SHERPA
Rural Science-Society-Policy Interfaces

SHERPA Discussion Paper

CHANGE IN PRODUCTION AND DIVERSIFICATION OF THE RURAL ECONOMY

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Sustainable Hub to Engage into Rural Policies with Actors (SHERPA) is a four-year project (2019-2023) with 17 partners funded by the Horizon 2020 programme. It aims to gather knowledge thatcontributes to the formulation of recommendations for future policies relevant to EU ruralareas, by creating a science-society-policy interface which provides a hub for knowledge andpolicy. Find out more on our website:

www.rural-interfaces.eu

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Summary

The green and digital transition is at the heart of the transformational change needed in European rural areas. This will require diversification and changes in production in the rural economy. The diversification of the rural economy has improved the resilience of rural communities, and will play a pivotal role in the post-COVID-19 pandemic recovery by offering new development opportunities.

The SHERPA process will support the gathering of evidence from across Europe, at multiple levels, regarding the diversification of the rural economy, showing the directions in which it is most appropriate and feasible to address local needs.

SHERPA Multi-Actor Platforms (MAPs) are invited to discuss three key questions:

1) What are the key needs for the development of the rural economy in your MAP, and how can they be addressed most effectively?

2) How can policy interventions support positive changes in the diversification of the rural economy, considering solutions that are needed at the local and national levels, and any implications for the wider policy framework (European Union level or others)? What can public administrations (at all levels) do to facilitate and encourage these changes?

3) What are the research needs and gaps?

The exercise will follow our standard process: (i) preparation of a Discussion Paper by each regional or national MAP, (ii) consultation with MAP participants, (iii) summary of the discussions in a MAP Position Paper, and (iv) synthesis of the regional and national MAP Position Papers for discussion at European Union level.

This draft SHERPA Discussion Paper provides a synthesis of research findings identified in recent research projects.

Introduction

In 2020, SHERPA Multi-Actor Platforms (MAPs) explored their visions and desired futures for their rural areas towards 2040, and the opportunities, challenges and enablers for achieving those visions. By engaging more than 1 100 individuals, from 17 countries across the European Union (EU), in visioning the future of their territories, the SHERPA MAPs made a strong call for mechanisms to ensure that rural matters are addressed in a coordinated and coherent manner in all areas of policy. The challenges and opportunities identified by the Multi-Actor Platforms cover a range of thematic domains, many of which are not tackled by traditional rural policies. Several such domains are within the responsibilities of government departments or public agencies that do not view their policies through a specifically 'rural lens'. These domains include the provision of basic services (e.g. education, health, and mobility), digitalisation, innovation and culture. In due course, they may be expanded to other sectors, which emerge as a consequence of the COVID-19 crisis[1].

This SHERPA Discussion Paper aims to stimulate the debate by presenting the key issues related to the process of diversification of the rural economy. It provides a compilation of knowledge around four key dimensions for rural diversification. Results from research projects have been identified with the help of a 'web crawler'[2] that has been developed for the SHERPA project.

This Discussion Paper focuses on fundamental issues reflected in local development, of particular interest to the SHERPA Multi-Actor Platforms community. These issues include entrepreneurship and the labour market, digitalisation and smart growth, as well as agricultural diversification and the response of rural communities to climate change. The Discussion Paper initiates a debate among MAPs' members on the future possibilities of rural development, and previous diversification of production and economic activities.

1 SHERPA Position Paper on 'Long-term vision for rural areas: contribution from SHERPA science-society-policy platforms', 12 February 2021, www.rural-interfaces.eu

2 The web crawler exercise resulted in the preparation of 3 databases:
List of most relevant projects: https://docs.google.com/spreadsheets/d/1btQyfbAzyPLI269FusYX6x1LV1_7eigCoW9JXG4tDN0/edit?usp=sharing
List of most relevant projects and outputs: https://docs.google.com/spreadsheets/d/13GlaI46MVJ8ouMVf2GEsUkEdozzq_KZCEdcBWXZf01o/edit?usp=sharing
List of the least relevant projects: https://docs.google.com/spreadsheets/d/1uD8Pilvzn614yVY8HLvaqyj21zLhu4Ut-ezWI1gOmjk/edit?usp=sharing

1. Dimensions of diversification

The green and digital transition, and the recovery after the COVID-19 pandemic, are the key challenges facing the EU and its rural areas. The pandemic highlighted the most vital needs of rural areas that should be tackled to support their green and digital transition potential. An important way to achieve the goals of the European Green Deal, and specifically the Farm to Fork and Biodiversity strategies, is diversification of the rural economy. It is crucial to transform the challenges of the green transition into development opportunities for rural communities, which would also increase the resilience of rural economy and thus of rural communities.

There are four key dimensions of rural diversification that require the attention of policy-makers, both in the short- and long-term:

- Entrepreneurship, employment & new business models
- Smartness and digitalisation
- Farm diversification
- Response to climate and bioeconomy development.

Employment is vital for people not only as a source of income but also of self-identification. The impossibility of finding a good job is a very important reason for migrating from rural areas and thus aggravates the rural problem of depopulation. Therefore, lack of jobs is a significant challenge for rural areas and their future prospects.

There are various drivers influencing the functioning of the labour market and, as a result, the potential of finding adequate employment in rural areas (RURALJOBS project). Also, the capacity – both of humans and institutions – to innovate and create new ways of governance is vital (ETUDE project).

The rural economy is faced with certain limitations and barriers related to the scale of the market and too few consumers and employees. Technological changes can help overcome these limitations, and the development of a circular bioeconomy offers new opportunities for rural businesses (BE-Rural, D2.4). Developing a circular bioeconomy can lead to rural industrialisation - "soft re-industrialisation" (RUBIZMO project). The growing demand for access to nature (H2020 RUBIZMO project) as well as food-related tourism offers another development opportunity for rural areas. Cultural heritage can also support regeneration of rural areas (Åberg *et al.*, 2020; H2020 RURITAGE), and intangible heritage (e.g. social practices, arts) as well as tangible heritage (e.g. built and natural heritage features) play a crucial role. However, the over-reliance on tourism and innovation can have a negative impact on the resilience of rural areas (Hennebry, 2019; H2020 RURACTION).

