



## Horizon Europe Strategic Plan

---

Brussels, 18.02.2020

EPSO welcomes the EC's 'Orientation paper' and looks forward to actions across clusters and pillars to better address the Sustainable Development Goals and the EU Green Deal including the farm to fork and the biodiversity strategies. To this end, EPSO makes the following key recommendations to policy makers at European and national level:

**1-Combine genetic, chemical, ecological and agronomic strategies for smart, diverse agriculture that benefits the environment and increases Food and Nutritional Security as well as Human Health**

- Encourage contributions from plant scientists to help boost the water- and nutrient-use efficiency of agricultural crops and to improve resource stewardship for resilient and environmentally sustainable production in agriculture, horticulture and forestry
- Encourage contributions from plant scientists to improve plant / crop health for resilient and environmentally sustainable production, thereby supporting the one health concept in agriculture, horticulture and forestry
- Encourage contributions from (plant) scientists to not only help decrease the environmental footprint, but also improve Food and Nutritional Security for human health and wellbeing.
- Develop a food label acknowledging lower environmental footprint without reducing yield and quality
- Engage more stakeholders in research projects through a consultative process from the start

**2-Support new technologies and adhere to international agreements** by improving the legislation and supporting flagship projects utilising New Breeding Technologies

**3-Ensure continued open access to Digital Sequence Information (DSI)** – DSI must NOT be included under the Nagoya protocol, as this would prevent open access

**4-Close the research and innovation cycle in pillar 2 of the Horizon Europe 2021-27 programme**

**5-Implement underlying concepts to address global challenges and EU priorities:**

- 1001 Crops - Diverse crops for diverse diets, human health and resilient production.
- Encourage and combine crop improvement, crop management and crop processing
- Combine all available approaches

These recommendations are relevant to the strategy for future Work Programmes as well as for Partnerships and Missions in Horizon Europe, particularly the partnerships 'Accelerating farming systems transitions: agro-ecology living labs and research infrastructure', 'Rescuing biodiversity to safeguard life on earth', Safe and sustainable

Food System for People, Planet and Climate’ and ‘Circular bio-based Europe: Sustainable, inclusive and circular bio-based solutions’, and the mission area for ‘Soil and Food’.

**1-Combine genetic, chemical, ecological and agronomic strategies for smart, diverse agriculture that benefits the environment and increases Food and Nutritional Security as well as Human Health**

***Encourage contributions from plant scientists to help boost the water- and nutrient-use efficiency of agricultural crops and to improve resource stewardship for resilient and environmentally sustainable production in agriculture, horticulture and forestry.***

Not only the world’s burgeoning population of 7.5 Bn, but also the plants on which that population depends, need sufficient and high-quality water for their survival. The increases in droughts and waterlogging associated with climate change put agricultural production at risk of crop failures, while the fertilizers and pesticides used to generate sufficient and healthy food in turn put groundwater at risk of contamination. Biological research-based solutions are needed to produce breakthroughs in understanding so that resilient, environmentally sustainable, water- and nutrient-efficient improved crops, able to achieve high yields on low inputs, will be available to farmers and foresters worldwide. Improved crops – with respect to improved root performance and lower water loss - and low-water consumption management systems, can contribute to higher yield at less water footprint. In addition, Biostimulants can support plants to resist abiotic stresses such as draught and salinity.

These targets should be priorities under ‘Horizon Europe’, so that we may help deliver on the **UN SDGs**: SDG2 “Zero Hunger”, Target 2.4; SDG6 “Clean Water”, Targets 6.1, 6.3, 6.6; SDG8 “Decent work and economic growth”, Target 8.4.; SDG12 “Responsible consumption and production”, Targets 12.1-12.2; SDG13 “Climate Action.” and on the EU’s **Green Deal**.

***Encourage contributions from plant scientists to improve plant / crop health for resilient and environmentally sustainable production, thereby supporting the one health concept in agriculture, horticulture and forestry.***

Future cropping systems consist of resilient plants grown in resilient cropping systems that are much less dependent on external inputs than current cropping systems. These systems are based on ecological principles and technology and use and stimulate biodiversity and produce safe and healthy products. Focus is needed on: healthy and resilient starting materials, development of resilient plants (including the use of new breeding technologies), soil health (including the role of microbiome in stimulating plant health), design of resilient cropping systems (including diversity in space and time such as strip-cropping and smart rotations) that also benefit pollinators and beneficial insects and the development of effective control methods that do not negatively impact human health and environment such as biocontrol of pests and diseases and physical methods for control of weeds. These methods are supported by monitoring and detection technologies that help the growers to manage their cropping systems.

