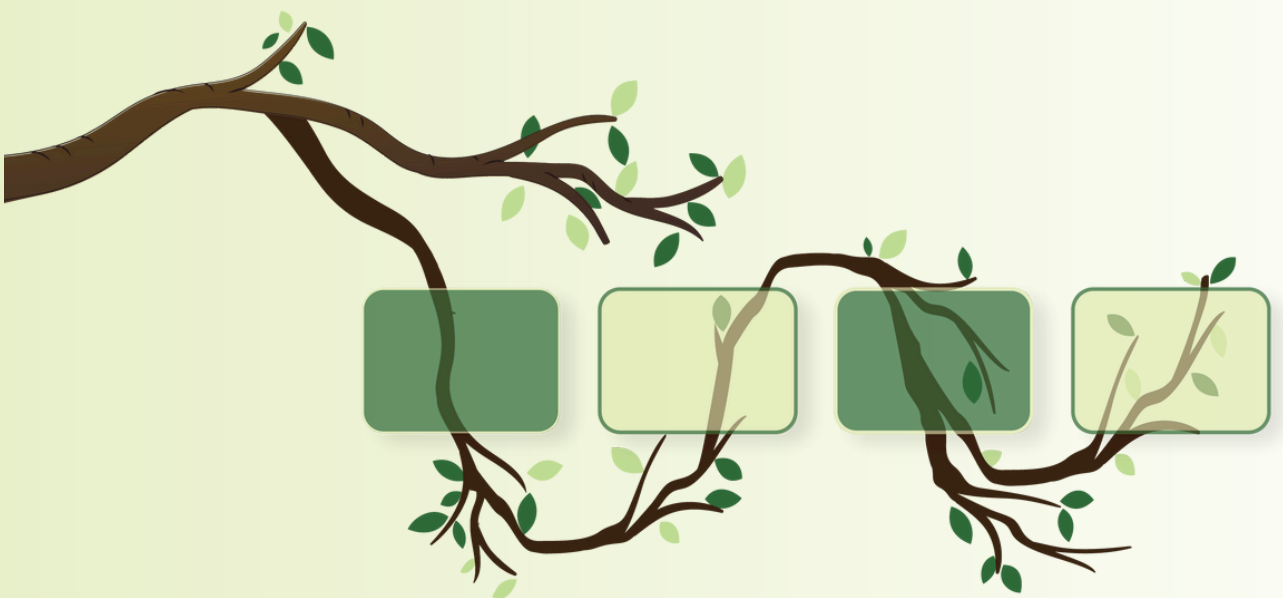
GeneBEcon

Consumer 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 Consumer Associations Action Pathway forms part of the GeneBEcon Transition Action Plan (TAP), designed to responsibly guide the adoption of New Genomic Techniques (NGTs) in Europe's agri-food system. NGTs are advanced, precise breeding tools that can help produce healthier, more resilient crops while aligning with EU sustainability goals. This specific TAP focuses on empowering consumer associations to play a central role in building trust, countering misinformation, and engaging the public on the benefits and implications of NGT products.

Why NGTs 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 Consumer Associations

Consumer associations are critical in shaping public opinion. The Consumer Associations TAP outlines a two-phase roadmap tailored to:

- Develop fact-based, relatable communication materials.
- Organize awareness campaigns and educational workshops.
- Collaborate with media, scientists, NGOs, and industry.
- Monitor misinformation and support regulatory understanding.
- Advocate for consumer-centric, science-based policy.

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 the Consumer Association to fit its goals and own information strategy.

Conclusion

The GeneBEcon Consumer Associations TAP equips stakeholders with practical, actionable strategies to advance responsible innovation. By fostering transparency, collaboration, and public trust, it supports the EU's vision for a resilient, sustainable, and inclusive bioeconomy.

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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 and 2: 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.