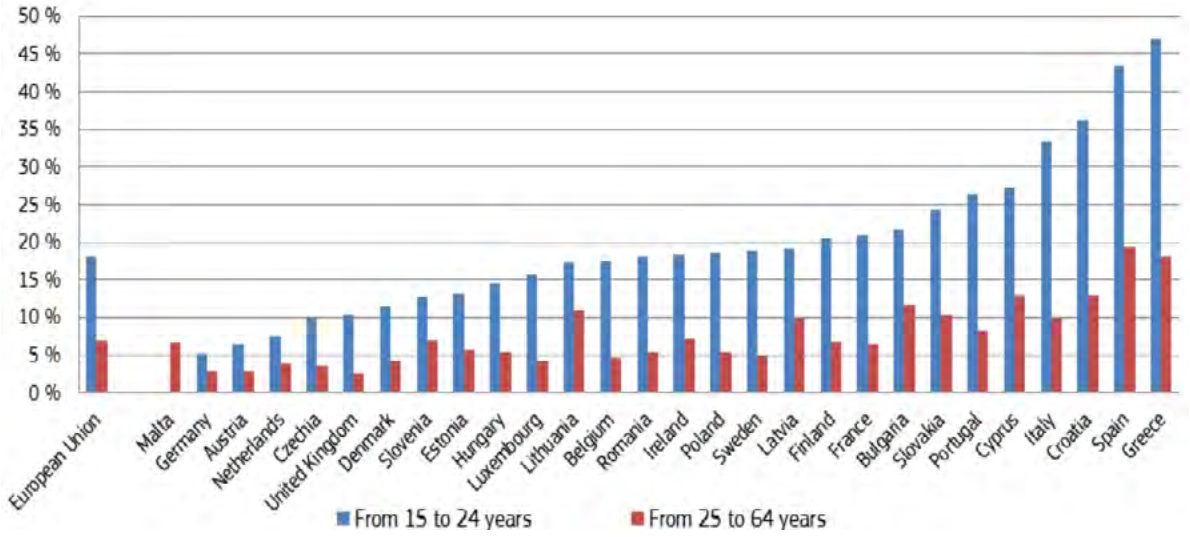
The concern for environmental footprint and the limitations of global production chains, as revealed during the pandemic, can result in the reversal of the trend for moving production to less developed countries, which can give another opportunity for diversifying rural economies in the EU.

Among its priorities, the Next Generation EU programme highlights the upskilling and reskilling of EU citizens as an important action for the economic and social recovery after COVID-19. This is an important issue for rural citizens who are faced with more limited options in the labour market due to the specificity of rural economies. The EU Recovery Fund also focuses on digitalisation, biodiversity protection and green transition, which are vital for rural economies

and generate new job opportunities. The support of the Recovery Fund to rural areas will depend on each Member State and the extent to which rural development issues are considered in their national Recovery Plans.

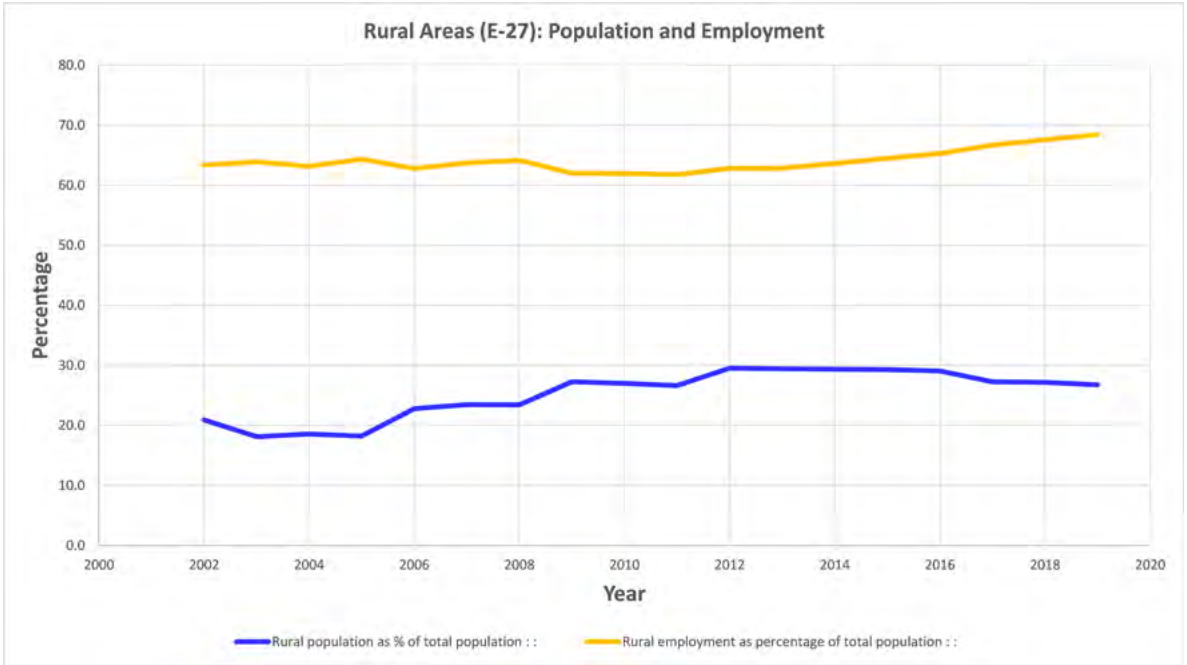
The labour situation in rural areas varies depending on both Member States and the localisation of rural areas (the level of their peripherality). Moreover, the role of agriculture in the labour market is different depending on the characteristics of the farming sector in a given Member State and region. During the period 2015-2017 the unemployment rate in the EU reached on average 9% of the active population (between 15 and 64 years old) (Fig. 1 and 2). Unemployment was much higher (18%) for young people (15-24 years old). The 2015-2017 average was close to 8.1% unemployment of the active population, and 18% for the young population.

