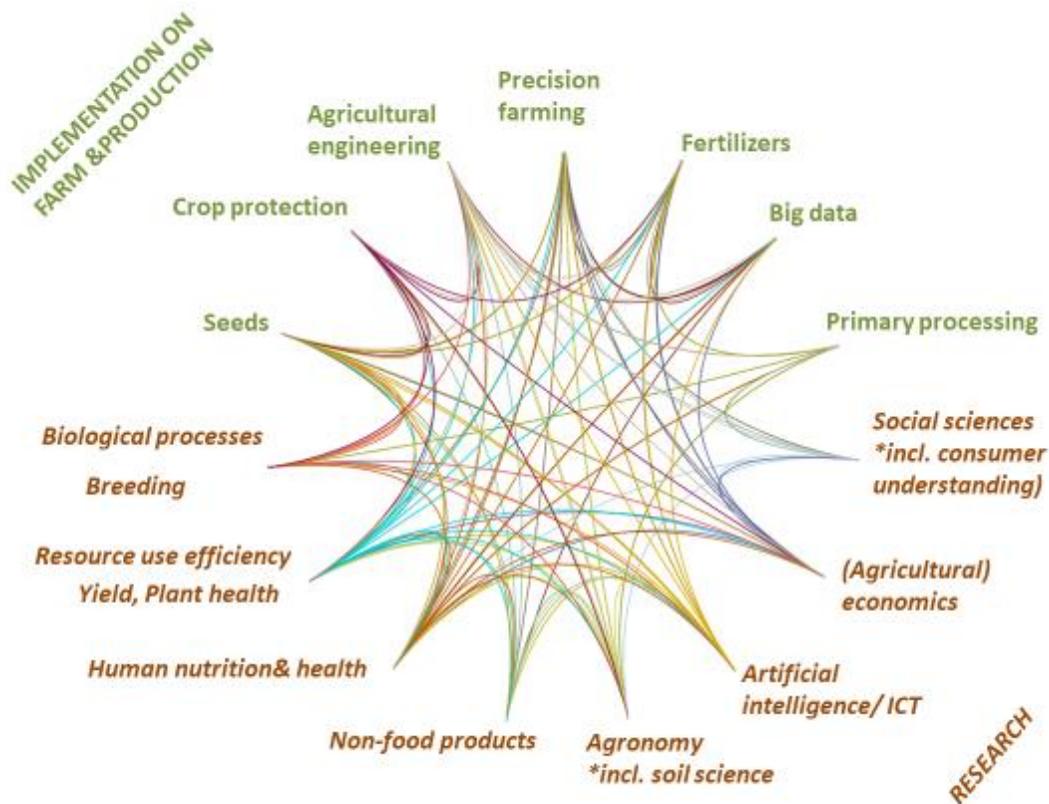


### 3. Stakeholder needs and relevant focal areas for research and innovation

The **challenges of productivity and sustainability** that the world is facing translate into a multitude of opportunities for innovation across the complete agricultural value network – from inputs and crop production – to transport, processing, distribution, storage, retail/consumption and waste disposal. Integration at various levels of research and innovation will maximise impact. The dialogues and exchanges between different stakeholders should be multidirectional, creating opportunities for novel cross-overs in the bio-economy. The ICP partnership will facilitate this multidimensional perspective. This includes looking from the science base to crop production, processing and retailing, as well as from an end-user perspective to crop production and biological research (fig. 3).



**Figure 1: Cross-sectorial connections between research and innovation** – the KIS platform will translate this to stakeholder innovation opportunities and accelerate innovation-oriented partnership development.

Plant science and breeding can contribute to the challenges of food and nutritional security by developing and producing plant raw materials for food products, providing tailored plants for specific health benefits and reducing or eliminating potentially harmful compounds to improve safety of food. According to a

recent study<sup>1</sup>, since 2000, EU innovation in plant breeding has significantly improved the global food supply - enough to feed an additional 160 million people with kcal. Regarding human and animal health improvement, plant compounds are sustainable and highly nutritious alternatives to replace marine ingredients in human food and fish and cattle feed. Plant breeding can contribute to the development of plants with improved composition.