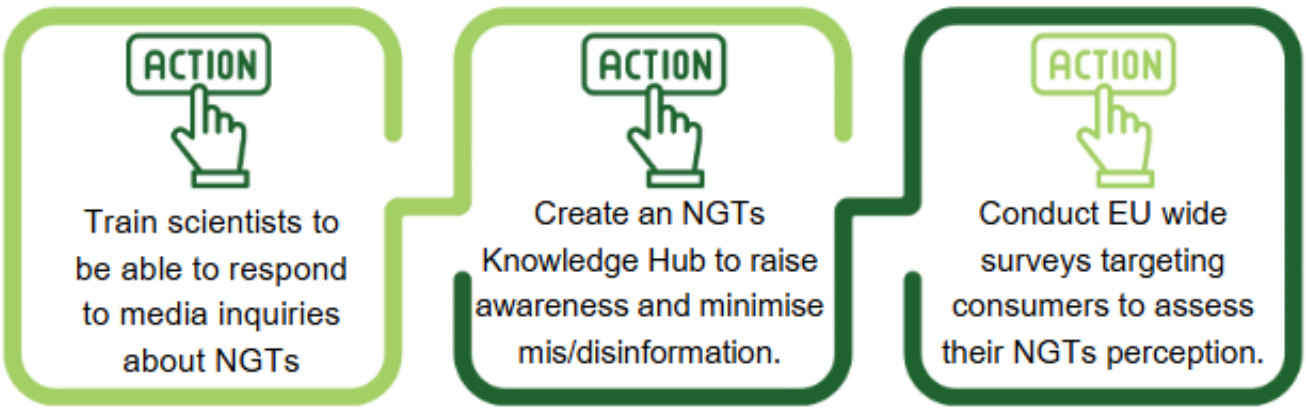
Phase 4: Finalising the Transition Action Plans – 3rd RRI Workshop (Oct 2024) until May 2025
The third workshop validated and refined the proposed Transition Action Plans, ensuring their feasibility, alignment with EU policy goals, and concrete implementation steps. A major focus was on building trust 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 Consumer Associations

Transitioning Consumers towards NGTs

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

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 shall be involved to transition towards these innovations. In this respect, consumer associations play a crucial role for informing and guiding consumers to make informed decisions and choices.

The GeneBEcon project has worked throughout its duration with consumer associations and studied consumer trends resulting in a potential to foster greater consumer trust. When consumers are presented with NGT products that clearly demonstrate advantages over conventional alternatives, their openness to consider and adopt these innovations is likely to increase. During this work, the project has identified two major issues that impair transitioning A) due to misinformation and B) due to regulatory uncertainty. The goal of this section is to enable consumer associations to consider specific actions to help their members in better understanding NGTs, what they mean for our wellbeing, quality of life, sustainability and provide measures to improve regulatory clarity.

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

How to use the Pathway

Who implements the Pathway? Consumer 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 consumer associations.

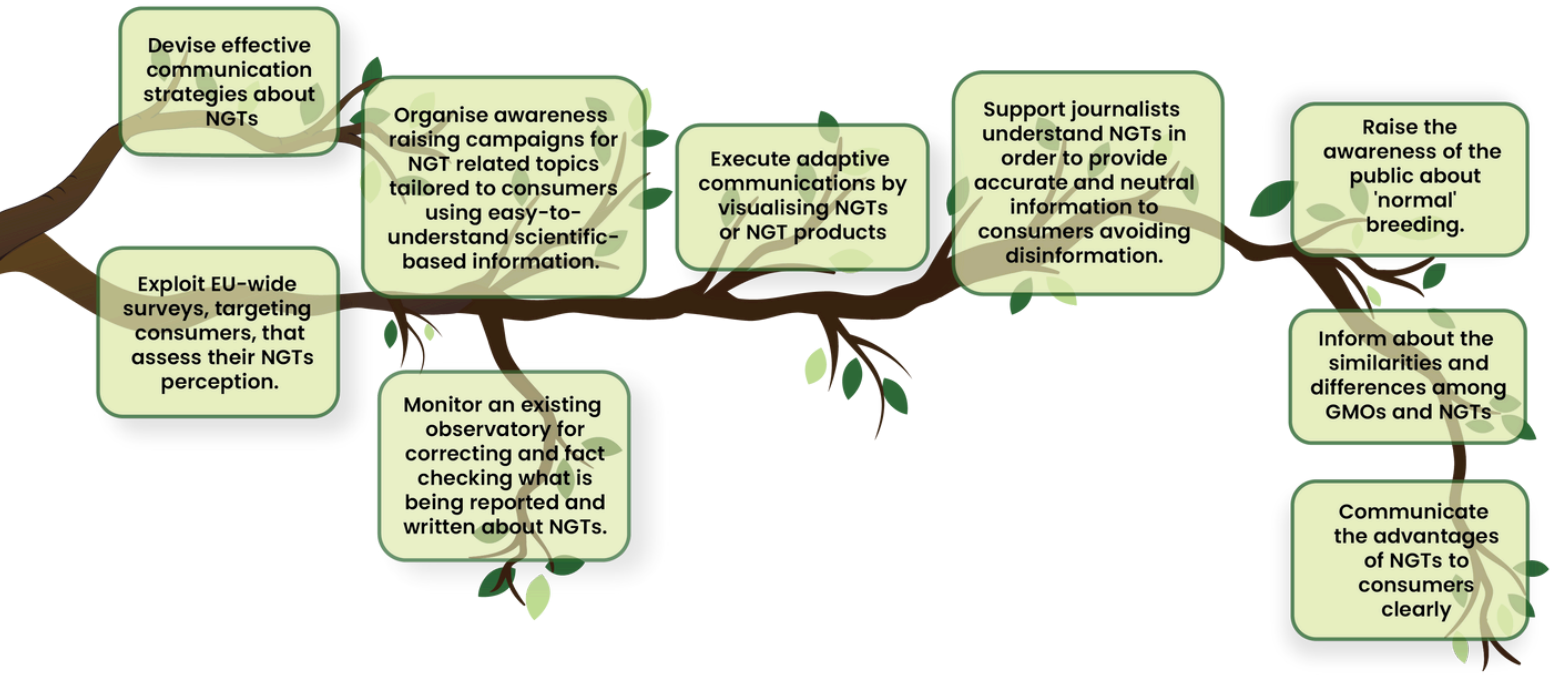
Each action is defined based on the I-SMART principle with steps and objectives to make each action impactful.

