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JRC99987

EUR 27757 EN

PDF ISBN 978-92-79-56682-0 ISSN 1831-9424 doi:10.2791/284013 LF-NA-27757-EN-N

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How to cite: Cavicchi, A. and K., Ciampi Stancova, (2016); Food and gastronomy as elements of regional innovation strategies. European Commission, Joint Research Centre, Institute for Prospective Technological Studies, Spain. EUR 27757 EN; doi:10.2791/284013

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Abstract:

Food and gastronomy as elements of regional innovation strategies

The paper discusses recent innovation and diversification paths in agro-food, specifically the linkage between food, territory and branding, the emerging phenomenon of Food Cities and increasing interest in healthier and more sustainable food products. It also focuses on EU policies and instruments in support of R&I activities in agro-food and explores agro-food domain within the context of smart specialisation.

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Executive summary

Policy context

Food is an essential commodity as well as social and cultural heritage. Food influences people's health as well as other production systems including agriculture, waste, water, transport and social justice and it is a planning prism for land, water, energy, transport and eco-system services.

Innovation and knowledge creation across agro-food related sectors and food value chains became a necessity for regional stakeholders that search for new production and business opportunities. New emerging processes create new relevant contexts for regional development paths and challenges for policy-makers. Policy-makers, influenced by modern consumer lifestyles, socio-economic megatrends, business needs and new technologies, face a number of issues related to the development and implementation of relevant policy measures and instruments. This is particularly evident in EU countries and regions that have strong interest in agro-food and have identified it as one a smart specialisation priority.

Within this context, the Smart Specialisation Platform (S3 Platform) organised a thematic workshop entitled "Smart specialisation and food: food, gastronomy and bio-economy as elements of regional innovation strategies" at 2015 EXPO Milan in September 2015. The workshop focused on food, gastronomy and bio-economy as domains of smart specialisation in EU countries and regions. International experts discussed food as an element of smart specialisation in EU countries and regions. Workshop participants reflected upon the issues of food innovation as a driver of smart regional growth, the role of public and private institutions in supporting agro-food priorities as well as differences in gastronomy culture and approaches. This paper builds on the discussions and lessons learnt.

Key conclusions

The current programming period (2014-2020) of the European Structural and Investment Funds represents a promising context for the development of diversification paths. New actors are increasingly involved in emerging agro-food value chains and new opportunities for cross-sectoral and trans-regional collaborations are emerging. In this paper, it is suggested that:

- Collaboration across different stages of agro-food value chains must be investigated and mapped.
- It is crucial to explore niches in the agro-food sector that have potential to generate new innovative products and services.
- It is crucial to promote collaboration among local actors including universities, SMEs, multi-national enterprises, research and technology organisations, science parks, etcetera because they provide an adequate innovation ecosystem, support particular technologies, clusters and industries, and are involved in international networks.
- The entrepreneurial discovery process together with Community-led local development initiatives facilitate participatory approaches aimed at discovering innovation and business opportunities.
- Building infrastructure without considering the demand side and needs of entrepreneurs can be damaging for the national economy and innovation system. As it is difficult for public administrations to foresee all requirements and needs of the final user, it is crucial to involve the demand side in both the preparation and implementation of investment projects.

- Place-branding is a crucial strategy to be carefully planned and monitored by both national and regional governments.
- Educational activities related to sustainability, nutrition, food preparation and hospitality are needed to sustain effective development paths and facilitate community empowerment.

1. Introduction

Food is an essential commodity as well as social and cultural heritage. As Morgan (2010) claims: "Food is ... vital to human health and well-being in a way that the products of other industries are not, and this remains the quintessential reason as to why we attach such profound significance to it". (Morgan, 2010: 1852). He suggests that food plays a multi-functional connecting role in society and sustainable food systems are supportive of sustainable communities. Food influences people's lifestyle, health and habits as well as being a planning prism for land, water, energy, transport and eco-system services.

The agro-food sector represents a breeding ground for regional stakeholders and business investments. It attracts large international investments from private financial actors, commercial banks, and private foundations that search continuously for new investment opportunities. Additionally, new actors are increasingly involved in emerging agro-food value chains: new farmers' organisations, new co-operatives, start-up companies as well as multinational enterprises and state-owned companies.

New business activities stimulate collaboration between agriculture and other sectors including tourism, hospitality, education, handcraft, etc. In 2012, the European Economic and Social Committee of European Union contemplated that regional food value chains and cross-sectoral fertilisation of productive processes have a strong impact on local development.¹ Particularly, the Committee recognises the importance that food can have in connecting agriculture, crafts, tourism, retailing and the entire rural economy as a whole while developing regional umbrella brands.

Gastronomy and cooking have become gradually important as well. In 2014, the Committee on Culture and Education of the European Parliament approved a motion for European Parliament Resolution on the "European gastronomic heritage: cultural and educational aspects".² It recognises the importance of food and gastronomy as artistic and cultural expression and fundamental pillars of family and social relationships.³

Thus, innovation and knowledge-creation across agro-food related sectors and food value chains became a necessity for regional stakeholders that search for new production and business opportunities. New emerging processes create new relevant contexts for regional development paths and challenges for policy-makers. Policy-makers, influenced by modern consumer lifestyles, socio-economic megatrends, business needs and new technologies, face a number of issues related to the development and implementation of relevant policy measures and instruments. This is particularly evident in EU countries and regions that have strong interest in agro-food and have identified agro-food as a smart specialisation priority.

The 2015 EXPO has provided a multinational and multi-stakeholder platform for policy-makers to discuss the role of food in addressing contemporary challenges and guarantee sustainable growth. The motto of the EXPO 2015, "Feeding the Planet, Energy for Life", had a global appeal to reflect upon current issues of nutrition, food production, management and distribution, as well as global and regional food governance. The European Commission, Directorate General Joint Research Centre (DG JRC), Institute for Prospective Technological Studies (IPTS) and its Smart Specialisation Platform (S3 Platform) specifically contributed to the discussions on food and smart growth in EU

¹ <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52012IE0483>

² <http://www.europarl.europa.eu/sides/getDoc.do?type=TA&reference=P7-TA-2014-0211&language=EN&ring=A7-2014-0127>

³ <http://www.europarl.europa.eu/sides/getDoc.do?type=TA&reference=P7-TA-2014-0211&language=EN&ring=A7-2014-0127>

regions and on the role of public institutions in supporting research and innovation in the agro-food sector.⁴

This paper builds upon the discussions and lessons learnt. It aims specifically at discussing recent food innovation paths, EU policies and instruments in support of R&I activities in food-related areas as well as agro-food as a smart specialisation domain. In addition, the paper points out that good mapping of regional capabilities in the food sector, understanding of the origins of food products and exploration of cultural identity linked to food production, tourism and health is vital for the implementation of agro-food smart specialisation. The paper focuses on the role of national and regional governments in sustaining and enhancing R&I in food specialisation areas and the development and implementation processes of food smart specialisation domains. The paper concludes by framing policy advice, and recommending strategies and actions for stakeholders.

The paper is organised into seven sections. The objective of the second section is to discuss food innovation and diversification paths, and in particular the importance of territory and branding, emergence of food cities, and linkages between health, ethics and food. Section 3 presents EU policies, instruments and initiatives in agro-food domains while section 4 discusses smart specialisation concept and the role of various stakeholders in agro-food. It also examines the most prominent agro-food-related priorities at EU level. Section 5 presents three examples of food smart specialisation in EU countries and regions. This is followed by policy recommendations (section 6) and conclusions (section 7).

⁴ The S3 Platform organised a thematic workshop "Smart specialisation and food: food, gastronomy and bio-economy as elements of regional innovation strategies". The workshop focused on food, gastronomy and bio-economy as domains of smart specialisation in EU countries and regions. International experts discussed food as an element of smart specialisation in EU countries and regions. Workshop participants reflected upon the issues of food innovation as a driver of smart regional growth, the role of public and private institutions in supporting agro-food priorities as well as differences in gastronomy culture and approaches.

2. Food: innovation and diversification paths

2.1 Territory and branding

The potential of food as an industry as well as a social, cultural and health commodity is enormous. Food has a connecting power. It can connect people of various ages, culture, religion and social background. It is also one of the oldest industries that contribute to local development and growth. Moreover, food is a cross-sectoral economic activity and is thus closely linked to other activities including tourism, health and well-being, bio-economy, safety and security, waste management, transportation and logistics, etc.

Hall (2012: 50) argues that "food consumption is integral to tourism and its economic impact can be important not only for immediate businesses that directly provide food for tourists (such as hotels, restaurants and attractions), it can also have significant economic impact throughout the food supply chain", especially if the food provided is supplied locally. The Organisation for Economic Co-operation and Development (OECD, 2012) revealed that food plays an important role in the development of tourism services, since it often comprises 30% or more of tourist expenditure and this money is regularly spent directly with local business.

The concept of "Foodscapes" which unite local culture, creativity and food is becoming relevant in highlighting the important linkages between novelty, authenticity and locality in food experiences. Small scale food production can represent a route to the future if a strategy considering multiple stakeholders, accounting social responsibility and dealing with multiple identities can be established (Ashworth and Kavaratzis 2009).

Richards (2015) underlines the role that food can play in influencing the overall branding and positioning of a destination:

- Food is a part of the destination marketing mix, because it helps to give a sense of place and allows tourists to literally taste the destination, coming directly into contact with local culture.
- Since we eat two or three times a day, gastronomy is the aspect of culture that tourists most frequently come into contact. They literally ingest local culture.
- Eating habits are differences that immediately become obvious: the time people eat, the way they eat and what they eat all become immediate points of difference upon entering a new culture.
- Food provides a direct connection with landscape because tourists can recognise origins of food.