These targets should be priorities under ‘Horizon Europe’ to help deliver on the **UN SDGs**: SDG2 “Zero Hunger”, Targets 2.1.-2.5.; SDG13 “Climate Action.”, Targets 13.1. and 13.3.; SDG15 “Life on Land” Targets 15.3., 15.5. and on the EU’s **Green Deal**.

***Encourage contributions from (plant) scientists to not only help decrease the environmental footprint, but also improve Food and Nutritional Security for human health and wellbeing.***

Due to the complex nature of plants and ecosystems, projects often tackle either sustainability or food and nutritional security. With science and technology advancing,

future projects should address both goals, using a systems approach to provide farmers, food companies and consumers integrated solutions.

EPSO proposed such a concept in the mission idea '1001 Crops - Diverse crops for diverse diets, human health and resilient production'.

In the medium-term, related projects could be clustered and actions taken forward always by those currently receiving funding so as to not miss benefits from finishing / ended projects.

In addition to Food security, the major plant compounds ensuring Nutritional / health benefits that need urgent attention in R&I programmes are: Micronutrients, encompassing beneficial ions (such as iron, cobalt, chromium, copper, iodine, manganese, selenium, zinc and molybdenum), (pro)-vitamins and the increasingly important phytochemicals (carotenoids, flavonoids, lignans..); and dietary fibre.

There are three major paths towards nutritional security: Improving the economic performance and further improve the nutritional quality of underutilised nutritious fruit, and vegetable crops (incl. legumes), which offer the highest potential for Europe as well as developing countries; Boosting micronutrients and their bioavailability from food in staple crops by biofortification, which is relatively easy to achieve, as it does not require a major change in consumer behaviour; Improving dietary supplements – the most common until now.

These targets should be priorities under 'Horizon Europe' to help deliver on the **UN SDGs**: SDG2 "Zero Hunger", Targets 2.1., 2.2.; SDG3 "Good Health and Well-being" Target 3.4.; indirectly to SDG12 "Responsible Consumption and Production" and SDG15 "Life on Land" and on the EU's **Green Deal**.

#### ***Develop a food label acknowledging lower environmental footprint without reducing yield and quality***

There seems to be no common label yet in Europe that acknowledges a smaller environmental footprint in crop cultivation that maintains crop yield and quality, regardless of the crop improvement technologies and crop management practices used. Such a label would create an innovation pull, provide acknowledgement and possibly better return of investment to breeding companies and to farmers, encourage a more responsible production regime (SDG12), and help towards climate action (SDG13), while not compromising on Food and Nutritional Security (SDGs 2 and 3).

Such a label would use as reference the environmental footprint for the same crop production in the same region in the previous year(s), thus encouraging local solutions to global problems.

A 'Low Environmental Footprint' label should be EU-wide, based on objective and measurable criteria, and managed by a public body, not to be confused with the many local and company labels that currently exist.

#### ***Engage more stakeholders in research projects through a consultative status from the start***

In addition to stakeholders participating as partners in projects under the multi-actor approach, more stakeholders who may lack the time and resources to be partners can be engaged on a consultative basis throughout the project, generating a win-win for partners, stakeholders, funders, and society.

EPSO has experience in engaging stakeholders through a dedicated Stakeholder Group (SHG), which has consultative status and helps steering the research, knowledge transfer, dissemination, and outreach of projects in an openly engaged way. This complements the multi-actor approach for advice throughout the project to optimise the

project results as well as their uptake and impact. SHG members are from academia and industry and include farmer and consumer organisation representatives.

## **2-Support new technologies and adhere to international agreements by improving the legislation and supporting flagship projects utilising New Breeding Technologies**

Currently, Europe's position on New Breeding Technologies as laid down in article 2 of directive 2001/18/EC, which is binding for NBT, is not in line with the definition of Living Modified Organism as it is defined in article 3 (g) in the Cartagena Protocol on Biosafety to the Convention on Biological Diversity, an international agreement signed by 171 countries.

