



EPSO position on the next Framework Programme for Research and Innovation, FP9

Brussels, 19.9.2017

Horizon 2020 provides a unique opportunity to bring scientists and societies closer together to help build an inclusive, collaborative and globally connected Europe. A core component of this is the provision of intensive collaborative efforts for plant, agricultural and forestry sciences contributing to the wider bioeconomy to (a) address the future needs of farmers and consumers for healthy plant-based food and for non-food products, (b) maintain and extend sustainable agriculture and forestry practices to meet increasing food and non-food demand and (c) to address the challenges linked to mitigation of and adaptation to climate change as well as the circular economy. Pan-European programmes enable knowledge generation as well as synergistic and cost-efficient collaboration across Europe, and are thus capable of achieving impact on a broader scale than independent national efforts. European efforts are also critical to global productivity where increasing lack of food and nutritional security, scarcity of natural resources like water, nutrients and land, but also loss of biodiversity and genetic resources, imperil sustainable development and political stability. These factors already contribute to social unrest and migration pressures on a global scale and if no action is taken, will increasingly do so in the future. Plant scientists in cooperation with researchers in other fields (e.g. natural, engineering and social sciences) generate the knowledge required to underpin solutions to address the targets set under the United Nations Sustainable Development Goals (SDGs; *Reference R1; Annex 1*).

However, now is the time to go beyond target setting: the knowledge and skills of the European plant science sector are urgently needed if Europe is to deliver timely and effective solutions to these major societal challenges. The structure of Framework Programme 9 will be crucial in enabling the involvement of the plant science community and in determining the effectiveness of their efforts in delivering innovative and transformative solutions for the wider European, and global, communities.

The European Plant Science Organisation (EPSO) welcomes the continued inclusion of the successful Excellent Science pillar in FP9, and sets out here our position for research priorities and mechanisms to engender a mission-based approach to close the research and innovation cycle through increasing support for collaborative basic research, encouraging increased levels of trans-disciplinarity and emphasising the importance of plant science in meeting the UN SDGs.

The EPSO recommendations:

I - Welcome the great success of the “Excellent Science” pillar

◆ 1 Continue and further strengthen the “Excellent Science” pillar and European Research Council (ERC) programmes as well as the Marie Skłodowska-Curie Actions (MSCA) which have achieved major successes in terms of attracting, supporting and

retaining excellent frontier scientists and training the next generation of scientists and entrepreneurs. (R2)

- There is an opportunity to improve the MSCA Innovative Training Network scheme by increasing the flexibility for students to choose the primary training institute / university among the network members according to their individual needs. Current rules require this to be fixed in the proposal / contract with minute flexibility.
- The success rate of ERC applications remains too low, leading to the exclusion of many excellent projects. This should be addressed by increasing the total budget for the ERC programme with the aim of increasing the total number of funded projects.

II-Improve the “Societal Challenges” mission based pillar addressing the Sustainable Development Goals (SDGs) (Annex 1)

◆ **2 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:** Work by the Initiative for Science in Europe (ISE; R2 and 3), the League of European Research Universities (LERU; R4) and Science Europe (R5) suggest that due to the increasing focus on higher Technology Readiness Levels (TRLs), the Societal Challenges aspect of Horizon 2020 misses out not only on the potential benefits from projects that include, or focus on, basic research, but also on linking basic research to applied solutions. It thus hinders ground-breaking solutions for current and future challenges. Compared with FP6 and FP7, there is a steady increase of support for applied research and demonstration actions and a steep increase of support for innovation actions. However, support for basic research has dropped dramatically, especially from FP7 to Horizon 2020 (R3).

This could be overcome by:

- Provisioning funding that addresses Societal Challenges through encouraging collaborative basic research as focus or intrinsic component of research and innovation projects.
- Reduce the number of subject-specific ERA-NETs and encourage fundamental transdisciplinary approaches within fewer of these mechanisms to broaden the scope of the European Research Area Networks and its ability to address interlinking and related goals through basic as well as applied research.

Both approaches will widen participation, including from underrepresented countries (EU13; R6), increase mobilisation of national and EU resources and contribute to resolving gaps in collaborative research. This will create a translational bridge between the scientific excellence and the industrial leadership 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 explorative research which lays the ground for innovation activities (see Annex 2).