For these reasons, according to Hall and Sharples (2008) and Hall (2012: 50), several motivations push private and public interest in relationships between gastronomy, tourism and branding:

- "Gastronomy and cuisine-oriented tourists are perceived as high yield markets.
- Food tourism can be linked with other visitor products such as cultural and natural heritage attractions, thereby providing a comprehensive offer.
- Rural areas that may otherwise be affected by economic restructuring are provided with an alternative: the development, maintenance and/or even revival of local food products.
- Urban neighbourhoods or quarters can become attractive to visitors, especially those that specialise in particular ethnic foods. A concentration of restaurants, cafés and markets can bring character to the neighbourhood".

A recent report released by the World Tourism Organisation (2012) stresses the importance of food as immaterial cultural heritage that can enhance the reputation of destinations worldwide and differentiate locations. With the inscription of food-related tradition and cultures (such as the Mediterranean Diet, Gingerbread craft from Northern

Croatia, Traditional Mexican cuisine and Gastronomic meal of the French) in the UNESCO Intangible Cultural Heritage List, food has finally received status as a true part of a common heritage. Thus, food is gradually replacing geographical location as brand destination (Williams et al., 2014) and it is becoming an essential component in destination choice motivation (Hall et al., 2003). For these reasons, many tour operators worldwide are exploiting this trend organising gastronomic experiences such as:

- offering cooking school holidays,
- dining at famous restaurants in light of their chef's reputation,
- visiting farmers' markets,
- visiting food producers,
- organising street food tours.

In all of these, two concepts are particularly important: co-creation and experience economy. Their typical elements are proven in the literature, such as close contact and involvement of customers, as well as the educational, escapist, entertainment and aesthetic profile of the consumption experience are easily detectible in many food-related touristic products. Nevertheless, they cannot be taken for granted and according to Santini et al. (2011), diversification strategies using experience economy and co-creation approaches can help SMEs and SME networks producing food in rural areas in:

- repositioning their offer, because they can address new market niches;
- gaining a sustainable competitive advantage through the inimitability of some product attributes that makes a product unique;
- differentiating and positioning in a distinctive way among regional competitors, being perceived as unique by customers.

Hall (2012:51) underlines the importance to plan regional economic development strategies and suggests that:

"... the critical question becomes how cuisine, food and tourism fit into the bigger picture and overall economic development strategies of a region or country? The above question is fundamental to thinking about the economic development value of food and tourism. Agencies need to question the perspective promoted by some parties that food tourism is an automatic good for economic development at a destination. Policy decisions need to be informed by quality research and access to a range of different perspectives on food and tourism initiatives. The role of research is extremely important as different regions not only have substantially different visitor profiles, demographics and psychographics but also very different types of food, tourism products as well as, supply and value chains".

Hall thus suggests that promotion and governance of an area is a complex issue. A "one size fits all" solution does not exist. Destinations cannot simply copy what has worked in other regions, particularly as what was best practice at one point in time will not be later on (Hall and Williams, 2008), and this difficulty becomes bigger when destination-branding is based on food.

When dealing with food, the topic of sustainability under all its perspectives is more evident. Governmental efforts face so-called "wicked problems": issues which are highly complex, have innumerable and undefined causes, and are difficult to understand and frame. In fact, rural areas are "marked by uncertain, complex and often contradictory modes of decision-making, swayed by multiple interest-groups, each with its own distinctive set of values and ideologies" (Holmes, 2002: 372). In rural areas, interconnectedness, ambiguity, pluralism and societal constraints require a strategic integrated and interactive approach (Lang, 1988; Cavicchi et al., 2013). Thus,

participatory approaches, stakeholder engagement activities and constant problem-based research are crucial elements in the implementation of diversification strategies.

In relation to this, Alessio Cavicchi argues that⁵

“planning innovation paths in food smart specialisation areas represents a wicked problem; that means an issue highly complex, difficult to understand and frame. A one size fits all recipe does not exist and the search for a solution implies a wise stakeholders’ management. Thus, every territory, every community, every district or rural area, having different characteristics, cultural and economic backgrounds, need to be «discovered» through participatory approaches, supported and facilitated by different levels of Public Private Partnerships (PPP)”.

The Italian region of Emilia Romagna illustrates nicely a series of place-branding activities that have emerged from the holistic regional ecosystem approach (see box below).⁶

⁵ Presentation delivered during the S3 Platform Workshop "Smart specialisation and food: food, gastronomy and bio-economy as elements of regional innovation strategies" at 2015 EXPO on 22nd September 2015.

⁶ The case was presented by Kevin Morgan during the S3 Platform Workshop "Smart specialisation and food: food, gastronomy and bio-economy as elements of regional innovation strategies" at 2015 EXPO on 22nd September 2015.

Emilia-Romagna research & innovation strategy

The regional strategy is based on three main pillars:

- stimulating R&D activity in firms and especially in SMEs, supporting projects involving new graduates and including collaboration with research centres;
- promoting industrial research and technology transfer from Universities and public research organisations to firms through a regional network of industrial research laboratories and innovation centres;
- evolving industrial clusters towards knowledge dimension, through collaborative research and technology transfer, networking firms and promoting start-ups.

We can thus observe a distributed geographically-spread approach. In this system, it is possible to observe collective experimentation and strategic collaboration between industry, governance, citizen and education-led innovation. This governance structure allows for a large scale of initiatives and approaches in support of SMEs.

A breeding ground for initiatives and projects: the case of Bologna

An interesting case study is DegustiBO. Through this initiative, the town of Bologna seeks to present the excellences embedded in the Provincial territory, giving the opportunity to tourists and visitors to discover farmhouses, restaurants and shops of high quality steeped in tradition. This project, created by the Province of Bologna in collaboration with the Fondazione Carisbo and registered with the Chamber of Commerce, wants, on one hand, to narrate the history of the territory, linking it to local tradition and the numerous products of excellence, and on the other hand, create a virtuous circle between producers and consumers to stimulate the whole provincial economic system. Currently there are 84 companies that boast the brand: 18 farmhouses, 23 restaurants, 11 food shops, 10 bakeries, 8 fresh pasta shops, 4 delicatessens, 7 butchers and 3 greengrocers. Food quality and culture, nutrition, environmental sustainability, scientific research, protection of biodiversity and farming soil are the inspiring principles of the project as well as Bologna's world-renowned distinctive traits.

Source: www.dequstibo.it and Kevin Morgan's presentation

2.2 Food cities

The proliferation of city networks around the theme of food and gastronomy is an important topic for policy-makers and scholars. National and transnational consortia have been created to enhance branding efforts and attract international visitors. Many of them consider food as a vehicle not only to promote their towns but also to follow sustainable development paths in a holistic way, proposing new and innovative governance models and supporting healthy and active lifestyles.

In a recent report written by Jennings et al. (2015) for Food and Agriculture Organisation of the United Nations (FAO) "Food in an Urbanised World", the authors argue that while food system challenges have many global dimensions, a "city region food system" approach is reasonable to address challenges that are bound to specific places, in terms of causes, impacts, and governance. In fact, according to Jennings et al. (2015), at least three macro-categories of linkages exist between urban and rural areas: ecological, comprising ecosystem services and appropriate land-use planning; socio-economic, including shorter, more direct supply chains; and governance, bringing together urban and rural governance structures in a democratic and participatory way.

According to Jennings (2015: 5),

"a 'city region food system' provides a framework for conscious food governance that fosters improved balance between global and local food supply, with an awareness of the multiple food system outcomes for health, economic development and environmental sustainability. More broadly, the governance characteristics associated with an explicit city region food system approach are in turn likely to generate wider community benefits".

Table 1 shows a list of the potential benefits for the territories where the "city region food system" as governance approach is considered.

Table 1: Proposed benefits of city/region food systems

Theme	Proposed benefits
Food security	Increased livelihood resilience for small-scale producers
	Reduced food prices for urban consumers
	Increased resilience of urban food supply against shocks
Economic development	Regional economic growth
	Increased rural incomes and jobs
	Economic vitality, entrepreneurship and innovation
Environment	Opportunities for 'circular economies', including reduced food waste and loss
	Increased local agroecological diversity
	Increased recognition and valuing of ecosystem services
	Lower greenhouse gas emissions
Health	Increased knowledge about food and nutrition amongst urban dwellers, resulting in more healthy diets
	Increased availability of, and access to, nutritious food
Governance and culture	Promoting a food culture
	Integrated ('joined-up') policy and action
	Greater participation in and transparency of the food system

Source: Jennings et al. (2015)

In recent years, national and transnational consortia have been created to enhance branding efforts and attract international visitors. One of those created is "Sustainable Food Cities Network", located in the United Kingdom. Its aim is to promote sustainable food economy, and specifically to promote access to healthy and sustainable food, tackle food poverty and combat diet-related illnesses. Another programme is "Eating City" which was established in France in 2010. Italian "Cittàslow" was created in 1997 to broaden the philosophy of Slow Food to local communities and their governing bodies; nowadays, more than 190 cities in the world are taking part in the programme. Finally, "Creative cities of Unesco" is a network of creative cities, working together towards a common mission of cultural diversity and sustainable urban development. Among different thematic networks, one on gastronomy was established. The gastronomy network incorporated 18 cities characterised by vibrant gastronomic communities and local traditional culinary practices⁷.