Europe needs to have a more balanced approach to new technologies; it should improve the legislation and start flagship projects engaging all stakeholders, ranging from scientists, companies, and farmers to end-users, towards products with consumer benefits on the market in Europe and globally.

In parallel to such projects, new concepts for deregulation, based on public-private risk and benefit sharing, need to be developed to enable SMEs bringing such products to the market. Scientists (e.g. in EPSO) invite policy makers to exchange views on the current situation of genome editing in Europe and possible next steps to enable Europe to better address climate change, achieve food and nutritional security, and establish a sustainable agriculture in Europe and world-wide.

## **3-Ensure continued open access to Digital Sequence Information (DSI) must remain open – DSI must NOT be included under the Nagoya protocol, as this would prevent open access**

To implement the principle of 'Open Science', one of three goals of EU Commissioner Moedas, access to digital sequence information must remain open. This is questioned by some countries outside of Europe.

Scientists (e.g. in EPSO) call upon the parties of the Convention on Biological Diversity (CBD) and on national and EU decision makers to maintain Open Access to Digital Sequence Information a part of the 'Open Science' principle and therefore NOT to include this in the Nagoya Protocol, as its inclusion would substantially decrease the analysis and improvement of germplasm, including that of plants from Developing Countries.

## **4-Close the research and innovation cycle in pillar 2 of the Horizon Europe 2021-27 programme**

Scientists urge giving a more balanced consideration to basic research in relation to the other components (applied research, demonstration and innovation actions) of the research and innovation cycle in the Global Challenges and European Industrial Competitiveness programme.

Work by the Initiative for Science in Europe (ISE), the League of European Research Universities (LERU) and Science Europe suggest that, due to the increasing focus on higher Technology Readiness Levels (TRLs), the Societal Challenges aspect of Horizon 2020 misses out on the potential benefits from projects that include, or focus on, basic research (incl. bringing back questions from innovation to basic research) and on the

linking of basic research to applied solutions. It thus hinders ground-breaking solutions for current and future challenges. There has been a steady increase of support for applied research and demonstration actions and a steep increase of support for innovation actions, which is needed. However, support for basic research has dropped dramatically, especially from FP7 to Horizon 2020, and needs to be increased to be balanced for Horizon Europe.

This could be achieved by providing funding that addresses Global Challenges through the encouragement of collaborative basic research as an intrinsic component and occasional focus of Research and Innovation Action projects.

This will widen participation, including from underrepresented countries (EU13), and contribute to resolving gaps in collaborative research. This will create a translational bridge between the Excellent Science and the Innovative Europe pillars.

Increased funding for basic and strategic research will also meet the needs of private companies, who might have in-house capacity for applied research and innovation, but lack motivation, time, and funding to do the exploratory research that lays the groundwork or further improves innovation activities.

#### **5-Implement underlying concepts to address global challenges and EU priorities in a comprehensive way:**

***1001Crops - Diverse crops for diverse diets, human health and resilient production.*** See page 2

#### ***Encourage and combine crop improvement, crop management and crop processing***

Contributions from crop improvement, combined with better crop management as well as crop / food processing will better address e.g. nutritional security throughout the value chain. To do so, the actors in research and industry, funders and regulators across sectors need to collaborate from the start.

***Combine all available approaches*** – ranging from high-tech research to social innovation. One example can be flagship projects bringing together advantages of New Breeding Technologies and organic farming practices to increase resilience of crop production and reduce chemical inputs.

*This statement was developed by the EPSO Board, led by Karin Metzloff, based on the discussions at the EPSO General Meeting in Vienna 2019.*

---

#### **Contacts**

Karin Metzloff, European Plant Science Organisation, EPSO, [Karin.Metzloff@epsomail.org](mailto:Karin.Metzloff@epsomail.org), +32-2213-6260  
Alan Schulman, LUKE, FI & EPSO President, [Alan.schulman@helsinki.fi](mailto:Alan.schulman@helsinki.fi), +358-295-326521  
Ernst van den Ende, WUR, NL & EPSO Board, [ernst.vandenende@wur.nl](mailto:ernst.vandenende@wur.nl), +31-317-482146

