THE ROLE OF THE EUROPEAN FRUIT SECTOR IN EUROPE 2030

BY THE EUFRIN WORKING GROUP ON HORIZON 2020

OVERALL VISION

To secure the availability of a wide range of healthy, high quality fruit / fruit products for the European Consumer through **Research-Driven Innovations** that help the **European Fruit Chain** to be **Competitive** and **Sustainable**

STATUS

The European (EU) fruit sector delivers an essential and unique contribution to the economic, social, and environmental future of the EU.

- In 2010 the EU fruit and vegetable sector occupied only 3% of the cultivated land area yet it accounted for 17% of the value of EU agricultural production.
- The total production value was estimated at more than 50 billion Euro p.a.
- EU fruit production is a key contributor to the regions.
- The combined turnover of the fruit and vegetables supply chain was estimated at more than 120 billion Euro p.a. with approx. 550,000 employees and 1.4 million farm holdings.
- The main fruit types grown in EU 27 include apples, oranges, peaches and nectarines, tangerines, mandarins and clementines, pears, table grapes, plums, lemons, strawberries, kiwifruit, apricots and cherries.
- In 2010 the combined total production of EU fruit was approx. 34 million tonnes, (excluding 23 million tonnes of wine grapes, and 11 million tonnes of olives).
- Fruit consumption is a critical part of a healthy and balanced diet for EU consumers, fruit delivers health and wellbeing benefits whilst reducing lifestyle based diseases.

The total fruit sector is technologically advanced and includes a complex chain of production, storage, marketing, logistics, wholesaler and retailer. The competitiveness of the EU fruit sector in the global market is highly dependent on delivering innovation through research and development (R&D) activities. It is critical to address R&D challenges that are specific to the EU fruit sector to secure its growth and future contribution to the EU. There are specific challenges linked to the fruit sector.

- How can we best deliver a safe and secure supply of quality fruit to urban based populations due to the perishable nature of the product.
- How can we secure the significant financial investment needed in the EU fruit sector. This is especially important as the fruit sector has lengthy production cycles resulting in delayed return on investment. Therefore efficiencies to ensure productivity and profitability must to be continuously implemented otherwise the EU fruit sector is not competitive with non EU fruit sectors.
- There is a requirement for continual innovation to be implemented in the EU fruit sector to secure its competitiveness against manufactured goods that have a short product development lifecycle and a short product life. As the EU fruit sector is knowledge based it requires a high level of, and a continuous implementation of, new knowledge to remain competitive in the long term.
- There is a critical need to strengthen existing national and transnational networks within Europe to secure knowledge exchange and implementation to ensure that the EU fruit sector remains competitive. This is especially important given that nationally based regulations often lead to nationally based research challenges.
- There needs to be an increased focus on delivering products that fulfill consumer needs to increase consumption of fruit. Current barriers to consumption include price, limited convenience and availability, lack of safety and security, inconsistent quality and lack of innovative fruit types or fruit-derived products.
- The current EU organic fruit sector is unable to provide the necessary volumes of fruit for the fresh and processed market to meet consumer needs.

EUROPE 2020 Strategy has defined clear goals to deliver on a smart, sustainable and inclusive economy delivering high levels of employment, productivity and increasing social cohesion. The EU fruit sector is ideally positioned to positively contribute to this strategy via delivering **societal, economic, environmental** and **innovation** benefits. The following summaries provide an insight into how the EU fruit sector can make a significant contribution to the Europe 2020 Strategy.

EU FRUIT SECTOR CONTRIBUTION TO SOCIETY BY 2030	
Vision	By 2030 fruit consumption will have considerably increased, contributing significantly to Europeans' well being and health. The increase will be brought about by a reliable supply and consumption of healthy, accessible, convenient, novel fruit and fruit-based products for European **consumers**. To meet this demand, the European **fruit production** will contribute by providing a secure, continuous supply of consumer-oriented healthy foods. This will be delivered through European interdisciplinary research, encompassing social and natural sciences. Resulting benefits will include the development of specialist expertise **throughout the supply chain**, education through knowledge exchange, wealth creation for the rural environment, the empowerment of rural areas and the preservation of the landscape.
Examples of how R&D in the EU fruit sector will deliver on societal issues and the EU 2020 strategy	
Elucidation of the physiological mechanisms underpinning the 'healthy attributes' in fruit will secure, increase and exploit the beneficial attributes in fruit thereby driving an increased consumption.	
Projected increase in global urban based populations and unprecedented climate extremes emphasize the need to focus on food security and food safety. If fruit production is moved to non EU countries due to lower production costs the EU will become dependent on importing essential foods. Relying on imported fruit will negatively impact on the regions and will leave the EU at risk during times of global competition for food as we will be unable to secure a supply of food for EU based consumers.	
A generation of older fruit growers and their expertise is being lost because younger generations prefer to be urban based. This threat on rural societies requires new innovations to be delivered into the fruit sector driving profitability and competiveness to secure young highly skilled growers.	
Innovation and value need to be implemented throughout the EU fruit chain, an interdisciplinary approach needs to be taken to validate the food chain, thereby increasing the trustworthiness of the food chain, and driving an increased consumption through increased consumer confidence.	
Fruit variability needs to be overcome to optimize both the fresh fruit chain and efficiencies in the processing industry, thereby increasing satisfaction and reducing food wastage.	
R&D focused on delivering EU fruit products that are aligned to consumer needs. Consumer needs must be defined through consumer-driven R&D. The EU fruit sector must deliver a reliable, healthy, convenient and tasty fruit product that is a superior alternative to manufactured food products.	