In 2013, the Urbact secretariat funded the "Gastronomic Cities" project with the aim of creating a brand for cities based on gastronomy. The project was carried out by five cities working together to create strategies that leverage gastronomy as a tool for urban

⁷ <http://en.unesco.org/creative-cities/events/47-cities-join-unesco-creative-cities-network>

development. The project was led by the leading 'giving' city in terms of best practice, Burgos (Spain). As a result, stakeholders became more self-conscious about the cultural heritage and traditions in their cities and the need to appropriately market their territories through a common effort.

Food councils and charters are further expressions of the rapid expansion of city food strategies and "they have been inclusive in nature, bringing about much deliberation and stakeholder engagement of major public, private and civic sectors" (Mardsen and Morley, 2014: 16). Here below we provide examples of food city councils in the United Kingdom, United States of America and Sweden.⁸

Bristol Food Policy Council

The aim of the Bristol Food Policy Council is to ensure that Bristol residents and visitors have access to good food. The Food Policy Council defines good food as being: vital to the quality of people's lives in Bristol. Food can be considered tasty, healthy and affordable if it is good for nature, good for workers, good for local businesses and good for animal welfare.

New York Food

NYC Food is a website created to help New Yorkers to find information on New York City programs, resources, and policies relating to food insecurity, food access, healthy eating, and economic development in the food sector. NYC Food is overseen and managed by the office of the Director of Food Policy. New York City is home to many non-profits, businesses, community groups, entrepreneurs, and individuals who are actively engaged with the issues of food access, hunger, nutrition, and community greening. NYC Food, however, focuses on programs that are run, administered by, or affiliated with City government agencies.

Sustainable food in Malmö

Malmö's policy for sustainable development and food was approved by the city council in 2010. The goal of the policy is that all food purchased should be organic by 2020 and greenhouse gas (GHG) emissions from food procurement should be reduced by 40% by 2020, compared to the 2002 level, which was 13,360 ton CO₂-equivalent. With the policy the city council wants to: contribute to a sustainable Malmö with healthy citizens, strengthen the importance of food in the City of Malmö's own operations to increase the attractiveness of food, work towards 100% sustainable purchasing in the City of Malmö and ensure that the City of Malmö leads from the front and only serves sustainable and safe food when serving food at official functions and representation.

Sources: [http://bristolfoodpolicycouncil.org/about/;](http://bristolfoodpolicycouncil.org/about/)

[http://www.nyc.gov/html/nycfood/html/about/about.shtml;](http://www.nyc.gov/html/nycfood/html/about/about.shtml)

<http://malmo.se/English/Sustainable-City-Development/Sustainable-food-in-Malmo.html>

2.3 Health and ethics of food

Meier et al. (2015) affirm that consumer interest in organic products and healthier items is one of the major trends in the restaurant industry. The numbers of this phenomenon are clearly pushed by two major demographic evolutions such as obesity and ageing.

⁸ The cases were presented by Kevin Morgan during the S3 Platform Workshop "Smart specialisation and food: food, gastronomy and bio-economy as elements of regional innovation strategies" at 2015 EXPO on 22nd September 2015.

It is problematic to exactly define healthy foods, especially when compared to the specific attributes characterising organic products: for instance, energy boosting products, probiotic yoghurts, whole grain products, anti-allergenic or gluten-free belong in this category. Despite the problem of finding market boundaries, 2015 was an important year for the consecration of health and wellness products. In fact, evidence shows that consumption of naturally healthy products worldwide has increased. Euromonitor estimates annual growth in sales around 7% (\$732bn).

According to Agriculture and Agri-Food Canada (2011, cited in Meier et al., 2015), five main market segments can be detectable worldwide: "naturally healthy", "enriched and functional", "better for health", "organic" and "non-allergenic" food. Meier et al. (2015) specify that the first segment concerns "little or no processed food, which retains basically all its original state and is consumed for its natural health benefits, such as vitamins and nutrients in their natural state, such as (fibre and calcium, etc.)". In the category entitled Enriched and Functional are items to which healthy ingredients have been added, as the enrichment with antioxidants or organisms such as probiotics. The category "better for health" is related to those products with a lower amount of lipids, sugar or salt. Organic foods are those grown under strict control without (or with a limited use) of drugs, hormones or synthetic chemicals. The Anti-allergenic segment concerns all those lactose- or dairy-free and gluten-free products specifically addressed to food intolerances. Euromonitor (2015) provides an estimation of the phenomenon and proposes 14 global trends (Euromonitor, 2015b).

Some tendencies are worth mentioning because sustainability and health are gradually becoming relevant elements in consumer purchasing behaviour and regions that consider these factors in planning and promoting innovation strategies among clusters of firms (even at cross-sectoral level) can gain competitive advantage worldwide.

First of all, it is evident that governments worldwide are looking for ways to reduce expenditure on health. This fact is particularly important because ageing populations will naturally demand higher expenditure in the care of elderly citizens. That means that initiatives focused specifically on food and active aging will be more and more important for regional policy design.

Secondly, the gradual rise of internet coverage and usage obliges both food industries and local food systems to monitor consumers' perception. A two-way dialogue is necessary to check products and regional reputation. In fact, coherent and truthful communication is the best way to increase regional reputation.

Thirdly, ethical consumption is another trend that could be considered a niche in consumer behaviour. For instance, food wastage is progressively considered as immoral. Thus, certifications, awareness initiatives and education campaigns targeting ethically- or environmentally-concerned consumers and tourists are potential sources of market power.

In this regard, Andrea Fedrizzi, Strategic Marketing Manager at Melinda Consortium, stresses the necessity to increase the overall sustainability of production.⁹ Melinda, one of the biggest Italian apple producers, obtained EPD (Environmental Product Declaration) certification which shows that apples boast the lowest carbon footprint (370 g CO₂/kg) and also very low water and land use footprints (78 l/kg and 0,92 m²/kg respectively). Nevertheless, intensive farming methods requiring the use of pesticides as well as their

⁹ The case of Melinda was presented during the S3 Platform Workshop "Smart specialisation and food: food, gastronomy and bio-economy as elements of regional innovation strategies" at 2015 EXPO on 22nd September 2015.

presence in international markets can have a strong environmental impact. For this reason, the respect for natural biological rhythms and the adoption of “green” innovations became crucial for the development of sustainable production, safeguarding the environment and bringing real benefits to the local community.

Melinda’s mission is to maximise - in a sustainable manner and coherently addressing the market – the profit of shareholder growers through the means of restless attention to the quality of products and processes, and by preserving the environment while generating more and more tangible benefits for consumers, employees and the local community.

Melinda’s commitment to the Environment

Melinda’s commitment to “true sustainability” led to the implementation of a project called HYPOGEUM: the plan is to build a 50,000-tonne cold store equipped with DCA (Dynamic Controlled Atmosphere) inside a mountain between now and 2020. It is the first facility in the world to store apples underground in controlled atmospheric conditions. The main benefits for society, economy and the environment are:

1. The important energy savings (meaning reduction of CO₂ in the atmosphere).
2. The strong water savings resulting from the possibility of using geothermal energy for cooling the compressor.
3. Elimination of insulating panels whose disposal generates heavy pollution.
4. Preservation of the landscape and the agricultural and rural territory avoiding the construction of new buildings on the surface.

Source: our elaboration on Melinda website and press releases

The main trends reported in this section confirm that the concept of sustainability and its many nuances - including economic, ecological, intra- and inter-generational equity, etc. (Santini et al., 2013) - are becoming mainstream in the food sector. These trends boost relationships with other economic sectors such as those of tourism and hospitality, education, logistics, etc.

Also, policy-makers dealing with education issues must be informed about the meaning of these trends. Recently, Morgan and Morley (2014) underlined the importance for regional governments to consider sustainability under every perspective when designing public tenders for public procurement. These policies must consider more than just “low cost” criteria. For instance:

“A sustainable public plate calls for a radically different kind of catering and procurement culture, where values for money is the goal and not value for money in the narrowest sense of the term. This means that the public realm has to recognise and integrate the core values of sustainability, namely the values of public health, social justice and ecological integrity”.

Thus, in order to promote enduring knowledge and engagement in the food system, educational activities related to sustainability, nutrition, food preparation and community are needed. Such activities raise awareness in communities of the impact that food choices have on health, environment, community public food procurers, and urban households in disadvantaged areas. Introducing food literacy as a means to avoid the erosion of agro-biodiversity and allowing the establishment of successful food systems means drawing from locally-available genetic resources, food variety and traditional food cultures.

A growing educational effort to promote sustainable practices in the light of an increase demand by consumers and citizens is demonstrated worldwide by Higher Education Institutions that are actively involved in the provision of *Food Literacy* programmes.¹⁰

Ute Walter, Senior Lecturer and Head of Umeå University School of Restaurant and Culinary Arts, stresses the important role of Universities for enhancing food skills (see box below):¹¹

Building Skills and Growth Talent for Innovative Food Industry

At Umeå University a holistic view on the customer meal experience is applied. In particular, the social context of the meal is crucial because most meals consumed are not eaten alone and companies have a great impact on how customers create value through restaurant service experiences. Furthermore, the physical environment, how it looks and its design in detail plays an important role as each meal is eaten in a certain physical context, often even relating to social aspects. The food and beverages and the specific combination of these based on sensory attributes, are central as we are talking about a meal or eating experience. Finally, time is another important aspect not to be forgotten, as eating a meal always takes time and influences the consumer experience. At Umeå University, a programme based on a multi-disciplinary approach was designed to combine craft knowledge and skills in cooking and serving meals in close relation to science from different disciplines. The processes are innovative and apply a norm-critical approach. Innovative technology and equipment are available for free for students at Sliperiet (a 3-D innovation platform at Umeå University), for example, laser cutter, FAB-lab with 3-d printers, motion capture equipment.