◆ **3 Define the goals and objectives for innovative solutions, not the path to get there.**

Innovative research utilising a variety of technologies and cross-disciplinary approaches must be strengthened to develop solutions for Societal Challenges that we face now and in future. While FP6 fostered advanced technology research, this changed to increasingly tacit (traditional) knowledge development and application in FP7, which is now peaking in Horizon 2020, thus going from one extreme to the other. Prescriptive high-TRL, multi-actor, approaches can weaken the ability of fundamental and applied research and innovation to respond to specific challenges. To derive maximum benefit for the environment, human health, and the European economy, EPSO suggest that future programmes should be more flexible in their approach to encourage a truly balanced support to the use of diverse combinations of technologies and practices. Goals and objectives for innovative solutions should be identified while the approaches employed to reach these targets should be kept open to the applicants where possible, as mentioned in the Horizon 2020 Regulation of Establishment. (R7-9)

◆ **4 Incentivise outreach activities of researchers** across Europe and beyond by encouraging stakeholders to initiate and coordinate snowball-principle bottom-up activities at the European or even global scale. Competitive European funding could be used to provide central coordination support and core resources for outreach activities. The resulting tools such as websites, posters, flyers, images would then be made openly available for free use by researchers and other stakeholders across Europe and beyond. This will be an important contribution to engage the public, learning from concepts such as citizen science. (R10)

◆ **5 Increase participation of EU13** (R6) through incentives in the evaluation criteria, such as bonus points, or an obligation in some call topics to include participants across the (underrepresented) regions of Europe (including EU13). This will ensure that scientific excellence as well as potential impact of the project remain the main evaluation criteria while also encouraging the inclusion of academic and industrial partners from the EU13 in consortia assembled for European-funded competitions and collaborations. (See ◆2)

◆ **6 Address the SDGs and incentivise the private sector to invest in R&I by supporting a public-private partnership on Integrated Crop Production**

The public and private sectors share a common interest in aligning future research and production activities with the SDGs. This provides opportunities for the inclusion of Public-Private-Partnerships (PPP) addressing SDGs within FP9. For instance, a PPP on Integrated Crop Production would support an interdisciplinary and multi-sector mission. By building a partnership between industry, farming, academia, the European Commission and the Member States, a critical mass of stakeholders could be reached and thus consortia would be well-positioned to achieve high impact. The establishment of PPPs directly addresses SDG9 (*“Industry, Innovation and Infrastructure”*), specifically target 9.5 (*“Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending”*).

◆ **7 Strengthen Europe as a strong leader of and contributor to global action**

Implementing the ‘Open to the World’ concept of Commissioner Carlos Moedas: Addressing SDG2 “partnerships for the Goals” Targets 17.6,-17.8, SDG2 “End hunger” Targets 2.1-2.5, SDG13 “Climate action” Targets 13.1-13.3, SDG15 “Life on land” Targets 15.2, 15.5, etc.. EPSO encourages the provision of flexible resources for European-international collaborations, as successfully practised by the USA and China, for expanding nutritional security and development beyond Europe, particularly in Africa (R11-13). Addressing the following challenges is a priority both in Europe and globally:

- Building capacity through application of new technologies (e.g. New Breeding Technologies) and methodological progresses (e.g. phenotyping) necessary for agile plant breeding towards improved traits, crops and farming and forestry systems.
- Developing biological resources with careful characterization, preservation and management protocols, and with shared grounds and fair rules for global access and distribution of benefits.
- Biofortification of staple crops of global importance and improving the economic performance of nutritious under-utilised crops, including fruits, vegetables and ‘orphan’ cereals.
- Promoting precision agriculture and forestry to enable sustainable resource management, including low-cost technologies for effective decision-making, open science solutions such as satellite-based crop surveys and autonomous unmanned vehicles.

Long-term global partnerships are necessary to achieve these goals and would substantially benefit from: i) the establishment of open technology hubs with the capacity to host researchers and contribute to programmes that are conceived and implemented collectively, and ii) the development of vibrant education programmes that encourage mobility for students, lecturers (including non-European partners) and early career researchers, and harmonize process, curricula and qualifications.

◆ **8 to 14: Include the plant research and innovation areas (R14) that can help addressing several SDGs in the mission-based collaborative approaches in FP9.** Most of the SDGs are directly or indirectly linked to plant and agricultural sciences (*Annex 1*).