Increased consumer awareness on the value of seasonal, healthy and fresh food choices will underpin growth of the EU fruit sector.
R&D is needed that is focused on the benefit of EU fruit industry in retaining the natural capital in Europe. Validation of the terroir value of locally grown fruit and validation of the EU fruit sector in eco-tourism and in protecting the environments via land stewardship will improve consumer awareness of the value of EU fruit choices.
R&D focused on strengthening the role and contribution of urban horticulture to secure a healthy food supply in urban environments.
R&D focused on delivering novel fruit and fruit based products to meet consumer needs for new foods
R&D delivering increased productivity and efficiencies and uniformity to ensure that the EU fruit sector can deliver competitively priced products for EU consumers and that the quality of products exceeds consumer expectations.

EU FRUIT SECTOR CONTRIBUTION TO ECONOMY BY 2030	
Vision	By 2030 all the **components** of the European fruit chain will have increased competitivity by intensive use of novel, eco-innovative technologies. These will secure greater profitability by means of increased labor efficiency, improved quality and productivity, innovative products and increased consumption of fruit (products).
Examples of how R&D in the EU fruit sector will deliver on economic issues and the EU 2020 strategy	
EU fruit producers are facing reduced economic returns, they have reduced control in the market place due to the strength of the retailers and competition from imported products. Therefore R&D focussed on implementing new technologies into the fruit chain are needed to increase efficiencies and profitability.	
R&D focused on delivering novel cultivars with increased productivity and reduced reliance on inputs (resource and chemical) that meet consumer requirements will drive consumption and increase profitability.	
R&D focused on delivering novel cultivars that are differentiated and competitive against alternative snack / food products will increase the likelihood that consumers will choose and consume fruit and fruit based products.	
Validation of the EU fruit sector through life cycle analysis and thereafter targeted innovation to increase the sustainability of the EU fruit sector will increase its competitiveness and provide increased consumer confidence in the chain.	
R&D focused on delivering full traceability throughout the fruit sector will increase consumer confidence in the safety of fruit and fruit based products.	

R&D focused on consumer choices and how to align novel fruit products to consumer segments will drive increased satisfaction and increased consumption.
R&D delivering novel fruit based products through innovative knowledge and technologies will increase the suite of products available to consumers and drive consumption.
R&D focused on improving systems within the fruit chain and that deliver digital, communication and improved decision making tools through ICT and sensor based technologies will increase efficiencies and drive profitability.
R&D focused on increasing the linkages between industries within the entire food chain will increase connectivity and will secure a common vision for the players in the chain, this will increase efficiencies and ultimately the value of the end product when it reaches the consumer.
R&D delivering innovation throughout the fruit chain will improve quality and reduce wastage.
R&D on elucidating physiological approaches to efficient production systems focused on increased density and reduced variability will increase the efficiency of the systems and underpin optimization of handling fruit throughout the fruit chain thereby increasing profitability.