The Gastronomy programme at Umeå University involves disciplines from the faculty of natural science such as food chemistry, the faculties of social sciences and humanities with psychology/sensory science, nutrition and health, business administration, revenue management, leadership, food culture, food history, and design. Furthermore, the craft of culinary arts and hospitality plays a major role in education. Students obtain continuous scientific methodological training which is specially designed for the field of culinary arts. Courses include sensory science and analysis for food product development, food pairing, and food and beverage pairing. Moreover, field study as a multi-methodological approach is involved in order to be able to study the eating context in combination with design methods. Multidisciplinary undergraduate programmes are an opportunity for universities to link together different academic disciplines in an early stage of education. The multidisciplinary character of the Gastronomy programme facilitates the involvement of other disciplines and the strong focus on practical craft knowledge makes cooperation with experts from outside the university a natural part of the programme including local/regional businesses, food products and food culture.

Source: Ute Walter's presentation

¹⁰ For example, the case of Harvard (<http://www.dining.harvard.edu/food-literacy-project>).

¹¹ Presentation delivered during the S3 Platform Workshop "Smart specialisation and food: food, gastronomy and bio-economy as elements of regional innovation strategies" at 2015 EXPO on 22nd September 2015.

3. EU policies and instruments

3.1 A brief historical overview of EU agro-food policy

Since the beginning of the European Union path, the Common Agricultural Policy (CAP) has been a cornerstone of European integration, providing citizens with secure food supply and a vibrant countryside (European Commission, 2012). In fact, food security was the main objectives of the post-war context where daily living was terribly challenging for families in light of hunger and starvation. In 1962, the first CAP was released which provided guaranteed prices and shared funding among the first member countries to subsidise the production of basic foodstuff. It then gradually moved away from price and production support, switching to holistic approaches to agriculture and rural areas, considering food safety and quality, market orientation and the vitality of rural communities. Rural development policies were initially integrated in structural policy, mainly targeting farmers through agricultural restructuring and modernisation. Thus, with the "Agenda 2000" reform aimed at pursuing economic, social and environmental goals in line with the Amsterdam Treaty, a new rural development policy was introduced as a second pillar of the CAP. This new policy encouraged many rural initiatives while also helping farmers to diversify, improve their product marketing and otherwise restructure their businesses.¹²

In 1991, a piloting project for funding bottom-up initiatives was launched: the Leader approach. Leader is a French acronym for "Liaison Entre Actions de Développement de l'Économie Rurale", meaning "links between the rural economy and development actions". The Leader approach has been an important component of EU Rural Development Policy for over 20 years. In fact, since 1991, four Leader initiatives have been implemented: Leader I (1991–1993), Leader II (1994–1999), and Leader Plus (2000–2007 and 2007–2013). Since the beginning, this programme has provided rural communities in the EU with a method for involving local partners in shaping the future development of their area.

The first generations of Leader were designed to aid the development of sustainable rural communities following the reforms of the Common Agricultural Policy. Since the piloting initiative in 1991, it has grown to become a mainstream methodological approach. In fact, since 2007, it has been implemented under Rural Development Programmes and co-funded under the European Agricultural Fund for Rural Development (EAFRD). Implementation of the Leader approach in rural areas was successful and it thus became a model for other areas. Firstly, it was successfully applied to the European Fisheries Fund between 2007 and 2013, and consequently became available in European Regional Development Fund (ERDF) and the European Social Fund (ESF). However, the application of this approach is mandatory only in the EAFRD.

Currently, a new term is being used for a wider application of the Leader approach: "Community-Led Local Development" (CLLD). Since 2014, it is possible for a single Local Development Strategy (LDS) to be supported by several EU Funds (known as multi-funded CLLD). This will enable Local Action Groups in rural, maritime and urban settings to fully explore the potential of the CLLD approach to comprehensively integrate local needs and solutions. It also enables Leader-type support to be better coordinated

¹² Complete historical overview is available at http://ec.europa.eu/agriculture/cap-history/index_en.htm

with local development support from other EU funds and thus reinforce the links between rural, urban and fisheries areas.¹³

3.2 EU financial instruments and support

In support of EU policies, the EU provides financial and technical support to EU countries and regions as well as public and private bodies. This support is:

- a) Direct through competitive funds such as Horizon 2020 and COSME. Generally, direct grants are publicised through specific calls for proposals. In most cases, these grants co-finance projects in relation to EU policy objectives and the beneficiaries own the results of their activity. Grants cannot be awarded for actions already completed (non-retroactivity rule) and cannot result in a profit for beneficiaries.
- b) Indirect through European Structural and Investment Funds (ESI funds). Funds are managed by Member States in support of European Cohesion Policy. In this case, a designated managing authority provides information on the programme, selects projects and monitors implementation.
- c) "Access to finance" tools usually consist of loans, equity financing, venture capital and guarantees provided by financial intermediaries. They help SMEs in particular to find seed money, start-up, expand and transfer their business. Even in this case, the beneficiaries own the results of their activities.

Regarding the competitive funds, two main instruments are available: Horizon 2020 (Framework Programme for Research and Innovation) and COSME. One of the sections of Horizon 2020 is devoted to "Food Security, Sustainable Agriculture and Forestry, Marine, Maritime and Inland Water Research and the Bio-economy". The rationale of this intervention originates in the idea that ensuring food security goes beyond securing a sufficient supply. It deals with social and economic access to safe and nutritious food. The objective of this intervention is to meet consumer needs and preferences while minimising the impact on health and the environment. A holistic view of the whole food supply chain and its related services from primary production to consumption is a priority that Horizon 2020 pursues through a strong emphasis on multi-actor approaches. The involvement of various actors such as farmers/farming organisations, associations relating to the fishing industry, advisors, enterprises and consumers is necessary to provide demand driven innovation. An adequate choice of key actors with complementary types of knowledge (scientific and practical) among project participants is a necessary prerequisite to the generation of measurable impact and cross-fertilisation of ideas.

COSME is the EU programme for the Competitiveness of Enterprises and Small and Medium-sized Enterprises (SMEs). It gives support to SMEs through four actions: facilitating the access to finance for SMEs through the "Loan Guarantee Facility" and the "Equity Facility for Growth", improving access to markets (notably thanks to the services provided by the Enterprise Europe Network), improving framework conditions for the competitiveness and sustainability of Union enterprises and promoting entrepreneurship and entrepreneurial culture. By offering access to finance, the COSME programme eases guarantees provided by financial intermediaries, and is useful in the sharing of entrepreneurial risks.

With regards to European Structural and Investment Funds (ESI funds), five funds are currently available: European Agricultural Fund for Rural Development (EAFRD),

¹³ For further information on CLLD, refer to this document: http://ec.europa.eu/regional_policy/sources/docgener/informat/2014/guidance_clld_local_actors.pdf

European Regional Development Fund (ERDF), European Social Fund (ESF), Cohesion Fund (CF) and the European Maritime & Fisheries Fund (EMFF). The most important Fund supporting agro-food-related activities is the European Agricultural Fund for Rural Development (EAFRD). Its objective is to contribute to the competitiveness of European agriculture, a sustainable management of natural resources and climate actions and a balanced territorial development of rural areas. Six main priorities are supported through Rural Development Programmes (RDPs) implemented at regional level:

- Fostering knowledge transfer in agriculture, forestry and rural areas.
- Enhancing the competitiveness of all types of agriculture and enhancing farm viability.
- Promoting food chain organisation and risk management in agriculture.
- Restoring, preserving and enhancing ecosystems dependent on agriculture and forestry.
- Promoting resource efficiency and supporting the shift toward a low-carbon and climate-resilient economy in agriculture, food and forestry sectors.
- Promoting social inclusion, poverty reduction and economic development in rural areas.

Finally, a number of European partnerships, platforms and initiatives are supported by EU institutions: European Innovation Partnership (EIP), European Technology Platforms (ETP), European Institute of Technology Knowledge Innovation Communities (EIT KICs) and Food Cluster Initiative.

Five European Innovation Partnerships (EIPs) have been launched to pool expertise and resources by bringing together public and private sectors and supporting cooperation between research and innovation partners. Among these, the European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-AGRI) was promoted in 2012 to provide proposals and suggestions to ensure a steady supply of food, feed and biomaterials. Specific actors such as farmers, advisors, researchers, and businesses work together in multi-actor projects to find a solution for a specific issue or develop concrete opportunities.

In order to develop a long-term vision and the co-generation of innovation in some key economic sectors, the European Commission has also facilitated the development of European Technology Platforms (ETPs). The ETP Food for Life Vision for 2020 and beyond was launched in Brussels in July 2005. The vision of the ETP identified the need for an effective integration of strategically-focused, trans-national, concerted research in the nutritional, food and consumer sciences and food chain management. The aim is to deliver innovative, novel and improved food products for, and to, national, regional and global markets in line with consumer needs and expectations. In 2014, the Platform launched the implementation plan of its Strategic Research and Innovation Agenda for the food and drink industry. Strategic priorities for the food and drink industry include the promotion of informed consumer choices, the delivery of strategic solutions for safe food and healthy diets for all, and the creation of opportunities for a sustainable and competitive agro-food industry through innovation in food processing.

