformation or disinformation to farmers.

Humans have been selecting genetic traits for millennia by breeding plants, with the aim to either enhance crop yields or improve food quality. The findings made in modern biology have allowed to refine this process by using New Genomic Techniques (NGTs). NGTs is part of the bioeconomy, which aims to enable Europe to achieve food and nutrition security, natural resources sustainability, mitigate and adapt to climate change, achieve circularity, and strengthen economy and social fairness. To achieve these strategic goals, all Europeans must be involved to transition towards these innovations. In this respect, Farmers' Associations play a crucial role for informing and guiding farmers to make informed decisions and choices.

The GeneBEcon project has worked throughout its duration with consumer associations and studied consumer trends. During this work, the project has identified two major issues that impair transitioning due to lack of information and understanding and due to non-factual or erroneous information. The goal of this document is to enable Farmers' Associations to consider specific actions to help their members in better understanding NGTs, what they mean for our wellbeing, quality of life and for our sustainability.

Finally, this NGTs Transition Pathway has been developed through active stakeholder engagement, including input from Farmers' Associations, as part of GeneBEcon's Responsible Research and Innovation activities.

How to use the Pathway

Who implements the Pathway? Farmers' Associations

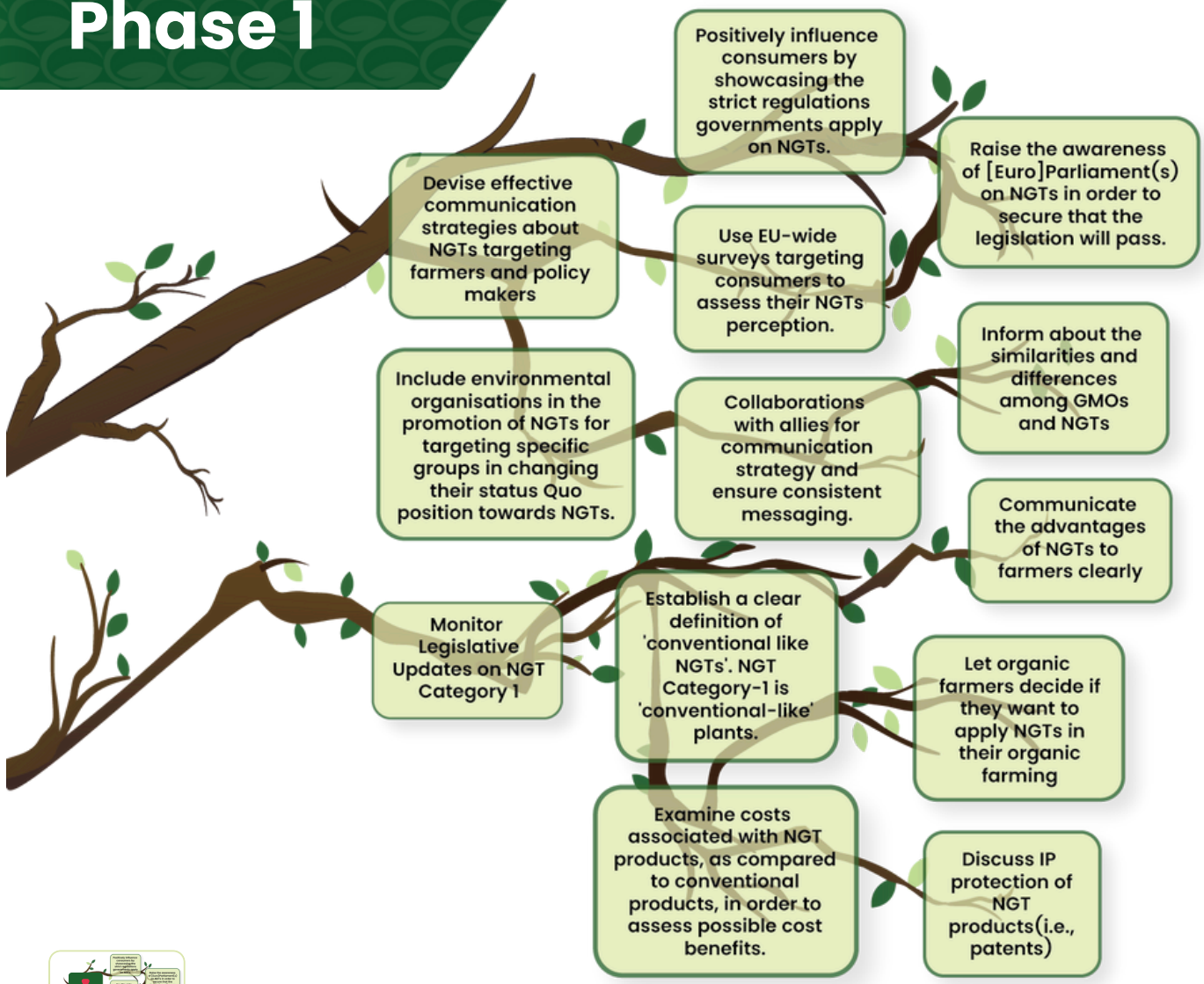
This pathway is organised into two linked phases, Phase 1 and Phase 2. Each phase consists of a series of interlinked actions. The pathway shows the logical sequence that these actions should be implemented. Actions that are illustrated in the same vertical line (top of each other) show that they are equally interdependent to each other and that they can be executed in parallel. The interdependence of the actions has been specified through a specialised algorithm and checked by stakeholders and Farmers' Associations.