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 consumer association to adjust the objectives of each step to better fit its 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 consumer association and its actors[3].

3 It is recommended that, whenever consumers are involved in the implementation of any actions outlined in the roadmap, organizers ensure compliance with GDPR regulations by obtaining signed informed consent forms confirming participants' voluntary agreement to take part.

Phase 1



Devise effective communication strategies about NGTs.

S

Step: Develop a consumer-focused communication plan that simplifies NGT concepts, highlights their benefits, and addresses common concerns (e.g., safety, ethics, environmental impact).
Objective: Ensure consumers understand the relevance of NGTs to their daily lives, such as improved food security and sustainability.

M

Step: Create and distribute 10 consumer-friendly communication materials (e.g., videos, infographics, FAQs, and blog posts) within six months. Include in the communication plan surveys to measure the impact on consumer perception.
Objective: Achieve at least 50,000 impressions and 10,000 engagements (likes, shares, comments) across social media and other digital platforms within the first six months of the campaign.

A

Step: Partner with marketing and communication experts to craft messages that resonate with diverse consumer groups (e.g., families, schools, and science museums).
Objective: Launch targeted campaigns that reach at least 60% of the intended demographic groups within six months.

R

Step: Focus the communication strategy on NGT benefits directly aligned with consumer priorities, such as healthier food with reduced allergens, reduced pesticide use, and climate-resilient crops.
Objective: Ensure that 70% of survey respondents indicate a positive shift in their perception of NGTs within six months of campaign rollout.

T

Step: Roll out the first phase of the communication strategy within two months, including social media campaigns, webinars, and outreach events.
Objective: Conduct a mid-campaign evaluation after three months to assess effectiveness and adjust strategies based on feedback and analytics.

Exploit EU-wide surveys, targeting consumers, that assess their NGTs perception.

S

Step: Analyze data from recent and ongoing EU-wide consumer surveys on NGT perception to identify key insights, such as levels of awareness, trust, and concerns.
Objective: Use survey results to tailor communication and engagement strategies addressing consumer needs and misconceptions.

M

Step: Extract and present at least 10 key findings from survey data (e.g., trust levels in NGTs, demographic differences in perception) in a comprehensive report.
Objective: Ensure the report is shared with stakeholders, including policymakers, industry leaders, and advocacy groups, within three months.

A

Step: Create targeted action plans based on survey insights, such as addressing low trust regions or age groups with specific campaigns.
Objective: Develop at least three region-specific or demographic-specific campaigns within six months to address the identified gaps in perception.