Created in 2008, the European Institute of Innovation and Technology is aimed at increasing European sustainable growth and competitiveness and reinforcing the innovation capacity of EU Member States. The EIT is the first EU initiative to fully integrate all three sides of the Knowledge Triangle (higher education, research and business) through the so-called Knowledge and Innovation Communities (KICs). In 2016, a new KIC "Food4Future – Sustainable Supply Chain from Resources to Consumers" will be launched. This will address relevant societal challenges, contribute to the delivery of the Europe 2020 agenda and will be complementary to the EIP "Agricultural Productivity and Sustainability". Among the different objectives reported by Decision No 1312/2013/EU of the European Parliament, it is worth noting the attempt to

bring together a critical mass of excellent research, innovation, education and training for stakeholders along the whole supply chain. To accomplish these objectives, a trans-disciplinary work is necessary.

The basic concept behind the Food Cluster initiative was to create interlinks among the FP7 food projects and set up a European Food Cluster. The Food Cluster Initiative has proven to be beneficial because it allowed for critical mass creation and helped to meet expectations that would not have been reached at individual project level.

Table 2 provides an overview of various EU financial frameworks, funds, programmes and supported initiatives. ESI funds are described in the first section of the table and some examples of funded projects in the field of agro-food in the 2007-2013 programming period are provided. This is followed by information on multi-annual financial frameworks, and specific platforms and initiatives on food.

Table 2: Examples of representative initiatives in the area of agro-food

Multi-Annual Financial Framework	Objectives	Instruments	For more information	Examples of funded projects in 2007-2013
European Agriculture Fund for Rural Development	Improve competitiveness of agriculture; the sustainable management of natural resources and climate action; a balanced territorial development of rural areas.	Rural Development Programme at regional level addressing 6 priorities	http://enrd.ec.europa.eu/en/country	Innovating Agriculture: "Fresh and Ready to Eat" produce in Umbria http://enrd.ec.europa.eu/enrd-static/policy-in-action/rdp_view/en/view_project_8380_en.html
European Regional Development Fund	Strengthen economic and social cohesion by correcting imbalances between regions. It supports 11 thematic objectives and investment priorities	Operational Programmes prepared by each Member State and/or Region	http://ec.europa.eu/regional_policy/en/atlas/programmes/	http://ec.europa.eu/regional_policy/en/projects/belgium/mega-food-hall-boosts-sustainable-development-of-wider-city-area
		European Territorial Cooperation	http://ec.europa.eu/regional_policy/en/policy/cooperation/european-territorial/	http://ec.europa.eu/regional_policy/en/projects/
		Cross-border	http://ec.europa.eu/regional_policy/en/policy/cooperation/european-territorial/cross-border/	Joint research for development of a agro-food business incubator in Croatia and Hungary http://www.keep.eu/search/show/36914?ss=75c480eb83130d3fb14a63729e3ce336cfd90e0f7b9195cfbfe53f3fa417de7f&zooom=3#bb
		Transnational	http://ec.europa.eu/regional_policy/en/policy/cooperation/european-territorial/transnational/	BaltFood - The BSR Food Cluster: Innovation and Competitiveness in Action http://www.keep.eu/search/show/19763?ss=5da417b20ecc06ad44a73aa01c020b15f94c031e8a62edd3c62ed5c3f16be631&zooom=3#bb

		Interregional	http://ec.europa.eu/regional_policy/en/policy/cooperation/european-territorial/interregional/	Setting up the innovation support mechanisms and increasing awareness on the potential of Food Innovation and RTD in the South- East Europe area http://www.keep.eu/search/show/19185?ss=20ef1dd21f246b51e0f23ffef113a94ac6585913d899ede81d315a28f68c5ad8&zoom=3#bb
Cohesion Fund	Reduce economic and social disparities and promote sustainable development; it is aimed at Member States that have Gross National Income (GNI) per inhabitant lower than 90 % of the EU average (In 2014-2020 is dedicated to: Bulgaria, Croatia, Cyprus, the Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia and Slovenia)	Operational Programmes specify concrete actions. OPs are implemented by Managing Authorities set up by the Member States (at national, regional or another level).	http://ec.europa.eu/regional_policy/en/funding/cohesion-fund/	Harnessing the potential of Croatia's world famous indigenous cherry http://ec.europa.eu/regional_policy/en/projects/croatia/harnessing-the-potential-of-croatias-world-famous-indigenous-cherry
European Social Fund	Improve employment and worker mobility as well as levels of professional qualifications	Operational Programmes specify concrete actions. OPs are implemented by Managing Authorities set up by the Member States (at national, regional or another level).	http://ec.europa.eu/esf/main.jsp?catId=25&langId=en	Cooking with local produce http://ec.europa.eu/esf/main.jsp?catId=46&langId=en&projectId=454
European Maritime and Fisheries Fund	Helping fishermen in the transition to sustainable fishing; supporting coastal communities in diversifying their economies; financing projects that create new jobs and improve quality of life along European coasts	Operational Programmes specify concrete actions. OPs are implemented by Managing Authorities set up by the Member States (at national, regional or another level). Managing authorities responsible for the implementation of EMFF operational programmes delegate a number of tasks to "Fisheries Local Action Groups" (FLAGS).	http://ec.europa.eu/fisheries/cfp/emff/index_en.htm	Multi-functional fish restaurant, shop & work space https://webgate.ec.europa.eu/fpfis/cms/farnet/files/documents/FARNET_GP_025-DK01-EN_multifunctional-fish-outlet_0.pdf

Other Multi-Annual Financial Framework	Objectives	Instruments	For more information	Examples of funded projects in 2007-2013
Life	Contribute to the implementation, updating and development of EU environmental and climate policy and legislation by co-financing projects with European added value	Life Action Grants	http://ec.europa.eu/environment/life/funding/life2014/index.htm	Promoting sustainable salmon fishing practices on Lake Saimaa http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=4033
Horizon 2020 (Framework Programme for Research and Innovation)	Help to achieve economic growth and jobs creation; ensure the establishment of world-class science, remove barriers to innovation through 3 priorities: excellent science, industrial leadership and tackling societal challenges.	This framework is divided in several "programme sections" (also called "pillars"), some being divided into sub-sections.	http://ec.europa.eu/programmes/horizon2020/en/h2020-sections http://ec.europa.eu/programmes/horizon2020/en/h2020-section/food-security-sustainable-agriculture-and-forestry-marine-maritime-and-inland-water https://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/calls/h2020-rur-2016-2017.html#callstatus=callIdentifier/t/H2020-RUR-2016-2017/1/1/1&callStatus/t/Forthcoming/1/1/0&callStatus/t/Open/1/1/0&callStatus/t/Closed/1/1/0&+identifier/desc	Global and local food assessment: a multidimensional performance-based approach https://ec.europa.eu/programmes/horizon2020/en/news/connecting-links-sustainable-food-supply-chain The Impact of Intangible Cultural Heritage (ICH) in formal, non-formal and informal education and its contribution to the Key Competences for Lifelong Learning in the EU Reference Framework http://cordis.europa.eu/project/rcn/196090_en.html Introduction of innovative technologies in modern gastronomy for the modernisation of cooking http://www.ttz-bremerhaven.de/en/research/food/research-projects/893-inicon.html
COSME (Programme for the Competitiveness of Enterprises and SMEs)	Support SMEs: facilitate access to finance; improve access to markets; improve framework conditions for the competitiveness and sustainability of Union enterprises; promoting entrepreneurship and entrepreneurial culture	Loan Guarantee Facility Equity Facility for Growth Enterprise Europe Network Erasmus for Young Entrepreneurs	http://ec.europa.eu/growth/smes/cosme/ http://ec.europa.eu/easme/en/cosme-eu-programme-competitiveness-enterprises-and-small-and-medium-sized-enterprises-smes http://een.ec.europa.eu/	Tastes of Trappists http://www.tatraproject.eu/
Creative Europe	Help cultural and creative sectors explore opportunities of the	Culture sector initiatives, such as those promoting	http://ec.europa.eu/programmes/c	Europeana Food & Drink http://foodanddrinkeuro