Figure 1. Unemployment rate in EU-28 rural areas (average 2015-2017)



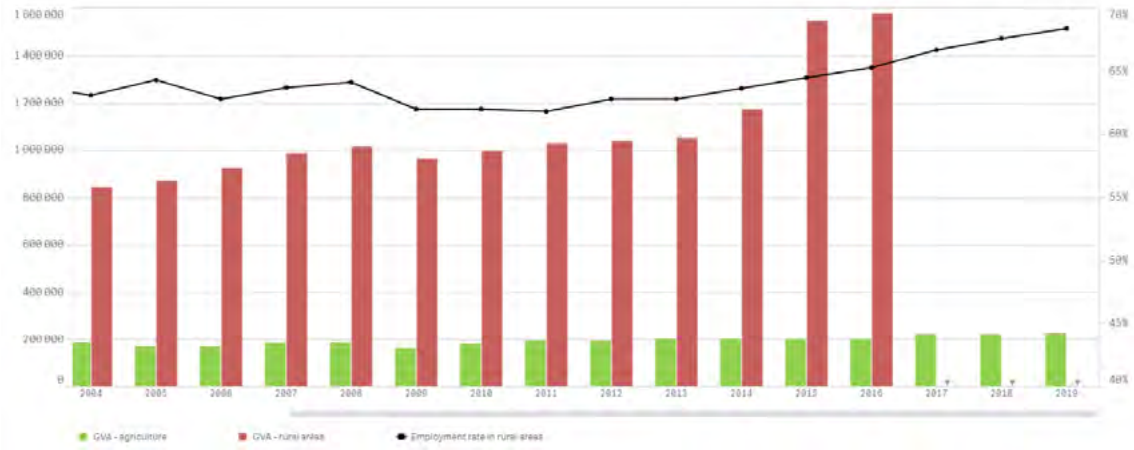
Source: DG AGRI, CAP SPECIFIC OBJECTIVES ...explained - Brief No 8

Figure 2. Change in total employment, and employment in rural areas as a proportion of total population, for EU-27, 2009 to 2019



Source: Eurostat

Figure 3. Gross Value Added (GVA) in rural areas and agriculture



Source: DG AGRI

Over the years, the rural economy has developed dynamically, increasingly determining the future prosperity of the population in these areas. New opportunities for the countryside mean that the level of development of the non-agricultural economy has been increasing dynamically in recent years (Fig. 3). Agriculture is an important component of rural systems, but economically it makes a stable, albeit limited contribution to value added in rural areas.

Digitalisation is a prerequisite for smartness and the development of rural areas, in line with the concept of Smart Villages. The data show that the internet has become increasingly accessible to rural residents over the past decade (Fig. 4). So far, there are significant differences among Member States. Moreover, as the pandemic has moved education, healthcare and other activities and services to the internet, many rural communities have observed the limitations of the quality of internet access. The divide between urban and rural areas remains large. While urban areas had a 91% household coverage in 2018, only an estimated 65% of rural households enjoyed access to broadband speeds of at least 30 Mbit/s in the same year (de Clercq *et al.,* 2020).

Figure 4. Percentage of rural households with internet access in 2011 and 2020*

*For France and Italy data for 2019
Source: Own elaboration based on Eurostat data.

The availability of internet access may not always be translated into active use. A good example of this is the percentage of individuals in rural areas who made an online purchase within the last 12 months (Table 1). The data shows significant differences among Member States – with northern countries having as many as 81% (like Denmark and Sweden) of individuals shopping online, while in southern countries the share is much lower than the EU average of 56% (in 2019) (like Bulgaria – 15% or Romania – 18%).

Digitalisation opens new business opportunities for rural areas, as it offers rural businesses access to wider markets than just those in the proximity. The same applies to suppliers. Moreover, online access to public administration reduces the administrative burden related with travelling to file, for example, building permissions or public support measures. Digitalisation can also increase accessibility to public services, such as healthcare.

Table 1. Percentage of individuals living in rural areas who made an online purchase within the last 12 months

Member State	2016	2017	2018	2019
Belgium	59	61	60	70
Bulgaria	8	10	13	15
Czechia	48	51	56	60
Denmark	78	75	82	81
Germany	72	74	74	79
Estonia	54	58	59	66
Ireland	54	47	55	61
Greece	23	24	28	30
Spain	36	42	45	52
France	65	65	67	69
Croatia	32	24	30	42
Italy	29	32	35	37
Cyprus	25	28	26	30
Latvia	42	40	39	40
Lithuania	26	31	38	41
Luxembourg	82	84	71	73
Hungary	35	34	35	43
Malta	39	58	57	55
Netherlands	70	79	78	79
Austria	54	59	58	59
Poland	35	40	41	48
Portugal	24	27	29	30
Romania	8	10	14	18
Slovenia	37	45	47	51
Slovakia	54	55	53	56
Finland	60	61	63	67
Sweden	71	79	75	81

Source: Own elaboration based on Eurostat data.