#### **Useful links**

EPSO [www.epsoweb.org](http://www.epsoweb.org)

EPSO [submission on orientation towards strategic programming](#), 20.12.2019 (17.11.2019 Contribution ID 666b7610-ddca-4262-b4be-dc125b7ec2cf) to the EC

EPSO [Genome editing – improving legislation and starting flagships to better address climate, environmental, food and health challenges](#), 4.11.2019

EPPO [Implementing a Plants and Mircobiomes Strategy in Europe](#) – Recommendations, 18.10.2019  
 EPPO [First reaction to the Horizon Europe Provisional Agreement](#), 22.3.2019  
 EPPO [Statement on the Court of Justice of the EU ruling regarding mutagenesis and the GMO Directive](#), 19.2.2019  
 EPPO [Submission to the EC consultation on EU research and innovation missions \(FP9\)](#), 30.3.2018, incl. 1001 Crops – diverse crops for diverse diets and human health and sustainable production.  
 EPPO [Access to Digital Sequence Information must remain open](#), 26.6.2018  
 EPPO [position on FP9](#), 19.9.2017  
 EPPO [submission to CAP consultation](#), 2.5.2017: Need Common Agricultural, Food and Nutrition Policy

**About EPPO:** EPPO, the European Plant Science Organisation, is an independent academic organisation that represents more than 200 research institutes, departments and universities from 31 countries, mainly from Europe, and 2.700 individuals Personal Members, representing over 26 000 people working in plant science. EPPO's mission is to improve the impact and visibility of plant science in Europe, to provide authoritative source of independent information on plant science including science advice to policy, and to promote training of plant scientists to meet the 21st century challenges in breeding, agriculture, horticulture, forestry, plant ecology and sectors related to plant science. <https://epsoweb.org> | EU Transparency Register Number 38511867304-09

## Annex I – Detailed input to the EC’s Orientation towards strategic planning II

### EPPO submission towards Horizon Europe Strategic Programming

EPPO submitted these suggestions on 17.11.2019, to the EC: Horizon Europe online consultation for umbrella organisations regarding [Orientations towards first Strategic Plan for Horizon Europe – vs 2](#) of 31.10.2019. the EPPO Contribution ID is 666b7610-ddca-4262-b4be-dc125b7ec2cf.

### Section B Question 1: Which **targeted impacts can be best reached (or only reached) through Horizon Europe?**

#### **ALL targeted impacts from CLUSTER 1 – HEALTH.**

Suggestions to their content:

- To 3.1 Staying healthy in a rapidly changing society: Add the concept of ‘diverse crops for diverse diets and human health’ and the goal of ‘nutritional security’ to healthier food choices, health promotion and disease prevention.
- To 3.2 Living and working in a health-promoting environment: Add the ‘importance of plants’ for health and well-being in terms of agriculture, horticulture and forests.

#### **ALL targeted impacts from CLUSTER 6 – Food, Bioeconomy, Natural Resources, Agriculture and Environment.**

Suggestions to their content:

- To 3.4. Sustainable primary production, food and bio-based systems, FNS: Add ‘Diverse crops for diverse diets, human health and resilient production will become available.’ Sustainable, safe and healthy diets ...a major shift to ‘diverse and’ healthy diets from sustainable food production systems ....
- To 4.2. Biodiversity and Natural Capital: Link to increasing ‘cultured diversity’ in 4.3.
- To 4.3. Agriculture, forestry and rural areas: Add the concepts of ‘improved crops’ (in addition to management approaches) and of ‘Diverse crops for diverse diets, human health and resilient production’.
- To 4.5. Food systems: Link to the concepts of ‘improved crops’ (in addition to management) and of ‘Diverse crops for diverse diets, human health and resilient production’ in 4.3.
- To 4.6. BBI Systems: Add to the use of nature’s “biological assets” ‘and improved crops, synthetic biology’...

Section B Question 2: **Which common challenges between different clusters could reinforce their impacts (e.g. environment and health, green IT...)?**

**Clusters 1 (Health) and 6 (Food, Bioeconomy, Natural Resources, Agriculture and Environment (FBNRAE)) should jointly address Food and Nutritional Security (FNS) and Environmental sustainability and human health:**

EPSO welcomes the link between Food and Health Clusters:

- Crops without diseases, but with high plant secondary metabolite levels are beneficial for human health and help preventing diseases.
- Plants in natural and cultured environments improve air quality and human wellbeing.
- Possibly add: Plant Made Pharmaceuticals contribute to novel medicines.