Programme	digital age and globalisation; enable the sectors to reach their economic potential, contribute to sustainable growth, jobs, and social cohesion; give Europe's culture and media sectors access to new international opportunities, markets, and audiences.	cross-border cooperation, platforms, networking, and literary translation. Audiovisual sector initiatives, such as those promoting the development, distribution, or access to audiovisual works. A cross-sectoral strand, including a Guarantee Facility and transnational policy cooperation.	reative-europe/ http://ec.europa.eu/programmes/creative-europe/projects/	pe.eu/ Born2BeWine http://www.unisg.it/eventi/creative-europe-born2bewine/
Erasmus for All Programme	Improve skills and employability, as well as modernise education and training.	The programme brings together 6 programmes from the previous programming period: the Lifelong Learning Programme (Erasmus, Leonardo da Vinci, Comenius and Grundtvig), Erasmus Mundus, Tempus, Alfa, Edulink and the programme for cooperation with industrialised countries	http://ec.europa.eu/programmes/erasmus-plus/index_en.htm# http://ec.europa.eu/programmes/erasmus-plus/projects/	Farm Inc: Introducing Marketing Principles in the Agricultural Sector www.farminc.eu European Food Studies and Learning Alliances https://www.food-sta.eu/
Specific Platforms and Initiatives on Food	Objectives	For more information		
Technology Platform "Food For Life"	Bring together stakeholders in key economic sectors to: a) develop a longterm vision of the sector, b) create a strategy for delivery, and c) establish a management structure to ensure maximum impact.	http://etp.fooddrinkeurope.eu/asp/index.asp		
European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-AGRI)	Pool expertise and resources by bringing together public and private sectors at EU, national and regional levels, combining supply and demand side measures. Support cooperation between research and innovation partners so that they are able to achieve better and faster results compared to existing approaches.	https://ec.europa.eu/eip/agriculture/		
FOOD Cluster Initiative	Promote diversity and excellence in food production and food research in European regions to increase welfare. Interregional cooperation and learning between clusters, regions and projects: exchange of experiences with defining Regional Food RTD strategies and implementation through projects at regional level, together with regional policy-makers, companies and research institutes to increase R&D performance, innovation and technology transfer. Developing interregional projects to invest	http://www.foodclusterinitiative.eu/		

	in the combined regional strengths to create excellence in the European Research Area, with use of ESI funds.	
European Institute of Technology and Innovation (EIT) and Knowledge Innovation Communities KIC Food4Future - Sustainable Supply Chain from Resources to Consumers (to be released in 2016)	Increase European sustainable growth and competitiveness; reinforce the innovation capacity of EU Member States. The EIT creates an unprecedented level of collaboration between innovation and excellence centres with the aim of boosting the innovation process: a) from idea to product; b) from lab to market; c) from student to entrepreneur	http://eit.europa.eu/
Horizon 2020 Advisory Group for "Food Security, Sustainable Agriculture, Marine and Maritime Research and the Bioeconomy"	Assist EC in the evaluation of proposals and monitoring of actions as well as in the preparation implementation or evaluation of programmes and design of policies. This includes the Horizon 2020 advisory groups.	http://ec.europa.eu/transparency/regexpert/index.cfm?do=groupDetail.groupDetail&groupID=2939

Source: authors

Please note that the table is not intended to provide an exhaustive list of actions by the bodies cited.

4. Smart specialisation

4.1 Concept and elements of smart specialisation

Smart specialisation is a new policy approach to regional development and regional innovation strategy planning, introducing integrated, place-based evolutionary process grounded in Entrepreneurial Discovery Process (EDP). It builds on national/regional assets, strengths, potentials, capacities, critical mass and expertise. Charles and Ciampi Stancova (2015) argue that

"smart specialisation is an approach to developing a regional innovation strategy which recognises the importance of specific regional knowledge, technological assets and critical mass. A specific dimension of smart specialisation approach is the focus on diversification of regional economies alongside specialisation".

The central idea of smart specialisation is that a limited number of promising priorities is selected through EDP to stimulate regional growth, job creation, and collaboration among research and knowledge institutions, businesses and investors. In this regard, Nauwelaers, Kleibrink and Stancova (2014) suggest that smart specialisation is

"about fostering the identification of new, original and distinctive areas of activities, which have the potential to transform the economy of the region. What is important here is the capacity of innovation actors to identify new business opportunities, tapping on their core competences and combining them with other skills and knowledge inputs, to create such new combinations".

These opportunities are best identified by regional entrepreneurs,¹⁴ because they are positioned close to the market, and thus in the best position to constantly collect information on business opportunities, economic trends, competitors, market gaps, industrial trends, new markets, etc. Regional entrepreneurs then inform regional governments through EDP on domains of R&I in which the region is likely to excel.

Freeman (1984: 46) defines stakeholder as "any group or individual who can affect or is affected by the achievement of the organisation's objectives". Thus, in general, we can define stakeholders in local food systems as groups of people, professionals (farmers, chefs, schoolteachers, etc.), institutions or organisations that can affect or are affected economically or socially by the innovation and diversification path, and that are linked together by it. In local food systems, a continuous dialogue between chefs, farmers, retailers, hospitality managers, innovation brokers and public bodies, is essential for planning, managing, monitoring and assessing innovation paths. Jennings et al. (2015) provide a list of stakeholders, with different interests and opportunities (table 3). The list is not exhaustive, yet it provides us with an outline of the complex issue of managing diversification paths in local food systems.

¹⁴ Entrepreneurs are all relevant actors that are active in research, development and business with innovation potential.

Table 3: Some of the practical implications of a “city/region food system” approach for different stakeholders in the food system.

Stakeholder	What would be needed to make city region food systems happen?
The city leader	<p>Requirement for the development and administration of a representative food governance structure and a city/region food strategy. Cross-departmental working within the municipal authority may be challenging.</p> <p>Limitations in municipal jurisdiction should be addressed: Geographical scope would require cooperation and partnership with rural authorities Policy instruments (e.g. procurement policies, planning, licences to trade) may require new powers, or existing powers to be applied in novel ways. May need to create ‘quick wins’ to maintain the confidence of the electorate and form alliances across political divides to ensure longterm success.</p>
The rural Governor	<p>Would need to secure resources (financial and technical) to support changes in food production and logistics, and to support new food-related enterprises.</p> <p>Would be required to invest time and political capital in new alliances, including with urban areas.</p> <p>May need to challenge vested interests in existing food system organisation, but rural population should be in favour of policies that boost rural economic development.</p>
National government	<p>National policies can enable or inhibit appropriate food system governance at regional level – new policies may be necessary to support local action, or powers may need to be devolved.</p> <p>Investment in appropriate infrastructure</p>
Large agricultural business	<p>May be required to alter business strategy to engage with regional markets – routes to market could look very different, requiring new contractual agreements with purchasers.</p> <p>There may be a need to change or diversify the type of food product being produced, and the agricultural practices used.</p> <p>May see new corporate social responsibility angles in terms of leading on sustainability initiatives that focus on generating local value</p>
The small scale producer	<p>May be required to change crops and agricultural techniques.</p> <p>Some farmers might develop new more direct routes to market with greater involvement in retail themselves. For others it might mean new kinds of relationships with purchasers.</p> <p>Likely to require access to capital and skills development to change production and marketing, potentially though more structured collaborations with farming organisations.</p>
Food manufacturers	<p>May see potential marketing benefits to leading on sustainability initiatives or creating supply chains that incorporate local small-scale growers.</p> <p>In order to maintain cost effectiveness and business flexibility, proportionality when it comes to city/region-sourcing targets would be expected, along with flexibility when it comes to non-indigenous products.</p> <p>May require involvement in pre-competitive collaborations and investments to develop city/region-scale solutions to logistics and processing, for example, a structured trading forum of brokering services</p>

Food retailers	<p>Would need clear and supportive policy instruments (grants, regulations, infrastructure investments) to ensure SMEs are not squeezed out of the market</p> <p>May require involvement in pre-competitive collaborations and investments to develop city/region-scale solutions to logistics and processing requirements</p> <p>For large retailers, it may require devolving a degree of authority to regional decision-makers, to link the centralised spine of the operations to regional stores</p> <p>In some cases, it would require funds to be available to drive engagement and implementation activities at city region level.</p>
The consumer	<p>May require investment in infrastructure to increase access to nutritious food (e.g., market places, fresh food retail in food deserts).</p> <p>Would require new modes of democratic participation in food system policies and activities.</p> <p>Would need greater awareness of food and nutrition and increased access to information, including regarding provenance in order to make healthy and sustainable choices.</p>
The civil society organisation	<p>May need capacity-building to fully understand potential to convene stakeholders and sectors in early stages of building linkages and identifying policy changes needed to strengthen city/region food systems. Organisations may find it difficult initially to work across sectors.</p>

Source: Jennings et al. (2015: 62)

An essential element of smart specialisation is its outward looking dimension and trans-regional connectivity. Radosevic and Ciampi Stancova (2015) argue that the transformative power of smart specialisation is "the coupling of knowledge and technology accumulation with international knowledge and production networks". Opportunities for trans-regional cooperation can be identified through mapping of selected priorities in the context of value chains. A good understanding of value chains contributes to better identification of collaboration opportunities, and consequently to technological upgrading and economic growth.

By mapping value chains, we understand systematic exploration and description of "the full range of activities that firms engage in to bring a product from its conception to its end use and beyond. This includes design, production, marketing, distribution and support to the final consumer" (Brennan and Rakhmatullin, 2015). A similar exercise can be undertaken with food supply chains. According to the OECD (2015), the term food supply chain refers to

"the system encompassing all the activities, organisations, actors, technology, information, resources and services involved in producing agricultural products for consumer markets. It covers agricultural upstream and downstream sectors from the supply of agricultural inputs (such as seeds, fertilisers, feeds, medicines, or equipment), to production, post-harvest handling, processing, transportation, marketing and distribution".

This definition embraces the presence along the supply chain of many interlinked stakeholders and actors such as input suppliers, producers, and processors, trading companies and retailers. Moreover, technical, business and financial service providers can be included at the downstream stages of the supply chain as well as the Ho.Re.Ca (Hotels, Restaurants and Catering Services) sector.

4.2 Agro-food as a smart specialisation priority

According to the Eye@RIS3 database, agro-food related priorities are one of the most prominent priority areas selected by EU countries and regions, along with Key Enabling Technologies (KETs), health, energy and the digital agenda.¹⁵ It is worth pointing out that three in four regions selected a agro-food related priority and one in five priorities reported by countries and regions focus on agro-food and technologies.