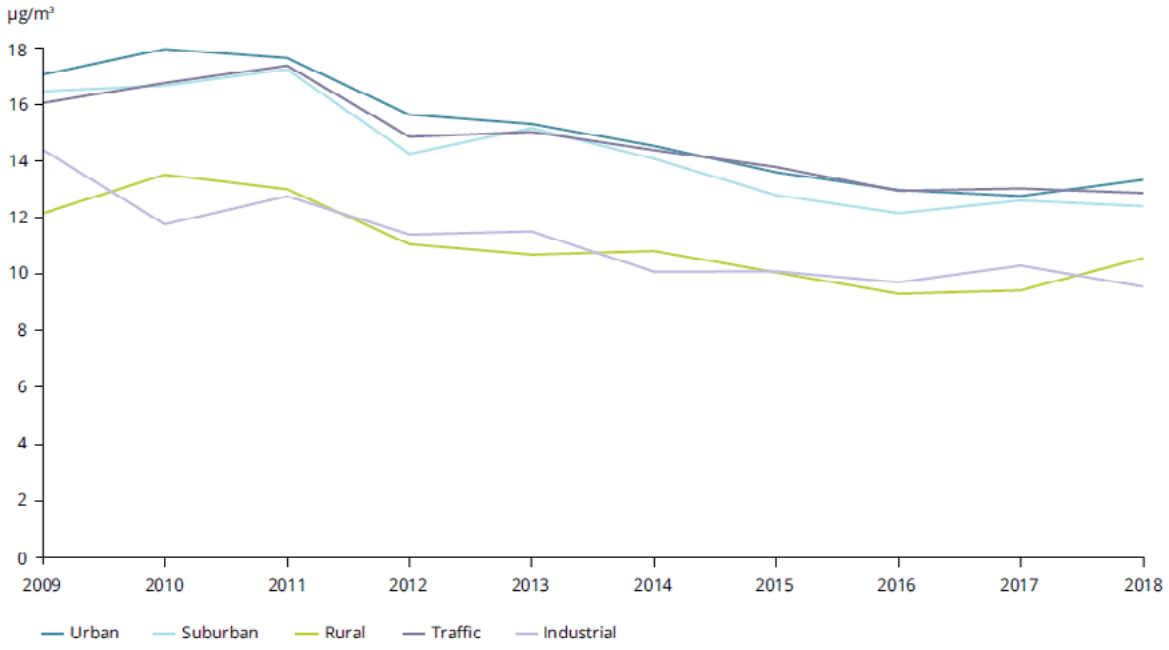
Smart Villages and smart business models must be adapted to local context and the specific characteristics of rural areas. Smart Villages rely on bottom-up action for the development of rural areas, and digital transformation is often at the core of the implementation of this approach. In addition, the Smart Villages approach supports community-led innovations (both social and digital innovation) that in turn support the green transition, in areas such as[3]:

- Supply of clean, reliable and affordable energy
- Protection of biodiversity and ecosystems
- Production of environmentally-friendly and healthy food
- Development of environmentally-sustainable public transport systems.

The operationalisation of Smart Villages, similarly as in the case of smart specialisation (Balland *et al.*, 2019), has been limited due to lack of holistic support for implementing this complex approach to development.

Farm diversification is also an opportunity for increasing farm resilience, which is vital to reduce vulnerability related to market fluctuations and climate change. An important way of diversifying is linked to increasing the added value of production and shortening supply chains, including direct selling. Moreover, changes in food policy, strategies for making eating habits healthier and more environmentally-friendly, can help farmers achieve new markets for fresh products not reached by mass manufacturers. This can also help develop food-oriented rural-urban linkages (ROBUST) or food strategies that give preference to local food sourcing (GLAMUR). Therefore, more environmentally-friendly farming practices, like agro-ecological farming systems (UNISECO), can offer higher profit margins.

Figure 5. Average PM2.5 annual mean concentrations by station type



Source: EEA (2020), Air quality in Europe — 2020 report, Figure 4.8.

3 See more information in the ENRD Smart Villages portal: https://enrd.ec.europa.eu/smart-and-competitive-rural-areas/smart-villages/smart-villages-portal_en

The share of farms with diversified sources of income differs in different parts of the EU. Still, in all Member States it can be increased. In 2013, 5.2% of all EU farms were diversified. The situation is deeply contrasted across Member States: while this share is less than 5% in Italy, Poland, Malta, Spain, Greece, Bulgaria, Romania, Cyprus and Lithuania, it reaches 52% in Denmark, 37.3% in Austria, 33.8% in Sweden, 31% in Germany, and 26% in Finland" (European Parliament, 2016).

Rural areas need support to realise the green transition. Apart from all the environmental services that can be offered by rural areas, there are important challenges that need to be tackled. There is still not sufficient infrastructure related to water management systems, for example, and there is also the problems of air pollution and greenhouse gas emissions, especially stemming from energy use by rural households and livestock rearing (methane emissions) (Fig. 5). Therefore, smog is still an issue in rural areas, especially in valleys where air circulation is limited.

2. Entrepreneurship, employment & new business models

Changes in labour market conditions, employment and entrepreneurship are the basic determinants of the level of development of rural areas. Several basic factors shaping the situation of the rural population, as well as their position on the labour market, can be identified (RESAS study output 3.4.1; Copus, 2017):

- Technological development
- Environment and climate change
- Demographic change
- Globalisation and emerging markets
- Political changes.

Rapid advances in digital and other technologies since the turn of the century have in many cases resulted in transformative changes to existing ways of working in rural areas. However, the reach and impact of these technologies in rural areas has been very uneven across Europe. Rural smartness, linked to the need for transformative approaches to the formation of modern businesses as well as services, is one of the fundamental drivers of change, as we discuss in more detail in the next section (LIVERUR).

Environmental pressures are having an increasingly significant impact on many rural activities, which depend on natural resources and climate for their modes and forms of functioning (UNISECO). At the same time, rural areas play a key role in responding to European and global environmental challenges. They can help provide important answers to societal issues such as: securing future food production, mitigating climate change, reversing habitat and biodiversity loss, sustainable management of natural resources, improving water, air and soil quality, and producing renewable energy.

A number of interrelated processes of demographic change are transforming the population structure in many rural areas. This constitutes a fundamental challenge for the labour market and for diversification processes. Population ageing, migration between rural and urban areas, and migration between countries are major factors that have very different impacts in different places. In many rural areas there is significant population ageing as a result of both internal migration of younger generations and longer life expectancy of older people, as evidenced by positive reports of healthier lives (RURITAGE).

As a result of the globalisation of commodity markets, many primary producers are exposed to volatile commodity prices on a global scale. This can threaten the viability of their business at a time of growing concern about the security of future food supplies. Value chains are also becoming increasingly complex and globalised. This may motivate the search for cheaper suppliers and new market opportunities, but also leads to greater competition. A shift towards local products and shorter supply chains was catalysed by the COVID-19 pandemic and disruptions in logistic processes caused by closed borders. However, it is hard to predict whether this trend will continue after the end of the pandemic.

Institutional changes are also important, especially in the creation and implementation of public policy instruments, both nationally and locally. In many cases, the presence or absence of a clear prioritisation in rural areas can determine whether policies and programmes are really effective in reaching rural areas or whether they are focused on urban centres. This is important, for example, in the use of business support programmes, regional development funding and the deployment of broadband infrastructure (LIAISON).

