



Input to the European Commission Consultation

European Plant Science Organisation
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EPSO input to the EC consultation on missions towards FP9, based on the Mazzucato report

Brussels, 30.3.2018

EPSO welcomes the concept of missions outlined in the Mazzucato report and offers to actively contribute towards its further development and implementation. It highlights similar principles we proposed in the [EPSO position on FP9 \(19.9.2017\)](#). For example, EPSO Recommendations (R)

- R ♦ **3 Define the goals and objectives** for innovative solutions, not the path to get there.
- R ♦ **4 Incentivise outreach activities** of researchers across Europe and beyond
- R ♦ **6 Address the SDGs and incentivise the private sector to invest in R&I** by supporting a public-private partnership on Integrated Crop Production
- R ♦ **7 Strengthen Europe as a strong leader of and contributor to global action**
- R ♦ **17 Strengthen 'Open Science'**
- R ♦ **18 Improve links between FP9, CAP+, ESIF and ESFRI programmes** to maximise impact.

Hereafter we describe three ideas for EU research and innovation along the criteria proposed in the Mazzucato report.

Idea 1 for EU research and innovation mission:

1001 crops: Nutritional insufficiency and disease are closely linked and one of the greatest world challenges. We eat only 200 of >10.000 edible plants. Many neglected crops are rich in micronutrients, vitamins and health-promoting plant compounds. The mission will improve the performance and value of underutilized nutritious plants for diverse healthy diets grown sustainably. Economists, agronomists, processors, nutritionalists, clinicians, consumers and plant scientists will collaborate.

Diverse crops for diverse diets and human health and resilient production

Bold, inspirational with wide societal relevance

Malnutrition (nutritional insufficiency) and disease are closely linked and one of the greatest world challenges. From more than 10.000 known edible plant species only 150 – 200 are currently used for the human diet and only three - rice, maize and wheat - contribute nearly 60 % of calories and proteins obtained by humans from plants.

Many neglected crops contain micronutrients, vitamins and health-promoting plant compounds (so-called secondary plant metabolites). In addition, well performing crops can be improved in their nutritional quality since many nutritional benefits have been lost in breeding for yield.

The mission “1001 crops” will diversify crops leading to more diverse, nutritious diets and improved human health.

At the same time, diversification in agriculture will help to better adapt cultivation to changing environmental conditions and make agriculture and the food systems more resilient to changes in climate and more sustainable. A much broader range of crops cultivated (species as well as cultivars) will better withstand biological pests and environmental changes including climate change.

A clear direction: targeted, measurable and time-bound

Target 1: Increase the number of crops for nutritious human diets from 200 to 1001.

Target 2: Provide 1001 improved crops with high nutritional as well as economic performance and value.

Target 3: Provide improved agricultural management, harvesting and processing technologies as well as economic incentives for cultivating these improved crops.

Target 4: Retailers will appreciate these improved crops as well as the increased variety of their produce. Consumers will benefit through reduced risk of chronic diseases, improved quality of life, especially in older people and decreased burdens on health care systems.

Ambitious but realistic research and innovation actions

Action 1: Identify and define nutritious neglected / underutilized crops and improve their economic performance and value through collaboration with chemists, nutritionists and clinicians, with focus on fiber, long chain polyunsaturated fatty acids, polyphenols, vitamins and micronutrients.