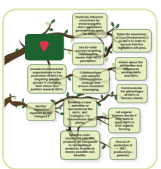
Each action is defined based on the SMART principle with steps:

S pecific:	Clearly outlines what is to be achieved, who is involved, and why it is important.
M easurable:	Includes criteria to track progress and determine success.
A chievable:	Realistic and feasible given the resources, constraints, and context.
R elevant:	Aligned with broader goals or priorities, ensuring it contributes meaningfully to the overarching objective of a consumer association.
T ime-bound:	Includes a deadline or timeline to create urgency and accountability.

The pathway is ready for implementation, and it is up to the Famers' Association, executing it, to adjust the objectives of each step to better fit their goals, for example the metrics and time frames mentioned in the step by step explanations. The pathway is a guidance document, and the implementation and subsequent results are the sole responsibility of the Farmers' Association and its actors.

Phase 1





Devise effective communication strategies about NGTs targeting farmers and policy makers

S

Step: Develop communication materials (e.g., fact sheets, infographics, case studies, and presentations) that differentiate NGTs from conventional breeding and GMOs, highlighting practical benefits for farmers (e.g., yield improvements, cost efficiency, sustainability) and policy-relevant aspects (e.g., regulatory frameworks, food safety, and innovation).

Objective: Clearly communicate tailored NGT information that addresses the distinct needs and concerns of farmers and policymakers.

M

Step: Conduct pre- and post-campaign surveys with at least 100 farmers and 100 policymakers to gauge changes in awareness and perception, aiming for at least a 70% improvement in understanding and a 30% increase in positive sentiment regarding NGTs within 6 months.

Objective: Achieve measurable improvements in understanding and engagement among the target groups.

A

Step: Partner with agricultural extension services, breeder associations, and policy advisory groups to disseminate the materials via workshops, webinars, and local meetings. Secure at least 3 key partnerships within 3 months to leverage existing communication channels.

Objective: Utilize existing networks and resources to effectively reach the target audiences.

R

Step: Conduct focus groups to refine the messaging and tailor content to their specific needs, such as demonstrating NGT benefits in improving crop resilience for farmers and aligning with sustainability and innovation policies for policymakers.

Objective: Ensure that the communication strategies address the practical concerns and interests of farmers and the policy priorities of decision-makers.

T

Step: Roll out the pilot campaign to both farmers and policymakers by month 6, then perform an impact assessment and finalize a comprehensive campaign report by month 12.

Objective: Launch a pilot communication campaign and evaluate its impact within a set timeframe to inform further adjustments.

Positively influence consumers by showcasing the strict regulations governments apply on NGTs.

S **Step: Develop a multimedia campaign** (including explainer videos, infographics, and Q&A documents) that details the regulatory processes, such as safety assessments, labeling standards, and continuous monitoring, applied to NGT products.
Objective: Clearly communicate how government regulations ensure the safety and reliability of NGTs.