◆ **8 Increase yield and yield stability in changing environments for resilient production**

The goal of 'Improving yield and yield stability' (SDG2 "End hunger": Targets 2.1-2.5; SDG13 "Climate action": Targets 13.1-13.3; SDG15 "Life on land": Targets 15.2, 15.5) needs to be embedded within the overall mission of FP9 (e.g. Food 2030) to achieve agricultural productivity and sustainability on both the European and global scale; this is highlighted in the title of the European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-AGRI) strategy and elaborated in its Strategic Implementation Plan (*R14*). Work on this topic must aim to increase agricultural sustainability while also addressing the needs of a growing population, increasing environmental changes (including those due to climate change) and reduced land availability (due to urbanisation). There is a need for future research focused diverse crops with diverse microbiomes for resilient production (*R15, R16*). This will contribute towards the first objective of the Common Agricultural, Food and Nutrition Policy – productivity and food security – and contribute as well to improved standard of living, stable markets and reasonable prices.

◆ **9 Improve food crops for better nutrition and human health.**

To tackle nutritional security (SDG2 "End hunger": Targets 2.1-2.5; SDG3 "Good health and well-being": Targets 3.3-3.4), the goal of 'Improving plant compounds beneficial for human and animal nutrition and health' by improving the economic performance and value of underutilised and often nutritious crops in Europe and globally must be considered under FP9. Research in this area will be crucial to better understand the genetic resources and, often untapped potential of these orphan crops and the links between plant composition, processing, bioavailability and health, and to utilize this knowledge for innovation improving human and animal health, as elaborated in the EIP-AGRI Strategic Implementation Plan (*R17*). An important concept to tackle is the need for diverse crops for diverse diets and human health. (*R16, R18*). This will contribute as well to the new Common Agricultural, Food and Nutrition Policy and to standard of living, stable markets, supplies and reasonable prices.

◆ **10 Utilise bioactive green molecules (secondary metabolites & proteins) for renewable materials, energy, human wellbeing and health.**

EPSO recommend the prioritisation within FP9 of actions focused on expanding the range of natural compounds, include bioactives, that can be used for industrial application (SDG1 "No poverty": Target 1.4) and enhancing the production of high value plant-made pharmaceuticals with human health benefits e.g. developing green proteins using innovative plant molecular farming approaches (SDG3 "Good health and well-being": Targets 3.3, 3.4, 3.9).

◆ **11 Improve resource use efficiency and resource stewardship for resilient production**

High global population growth combined with growth in economic prosperity continues to drive increased consumption of resources and energy, causing increased pressure on terrestrial production systems. Climate change is already compounding these issues and mitigating its effects will demand a fundamental, global shift towards a more sustainable economy. Plant science can inform the innovative solutions needed to address these challenges through the development of new crop varieties with improved tolerance to extreme weather conditions (e.g. drought, heat-waves, flooding) and/or improved nutrient, water, soil and land use efficiency (SDG2 "End Hunger" : Target 2.4; SDG6 "Clean water", Targets 6.1, 6.3, 6.6; SDG 8 "Decent work and economic growth" , Target 8.4.; SDG12 "Responsible consumption and production": Targets 12.1-12.2; SDG13 "Climate Action"). Such approaches should be a focus under FP9.

◆ **12 Improve plant and crop health for resilient production.** There is an urgent need for innovation in crop protection systems. Current approaches are overly-reliant on pesticides, resulting in increased use of pesticides, yet more pressures on global resources and a surge in acquired resistance to commonly used agri-chemicals greatly reducing the efficacy of current interventions. This may be addressed by tackling ongoing diseases and improving resistance to pests with major impact in Europe as well as anticipating and combatting emerging disease and

invasive species (SDG2 "End hunger": Targets 2.1-2.5; SDG13 "Climate action": Targets 13.1-13.3). Again, such approaches should be a focus under FP9.

◆ **13 Improve forest resilience and productivity under anticipated future climate conditions.** There is an urgent need for better understanding of the mechanisms underlying the resilience of forest ecosystems (quantity traits) to both current and long-term effects of climate change as well as improving quality traits in these systems. Both rely on genetic, species and system-level functional diversity as well as on adaptive management and breeding. Again, plants science may provide solutions here, including the optimisation of traits relevant to the bio-based, circular economy (SDG6 "Clean water": Targets 6.1, 6.3, 6.6; SDG7 "Clean energy": Target 7.2; SDG11 "Cities and communities": Target 11.7; SDG13 "Climate action": Targets 13.1-13.3; SDG15 "Life on land": Targets 15.1-15.9).