EU FRUIT SECTOR CONTRIBUTION TO ENVIRONMENT BY 2030	
Vision	In 2030 innovative European fruit production systems will contribute to the preservation of the environment through the adoption of an array of eco-innovative technologies which will deliver better products and reduced wastage under threats from climate change and limited natural resources. This will be achieved through energy efficient systems and innovative management tools which will optimize the use of production factors, and minimize the carbon, water, mineral nutrients, pesticides footprint of the fruit chain while improving land-stewardship.
Examples of how R&D in the EU fruit sector will deliver on environmental issues and the EU 2020 strategy	
R&D targeted at minimizing chemical residues on EU fruit, increasing the use of biological pest control and the use of novel and alternative technologies to chemical regulation of fruit trees will reduce the impact of the EU fruit sector on the environment.	
R&D focused on delivering novel cultivars with increased pest and disease resistance will reduce the use of chemicals throughout the fruit chain.	
R&D focused on delivering improved monitoring and forecasting through the use of smart technologies will minimize the use of chemicals and maximize the efficiency of chemicals.	
R&D delivering precision EU fruit growing, including real time orchard management for easy, reliable, accurate assessment of vital crop statistics, real time adjustment of	

production factors and precise use of water and fertilizer, and adoption of cultural practices capable of reducing resource inputs will improve the balance between the production system and the environmental resources.
Innovative solutions for delivering in-orchard assessment of storage potential for reliable and longer storability will reduce fruit loss during the chain.
Innovative technologies to produce more with less; to produce and to deliver innovative fruit and fruit based products, to increase implementation of sensors, artificial intelligence, intelligent management systems and remote sensing technologies will minimize the EU fruit sector footprint.
R&D to underpin the delivery of fruit and fruit based products with enhanced functional health properties via innovative production practices; including photo-selective films to enhance the production of pigments, use of natural compounds, modification of resource input to regulate beneficial properties will provide added value.
R&D focused on managing and responding to climate changes, through increased knowledge and detection of new and emerging pests and diseases, validation methodologies for carbon and water footprint will secure the EU fruit industry into the future.
R&D delivering new detection tools for climate change issues; including smart irrigation systems, improved and new warning systems, and innovative diagnostic systems will minimize the footprint.
R&D to reduce energy inputs via reduced chemical and fertilizer applications, adoption of soil and orchard management techniques to enhance the soil natural fertility, deliver technologies to enable orchards to become effective sites for sequestering carbon and providing “green shares” will enhance the natural capital of the EU.
Reducing waste of fruit and fruit-derived products at all points of the supply chain will increase efficiencies.
Innovative “omics” approaches to control tree behaviour and implementation of “soft-technologies” will increase competitiveness.
Introduction of “omics”-based breeding, including development of new fruit ideotypes addressing consumer preferences, providing growers with varieties that are easier to grow and manage along the chain, while preserving superior taste attributes will secure the EU fruit supply.
Innovative processed fruit and fruit products tailored to consumers segments; young, elderly, overweight, diabetics etc. Nanoencapsulation of bioactive components for enhancing functional properties of fruit juices and purees; flash vacuum expansion in fruit processing for juice and puree; membrane technology in concentrated juice production; non-thermal fruit products preservation (high hydrostatic pressure, pulsed electric field, ozonation, ultrasonication); edible coatings to prevent browning, microbial decay and loses of bioactive components and to enhance texture and sensory properties of ready-to-eat cut fruit; utilization of fruit processing wastes for industrial raw materials and biogas production will increase the consumption of EU fruit and fruit based products.

EU FRUIT SECTOR CONTRIBUTION TO INNOVATION BY 2030	
Vision	By 2030 barriers for innovation adoption will be overcome and this will deliver wealth for key stakeholders in the European fruit chain. European fruit research and innovation network will be strengthened and will facilitate the exchange and implementation of knowledge at the regional, national and transnational level.
Examples of how R&D in the EU fruit sector will deliver on innovation issues and the EU 2020 strategy	
Development of robust research methodologies will allow systematic and science-based bridging between consumer- and market-demand, and natural science-derived technology.	
Systematic identification of barriers will allow implementation of innovation e.g. lack of information, knowledge or skills, time constraints, costs, organizational and structural barriers, etc.	
Systematic evaluation of prevalent regulations and standards addressing the EU fruit sector at both national and transnational levels will provide science-based advice and expertise to the relevant authorities that establish regulations.	
Developing a proof of concept from fruit research to business accounting to meet regional requirements whilst maintaining conceptual European principles will provide a decision making tool.	
Increased integration of the fruit sector by a systematical organization and involvement of operational groups, e.g. growers, packing houses, processing SMEs, retailers and others will allow for the creation of European bottom-up technology exchange network, connecting stakeholders and research providers.	
Assuring appropriate research and demonstration facilities e.g. experimental farms will allow for accounting of realistic agro-ecological requirements while maintaining Common Agricultural Policy (CAP).	
Promoting public-private partnerships and other funding schemes will support innovative, high-impact technologies.	
Improving access to research-oriented pilot plants will secure knowledge exchange and implementation.	
Identification of ways to reduce the overall administrative burden thereby will encourage greater participation of Small and Medium-Sized Enterprises (SMEs).	