Keeping plants and animals healthy to supply safe food: We suggest adding 'Improving crops to prevent plant pests and diseases relevant to human health (e.g. fungi) is an important contributor.'

**Close the research and innovation cycle in pillar 2**

EPSO urges to give more balanced consideration to basic research in relation to the other components (applied research, demonstration and innovation actions) of the research and innovation cycle in pillar 2. We currently miss potential benefits from basic research (incl. questions from innovation to basic research), hindering ground-breaking solutions addressing the SDGs. This could be better balanced by encouraging collaborative basic research as component and / or focus of RIA projects. This will widen participation incl. EU13, close gaps in collaborative research and bridge between the Excellent Science and Innovative Europe pillars. It will help private companies who need to build on the explorative research.

Section B Question 3: **Beyond research and innovation, which other measures would be needed at the European level to best achieve the targeted impacts (e.g. innovation deals...)?**

**Support new technologies – adhere to international agreements – by improving legislation and supporting flagship projects**

Currently Europe's position on New Breeding Technologies as laid down in article 2 of directive 2001/18/EC, which is binding for NBT, is not in line with the definition of Living Modified Organism as it is defined in article 3 (g) in the Cartagena Protocol on Biosafety to the Convention on Biological Diversity, an international agreement signed by 171 countries. Europe needs to have a more balanced approach to new technologies incl. improving the legislation and start flagship projects engaging all stakeholders from scientists, companies, farmers to end-users towards products with consumer benefits on the market in Europe and globally. In parallel to such projects, new concepts for deregulation, based on public-private risk and benefit sharing, need to be developed to enable SMEs bringing such products to the market. EPSO invites policy makers to exchange views on the current situation of genome editing in Europe and possible next steps to enable Europe better addressing climate change, achieving food and nutritional security and establishing a sustainable agriculture in Europe and world-wide.

Section B Question 4: **What are your impressions on the co-design process and how can we improve it?**

**In general**, the idea of the co-design process is very good and most welcome. We see better links between the clusters in pillar 2 and hope this will be translated into calls that are cross-clusters (or alternating led by always one of these clusters), which would be a major improvement versus the Horizon Europe programme.

The method of co-design could be easily improved by

1. inviting free text contributions without set questions and only an overall text limit (e.g. 4 pages). Stakeholders would simply refer to certain chapters of the orientation paper on comment on these.
2. Inviting umbrella organisations to participate in or recommend experts to the upcoming workshops the respective EC colleagues will organise to further develop and translate the Strategic Plan.

## Annex II – Detailed input to the EC’s Orientation towards strategic planning

### EPSO submission to the stakeholder consultation Horizon Europe Co-design 2021-24

EPSO submitted these suggestions on 2.9.2019, to the EC: [stakeholder consultation](#) ‘Horizon Europe Co-design 2021-2024’ towards its 1<sup>st</sup> Strategic Plan for the first four years of Horizon Europe.

### EPSO suggestions improving Cluster 1 – Health:

#### To 4. Key R&I Orientations

- 4.1. Staying healthy in a rapidly changing world: We suggest considering Nutritional Security as contributor to ‘3) Personalised solutions for health promotion and disease prevention of individuals or stratified solutions tailored to groups, including for improved prediction and prevention of diseases before/at birth.’

To this end, we suggest adding in the cross-cluster issues regarding ‘cluster 6 ‘Food and natural resources’ on the role of nutrition for health (incl. human microbiome, mal- and over-nutrition, safe food), personalised diets (incl. food habits in general and childhood obesity in particular; micronutrients and dietary fibres from plants) and the impact of food-related environmental stressors on human health (incl. marketing)....’

Accordingly, we suggest considering Nutritional Security as well in International cooperation.