◆ **14 Nutrient cycling and carbon sequestration** (SDG13 "Climate action": Targets 13.1-13.3; SDG 6: "Clean water", Targets 6.1, 6.3.-6.6.). Research on nutrient cycling and carbon sequestration of different agricultural practices, which was one of the issues addressed in connection with COP 21 in Paris. There is a need for a deeper understanding of the influence of soil treatments on the turnover and circling of nutrients and carbon in different cropping systems and soil types. The need comprises research on the soil capacity and the multitude of soil organisms and processes to reduce the negative impact of increased greenhouse gas concentration (i.e., CO₂, CH₄, and N₂O) and the soil capacity to store carbon in a non-labile form with the aim to reduce the CO₂ emission.

III-Consider horizontal issues for improvement across the three pillars

◆ **15 Improve evaluation procedures to attract and fund the best proposals.** EPSO would like to acknowledge the efforts made by the European Commission to reduce the administrative burden of participating in Horizon 2020 by establishing a participant portal that allows for increased involvement of stakeholders and improved transparency. Likewise, we appreciate the adoption of the suggestion by the scientific community to invite only a small number of above-threshold pre-proposals to the second stage of two-stage calls, leading to 33-75% success rates in the second stage. This should be applied to all Societal Challenges. Themes oversubscribed by many above threshold proposals should be repeated.

However, it is necessary to improve the quality of evaluations to attract the best applicants and reviewers. The evaluation feedback must be relevant and unbiased, and should be provided to applicants for both full and pre-proposal submissions. The number of 'expert' reviewers on each panel should be increased. The current system requires presentation of a scientific rationale which is then evaluated, primarily, by generalists resulting in potentially 'weaker' proposals, explained in more simplistic terms being favoured. There should also be a better balance between change and consistency of evaluation panel members: for the Societal Challenges calls. Consistency of evaluation panel members between pre- and full proposal stages, but changes between years, will improve clarity of expectations and research outcomes. In the MSCA schemes, half of the panel members should be consistent between two years, following a rotation principle, to better evaluate re-submitted proposals.

◆ **16 Make 'green open access' the default for FP9 projects.** 'Green open access' should be a core strategy within FP9 in order to make publicly-funded research results in the green domain available free of charge. This will improve knowledge circulation and thus positively strengthen the knowledge-based economy. It will speed up innovation in the public and private sectors. Progression should be made towards "self-archiving green open access", where the author or an approved representative archives (deposits) the published article or final peer-reviewed manuscript in an online repository before, at the same time as, or after publication. It will be essential to focus on good data stewardship within this strategy. A broad community of international stakeholders has developed the FAIR (Findable, Accessible, Interoperable and Reusable) data principles, which will be key to the success of open access and should strongly be promoted in science.

◆ **17 Strengthen ‘Open Science’ (R19-24)** through: promoting collaborations across all FP9 pillars including collaborative research and innovation projects, including free movement of researchers; supporting fewer, broader ERA-NETs; establishing “self-archiving of green open access” as the standard in EU projects (see ◆16); creating open infrastructure, such as participatory computing networks and collaboration networks; improving impact assessment (e.g. traceable web or research uses); and bringing the public and research closer together through outreach activities (see ◆4). *The free movement of ideas has been described as the “fifth fundamental freedom of the European Union. [This]... requires the free movement of people.” (Felipe Fernandez-Arnesto)*

◆ **18 Improve links between FP9, CAP+, ESIF and ESFRI programmes** to maximise impact. For example:

To enable all countries to participate in FP9 schemes, allow contributions from the European Structural and Investment Funds (ESIF); additionally, ESIF could be utilised to fund projects that received the “Seal of Excellence” (i.e. projects of high calibre that cannot be funded through FP9 due to budget limits)

The Common Agricultural, Food and Nutrition Policy (CAP+) has identified five major challenges: food and nutrition security, climate change, the environment, healthy and safe food and inequality. These issues can only be addressed by involving farmers, academic researchers and industrial partners in initiatives to address the low incomes of farmers (e.g. fair trade principles), the environmental performance of agriculture and the need to offer healthy choices for consumers. The Framework Programme for R&I should be utilised to support basic and applied research demonstration and innovation actions focused on Societal Challenge. However, these activities would benefit substantially from connections with CAP+-supported field applications (e.g. CAP-EIP-Operational Groups [OGs]). Since farmers and extension services are already well-engaged in the OGs, EPSO recommends improving incentives for scientist involvement and better alignment between CAP-EIP and FP9.