M **Step: Aim to reach at least 500,000 consumers through digital and offline channels**, and use pre- and post-campaign surveys to target a 30% increase in positive sentiment regarding NGT regulatory oversight within 10 months.
Objective: Quantify consumer engagement and the improvement in their perception of NGT safety.

A **Step: Collaborate with at least three key regulatory bodies and industry associations** to produce and validate the campaign materials.
Objective: Leverage existing governmental and industry partnerships to ensure accurate and credible content.

R **Step: Ensure all campaign materials emphasize that strict government regulations mitigate health and environmental risks**, aligning with broader public priorities such as sustainability and food safety.
Objective: Address consumers' top concerns regarding product safety, environmental impact, and transparency.

T **Step: Roll out the campaign within 4 months.** Run the campaign for 6 months. Conduct a comprehensive impact review with surveys and engagement metrics at 10 months after the campaign start.
Objective: Implement the campaign within a defined timeframe to influence consumer perceptions before key market decisions.

Use EU-wide surveys targeting consumers to assess their NGTs perception.

S **Step: Compile a list of at least three relevant EU-wide consumer surveys** (e.g., from Eurobarometer, Eurostat, or academic sources) that contain NGT-related questions.
Objective: Identify and leverage current EU-wide surveys that include data on consumer perceptions of NGTs.

M **Step: Analyze survey datasets covering at least 10,000 respondents to extract measurable indicators** such as overall acceptance, prevalent misconceptions, and levels of awareness; aim to produce a detailed report summarizing these metrics with at least 95% data accuracy.
Objective: Quantify key consumer perception metrics regarding NGTs.

A **Step: Partner with at least three EU research institutions or data analysis experts** within the next 4 months to utilize existing statistical tools and frameworks, thereby minimizing additional resource requirements.
Objective: Ensure the data analysis is feasible with available resources and expertise.

R **Step: Focus the analysis on consumer factors that directly impact NGT policy and market acceptance** (e.g., trust in technology, willingness to pay, environmental and health concerns), and incorporate these insights into actionable recommendations in the final report.
Objective: Align survey insights with the needs of stakeholders, such as policymakers and industry communicators.

T **Step: Finalize data extraction, complete the analysis and publish a comprehensive report** with actionable insights to key stakeholders within 6 months of completing the analysis.
Objective: Complete the entire survey analysis and disseminate findings in a timely manner.

Raise the awareness of [Euro]Parliament(s) on NGTs in order to secure that the legislation will pass.

S

Step: Organize targeted briefing sessions and field visits led by farmers' associations for MEPs, featuring case studies and real-world examples from local farms that successfully use NGTs.
Objective: Clearly convey the practical benefits of NGTs in improving agricultural sustainability, food security, and rural development.

M

Step: Conduct pre- and post-event surveys with participating MEPs, aiming for at least a 30% improvement in positive perceptions of NGTs, and secure at least 50 supportive endorsements or statements from MEPs during legislative discussions.
Objective: Quantify the impact of the awareness efforts on MEPs' understanding and support for NGT legislation.

A

Step: Collaborate with at least 5 prominent farmers' associations and agricultural experts to develop a standardized briefing package and ensure participation of a minimum of 20 MEPs in the organized events within the next 6 months.
Objective: Utilize existing networks and resources within farmers' associations to effectively reach MEPs.

R

Step: Incorporate success stories, data on yield improvements, and environmental benefits from NGT adoption into all communication materials, ensuring they directly address key policy issues and resonate with the priorities of EU legislators.
Objective: Align the messaging with the EU's strategic priorities such as sustainability, food security, and rural development.

T

Step: Launch the first series of briefing events and field visits within 3 months, complete all scheduled activities within 12 months, and deliver a comprehensive impact report to stakeholders at least 2 months before the next parliamentary vote on NGT legislation.
Objective: Implement and complete the awareness campaign within a timeframe that allows its impact to be measured before key legislative votes.

Include environmental organisations in the promotion of NGTs for targeting specific groups in changing their status Quo position towards NGTs

S

Step: Compile a list of at least 5 influential environmental organizations that are open to science-based discussions, and invite them to participate in dedicated roundtables focused on NGT benefits and sustainability.
Objective: Identify and involve key environmental organizations in the promotion of NGTs.