R

Step: Use survey insights to inform policy briefs and public communication strategies that align with EU sustainability and innovation goals.
Objective: Ensure that at least two key findings from the surveys are cited in public forums, policy discussions, or media articles within six months.

T

Step: Complete the survey data analysis within six weeks and disseminate actionable insights to stakeholders immediately after.
Objective: Implement strategies informed by the surveys within three months and evaluate their impact within six months.

Organise awareness raising campaigns for NGT related topics tailored to consumers using easy-to-understand scientific-based information.

S

Step: Design and implement a consumer-focused awareness campaign that uses videos, infographics, and social media posts to explain key NGT topics, such as their role in sustainable agriculture, food safety, and climate resilience.
Objective: Provide accessible, science-based information that demystifies NGTs and addresses common concerns in a relatable way.

M

Step: Create and disseminate at least 15 educational materials (e.g., short videos, infographics, and fact sheets) across multiple platforms (social media, websites, and events) within the first three months.
Objective: Achieve at least 50,000 views on campaign materials and 10,000 direct engagements (likes, shares, comments) within the first three months.

A

Step: Collaborate with science communicators, influencers, and consumer advocacy groups to amplify the campaign's reach and ensure the content resonates with target audiences.
Objective: Partner with at least five organizations or influencers to co-host events or share campaign materials, reaching diverse consumer segments.

R

Step: Focus the campaign on issues that resonate with consumers, such as healthier food options, reduced environmental impact, and affordability, to highlight the tangible benefits of NGTs.
Objective: Conduct post-campaign surveys showing that at least 60% of participants have an improved understanding of NGTs and their potential benefits.

T

Step: Launch the campaign within three months, with scheduled updates every two weeks, and include a series of online and in-person events such as Q&A sessions, webinars, and community workshops.
Objective: Complete the first phase of the campaign within six months.

Monitor an existing observatory for correcting and fact checking what is being reported and written about NGTs.

S **Step: Set up a quarterly review committee consisting of experts from scientific, legal, and industry sectors to assess the observatory's findings** and identify trends in misinformation.
Objective: Establish a structured review process to analyze observatory reports.

M **Step: Develop a dashboard or report** summarizing the number of fact-checked articles, corrections issued, and major misinformation trends detected each quarter.
Objective: Track misinformation trends and corrections published by the observatory.

A **Step: Organize bi-annual stakeholder meetings** with policymakers, journalists, and industry representatives to discuss observatory findings and strategize responses to misinformation.
Objective: Facilitate communication between the observatory and stakeholders.

R **Step: Share key insights and misinformation trends with policymakers, media organizations, and consumer groups** through briefing documents and workshops.
Objective: Ensure observatory findings influence public awareness and policy decisions.

T **Step: Conduct an annual evaluation of the monitoring process**, adjust methodologies as needed, and set new targets based on findings.
Objective: Continuously improve monitoring strategies based on effectiveness.

Execute adaptive communications by visualising NGTs or NGT products.

S **Step: Develop visually engaging content**, such as 3D animations, videos, infographics, and interactive tools, to explain the science behind NGTs and showcase their real-world applications (e.g., drought-resistant crops, healthier food options).
Objective: Simplify complex NGT concepts and make them relatable to consumers by illustrating tangible benefits.

M **Step: Create and distribute at least 10 visual content pieces** across multiple platforms (e.g., websites, social media, and consumer events) within six months.
Objective: Achieve a minimum of 50,000 views and 15,000 interactions (likes, shares, comments) on visual content.

A **Step: Partner with graphic designers, videographers, and marketing experts** to produce high-quality, consumer-friendly visual materials.
Objective: Ensure at least 70% of visual content receives positive feedback (rated as “engaging” or “informative”) in post-campaign surveys.

R **Step: Focus visual content on NGT products addressing consumer priorities**, such as affordability, health benefits, and environmental sustainability, to highlight their societal relevance.
Objective: Ensure that at least 60% of consumers surveyed post-campaign report a better understanding of NGTs and their advantages.

T **Step: Launch the first phase of the adaptive communication campaign within two months**, with new visual content released every two weeks.
Objective: Complete the first phase of the campaign within six months.

Support journalists understand NGTs in order to provide accurate and neutral information to consumers avoiding disinformation.