The KIS, system that stepwise integrates people, organisations and funding schemes, will facilitate co-creation of knowledge to generate and utilize agriculture-related innovation within the predefined but non-exhaustive list of focal areas shown below:

- **Focal area 1: Increased yield and yield stability of crops in dynamic and adverse environments**  
*E.g. Development of improved crop resistance management programs and strategies; Novel strategies for reduced crop loss both before and after harvest (including storage and transportation);  
Improved photosynthetic efficiency to enhance yield potential;  
Designing the varieties of the future which combine resilience targets with quality targets;  
Diversifying plant production: more plants with higher yield potential, yield stability and quality.*
- **Focal area 2: Improved resource use efficiency and resource stewardship**  
*E.g. Enhanced decision support tools to optimize fertilizer and water use and application, more effective management of soil and water resources;  
Increased automation and robotics to optimize cultivation and harvesting strategies  
Increased efficiency in fleet-management of agricultural machinery potentially yields reduction in fuel consumption and consequential reduction of CO<sub>2</sub> emissions;  
Losses and waste reduction, savings on GHG emissions and recycling are relevant topics throughout the value chain including food-production and the various supply chains;  
Use of big data opportunities for growth monitoring / long term yield prediction;  
Life cycle assessment across the chain of new products and solutions, end to end, will help to monitor their impact.*
- **Focal area 3: Improved plant health for resilient production**  
*E.g. Co-designed plant and biological/chemical protection systems and bio-stimulants;  
Development of biocontrol products and strategies;  
Improved resistance management of current solutions;  
Development of EU-wide IPM compatible protection approaches;  
Design of new strategies to tackle disease drift associated with climate change;  
Improved pre- and post-harvest seeds and crop protection technologies.*
- **Focal area 4: Increased food safety**  
*E.g. More cross-sector insights in potential hazards compromising the safety of crop and food production and processing and ways to mitigate them (how to fight salmonella toxin contamination in human food or animal feed? How to limit mycotoxin production in crops with a*

---

<sup>1</sup> The economic, social and environmental value of plant breeding in the European Union. An ex post evaluation and ex ante assessment, HFFA Research GmbH (2016), <http://bit.do/plantetp-HFFAResearch>

*reduced number of certified chemical fungicides? How to mitigate the formation of acrylamide in bread?)*

- **Focal area 5: Enriched/enhanced plants for healthy food and for non-food products**  
*E.g. Healthy enriched human nutrition & animal feed including reduction of non-beneficial compounds;*  
*Design of novel foods meeting the needs of a 21<sup>st</sup> century lifestyle, including reduced sugar levels/ reduced need for salt / resistant starch / satiety stimulators etc.;*  
*Increased understanding of which phytonutrients promote health and protect against chronic diseases;*  
*Use of bio-fortification to increase micronutrients and / or increase health-beneficial compounds and enhancing their bioavailability;*  
*Develop new minimal food processing technologies that exploit the potential of the raw material and retain or enhance their nutritional qualities.*
- **Focal area 6: Agronomical strategies**  
*E.g. Optimizing choice of crop, variety, rotation, cultivation and management, development of improved decision support tools to optimize farm-level management decisions and input use efficiency;*  
*Design of more efficient novel fertilization and irrigation strategies.*
- **Focal area 7: Regulatory affairs**  
*E.g. Regulatory authorities should be enabled to benefit more from integrated scientific evidence when translating results into new legislation (cf. risk-based approach regarding approval of crop protection measures versus a hazard-based one).*
- **Focal area 8: Big data and data management**  
*E.g. Big data management tools create opportunities to analyse cross sectorial information and enable smart decision taking, however it also touches upon issues like the question of data protection; Solutions to apply an open access policy while protecting the individual interest both private as commercial of stakeholders when sharing their data;*  
*Better integration of data across chain-relevant factors.*
- **Focal area 9: Consumer research, drivers for consumer acceptance and behavioural change**  
*E.g. Increasing the availability and usefulness of existing and new tools and technologies in consumer science applied to food;*  
*Design and implementation of public engagement mechanisms by involving specialists and non-specialists. Building consumer trust by making the information flow from the different sectors more transparent is essential; Improving communication and outreach of society at large;*  
*Increasing knowledge and technology transfer at all levels; especially connectivity with the farming practise (e.g. an integrated network of demonstration farms in Europe to foster feasibility of new technology in the farming practise and for dissemination purposes).*
- **Focal area 10: Infrastructure**  
*E.g. Facilitate the advancement of and access to state of the art research- and farming infrastructure in the agri-food sector is highly relevant: to identify gaps an analysis of the research- and farming infrastructure landscape should be performed.*

- **Focal area 11: Finance, investment models and economic performance**

*E.g. Risk-sharing of innovative farming types. Risk sharing among a group of local farmers could lower the threshold to embark in innovative production processes. In Italy first pilots are running already (e.g. Maize Mutual Fund Veneto).*

*Development of economic performance indicators will enable the assessment of the impact of the activities that are promoted by the ICP initiative.*

For each of the listed focal areas the embedding in the larger EU policy environment has been indicated below in *Figure 4*.