Specific areas of digital opportunity for rural areas include digital access to markets, digital services and digital marketing. In the context of agriculture, digital technologies can contribute to improved productivity and efficient use of resources through techniques such as precision farming. Rural connectivity can also reduce the administrative burden of implementing the Common Agricultural Policy, for example, through remote sensing and rapid, real-time communication.

Rural communities dominated by commuters or retirees can offer market opportunities in a 'community-driven economy'. In this economy, wealth coming into the areas in the form of income or pensions is an important factor. The community-led economy is largely dominated by services, so economic opportunities will be hugely determined by the preferences and needs of residents. Typically, demand for local shops and services will arise.

A particular form of economy aimed at meeting local community needs is the 'silver economy' (Dwyer, 2019), where the rural economy benefits from a significant number of relatively affluent older people living in the area or moving to the area after retirement. This can lead to a distinctive demand for leisure, domestic and care services ranging from specially adapted buildings to golf courses, and from gardening services to health care.

Social enterprises play an important role in the local economy. Social enterprises are a social innovation in themselves, which challenge traditional boundaries between social initiatives and commercial ventures. As with all new ideas throughout history, the challenge now is to inform, raise awareness and support the development of the sector; to develop societies and communities which are sustainable and beneficial to the many; and to co-create the types of communities we are proud to live in (RurInno).

Rural regions across Europe face a range of similar problems: out-migration of young and well-skilled people; lack of local opportunities for skilled employment; limited possibilities for higher education; dispersed pockets of rural poverty; the exclusion of particular social groups; and sparse provision of public and private services such as public transport and community shops and services. However, at the same time, these challenges are an important source of motivation for social entrepreneurial activities. Rural regions not only provide opportunities for fostering social innovation and change, but often act as a backdrop for engaged local people, as well as offering available venues that provide physical and metaphorical space for trying out novel solutions, without the immediate pressures of commercial viability.

3. Smart rurality, smart communities and digitalisation

The concepts of 'Smart Villages' and 'smart rurality' have gained increasing attention on the European rural development and policy agenda in recent years. Although there is no clear-cut definition of these concepts, a number of distinguishing features can be emphasised.

The Smart Villages concept is founded on two core elements, namely the involvement of local communities and the use of digital tools (Juan and McEldowney, 2021). Central to the first key element is the participation of local people in improving their economic, social or environmental conditions, cooperation with other communities and social innovation. The second key element concerns the use of digital technologies in many aspects of living and working in rural areas, including the adoption of smart solutions in both the public and private sectors in various policy fields to improve access to services, improve food supply chains and develop renewable energy sources.

The emergence of the smart rurality concept is a response to a multitude of challenges that rural areas are confronted with, including a weak labour market and poorly diversified economy, inadequate infrastructure and service provision, low incomes and a risk of social exclusion, and a lack of educational facilities (Juan and McEldowney, 2021). Another major challenge is the digital divide between rural and urban areas. Here social and digital innovation in rural areas, including broadband development, training and the empowerment of local communities, are considered to be central for overcoming this digital divide and to enhance the potential offered by connectivity and digitalisation in rural areas (EU Action for Smart Villages, 2019).

Many European, national and regional actors are developing and implementing policy initiatives connected to the notion of smart rurality. Among the key initiatives at the European level are:

- the EU Action for Smart Villages,
- the Bled Declaration for a 'Smarter Future of the Rural Areas in EU',
- the declaration on A smart and sustainable digital future for European agriculture and rural areas, and
- the Smart Eco Social Villages pilot project.

An example of an intra-regional initiative is the Smart Islands Initiative (Smart Villages Portal, n.d.), which is a bottom-up effort of European island authorities and communities seeking to communicate the potential of islands as laboratories for technological, social, environmental, economic and political innovation. In addition, several European Member States have adopted strategies for promoting smart solutions in rural areas, including Austria, France, Finland, Germany and Spain (Smart Villages Portal, n.d.).

It has been emphasised that smart rural strategies need to adopt an integrated approach connecting different policy fields. They also need to be embedded in the wider development strategies for regions and territories, including strengthened links between rural and urban areas (EU Action for Smart Villages, 2019). Central here is that strategies are based on local strengths and assets. A Smart Villages strategy should aim to channel the resources of its community to deal with key problems faced within their local context (Smart eco-social villages, 2019). Agrarian and spatial structure should also be taken into consideration when developing smart rural strategies (Bielska *et al.*, 2021).

Smart rurality is closely related with the concept of smart specialisation, based on a theoretical background that should shape the thinking on smart rurality supporting policies. This theoretical background includes the following paradigms:

1. Smart specialisation rests on an organic conceptual paradigm, according to which innovation happens when the overall "ecosystem" is innovation-supportive;

2. Smart specialisation must encompass the concept of social innovation as a major driver for equitable growth and development;

3. Smart specialisations should be spatially identifiable at an appropriate level of granularity.

Smart specialisations "build on the concept of cross-fertilisation across different sectors rather than on an individual sector" (MAPS-LED, 2019).

Smart rurality cannot be achieved separately from the links with urban areas and urban communities (Matern *et al.*, 2020). To succeed, a smart rurality must be part of a smart region. The links between urban and rural areas must be reinforced so they benefit from their different strengths and specific development opportunities. Different policies must also ensure that rural areas are not left behind in the 4th industrial revolution (Cowie *et al.*, 2020), as this can deepen the gap between rural and urban areas.

The concept of smart rurality is challenging when faced with its actual implementation in a given rural surrounding. Yet, there are already several pieces of advice that can support a successful implementation of this concept. These recommendations include:

1. **Build on experience, on the basis of existing forms of collaboration**, often long-term and successful, for example related to rural revival or the LEADER approach. The concept should not be allowed to become bureaucratised.

2. **Start from one village, but build partnerships**. Smart Villages projects have to respond to the needs of local communities, even if they are in small localities. Advisory support in finding funds should be obtained from units specialising in consulting.

3. **Account for the digital backwardness of rural areas**. Although Smart Villages, unlike smart cities, are not based solely on new technologies, rural residents' basic access to a (fast and stable) internet network is crucial for local development. Appropriate competences are also important.