S

Step: Develop an NGT Media Resource Hub, including fact sheets, expert contacts, and a FAQ section, to serve as a go-to reference for journalists.
Objective: Provide journalists with direct access to verified scientific sources on NGTs.

M

Step: Organize quarterly media workshops featuring scientists, industry experts, and policymakers to clarify key NGT topics and address common misconceptions.
Objective: Increase the number of journalists receiving formal training on NGTs.

A

Step: Establish an NGT Journalist-Expert Network, where journalists can submit questions to scientists and receive verified responses.
Objective: Foster ongoing engagement between journalists and scientific experts.

R

Step: Conduct bi-annual media content analysis to assess accuracy in NGT reporting and provide constructive feedback to journalists and media outlets.
Objective: Improve the quality of NGT-related news coverage.

T

Step: Send a quarterly NGT Media Briefing summarising the latest research, policy updates, and industry insights.
Objective: Ensure journalists continuously receive updates on NGT developments.

Raise the awareness of the public about 'normal' breeding.

S

Step: Develop visually engaging content, such as 3D animations, videos, infographics, and interactive tools, to explain the science behind NGTs and showcase their real-world applications (e.g., drought-resistant crops, healthier food options).
Objective: Simplify complex NGT concepts and make them relatable to consumers by illustrating tangible benefits.

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Step: Create and distribute at least 10 visual content pieces across multiple platforms (e.g., websites, social media, and consumer events) within three months.
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Step: Focus visual content on NGT products addressing consumer priorities, such as affordability, health benefits, and environmental sustainability, to highlight their societal relevance.
Objective: Ensure that at least 60% of consumers surveyed post-campaign report a better understanding of NGTs and their advantages.

T

Step: Launch the first phase of the adaptive communication campaign within two months, with new visual content released every two weeks.
Objective: Complete the first phase of the campaign within twelve months.

Inform about the similarities and differences among GMOs and NGTs.

S

Step: Develop clear, science-based educational materials (e.g., infographics, videos, fact sheets) that explain the similarities and differences between GMOs and NGTs in terms of their methods, applications, and regulatory frameworks.
Objective: Ensure that consumers have a clear understanding of both technologies and their distinct implications.

M

Step: Create and distribute at least 10 educational resources through websites, social media platforms, and community events.
Objective: Achieve 50,000 views and 15,000 engagements (e.g., likes, shares, comments) on these materials within the first three months of the campaign.

A

Step: Collaborate with scientists, educators, and communication professionals to develop content that is accurate, engaging, and easily understandable.
Objective: Ensure that at least 80% of survey respondents rate the materials as "clear" or "very clear" in conveying the differences between GMOs and NGTs.

R

Step: Align the information campaign with current EU legislative and public debates about NGTs to address common misconceptions and foster informed discussions.
Objective: Ensure the materials are cited or referenced in at least five policy discussions, media articles, or educational webinars within six months.

T

Step: Launch the campaign within two months, with new content released bi-weekly across multiple channels.
Objective: Evaluate the campaign's impact through surveys and analytics and prepare a comprehensive report on improved consumer understanding at the end of the campaign.

Communicate the advantages of NGTs to consumers clearly.

S

Step: Develop a consumer-focused communication campaign that highlights the key advantages of NGTs, such as their role in creating healthier food, improving crop resilience to climate change and reducing the need for chemical pesticides.
Objective: Simplify technical language and emphasize real-life benefits to make NGTs relatable and relevant to consumers.

M

Step: Create and distribute 15 targeted content pieces (e.g., videos, infographics, blogs, and social media posts) across multiple platforms.
Objective: Reach at least 100,000 consumers, with 20,000 engagements (likes, shares, comments).

A

Step: Collaborate with other consumer advocacy groups, agricultural organizations, and communication experts to craft clear, accurate, and engaging messages.
Objective: Ensure that at least 75% of campaign participants report that the content improved their understanding of NGT advantages.