## SUSTAINABLE DEVELOPMENT GOALS (SDGs)

The Integrated Crop Production (ICP) partnership directly addresses : SDG 17 “Partnership for the goals”

SDG 1: “No poverty”



SDG 2: “Zero hunger”



SDG 3: “Good health and well-being”



SDG 6 “Clean water and sanitation”



SDG 7 “Affordable and clean energy”



SDG 8: “Decent work and economic growth”



SDG 9: “Industry innovation and infrastructure”



SDG 11 “Develop urban agriculture”



SDG 12 “Responsible consumption and production”



SDG 13 “Climate action”



SDG 15 “Life on land”



## OTHER GENERAL EU POLICY

1. The circular economy



2. The energy union

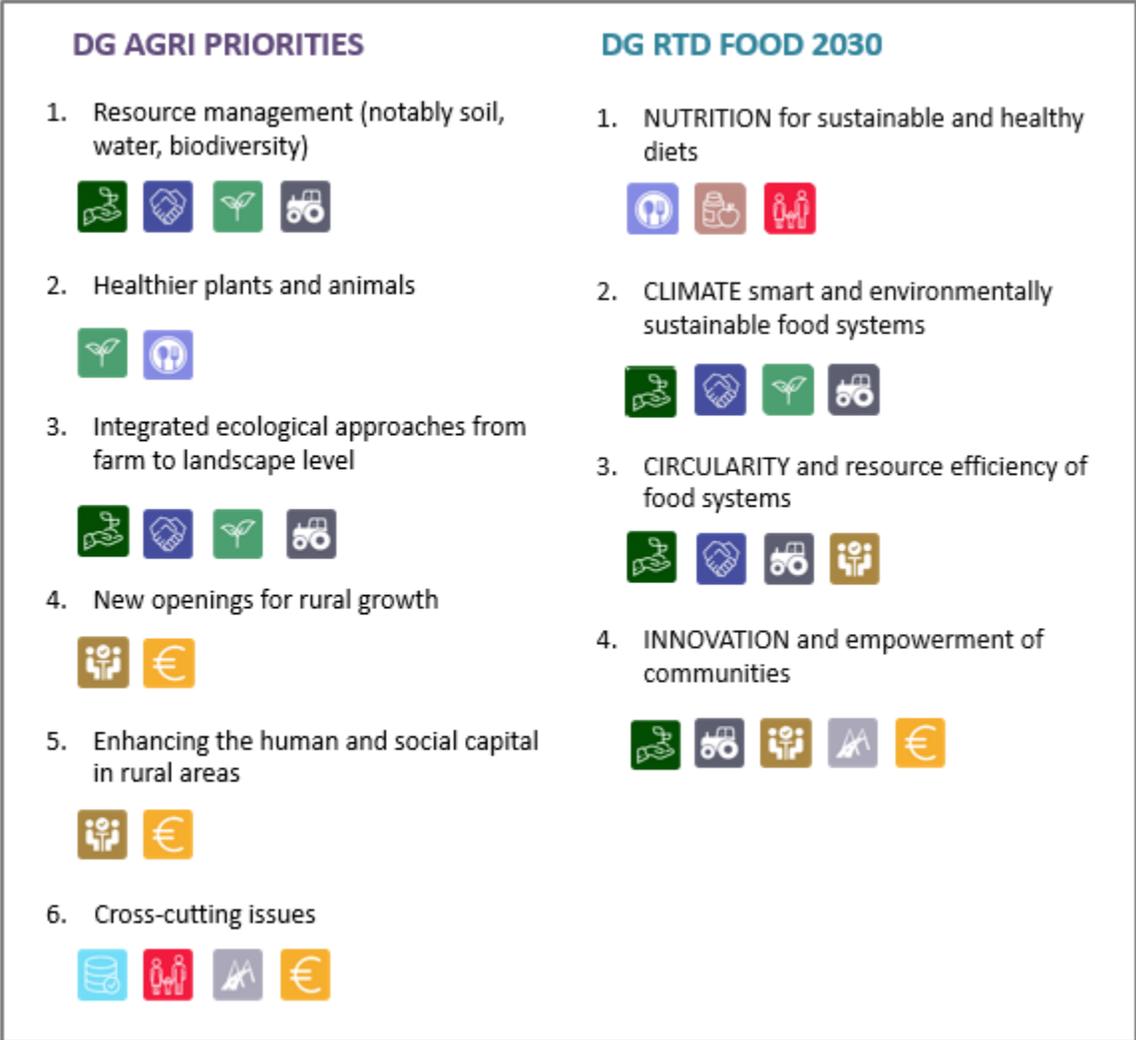


3. Digital Europe



4. Climate action (COP21)





**Figure 2: Embedding of ICP focal areas in global and EU strategic policies**