Consider establishing and improving an instrument in FP9 feeding into the European Strategy Forum for Research Infrastructure (ESFRI) to: (i) facilitate advancement of and access to state-of-the-art research infrastructure in the plant sector to address SDG2 (“*End hunger, achieve food security and improved nutrition and promote sustainable agriculture*”); (ii) perform a gap analysis on research infrastructure in the plant sector, building on the examples of phenotyping via the EMPHASIS project and the European Infrastructure for Analysis and Experimentation on managed and unmanaged Ecosystems (AnaEE); and (iii) advance the issues of data management and standardisation, as recently initiated by ERA-CAPS.

The EPSO position on FP9 was discussed at the EPSO General Meeting in 2017 and the FP9 core group was appointed to draft the position which was then finalised and approved by the EPSO Representatives. The members of the core group are Svend Christensen (Copenhagen University, DK), Jean Christophe Glaszmann (CIRAD, FR), Karin Metzloff (EPSO, BE), Ulrich Schurr (Julich Research centre, DE), Ernst van den Ende (Wageningen University and Research, NL), Tomas Vanek (Czech Academy of Sciences, CZ), and Simon Vaughan (Rothamsted Research, UK). Our FP9 position builds on the EPSO submission to the Horizon 2020 Interim Evaluation (R25).

Contacts

Dr. Karin Metzloff
EPSO Executive Director
Brussels, BE
T: +32-2213-6260
Karin.Metzloff@epsomail.org

Prof. Svend Christensen
EPSO Board Member
Copenhagen University, DK
T: +45-51489421
svc@plen.ku.dk

Prof. Ulrich Schurr
EPSO incoming Board Member
Julich Research Centre, DE
T: +49- 2461-613073
u.schurr@fz-juelich.de

References and links

- R1: UN: The Sustainable Development Goals Report 2017, August 2017
<https://unstats.un.org/sdgs/report/2017/overview/>
- R2: [ISE and EuroScience offer to engage in dialogue with the EC on the H2020 interim evaluation](#), at a meeting with Commissioner Moedas in Manchester, 26.7.2016