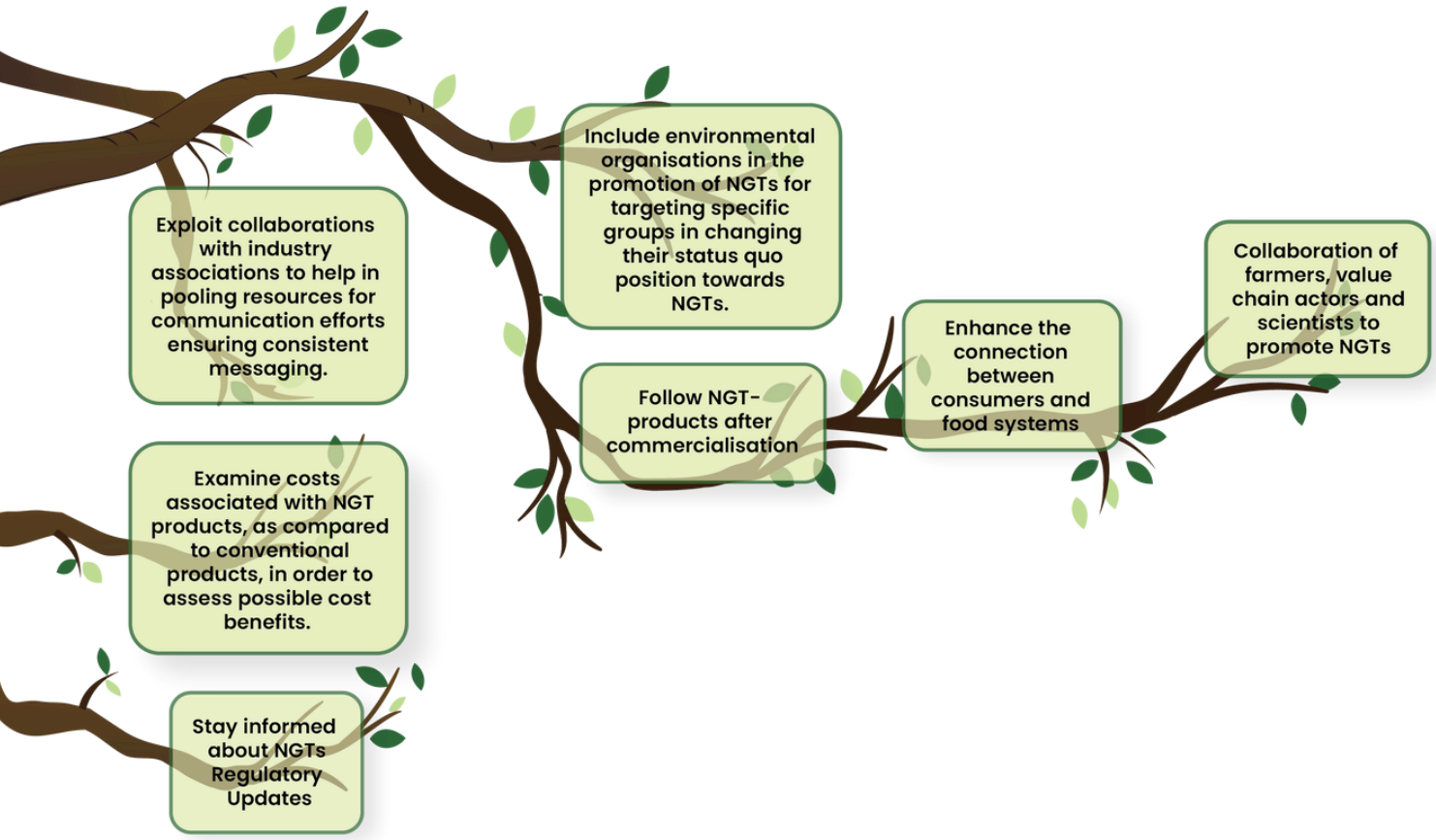
R

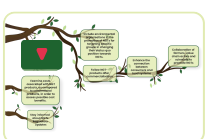
Step: Focus the campaign on addressing consumer concerns, such as food safety, environmental sustainability, and affordability, to align with current societal priorities.
Objective: Ensure that 50% of surveyed consumers express increased trust in NGTs and their potential benefits.

T

Step: Launch the campaign within two months and run it for six months, with weekly content releases and monthly impact assessments.
Objective: Conduct a comprehensive evaluation of the campaign's effectiveness, using analytics and feedback to refine future communications.

Phase 2





Exploit collaborations with industry associations to help in pooling resources for communication efforts ensuring consistent messaging.