M

Step: Conduct pre- and post-event surveys during a series of 3 joint workshops (over 6 months) with the aim of achieving at least a 20% positive change in attitude toward NGTs among participants.
Objective: Quantify shifts in perceptions toward NGTs among targeted groups through collaboration with environmental organizations.

A

Step: Partner with at least 3 environmental organizations that already engage in sustainable agriculture initiatives and utilize their communication channels to co-develop promotional materials.
Objective: Leverage existing networks and resources to facilitate collaboration.

R

Step: Collaboratively develop a joint messaging framework that emphasizes how NGTs contribute to reduced pesticide use, enhanced biodiversity, and overall environmental sustainability, and integrate these messages into all campaign materials and events.
Objective: Ensure that the promotional messaging aligns with the core environmental values of the target organizations and their stakeholders.

T

Step: Launch the joint awareness campaign within 6 months, conduct a series of follow-up events and surveys over the following 12 months, and publish an impact report summarizing the outcomes within 16 months.
Objective: Implement the collaborative campaign within a clear timeframe to drive measurable impact.

Collaborations with allies for communication strategy and ensure consistent messaging.

S

Step: Organize an initial kick-off meeting with at least 5 key allies to agree on communication priorities and strategic guidelines.
Objective: Form a dedicated working group with allied organizations (e.g., breeder associations, agricultural cooperatives, consumer groups) to develop unified messaging on NGTs.

M

Step: Develop a communication toolkit (including key messages, visual templates, and FAQs) within 4 months and achieve endorsement from 80% of the allied organizations; track the rollout by collecting implementation feedback from at least 100 stakeholders within 6 months of launch.
Objective: Ensure that the unified communication strategy is adopted and consistently implemented across all allied channels.

A

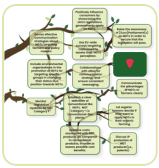
Step: Leverage existing digital platforms (e.g., online forums, email lists, social media groups) and schedule bi-monthly virtual meetings over the next 6 months to coordinate messaging efforts and refine the toolkit.
Objective: Utilize existing networks and resources of the farmers' associations and allied organizations to facilitate collaboration without significant additional investment.

R

Step: Incorporate feedback from at least 3 focus groups representing each target audience into the toolkit content, ensuring that messaging emphasizes safety, sustainability, and economic benefits of NGTs.
Objective: Align messaging with the key concerns and interests of target audiences (farmers, consumers, policymakers) to ensure the communication strategy addresses industry challenges and fosters trust.

T

Step: Finalize and distribute the communication toolkit in 6 months, with a full campaign launch scheduled within 9 months, and perform an impact evaluation in 12 months to measure consistency and audience reception.
Objective: Launch the unified communication strategy within a clear timeframe to support upcoming policy debates and market activities.



Inform about the similarities and differences among GMOs and NGTs

S

Step: Develop an educational brochure and infographic that provide side-by-side comparisons, including real-world examples and scientific data, in collaboration with subject matter experts.
Objective: Clearly differentiate GMOs and NGTs by highlighting their key similarities (e.g., use of genetic modification techniques) and differences (e.g., methods used, regulatory oversight, and outcomes).

M

Step: Distribute the educational materials to at least 5,000 stakeholders (farmers, consumers, and policymakers) via digital and physical channels, and conduct pre- and post-campaign surveys aiming for a minimum 30% improvement in understanding of GMOs vs. NGTs within 6 months.
Objective: Ensure broad outreach and assess improvement in understanding among target audiences.

A

Step: Collaborate with 3 agricultural research institutions and 2 consumer advocacy groups to validate and refine the educational content, and utilize established communication channels (newsletters, social media, farm events) of the farmers' associations for dissemination.
Objective: Leverage existing networks and resources to facilitate the campaign without significant additional investments.

R

Step: Integrate clear sections in the educational materials that discuss environmental, economic, and health aspects, ensuring alignment with current EU regulatory frameworks and public debates.
Objective: Address common misconceptions and key concerns regarding GMOs and NGTs to empower stakeholders with accurate, policy-aligned information.