- R3: ISE: [Conclusions from the ISE event "Is there a funding gap on collaborative basic research in Europe?"](#) which was held on 7 April 2016 in Brussels, 14.4.2016
- R4: LERU – [Beyond the Horizon – What LERU wants from FP9](#), 20.6.2017
- R5: Science Europe – [The Framework Programme that Europe needs](#), October 2016 & [Key principles to shape the future Framework Programme](#), 3.7.2017
- R6: EC (EU Science Hub): EU13 participation in Horizon 2020, 20.3.2017: <https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/collaboration-and-networks-eu13-participation-international-science>
- R7: EPSO [Opinion on the SAM Explanatory Note on New Techniques in Agricultural Biotechnology](#), 15.9.2017
- R8: EPSO: [Updated Statement: Crop Genetic Improvement Technologies](#), 12.01.2017. EPSO acknowledges the interpretation of the EU GMO legislation as both process and product based and considers that this could help to clarify the legal status of the NPBTs. In its update EPSO includes recently published reports from Belgium and Italy.
- R9: EPSO: [Fact sheets on New Breeding Technologies](#), 21.3.2016.
- R10: EPSO: [Fascination of Plants Day Success Stories 2015](#), From Bosnia to Bolivia, from South Africa to South Korea, FoPD 2015 truly united a global research community and engaged the public with plant science on an unprecedented scale. Read Success Stories and social media highlights from just some of the 965 events across 56 countries, 29.2.2016
- R11: EPSO: [Submission to EC consultation on the Role of Research in Global Food and Nutrition Security \(summary reply\)](#), 1.9.2015;
- R12: EPSO: Working Group Meeting [Towards longer term partnerships of scientists from Europe and Developing Countries](#), Meeting report 16.10.2014
- R13: FAO and EPSO: Report joint workshop 2012 – [Plant Sciences for Sustainable Crop Production: Strengthening Partnerships between Europe and Developing Countries](#), April 2013 & [EPSO Summary](#), 24.4.2013
- R14: Plants for the Future European Technology Platform: [Summary of Action Plans to 2020](#) for Innovation, Research and Education, 24.3.2015
- R15: EPSO: [Report and recommendations on Plants and Microbiomes](#) from the workshop in Vienna 23.2.2017, published 23.3.2017 and highlighting the concept of Diverse crops with diverse microbiomes for diverse diets and resilient production.
- R16: EPSO: [Submission to EC consultation "Modernising and simplifying the Common Agricultural Policy"](#), 2.5.2017, calling for an EU Common Agricultural, Food and Nutrition Policy (CAP+); Research and Innovation driven agriculture; Equal contribution from new/high tech and low tech / tacit knowledge; and Link of policies and decentralisation
- R17: EC: A [Strategic Implementation Plan](#) which identifies priority areas for the EIP-AGRI, July 2013
- R18: EPSO: [Input towards the European Commission Horizon 2020, Societal Challenge 2 strategy 2018-20](#), and [EPSO online submission to EC consultation SC2](#), both 25.7.2016
- R19: Moedas: [A Vision for Europe: The Three Os – Open Innovation, Open Science, Open to the World](#), May 2016
- R20: UK Government: [Collaboration on science and innovation, a future partnership paper](#), 6.9.2017
- R21: EPSO: [Science can help build an inclusive, collaborative and fairer Europe and world](#), EPSO Newsletter editorial, 14.11.2016
- R22: EPSO: [BREXIT: The necessity of avoiding the fragmentation of European Science](#), Open letter, 15.7.2016. Together scientists can help build an inclusive, collaborating and fairer Europe and world
- R23: EPSO: [58 European and Global research organisations call upon the European Parliament to encourage society to respect independent science advice and to condemn physical attacks on scientists. Updated Open letter 7.9.2016](#), Press information 4.7.2016, see [EP President response letter](#) 31.8.2016
- R24: EPSO: [Implementing the Nagoya Protocol by national legislation in the countries of Europe, statement](#), 3.7.2017, asking the European Commission and the Member States to support the adoption of uniform legislation across Europe for the exchange and use of Plant Genetic Resources by applying the multilateral system enshrined in the FAO International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA). In this way these resources would be subject to the standardized material transfer agreement procedures, which are considered of key importance to sustain future research and breeding activities.
- R25: EPSO: [Submission to the EC consultation on Horizon 2020 Interim Evaluation](#), 28.12.2016, [completed online questionnaire](#); "Horizon 2020 is a unique opportunity to bring European scientists and societies closer together to help build an inclusive, collaborative Europe and world." and highlighting urgently needed improvements in the Societal Challenges programmes to increase the impact of Horizon 2020

EC and EP on FP9, Bioeconomy, Food 2030 and agricultural research and innovation:

- EC: [High Level Group report on the future of the post-Horizon 2020 research and innovation funding programme](#), 3.7.2017, provides 11 recommendations including increased funding for the ERC and Marie Curie Actions, a mission-based approach in the Societal Challenges guided by the SDGs, and stronger and more rational synergy with structural funding.
- European Parliament: [Assessment of Horizon 2020 implementation in view of its interim evaluation and the Framework Programme 9 proposal](#), 13.6.2017, calls for increased FP9 budget, retaining a balance between fundamental research and innovation within FP9; notes the need to strengthen collaborative research
- EC-DG RTD Bioeconomy: <http://ec.europa.eu/research/bioeconomy/index.cfm?pg=home>
- EC-DG RTD Food 2030: <http://ec.europa.eu/research/bioeconomy/index.cfm?pg=policy&lib=food2030>
- EC RTD: [European Research and Innovation for Food & Nutritional Security](#), 14.10.2016
- EC-DG AGRI research and innovation: https://ec.europa.eu/agriculture/research-innovation_en

- EC-DG AGRI: [A strategic approach to EU agricultural research and innovation](#), 20.7.2016

Sources EPSO: www.epsoweb.org

- EPSO: [EPSO Young Plant Scientist Award – winners](#) Ruie LIU and Malaika K EBERT presented their research at the [Plant Biology Europe EPSO/FESPB congress](#) in Prague 26th-30th June, 18.1.2016.
- EPSO breaking news: www.epsoweb.org
- EPSO publications: www.epsoweb.org/archive-epsoweb-publications-and-statements?981448774=1
- EPSO member institutes and universities: www.epsoweb.org/membership/members
- EPSO representatives: www.epsoweb.org/membership/representatives