4. **Appreciate people's activity**. The Smart Villages approach should not be planned without the involvement of local leaders, local government, NGOs and other stakeholders. Existing resources should be utilised, such as active village heads and other local leaders.

5. **Reward active attitudes**. To promote the Smart Villages concept, it is worth showing rural communities the potential benefits of its implementation, for example with the help of identified, existing examples of smart solutions.

6. **Make sure the Smart Villages concept helps small farms**. Agriculture is a large area for developing this concept, as it uses advanced new technologies more and more often. Together with stimulating cooperation among farmers, this creates opportunities for the development of this sector of the economy, even in places where farming is fragmented and seemingly in decline.

7. **Involve the consulting sector in supporting smart ideas in local communities**. New technologies should be used to develop consulting services, which should ultimately become innovation brokers (Komorowski and Stanny, 2020).

Government institutions and stakeholders at all levels are putting in place a wide range of strategies to improve digital infrastructure, increase digital usage, enhance digital skills and inclusion, and promote digital innovation in rural areas. However, to optimise the benefits, these initiatives need to engage with and prioritise the needs and concerns of rural communities and stakeholders themselves. Smart Villages strategies can help overcome the digital gap by recognising the different starting points of rural areas and villages and co-designing digital pathways from the bottom-up while at the same time building bridges with the essential top-down strategies. Smart Villages addressing rural digitalisation embark on a journey which not only requires 'catching up' with more urbanised areas in terms of digital resources but also designing digital solutions from a rural perspective and carving out digital functions that the village can carry out to become a realistic player within a wider digital ecosystem (ENRD, 2020).

The potential of digital technologies to lead rural areas as well as the agriculture and forestry sectors to a desirable situation cannot be taken for granted, nor can the futures of these sectors be solely reliant on the processes of digitalisation. A well-conceived analysis of the concerns, threats, benefits and opportunities raised around the use of digital tools and technologies is absolutely necessary to achieve the desirable futures of rural areas through digitalisation. From a starting point that considers digitalisation as the means to an end rather than the end in itself, rural areas can create 'innovation environments' that stimulate researchers, developers, agricultural extensionists, farmers and other rural actors to identify, design and develop technological solutions that help them go in the desired direction (Brunori *et al.*, 2021).

The DESIRA project outlines a set of principles to guide digitalisation processes toward desired futures:

- Creating the basic conditions for digitalisation
- Anchoring digitalisation to sustainable development
- Adapting digitalisation to different contexts
- Favouring digital inclusion
- Developing digital ecosystems
- Developing adaptive governance models
- Designing policy tools for sustainable digitalisation.

The term 'Digital Game Changers' used in the DESIRA project is understood to mean digital or technological entities that create positive or negative disruption in agricultural, forestry and rural systems. When thinking about digital game changers, it is important to note that there is a close link between digital technologies - and tools using these technologies - and so-called application scenarios.

An application scenario can be defined as the context in which a given goal can be accomplished by using digital tools. The relevance of the different technologies depends on the specific scenario in which they are applied. In the DESIRA project, application scenarios have been built by grouping digital tools according to the function they serve. In the Synthesis Report on the Inventory and Taxonomy of Digital Game Changers[4] an overview is given of technologies which are considered as potentially game changing for agriculture, forestry and rural areas (see Table 2).

4 Bacco, M., Paolo, B., Brunori, G., Debruyne, L., Ferrari, A., Gotta, A., Koltsida, P., Lepore, F., Orsini, A., Rolandi, S., Scotti, I., Toli, E. (2020). Synthesis Report on the Taxonomy and Inventory of Digital Game Changers. http://desira2020.eu/wp-content/uploads/2020/11/D1.3-Taxonomy-inventory-Digital-Game-Changers.pdf

Table 2. Potentiality of game-changing digital technologies for DESIRA Rural Digitalisation Forum domains

Technology	Agriculture	Forestry	Rural areas/life
Social Media and social networks	Access to online services and connection with the market		Access to information, knowledge exchange
Websites and online platforms			
Cloud	Provision of remotely deployed services; better support to real-time sensitive scenarios	Provision of remotely deployed services	Provision of remotely deployed services to be accessed through web or mobile apps
Local and remote sensing (sensors), drones and/or satellite imagery	Advanced monitoring capabilities applied to crops and livestock to increase production, assess health status, and other	Advanced monitoring capabilities applied to trees to monitor physiological parameters, growth, and other	Wearables have a large potential in e-health scenarios; sensing can prevent and reduce the impact of natural hazards
Blockchain or other certification / traceability services	Traceability and smart contracts; insurances		Trust dependant services and applications (digital identity, education, health, insurance, energy)
Data and analytics (Big data)	Information from sensed data to support decision making		Supporting decision making at different levels in communities
Augmented reality/ virtual reality	Educational purposes; easily accessible visual information		
3D printing	Design and printing of custom parts and small equipment		Empowered local production
Artificial intelligence	Decision support and management system; planning and simulation		
Autonomous systems	Semi and fully autonomous systems for agricultural practices	Semi and fully autonomous systems for forestry (cutting, loading, harvesting, yarding)	Health (quality of life and independent living), mobility

Source: adapted from Bacco *et al.*, 2020[5]

5 Bacco, M., Paolo, B., Brunori, G., Debruyne, L., Ferrari, A., Gotta, A., Koltsida, P., Lepore, F., Orsini, A., Rolandi, S., Scotti, I., Toli, E. (2020). Synthesis Report on the Taxonomy and Inventory of Digital Game Changers.

4. Farm diversification and food chains

Diversification of rural economies, including farm diversification, is necessary for achieving the vision of vibrant rural areas with high biodiversity and good employment potential to integrate young people into the workforce. It is also a response to the challenges facing rural areas. Diversification is "a multi-level process which involves all actors operating in" a "value chain and its context" (DIVERFARMING, D6.1). The farm diversification "contributes to both the family sustainability and wider economy" (Jack *et al.*, 2020). To undergo just green transition rural areas, need to develop **renewable energy** systems and make their economies part of **circular economy** and **bioeconomy**, which bring new business opportunities (RUBIZMO, D.1.2). This requires several changes in different policy areas. "Successful developments require an integrated development approach which combines opportunities into a comprehensive development programme" (RUBIZMO, D.1.2). An important part of these changes is creation of entrepreneur-friendly conditions, including digitalisation and high-quality public services such as public transportation, educational services, and healthcare system.