T

Step: Finalize and distribute materials by month 4 and conduct the follow-up evaluation (including surveys) by month 8, with a comprehensive impact report published at that time.
Objective: Complete the entire educational campaign—from development to evaluation—within a defined timeframe to inform upcoming policy and market decisions.

Communicate the advantages of NGTs to farmers clearly

S **Step: Develop tailored educational materials**—including brochures, short videos, and local case studies—that showcase real-world examples and success stories of NGT adoption in farming.
Objective: Clearly articulate the practical benefits of NGTs (e.g., improved yield, reduced input costs, enhanced climate resilience, and decreased pesticide usage) that directly impact farmers.

M **Step: Conduct pre- and post-campaign surveys among at least 500 farmers**, targeting a 40% improvement in positive perceptions and understanding of NGTs as measured by survey responses within 4 months.
Objective: Quantify the impact of the communication campaign on farmers' understanding and perception of NGTs.

A **Step: Leverage established communication channels** such as association meetings, newsletters, and social media platforms to reach at least 80% of member farmers with the new materials.
Objective: Ensure effective dissemination of materials using the existing infrastructure of farmers' associations.

R **Step: Integrate local success stories and region-specific data into the materials** to directly address the farmers' concerns and demonstrate the tangible benefits of NGTs.
Objective: Align the campaign content with the immediate challenges and long-term goals of farmers, such as sustainability, profitability, and crop resilience.

T **Step: Roll out the campaign over a 6-month period with interim evaluations at 3 months** and a final impact assessment at the end of 6 months, culminating in a comprehensive evaluation report.
Objective: Complete the communication campaign and evaluate its effectiveness within a defined period.

Monitor Legislative Updates on NGT Category 1

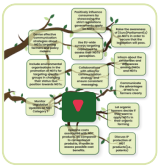
S **Step: Set up a dedicated monitoring team or designate a responsible unit that subscribes to EU legislative databases, official publications, and relevant industry updates** to identify all proposals, amendments, and decisions impacting NGT Category 1.
Objective: Identify and track all legislative activities related to NGT Category 1.

M **Step: Generate a monthly report detailing all legislative updates, with a target of tracking at least 10 relevant updates per quarter**, and conduct quarterly stakeholder surveys to confirm that the reports meet user needs with a satisfaction rate of at least 80%.
Objective: Quantify the output of the monitoring efforts to ensure effectiveness.

A **Step: Leverage existing legislative tracking tools (e.g., EUR-Lex, legislative dashboards) and partner with legal experts or policy analysts from industry associations** to validate the data, ensuring the process is integrated into the organization's current workflow.
Objective: Utilize existing resources and partnerships to implement the monitoring system efficiently.

R **Step: Focus on collecting and summarizing updates that affect regulatory compliance, market access, and the innovation landscape for NGTs**, tailoring reports for decision-makers in both industry and policymaking circles.
Objective: Ensure the monitoring system provides actionable insights that directly impact stakeholder decisions regarding NGT Category 1.

T **Step: Launch the full monitoring system within 3 months from project initiation, with continuous monthly reporting thereafter** and a comprehensive annual review conducted at the end of 12 months to assess performance and update methodologies as necessary.
Objective: Implement the monitoring system promptly to support upcoming legislative cycles.



Establish a clear definition of 'conventional like NGTs'. NGT Category-1 is 'conventional-like' plants.

S **Step: Form an expert panel comprising plant breeders, molecular biologists, regulatory experts, and industry stakeholders to draft the definition**, focusing on genetic similarity, breeding techniques, and phenotypic characteristics.
Objective: Create a precise and scientifically valid definition of "conventional-like NGTs."

M **Step: Organize 3 stakeholder consultation workshops (e.g., scientists, regulators, and policymakers) at months 3. 6 and 9,** to refine and finalize the definition, ensuring consensus among at least 80% of participants.
Objective: Ensure the definition is reviewed and validated by relevant stakeholders.

A **Step: Compile and review existing literature, regulatory precedents, and technical standards** related to "conventional-like" traits in plants to inform the definition. Engage third-party research organizations if necessary.
Objective: Utilize existing research and case studies to support the definition.

R **Step: Work closely with EU regulatory bodies, such as EFSA**, and align the definition with existing frameworks like those used for conventional breeding techniques to ensure compatibility.
Objective: Align the definition with EU regulatory requirements and global standards for clarity and consistency.