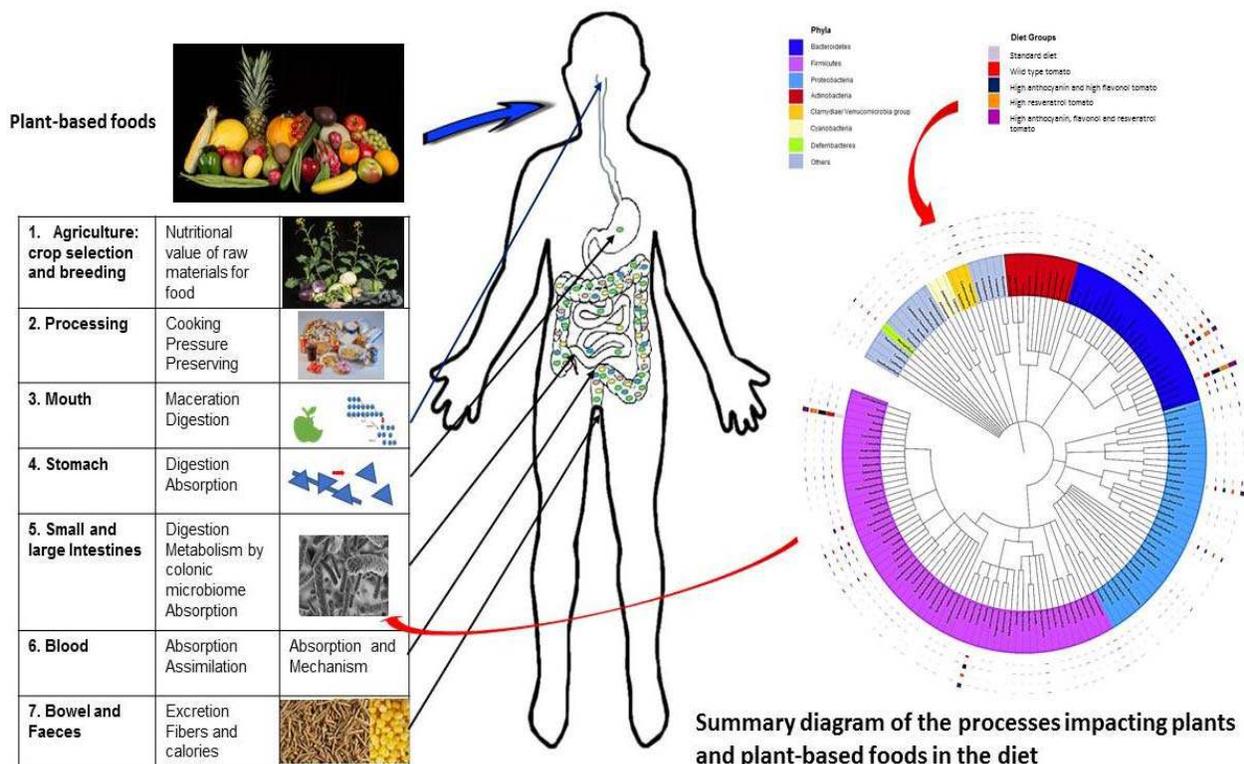
Action 2: Identify crops with good economic performance and value, but low nutritional value. Improve their nutritional quality through collaboration with nutritionists and breeders.

Action 3: Develop / adapt agricultural management, harvesting and processing technologies for these crops.

Action 4: Collaborate with retailers, chefs consumer scientists and consumer groups to develop appreciation and market uptake of these nutritionally improved crops.

Cross-disciplinary, cross-sectoral and cross-actor innovation

The mission requires interaction of experts in plant science, breeding industry, agronomy, engineering, artificial intelligence, economists, processing, human nutrition, clinicians, food industries, consumer scientists with farmers, retailers, chefs and consumers. The involvement of school teachers as well as media experts would be encouraged.



Multiple, bottom-up solutions

Each region in Europe and beyond has a range of nutritious neglected / underutilized crops. Therefore, solutions will be local, linked by Europe-wide co-development and application of knowledge. This mission will combine the acknowledged benefits of traditional diets with innovation.

Idea 2 for EU research and innovation mission:

Planty Food - Society is concerned about the impact of the human diet on climate and global warming. Eating less meat will mitigate climate change and improve animal welfare. The mission is to design innovative food-production strategies based on new / improved plant species that will benefit the environment and food accessibility, helping to alleviate malnutrition. Experts from farming, agronomy, natural variability and genome evolution, food processing, cooking and consumers will collaborate.