About EPSO

EPSO, the European Plant Science Organisation, is an independent academic organisation that represents more than 220 research institutes, departments and universities from 28 European countries, Australia, Japan and New Zealand, and 3.200 individuals Personal Members, representing over 28 000 people working in plant science. EPSO's mission is to improve the impact and visibility of plant science in Europe, to provide authoritative source of independent information on plant science, 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. www.epsoweb.org

Annex 1 - United Nations Sustainable Development Goals

- SDG 1: "No poverty" is closely linked to the development of an adequate and robust income for smallholder farmers. See ♦ 7
- SDG 2: "Zero hunger" requires sufficient and sustainable production of plant for food. See ♦ 7, 8, 9, 11, 12
- SDG 3: "Good health and well-being" requires a healthy diet balanced between carbohydrates, (micro)nutrients and healthy lipids (fats). See ♦ 9 and 10
- SDG 4 "Quality education" is required to translate knowledge from science as fast as possible from the lab bench to farmers
- SDG 5 "Gender equality" is tightly linked to female farmers, who still provide most of the crop production in developing countries. Thus an important aspect is to enable female farmers.
- SDG 6 "Clean water and sanitation". Water is essential to produce plants; thus increasing demand for water by agriculture will require higher water use efficiency of plants and agriculture production systems. See ♦ 11, 13, 14
- SDG 7 "Affordable and clean energy"; plant biomass is a significant source for energy: this is not only the case in industrial countries, where bioenergy will play a role in the future, but also today still most of the energy consumption in developing countries comes from burning biomass. See ♦ 13
- SDG 8: "Decent work and economic growth" farming-based societies will develop from today's status into future economies while maintaining and improving their plant production sector. See ♦ 11
- SDG 9: "Industry innovation and infrastructure" – bio-based solutions have long been inspiration for industrial processes and biomass is developed into a renewable resource for modern chemical and material industries.
- SDG 10 "Reduced inequalities"; inequalities today are strongly linked to the availability of food and non-food resources
- SDG 11 "Develop urban agriculture" with an increasing migration into cities the demand of urban megastructures needs to be maintained and the appreciation of urban population for their food basis needs to be (re-) established. See ♦ 13
- SDG 12 "Responsible consumption and production" is urgently needed in order to reduce the environmental footprint of agriculture. This also requires scientific solutions to reduce food and non-food waste and.
- SDG 13 "Climate action" agriculture is a major source as well as significantly impacted by climate change. See ♦ 7, 8, 11, 12, 13, 14
- SDG 14 "life below water"; plant sciences can help to reduce overfishing by sustainable production of fish feed for aquaculture; and by that means also reduce the pollution of coastal areas.
- SDG 15 "Life on land" is an important target for biodiversity research and diversified landscape approaches. See ♦ 7, 8, 13
- SDG 16 "Peace, justice and strong institutions" are the target and the basis to achieve the targets indicated in the SDGs
- SDG 17 "Partnership for the goals" Plant scientists are willing to contribute in inter- and transdisciplinary partnerships, but also require resilient institutions globally. See ♦ 7

Annex II – Research as a key to create jobs and growth

Horizon 2020 has created a gap between the fundamental research funded by the European Research Council (ERC) to the later stage innovation funded in Societal Challenges and Industrial Leadership. In order to strengthen the connection between research and innovation, more funding should be allocated for collaborative projects at lower Technology Readiness Levels (TRL). The role of the European Research Council is crucial and therefore the budget for the first pillar should not be changed. However, in Industrial Leadership and especially in Societal Challenges more funds should be allocated to frontier research at lower TRLs in order to ensure synergy between activities in ERC and projects in Societal Challenges and to promote transnational research collaboration. Increased funding for basic and strategic research will also meet the need of private companies, who might have in-house capacity for applied research and innovation, but lack motivation, time and funding to do the explorative research which lays the ground for innovation activities. While fundamental research is dependent on public grants, companies seeking funding for later stage innovation can benefit from different types of support, including instruments designed to leverage private investments and initiatives to reduce barriers to innovation.