S

Step: Establish a coalition of industry stakeholders (e.g., biotech companies, agricultural firms, and food producers) to develop a unified communication framework on NGTs.
Objective: Ensure consistent messaging and maximize the impact of communication efforts by sharing expertise, resources, and outreach strategies.

M

Step: Organize quarterly industry workshops to align messaging, share best practices, and review progress on communication initiatives.
Objective: Achieve participation from at least 80% of key industry stakeholders and produce three collaborative communication campaigns within the first year.

A

Step: Create a shared resource hub (e.g., a digital platform) where industry members can access pre-approved communication materials, such as infographics, videos, and FAQs.
Objective: Populate the hub with at least 20 high-quality, ready-to-use content pieces within six months of launch.

R

Step: Focus collaborative efforts on addressing common public concerns about NGTs (e.g., food safety, environmental impact) to ensure alignment with consumer priorities.
Objective: Ensure that all industry members adopt the agreed-upon messaging framework, with 90% of communications aligning with the framework within six months.

T

Step: Formalize the industry coalition and launch the shared resource hub within three months, with the first joint campaign rolling out within six months.
Objective: Evaluate the impact of collaborative communication efforts through consumer surveys and analytics by the end of the first year.

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

S

Step: Consult comprehensive cost analyses reports comparing the production, distribution, and market prices of NGT products versus conventional products in key agricultural sectors (e.g., grains, vegetables, and fruits).
Objective: Identify cost benefits and potential savings for producers, consumers, and supply chain stakeholders.

M

Step: Analyze at least 10 case studies or datasets comparing the costs of NGT and conventional products in terms of inputs (e.g., seeds, water, fertilizers) and outputs (e.g., yield, quality).
Objective: Produce a detailed report highlighting at least five significant cost benefits.

A

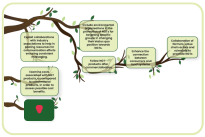
Step: Collaborate with agricultural economists, industry experts, and academic researchers to gather accurate cost data and perform in-depth analyses.
Objective: Ensure data collection and analysis are completed within the allocated budget and timeframe by leveraging partnerships with at least three institutions or organizations.

R

Step: Focus on cost factors most relevant to stakeholders, such as reduced pesticide use, higher yield efficiency, or lower transportation costs due to improved shelf life of NGT products.
Objective: Provide actionable insights to producers, policymakers, and consumers, demonstrating the economic advantages of adopting NGTs.

T

Step: Initiate the cost analysis project within one month and complete the study within six months.
Objective: Present the findings in a public forum or industry conference and distribute the final report to key stakeholders.



Stay informed about Regulatory Updates on NGTs.

S

Step: Establish a system for monitoring regulatory developments on NGTs, from the EU and non-EU markets, by subscribing to official publications, industry newsletters, and relevant policy forums.
Objective: Ensure timely access to information about new regulations, amendments, and policy changes.

M

Step: Track and summarize at relevant regulatory updates, highlighting their potential impact on the NGT industry.
Objective: Share updates with members through the associations communication channels.

A

Step: Assign competent resources to monitor regulatory activities, and participate in relevant hearings, workshops or webinars.
Objective: Ensure regulatory updates are identified and reported within two weeks of their publication.

R

Step: Focus on regulatory updates and highlighting the high EU food safety standards ensured by the EU and national competent authorities.
Objective: Provide actionable insights that help stakeholders adapt to regulatory changes and maintain compliance.

T

Step: Implement the monitoring system within one month and distribute the first regulatory brief within two months.
Objective: Maintain a consistent schedule of monthly updates and conduct a biannual review of the monitoring process to improve efficiency.

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

S

Step: Identify and engage with reputable environmental organizations (e.g., NGOs, advocacy groups) that are open to science-based discussions on sustainable agriculture and innovation.
Objective: Foster partnerships to co-develop and co-promote communication materials that highlight the environmental benefits of NGTs, such as reduced pesticide use and enhanced crop resilience.

M

Step: Collaborate with at least five environmental organizations to host joint events (e.g., webinars, panel discussions, or workshops) focused on the ecological advantages of NGTs.
Objective: Reach a critical mass of participants or viewers through these events.

A

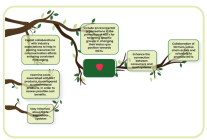
Step: Provide tailored, science-based information and training sessions to environmental organizations to help them understand and advocate for NGTs effectively.
Objective: Equip at least 50 representatives from partner organizations with NGT-related knowledge and materials.