Agro-food is probably one of the most transversal domains intercepting, among others, the areas of technologies, tourism, health and wellbeing, services, sustainable innovation, cultural and creative industries and obviously, bio-economy and agriculture. Analysis of agro-food priority areas encoded in Eye@RIS3 database based on the priority description showed that the most frequent priority is agro-food new technologies (23%) followed by agro-food and tourism (20%) and food with higher added value (13%) (table 4).

Table 4: Agro-food related sub-areas of specialisation in EU-28, based on priority description

Rank	Agro-food related sub-area	Number of priorities (entries)
1	Agro-food (new) technologies (incl. KETs and application of ICT in the field of agriculture)	62
2	Agro-food and Tourism	54
3	(Food) products and Organic food and food with higher added-value (healthy food, quality of life)	36
4	Water for Environment and Agriculture (incl. aquaculture, fisheries and maritime)	32
5	Food production, manufacturing and distribution	19
6	Environmentally-friendly agro-food production	18
7	Food safety and security	11
8	Research and Education in Food/Agriculture	2
9	Transport and logistics	2
*	<i>(Generic) Agriculture as industry (agro-food)</i>	36
	Total	272

Source: authors

The "Agro-food new technologies" priority has been identified in 53 countries and regions, of which nine are EU-13 countries and regions (countries that jointed the EU after 2004) and 44 other countries and regions. The "Agro-food and tourism" priority was selected by 49 countries and regions: three EU-13 countries and regions and 46 other countries and regions. And finally, "food with higher added value" priority was selected by 34 countries and regions: four EU-13 countries and regions and 30 other countries and regions.

The most frequent key words used by the countries and regions to describe "agro-food new technologies" specialisation are biotechnology, (food) technology, KETs and ICT. Related technologies that appear in the description are: KETs, ICT, digital services, chemistry, energy, biofuels, engineering, health and life sciences, bio-medicine and pharmacy. Looking at data entered in Eye@RIS3 under the category of EU priorities, the

¹⁵ Eye@RIS3 database is an open access database managed by the S3 Platform. The database contains information on S3 priorities selected by EU countries and regions. As of 1st December 2015, 25 countries and 178 regions encoded their priorities. The database is available at S3 Platform webpage: <http://s3platform.jrc.ec.europa.eu/map>

most frequent priority is KETs (27 entries) followed by sustainable innovation (13 entries), public health and security (10 entries) and Digital Agenda (7 entries). The most prominent KETs sub-category is "industrial biotechnology" with 25 entries. Industrial biotechnology was identified by 24 regions and countries of which three are EU-13 countries. With regards to region/country capability, the most frequent areas are: manufacturing and industry (35 entries), followed by agriculture, forestry and fishing (12 entries), energy production and distribution (5 entries) and ICT (5 entries).

Priority "agro-food and tourism" is the second most prominent agro-food-related sub-area priority. The most frequent key words used by the regions to describe this specialisation are: (sustainable) tourism, eco-tourism, experience-based industry, and health and wellness tourism.

Finally, the occurrence of priorities such as organic food and farming, food with higher added value and food products is frequent in EU countries and regions. The most frequent key words used by the regions to describe "food with higher added value" priority area are: health, healthy (organic) food, nutrition, life sciences, etc. From other data entered in Eye@RIS3 under the categories of EU priorities of target market, it is clear that there is a close link with human health and security. Regions will thus focus on high quality food products, healthy food and organic food to improve quality of people's lives.

5. Examples of food smart specialisation in Croatia, Ireland and Lazio

The following cases have been developed from presentations and discussions at the S3 Platform workshop that took place on 22nd September 2015 at EXPO Milan. During the workshop, the national (Croatia and Ireland) and regional (Lazio) representatives presented their agro-food smart specialisation domains. They specifically illustrated why they had chosen food as a priority, how they intended to implement the priority and what results, as well as impact, they expected. The presentations focused on the various approaches that have been taken by national and regional authorities with regards to:

- Entrepreneurial discovery process – how and why agro-food was selected as one of the smart specialisation areas? Who are the relevant stakeholders in the country/region? What is special about this specialisation? Is it a cross-sectoral activity or niche activity?
- Past, current, future R&I activities in agro-food, gastronomy, bio-economy, food tourism, etc. to enhance national and regional growth and employment.
- Implementation of S3 strategy including processes, tools, project calls and selection criteria, etc.
- Trans-regional and international collaborations within this smart specialisation area – experience, projects, partners and future activities.

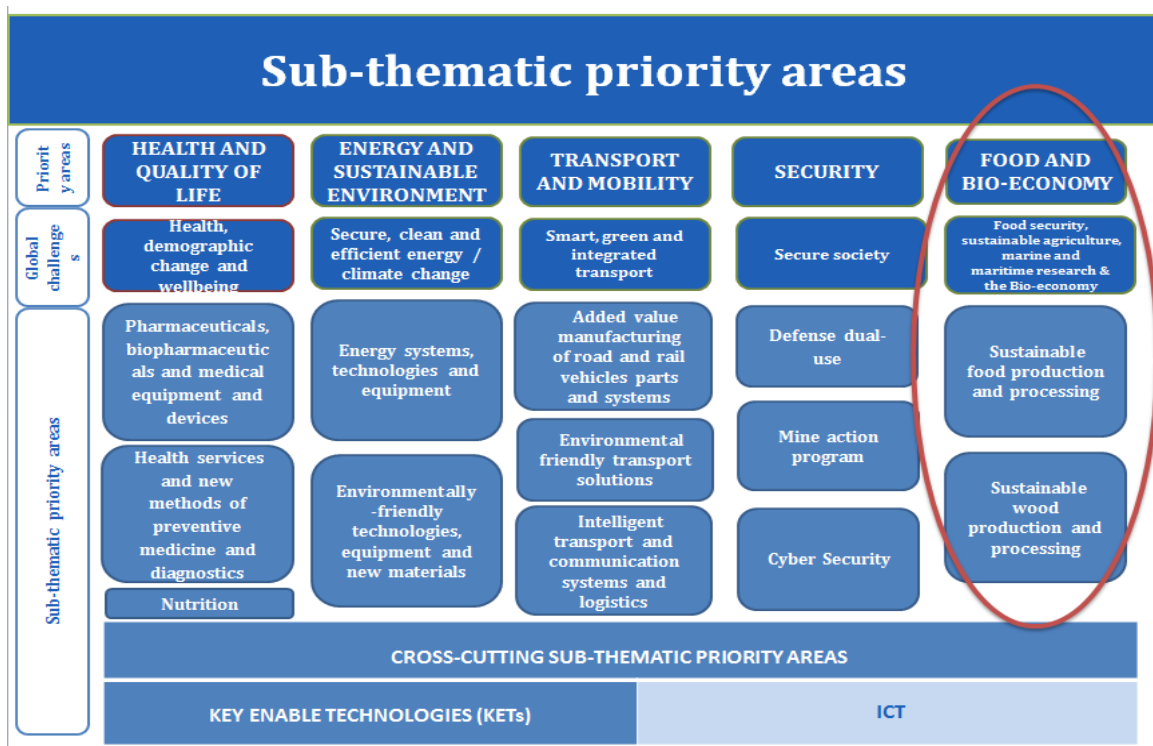
In addition, national and regional representatives presented some of the difficulties they were facing and which needed to be overcome, including:

- collaboration among stakeholders in agro-food GVCs,
- collaboration between industry and academia,
- incentives for SMEs to invest in R&D,
- funding mix,
- investment priorities,
- local branding strategies,
- public support to innovation processes,
- added value of food products,
- KETs in agro-food.

5.1 Croatia

Food and bio-economy is one of Croatia's S3 priorities, together with health and quality of life, energy, transport and security (figure 1). The food and bio-economy priority is linked to other priorities, mainly to nutrition which is a sub-thematic area of the health and quality of life priority. Croatia has identified new areas of potential development that sit at the cross-section between food and health priorities: natural health products (nutraceuticals), functional food and enriched products, and dietary supplements.

Figure 1: S3 priorities and sub-priorities in Croatia



Source: Croatia's presentation

The selection of the above mentioned priorities is an outcome of analytical work and the entrepreneurial discovery process (EDP). Specifically, a number of analyses were conducted: cluster analysis, sectoral and cross-sectoral analysis, analysis of data at firm level, and analysis of KETs and RDI sectors. Also, evaluation of country competitiveness potential and capacities was carried out and combined with partnership consultations and meetings with stakeholders representing R&D sectors, the business sector, public sector and NGOs.

Croatia's strategic goal in agro-food is to "reinforce innovation, extend current RDI infrastructure and raise competitiveness across the bio-economy value chain". Croatia has thus allocated resources on the supply side, focusing on building and reinforcing the infrastructure. In this regard, it was reminded that building infrastructure without considering the demand side and needs of entrepreneurs can be damaging for the national economy and innovation system. Entrepreneurs have shown little interest in acquiring and using new infrastructure for reasons such as insufficient technical, strategic, economic, business, geographical, security and other dispositions. As it is difficult for public administrations to foresee all the requirements and needs of final users, it is crucial to involve the demand side in both the preparation and implementation of investment projects.

Also, the question of trans-regional and international cooperation in agro-food is essential in order to enhance RDI potential, capacities and competitiveness. Croatia supports national companies and institutions to take part in a number of EU agro-food programmes, including Horizon 2020, COSME, European Technology Platform Food for Life, European Territorial Cooperation, etc.