T **Step: Publish the final definition, supported by a peer-reviewed white paper, within 12 months** and disseminate it to policymakers, regulatory bodies, and industry stakeholders.
Objective: Finalize and propose the definition within a defined timeframe to align with upcoming legislative timelines.

Let organic farmers decide if they want to apply NGTs in their organic farming

S **Step: Develop and distribute an educational toolkit** (including brochures, videos, and webinars) outlining NGT applications, regulatory frameworks, and compatibility with organic principles.
Objective: Provide organic farmers with comprehensive, science-based information on the potential benefits and challenges of using NGTs in organic farming.

M **Step: Organize 5 regional workshops and 2 online webinars** to engage at least 1,000 organic farmers in discussions about NGTs and gather their feedback within 8 months.
Objective: Ensure broad participation of organic farmers in the decision-making process regarding NGT use.

A **Step: Partner with at least 3 major organic farming organizations** to co-develop content and facilitate discussions about NGTs in organic farming practices.
Objective: Collaborate with organic farming associations to ensure the initiative meets the needs of organic farmers.

R **Step: Facilitate a dialogue between organic certification bodies, policymakers, and organic farmers** to clarify whether and how NGTs can fit within organic farming standards.
Objective: Align NGT use with organic certification standards and regulations to ensure compatibility with organic farming principles.

T **Step: Publish a consolidated report summarizing feedback, policy discussions, and recommendations** for farmers within 12 months and disseminate it widely.
Objective: Enable organic farmers to make a well-informed decision regarding NGTs within a reasonable timeframe.

Examine costs associated with NGT products, as compared to conventional products, in order to assess possible cost benefits.

S

Step: Conduct a detailed cost analysis of NGT products, comparing R&D, production, commercialization, and market prices to conventional products.
Objective: Collect and analyze cost data for NGT products throughout their lifecycle.

M

Step: Develop a comparative report detailing cost differences between NGT and conventional products, aiming to identify at least 3 cost-saving or value-adding factors within 14 months.
Objective: Quantify the potential cost benefits of NGT products.

A

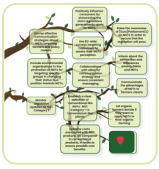
Step: Partner with at least 5 industry stakeholders (including NGT developers, conventional seed companies, and policymakers) to gather cost-related data and validate findings.
Objective: Involve stakeholders to ensure accurate data collection and insights.

R

Step: Host 2 stakeholder workshops to present preliminary findings and gather feedback to refine cost analysis and its implications.
Objective: Provide insights to policymakers, breeders, and farmers to support informed decision-making regarding NGT adoption.

T

Step: Release an executive summary of the findings and recommendations for stakeholders within 15 months of project initiation.
Objective: Deliver actionable results on cost analysis to inform future strategies.



Discuss IP protection of NGT products (i.e., patents)

S

Step: Host a 2-day conference with legal experts, policymakers, breeders, and industry representatives to examine the implications of patents and plant breeders' rights on NGT innovation.
Objective: Organize a dedicated forum to discuss IP protection for NGT products.

M

Step: Develop a position paper based on stakeholder input during the forum, outlining 5 actionable recommendations for IP policies.
Objective: Generate a clear set of recommendations on IP protection for NGT products.

A

Step: Secure participation from at least 10 key stakeholder groups, including patent offices, legal firms, industry associations, and research institutions, to ensure balanced representation.
Objective: Engage a diverse set of stakeholders in meaningful dialogue on IP protection.

R

Step: Collaborate with relevant EU regulatory bodies and IP offices to ensure alignment with ongoing legislative updates and challenges.
Objective: Align IP discussions with current legislative efforts and industry trends.

T

Step: Follow up with a stakeholder meeting to evaluate the progress on recommendations and explore next steps within 6 months of publishing the position paper.
Objective: Ensure actionable outcomes for IP discussions.

MY NOTES

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To access all Transition Action Plans,
please visit the link or scan the QR code

- **Consumer Associations**
- **Breeder Associations**
- **National Policymakers**
- **The Food Industry**
- **Farmer Associations**
- **NGO Associations**

https://genebecon.eu/transition-action-plans-taps/

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