Sustainable Agriculture for sustainable food (Smarter food production)

Bold, inspirational with wide societal relevance

Today, an increasing concern for society is the connection between human diet and global warming. To eat less meat is not only the most important contribution to address climate change but also a way to improve animal welfare. Furthermore, half of the synthetic fertilizers are used to feed crops, increasing the environmental impact of intensive agriculture. This mission aims to design innovative food-production strategies based on new plant species and other photosynthetic organisms that will have a beneficial effect on the environment and food accessibility. Therefore, new ways of sustainable food production using new crops are a priority to alleviate malnutrition and the impact of food production on climate change.

A clear direction: targeted, measurable and time-bound

Target 1: To identify new sustainable plant proteins and carbohydrate sources. To select new soil and aquatic plant species and other photosynthetic organisms with improved economic performance and nutrient cycling efficiency.

By 2025 ten new soil and aquatic crops will be identified by exploring natural variability.

Target 2: Educating rural farmers in new sustainable crop cultivation methods to grow new soil and aquatic crops.

By 2030 half of the farmers involved in cultivating feed crops will have turned to growing new sustainable crops.

Target 3: To design new food ingredients from the selected crop species using zero emission systems for food processing industry.

By 2030 50 new ingredients will be manufactured in a sustainable manner.

Target 4: To design new cooking methods using new sustainable foods.

By 2035 half of the cookery experts will be involved in public outreach activities to disseminate the benefits of the new food technology.

Ambitious but realistic research and innovation actions

Action 1: To identify new aquatic and soil plant species that are highly efficient in nutrient uptake to solve water and soil eutrophication.

Action 2: To exploit the natural variation of the selected species using genome wide and new breeding techniques.

Action 3: To define new sustainable agronomic systems adapted to new crops.

Action 4: To design a profound marketing action plan to educate society on the benefits of new crops, not only regarding environmental issues but also on the impact they can have on human health.

Action 5: To collaborate with experts in food processing and chefs to design new attractive and creative cooking recipes.

Cross-disciplinary, cross-sectoral and cross-actor innovation

The mission involves a wide variety of expertise from farmers, agronomists, experts in natural variability and genome evolution, food processors, cookery experts and consumers. All of these must act in close collaboration to design new foods that will feed the world in a more sustainable manner.

Multiple, bottom-up solutions

The mission requires the integration of particular competences. Each partner will contribute in detail with his expertise and all will be merged using a bottom-up approach.

Idea 3 for EU research and innovation mission:

Green Bio-Factories: The transition to a bio-based economy is driven by rising prices and sustainability concerns. The challenge is global; the goal to unlock the potential of plant biodiversity for pharmaceuticals, flavours, fragrances, cosmetics, food and fine chemicals. The mission will require multidisciplinary efforts to identify new bioactives and new functions for known molecules, modulation of pathways to improve productivity, plant molecular farming and cellular agriculture.

The EPSO input to the European Commission's consultation on missions towards FP9, based on the Mazzucato report, was developed by EPSO Representatives, based on the EPSO General Meeting exchange of views and recommendations on future research and innovation across the EU (Framework Programmes).

EPSO publications most relevant to this consultation are:

- EPSO: [Position on the next EU Framework Programme for Research and Innovation, FP9](#), 19.9.2017
- EPSO: [Submission to EC consultation "Modernising and simplifying the Common Agricultural Policy"](#), 2.5.2017
- EPSO: [Submission to the EC consultation on Horizon 2020 Interim Evaluation](#), 28.12.2016

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- EPSO breaking news: www.epsoweb.org
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About EPSO

EPSO, the European Plant Science Organisation, is an independent academic organisation that represents more than 200 research institutes, departments and universities from 28 European countries, Australia and New Zealand, and 3.300 individuals Personal Members, representing over 27 000 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 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. www.epsoweb.org