5.2 Ireland

In Ireland, food is an inherent part of the culture and national destiny, and as such, it has a connecting power bringing people, communities and businesses together. Food is the biggest indigenous industry, an important employer across the chain that enjoys high reputation owing to natural, sustainable, green production systems. Food also plays

a big role in the socio-economic life of rural and coastal communities, and is linked to other sectors including health, energy, tourism, pharma, etc. The food industry is clustered broadly around dairy, meat (beef), seafood, alcoholic beverages, horticulture, and artisan foods (e.g. farmhouse cheeses).

Two of 14 priority research investment areas arose from an independent National Research Prioritisation Exercise related to food: "Sustainable Food Production & Processing (SFPP)" and "Food for Health (F4H)". These priorities have been selected by High Level Group of independent experts with an input from ministries, agencies and stakeholders including farmers, food processors, environmental NGOs, clinicians (doctors, nutritionists, veterinarians, etc.), academics, policy-makers, regulators, consumers, and other professional organisations.

In terms of international cooperation, Ireland participates in JPIs that are oriented on RDI in agro-food (FACCE & HDHL) and primary production-oriented Eranets (Agri-ICT, RurAgri & two new Cofund Eranets – EraGas & Sust. Livestock). Ireland has also developed a number of partnerships with the UK (UK-Ireland Food Business Innovation Initiative) and USA (US-Ireland R&D Partnership). In addition, Irish research organisations have put in place bi-lateral and multi-lateral cooperation partnerships with counterpart institutes in other countries, especially the EU, United States of America and New Zealand.

Mapping of value chains in agro-food has been carried out through mapping of activities of JPIs, the Standing Committee on Agricultural Research (SCAR), relevant Eranets, Bioeconomy Panel & Global Research (GRA) Alliance on Agri greenhouse gases (GHGs). It was found that value chains are strongly vertically integrated, and the strongest globally connected value chains exist in meat and dairy (e.g. Infant Formula). Less integration and strength was noticed on high value, non-food bio-economy elements although there is increasing focus on waste and by-product valorisation.

5.3 Lazio

A strong relationship between food and local territory is an expression of tradition and culture in the Italian region of Lazio. Food is functional and complementary to tourism, cultural activities and health that are essential economic activities in the region. The potential for cross-fertilisation with Key Enabling Technologies (ICT, nanotech, new materials, biotechnology, etc.), life science, environment and the green economy has been identified as crucial for innovation and technology advancement.

Agro-food has been identified as a smart specialisation priority through an entrepreneurial discovery process carried out in focus groups involving representatives of the business community, business associations, research institutions and local universities. The entrepreneurial discovery process was complemented with the results of the regional eco-system analysis and fieldwork outcomes: Lazio Deli¹⁶ and The Call 4 Innovators@EXPO 2015¹⁷.

In the region of Lazio, there are approximately 3,400 agro-food enterprises that employ approximately 16,626 workers. The largest number (2,656 agricultural companies out of which 329 with direct sales) is concentrated in the capital city of the region – Rome. This

¹⁶ A project aims to qualify and categorise the range of products of regional excellence. Its specific objective is to promote fine foods and beverages originally from Lazio. The action, part of the Regional Guidelines for Internationalization, aims to qualify and classify some of the most important "niche" food products, also providing technical support and counselling to the participating companies.

¹⁷ A pilot action aimed at involving the different local actors in the design, development and promotion of projects-products-ideas of business-research projects.

makes the city one of the largest agricultural municipalities in Europe. Agro-food sector in Lazio represents 5% of the national turnover per year and 3% of the total wealth of the entire regional economy. Export of food products accounts for €580m (3.3% of total manufacturing export).

The R&I system is also well supported by a large number of academic and research institutes, including the CRA (Council for Research and Experimentation in Agriculture), AINRAN (National Research Institute for Food and Nutrition) - now CRA-NUT - INEA (National Institute of Agricultural Economics), ARSIAL (Regional Agency for Development and Innovation of Agriculture of Lazio), ENEA (Italian National Agency for New Technologies, Energy and Development sustainable economic), CNR (National Research Council), IZSLT (Istituto Sperimentale Zooprofilattico Lazio and Tuscany), IAgri BIC Lazio (Incubator of food and agriculture).

Additionally, large logistical platforms that make the region significantly important for the commercialisation of agro-food products are crucial players in regional agro-food ecosystem and global value chains. The largest regional platforms are Agribusiness Centre of Rome (CAR), The Fruit and Vegetable Market in Fondi (MOF), The Fruit and Vegetable Market of Latina (MOL).

In terms of international collaboration, Lazio seeks to promote and position better quality products that are characteristic of the local culture and linked to local gastronomy in international markets. At the same time, the region seeks to intensify the exchange of know-how and technology transfer in the fields related to food processing and new challenges, including precision farming, plant production in challenging environments, packaging and preservation, certification and inspection, etc.

6. Policy recommendations

Some policy recommendations can be drawn from the workshop discussions. Five main topics are of significant importance: (a) Entrepreneurial Discovery Process and Community-led local development, (b) collaboration in agro-food value chains, (c) infrastructure building, (d) place-branding, and (e) knowledge dissemination and education.

- a) Entrepreneurial discovery processes, together with Community-led local development initiatives, facilitate participatory approaches aimed at discovering innovation and business opportunities. Particular attention should be paid to preparatory work, including training and awareness-raising among the stakeholders involved, specifically in the food supply chain.

The role of local actors including universities, SMEs, multi-national enterprises, research and technology organisations, science parks, etc. in smart specialisation is essential because these provide an adequate innovation ecosystem, support particular technologies, clusters and industries, and are involved in international networks. Experiential learning and co-creation can stimulate collaboration among local actors. In particular, the regional and trans-regional networks of SMEs can be enhanced and can consequently gain a sustainable competitive advantage by repositioning their offer. Similarly, universities are taking on co-creation functions, and can thus help to generate innovation and share tangible outputs by means of, for example, Public Private Partnerships.

Despite the progressive importance of Public Private Partnerships, regional representatives cannot depend only on the stated needs of SMEs to understand economic development paths. Thus, policy decisions must be informed by quality research especially on food consumption trends, market foresights and business opportunities for SMEs and integrated with the entrepreneurial discovery process.

- b) Collaboration across different stages of agro-food value chains that involve a number of partners located in different EU regions is constantly increasing. These collaborations are taking on various forms and intensity that must be investigated and mapped. At the same time, it is important to design governance models that will facilitate synergistic efforts and cooperative behaviour including R&D, farming, food manufacturing and production, transformation, processing, marketing and delivery.

It is crucial to explore niches in the agro-food sector that have the potential to generate new innovative products and services. These niches can emerge from the cross-fertilisation of traditional agro-food sectors and services, e.g. agriculture, food production and gastronomy with other sectors including tourism, hospitality, handcraft and education.

Public budget constraints resulted in a reduction of public spending in healthcare sectors. At the same time, countries and regions dealing with the issue of an ageing population must allocate more resources to the care of elderly citizens. This means that initiatives focused specifically on food and active ageing will be increasingly important in regional policy design. Therefore, incentivising healthy

and quality food approaches must be aligned with the adaptation of legal and administrative procedures. For example, the role of territorial partnerships and city food leaderships (city food councils) should be enhanced and good practice shared and disseminated.

- c) Building infrastructure without considering the demand side and needs of entrepreneurs can be damaging for the national economy and innovation system. As it is difficult for public administrations to foresee all the requirements and needs of the final user, it is crucial to involve the demand side in both the preparation and implementation of investment projects.
- d) Nowadays, place branding is a crucial strategy to be carefully planned and monitored by both national and regional governments. Although food, gastronomy and cuisine are being promoted worldwide with great effort and intensity, no "one size fits all" solution exists and effective stakeholder engagement activities are necessary to assess and identify shared values and visions.
- e) Educational activities related to sustainability, nutrition, food preparation and hospitality are needed to sustain effective development paths and facilitate community empowerment.

The concept of sustainability and its many nuances including economic, ecological, and intra- and inter-generational equity among others is becoming mainstream in the food sector. In order to disseminate knowledge and promote engagement in the food system, educational activities related to sustainability, nutrition, food preparation and community are needed. Furthermore, sustainability should be considered under every perspective in designing public tenders for public procurement: food literacy programmes represent a suitable option for different levels of public governance.

7. Conclusions

Over the last 10 years, both policy-makers and scholars have increasingly emphasised the role that Food and Gastronomy have in local economic development. Agricultural economists, geographers, and scholars in territorial marketing, regional development, sociology and social psychology, among others, have investigated the relevance of these topics. Some scholars focus on issues related to research and development in the food industry including innovation and commercialisation of local food products, while others explore linkages between food and social innovation, social inclusion and sustainability. Additionally, there are those who focus on the issues of place branding linked to culinary resources. From these studies, we can learn that no 'one size fits all' recipe exists and a mixture of approaches and tools must be applied at local level. In fact, planning innovation paths in food smart specialisation areas requires local policy-makers to possess perfect knowledge of the local territory, its resources, actors and strengths. The search for the best solutions requires wise policy approaches and stakeholder engagement.

The current programming period (2014-2020) of the European Structural and Investment Funds represents a promising context for the development of diversification paths. New actors are increasingly involved in emerging agro-food value chains and new opportunities for cross-sectoral and trans-regional collaborations are emerging. The objective of this paper was to outline some of these opportunities and propose a new research agenda for academic and policy discussions.

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doi:10.2791/284013

ISBN 978-92-79-56682-0