### EPSO suggestions improving Cluster 6 - Food, bioeconomy, natural resources, agriculture and environment:

#### To 1. Global challenges and their drivers:

- We welcome the link between the Food and the Health Clusters: 1) Crops without diseases, but with plant secondary metabolites (phytochemicals) are beneficial for human health and help preventing diseases; 2) Plants in natural and cultured environments parks, buildings (horticulture, forestry, agriculture) improve air quality (*oxygen, less pollutants, temperature, humidity*) and relaxation; Possibly add 3) Plant Made Pharmaceuticals (PMPs) contribute to novel medicines, one example for high value products from plants in a bioeconomy.
- Keeping plants and animals healthy to supply safe food: We suggest adding to risk assessment and risk management: ‘Improving crops to prevent plant pests and diseases relevant to human health (e.g. fungi) is an important contributor.

#### To 2. EU Policy Objectives:

- EU policies and global commitment R&I can play a key role to contribute to: We suggest adding ‘achieving food and nutritional security, which is part of the UN SDGs and highly relevant at EU as well as global level.

#### To 3. Targeted impacts:

- Under ‘Establishment of primary production...based on sustainability’; ...food and nutritional security for all: We suggest adding the aspect of ‘diversity’: ... Diverse crops for diverse diets, human health and resilient production will become available. Sustainable, safe and healthy diets ...a major shift to diverse and healthy diets from sustainable food production systems will be achieved.



#### To 4. Key R&I Orientations

- 4.2. Biodiversity and Natural Capital: We suggest linking to the concept of increasing cultured diversity 'Diverse crops for diverse diets, human health and resilient production', which includes using more plant species and more varieties than today for food production.
- 4.3. Agriculture, forestry and rural areas: We suggest adding the concepts of 'improved crops' (in addition to management approaches) and of 'Diverse crops for diverse diets, human health and resilient production':
  - Enhance resource use efficiency: add 'more diverse / improved crops'
  - Adaptation of primary production climate change: add 'more diverse', better adapted crop varieties
  - Biodiversity and ecosystem: ... conservation, management, 'improvement' and use of plant and animal genetic resources
  - Health and safety in agriculture and forestry: ...methods for plant protection and weed control, 'including improved crops and management', that substantially reduce ...contentious pesticides...
  - New value chains: R&I will contribute to the ...EU-grown plant protein and organic sector 'and 1001 crops (Diverse crops for diverse diets, human health and resilient production)'. .... lead to greater diversity, 'quality (nutritional or non-food)', transparency .... across the food and non-food value chains.
- \*4.5. Food systems: We suggest linking to the concepts of 'improved crops' (in addition to management approaches) and of 'Diverse crops for diverse diets, human health and resilient production', mainly in 4.3..
  - .. in cooperation with Cluster 1....Tackling the causes of food and nutritional insecurity and identifying responses ...for different communities (..vulnerable groups like elderly, 'the different age groups such as pregnant women, children, young adults', ...)
  - Behavioural, socio-economic and demographic changes: ... European food 'and seed' industries should be involved ...by providing good quality ... food.
  - Citizen's empowerment and involvement: ... To develop and establish governance models enabling sustainability 'and food and nutritional security', R&I will ...
- 4.6. Bio-based Innovation Systems
  - Bio-based innovation: This goes far beyond biomass processing towards allowing the use of nature's "biological assets", 'including e.g improved crops, synthetic biology'.

#### To 5. European Partnerships or Annex 7. Missions

- Propose '1001 Crops - Diverse crops for diverse diets, human health and resilient production':

\*to 4.5.: **Theme: Improve food crops for better nutrition and human health** - How to get there: The objectives will be to generate phytonutrient-enriched plant-based foods and to assay their efficacy in protecting against inflammation and selected chronic diseases. Any foods showing positive effects on health in human cell-based assays or in intervention studies could be studied in combination with other 'health protecting' foods to address potential synergy between different phytonutrients. Such analyses will interest a target group of researchers working on experimental medicine and nutrition. The aim will be to promote understanding and appreciation of the nutritional value of plant-rich diets in protection against a broad range of chronic diseases. Beyond the immediate interest for nutrition and protection against chronic diseases, the translation of this research on the phytonutrient composition of traditional and/or orphan crops will allow identification of those offering greatest nutritional value in terms of protecting against chronic diseases, so promoting the development of diverse nutritious fruit and vegetable crops, best suited for the different regions of Europe and, in a broader context, different regions of the world.