R

Step: Focus messaging on NGTs' alignment with environmental goals, such as biodiversity protection, soil health improvement, and climate change mitigation, to address concerns and build trust.
Objective: Shift the perception of NGTs among at least 30% of surveyed participants from skepticism to neutrality or support.

T

Step: Launch the partnership and first co-promoted campaign within two months, with quarterly evaluations to assess progress and adjust strategies as needed.
Objective: Achieve measurable changes in public sentiment (via surveys) and environmental organizations' public statements within one year.



Follow NGT-based products after commercialisation.

S

Step: Assign a dedicated contact point or team to regularly monitor publications, guidelines, and announcements from key authorities (e.g., EFSA, national ministries, EU Commission).
Objective: Set up a structured process to collect and review updates from competent authorities regarding NGT-based products.

M

Step: Log and review all relevant documents, regulatory updates, and scientific opinions in a central database or internal reporting system.
Objective: Track the frequency and completeness of updates received and reviewed.

A

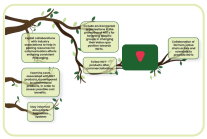
Step: Conduct internal briefings or distribute summaries to relevant teams after every major update from competent authorities.
Objective: Ensure key personnel have access to the latest regulatory and scientific information on NGTs.

R

Step: Incorporate new information into company strategies, communication materials, and product development plans.
Objective: Use official information to align internal strategies with regulatory and scientific developments on NGTs.

T

Step: Conduct a yearly review of the information collection process to assess effectiveness and identify any gaps in monitoring.
Objective: Maintain an ongoing process to ensure continuous awareness of regulatory and scientific developments on NGTs.



Enhance the connection between consumers and food systems.

S

Step: Develop educational initiatives, such as farm-to-table programs, interactive workshops, and digital content, to help consumers understand the journey of food from production to consumption.
Objective: Increase consumer awareness of how their food choices impact sustainability, health, and the economy.

M

Step: Organize 10 farm visits and 15 online or in-person workshops within the first six months.
Objective: Engage at least 5,000 participants, with 80% reporting increased understanding of food systems based on post-event surveys.

A

Step: Collaborate with farmers, food producers, and community organizations to provide hands-on experiences, such as cooking classes or virtual farm tours.
Objective: Ensure at least 70% of participants rate these activities as "helpful" or "very helpful" in connecting them to the food system.

R

Step: Focus on key consumer concerns, such as sustainability, traceability, and nutritional value, to align the initiative with current food trends and societal priorities.
Objective: Increase consumer trust and engagement with local food systems by 20% within the first year, as measured by surveys.

T

Step: Launch the educational initiative within three months and maintain a monthly schedule of activities.
Objective: Evaluate program success and its impact on consumer behavior through a comprehensive report by the end of the first year.

Collaboration of farmers, value chain actors and scientists to promote NGTs.

S

Step: Organize joint workshops and field demonstrations that bring together farmers, scientists, and value chain actors (e.g., processors, retailers) to showcase the benefits of NGTs in crop improvement and sustainability.
Objective: Facilitate knowledge sharing and practical insights into NGT applications and their value across the supply chain.

M

Step: Conduct at least 10 collaborative events (workshops, webinars, or field days), involving a minimum of 500 participants.
Objective: Gather feedback through surveys, aiming for at least 70% of participants to express increased understanding and willingness to adopt or support NGTs.

A

Step: Establish pilot projects involving at least 20 farmers, scientists, and value chain actors to test and document the performance and benefits of NGT-derived crops under real-world conditions.
Objective: Publish pilot results in industry reports and academic journals to build credibility and awareness.

R

Step: Align collaborative efforts with key agricultural challenges, such as improving yield, reducing pesticide use, and enhancing climate resilience, to ensure the promotion of NGTs addresses pressing stakeholder concerns.
Objective: Highlight specific examples of how NGTs contribute to sustainable agriculture, strengthening the case for their adoption.

T

Step: Launch the collaboration initiative within three months and conduct a mid-term review after six months to evaluate progress and adjust strategies.
Objective: Achieve measurable improvements in stakeholder perception and support for NGTs within 12 months, as evidenced by follow-up surveys and reports.

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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