The COVID-19 pandemic showed that diversification of activity is vital to resilience, an idea that had already been proposed (Stotten, 2020). Diversification versus specialisation has been identified as one of the top trends relating to agriculture (RURALIZATION, D.4.2), but it also relates to other sectors of the economy. Depending on the type of activity, different sectors benefited or suffered under the COVID-19 restrictions (example of Italian farms: Mastronardi *et al.*, 2020). Pandemic conditions showed how diversification provides the ability and agility to undergo rapid changes in marketing processes and other activities.

One of the possible and viable ways of farm and rural diversification are **traditional products** and traditional crafts. They, especially traditional food products, have been gaining in popularity both among consumers and experts promoting short food supply chains, multifunctional agriculture, and farm diversification. Traditional products and crafts are also a way to capitalise on the cultural heritage of a given rural area and thus redefine its development model (Stefan *et al.*, 2021).

Consumers have been more and more actively looking for food products manufactured outside of the global food industry, which has dominated food systems in recent decades. This trend has several socio-economic, environmental and health reasons. Traditional products are considered to be healthier, more sustainably produced and linked with the cultural heritage of local communities (Guerrero *et al.*, 2010).

Manufacturing traditional products can support farm incomes and become part of a risk management strategy for a farm. This potential has not been fully used in many regions (Florek and Gazda, 2021). Traditional products are also a way to increase attractiveness of an **agro-tourism** offer, which in a symbiosis with farming "contributes to the public awareness of the value of farming in general" (Stotten, 2020). When developed at a regional level and promoted at national level it can increase recognition of a region and increase its popularity as a tourist destination, especially for supporters of **eco-tourism** and food-tourism. Crafting traditional products is no longer a primary economic activity but a local innovation increasing business opportunities for other sectors, a good example of this is the production of artisanal cheese in Catalan Pyrenees (Fusté-Forné and Mundet i Cerdan, 2021).

Reviving manufacturing of traditional products is an important way of strengthening **local/ regional identity** and should be part of an educational process to raise awareness of the community of the traditions and cultural heritage they are obliged to preserve. They can also be part of diversifying rural economies and creating **agro-industries** and **on-site processing.** Creating value chains requires certain conditions to succeed. As analysed within the DIVERFARMING project, proximity, high quality and closes relations among different stakeholder are vital to development value chains (DIVERFARMING, D6.1). Developing relations with other members of a value chain must include both ends of this chain - downstream and upstream chain members (iSAGE, D2.5).

Short food supply chains and farm shops are part of being 'closer to nature' and increasing traceability of food products purchased and consumed, as well as a way of increasing profit margin (Grunert, 2017) and raising farm incomes and thus enhancing social equity. They as **local products** also have the "capacity to re-socialise or re-spatialise food" (Marsden *et al.*, 2000) by "creating new direct interactions and relations between producers and consumers that do not merely concern economic nature of market exchange" (Giampietri *et al.*, 2015) and build **community supported agriculture**. Short food supply chains can also encourage a transition to **organic farming** and other more environmentally-friendly practices, such as **agroecology, regenerative farming**, and **agro-forestry**. Thus, they support landscape care and the development of more **extensive production systems** and **high nature value farming**. It is worth mentioning that farm diversification in the form of nature conservation tends to show a significant positive spatial correlation, as neighbouring farms have a propensity to cooperate and exchange knowledge and experiences (Vroege *et al.*, 2020).

Short food supply chains can be more **sustainable** and decrease food waste. Crop diversification is a first step to more sustainable farming. "Mixed farms perform better than specialised farms, including organic, implying that a combination of crops and relatively extensive livestock can be more sustainable with regard to the provision of public goods than a specialised farm" (UNISECO, D.3.1). Crop diversification leads to "reducing the use of agrochemicals and resulting pollution, improving soil quality, reducing GHG emissions and improving the overall delivery of

ecosystem services. They are also said to reduce production costs and the risk of crop failure. Trials have found them to be both profitable and income-stabilising for farmers, smoothing labour demand and beneficial to the environment" (DIVERFARMING, D6.1).

The factors determining effectiveness of cooperation of farmers and other stakeholders in short food supply chains are still a subject of studies (Thurley, 2020). The research shows that the already more active stakeholders are more willing to cooperate than the less motivated people. Moreover, some stakeholders lack certain competences needed for successful functioning of short supply chains, like cooperation or creating innovative marketing solutions (Pitrová *et al.*, 2020). Policy and market nudges have to be explored to analyse the potential for further expansion of short supply chains as part of green growth and a just transition.

It must be emphasised that the diversification of farming and rural economic activities have their limitations. Especially, tourism development, although seen as a "smart chance" (Ciolac at al., 2020), tends not to live up to the expectations (Arru *et al.*, 2021), even if state support is offered (González and de los Ángeles Piñeiro Antelo, 2020), as it requires a certain scale that is dependent on prior investment. Moreover, it also must follow the sustainability approach to become part of the circular economy (Belliggiano *et al.*, 2020), which is needed for its long-term viability. Otherwise, negative effects and side effects of tourism can be counterproductive and make rural areas worse-off. This can relate to the issue of "the social reproduction of local communities and their specific forms of human-environment engagements" (Álvarez and Cortes-Vazquez, 2020).

The diversification of rural economies and new business opportunities can currently revolve around three issues (RUBIZMO, D.1.2):

- **Digitalisation** – utilisation of new information and communication technologies reduces relevance of space and distance;
- **Bioeconomy** – development of bioeconomy based on renewable resources creates potential for rural areas where these resources are located;
- **Ecosystem services** – protection of environment and touristic potential.

Although agroecology is only one of several approaches seen as promising solutions for tackling the challenges faced by the farming sector due to climate change, by lowering its negative externalities and increasing resilience, the principles of this approach offer opportunities and development paths also for other sectors of rural economies. These include: "recycling; input reduction; soil health; animal health; biodiversity; synergy; economic diversification; co-creation of knowledge; social values and diets; fairness; connectivity; land and natural resource governance; participation" (Wezel *et al.*, 2020).

Heterogeneity of rural areas means that the scale and actual possibilities for making use of these business opportunities differs widely. Natural values and cultural heritage particularly influence the development potential of rural areas, by basing their development on ecosystem services (Marcinkevičiūtė and Pranskūnienė, 2021). It is well documented that diversification of rural economies is based on resources already in place. A good example of this is a study of differences in diversification based on Rural Development Programme measures in Poland (Biczkowski *et al.*, 2021). The research showed that beneficiaries chose the type of new activity based on local resources, culture and tradition as well as farm size. The beneficiaries in the regions with deeply rooted agricultural traditions more often undertook agricultural related activities than beneficiaries in other regions. However, at the same time other studies show that "policy toward diversification in Poland favours areas of better developed agricultural structures" (Kiryluk-Dryjska and Wieckowska, 2020).

Some new solutions and innovations do not easily gain trust and popularity. Environmental and economic impact are especially of concern for farmers and other rural stakeholders. The conflicting views need to be taken into account and it is crucial to provide local communities with science-based facts (Ranacher *et al.*, 2021) so that the short-term potential gains do not endanger long-term resilience of these communities.

5. Bioeconomy and sustainable management of resources

The bioeconomy is a set of business activities related to the discovery, development, production and use of biological resources for the production of new products.

Technological advances continue to create new opportunities to add value to raw materials by exploiting the underlying biophysical properties of primary products. However, the path to the resource-intensive high-tech bioeconomy sector is very difficult and entry into this sector still involves high risks. The green economy encompasses a transition to low-carbon and resource-efficient economic activities, which can improve environmental sustainability while providing cost savings and market opportunities. Reducing resource consumption and capitalising on consumer preferences, which are increasingly for environmentally-friendly products and services - for example, in the form of eco-tourism or product identity elements - are two ways of turning environmental performance into higher returns. Investment in small or large-scale renewable energy infrastructure in rural areas also has economic potential in the context of the need to move away from fossil fuels and rising energy prices.

Increasing environmental and climate problems force the search for effective solutions in economic activity, including agriculture. Great importance in this respect is attached to the popularisation of appropriate production practices and techniques. The direction of development of European agriculture is particularly important for solving environmental and climate challenges.

Of the eight million species currently living on our planet, one million are threatened with extinction. Polluted and devastated forests and oceans are also a serious problem (European Commission 2019 after Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, 2019; International Resource Panel, 2019). Ongoing climate change and environmental issues (including pollution, depletion of natural resources and the decline of biodiversity) are forcing additional systemic international action, often based on new legal guidelines and pan-European standards. The European Environment Agency identifies several important areas where action is needed to make change possible. These areas include: a) strengthening policy delivery, integration and coherence; b) developing a more systemic, long-term policy framework and related objectives; c) leading international action towards sustainable development; d) promoting innovation through action in society; e) scaling up investment and reorienting finance; f) managing risks and ensuring socially just transitions; and g) linking knowledge to action (EEA, 2019).

In view of the deteriorating state of the natural environment in the European Union, including through the intensifying effects of climate change, in 2019 the European Commission prepared a

communication on the European Green Deal. This communication aimed to initiate international action to achieve economic goals with much stronger respect for pro-environmental and pro-climate practices (European Commission, 2019).

An important European Commission action for sustainable development in the Green Deal is the "Farm to Fork" strategy (European Commission, 2020), which aims to create a fair, healthy and environmentally-friendly food system. Food produced in Europe should be safe, nutritious and of high quality, and the way it is produced should be environmentally safe and climate neutral. The EU initiated a shift towards more sustainable production systems several decades ago, yet food production still results in environmental pollution and resource depletion, as well as biodiversity loss and climate change, according to the sector (DIVERSIFOOD, D4.6).

The bioeconomy covers many sectors and many stakeholders. Some stakeholders are local entrepreneurs or small-scale producers of raw materials. Other stakeholders may be industrial users of biomass. Diverse scientific and technological skills need to be brought together to make innovation and product development a reality.

Rural businesses and villages have discovered opportunities to deepen their cooperation in the area of new business models based on biotechnology, bioproducts and ecosystem services. At the same time, the importance of actions stimulating cooperation, creating short food supply chains and producing high value-added products is growing. Such an approach reinforces the importance of local purchasing of food and traditional processed products in an open market. The inclusion of local actors helps to ensure the sustainability of innovations. Once rural entrepreneurs realise their potential, they will seize the opportunities offered to them by the bioeconomy. This dynamic is a catalyst for innovation and stimulates actors at all levels to explore new opportunities for rural development.

The sustainability of the economic model is increasingly under discussion, including in rural areas. On an environmental level, the threats posed by climate change are leading us to question our dependence on energy sources that generate CO2 emissions. The linearity of our production and consumption systems leads to overexploitation of natural resources and loss of biodiversity. The pollution resulting from our economic activities has multiple impacts on the environment, as well as on citizens' well-being.

These new models, which may be based on new technologies, particularly digital technologies, are leading to a change in the relationship between producers, distributors and consumers, who are more often becoming 'prosumers'[6]. They are also leading to the questioning of some traditional notions, such as wage labour, providing more flexible forms of work and job sharing. Although they are referred to as 'new' models, they may in fact be a form of renewal of old practices.

It is also important to point to the activities of public institutions and policymakers in stimulating positive transformation of the rural economy. In this respect it is possible to point first of all to investment support instruments, but also to practices implemented by administrative units at national and regional/local level. Public procurement is recognised as an important instrument of innovation policy. Beyond bringing existing circular, low-carbon and other 'green' solutions to market today, it can stimulate markets, where government demand is significant. Sustainable public procurement has been introduced by at least 56 national governments and many more local governments, who have long understood how public procurement can improve sustainability, including through lowering greenhouse gas emissions (UNEP, 2015). It is by no means a universal practice, however, mainstreaming green purchasing requires the new approaches, including: (i) creation of national and local systems, (ii) the technical capacity of procuring officers and budget practices and (iii) better access to the system by SMEs and local producers. Better monitoring and evaluation would also help improve green procurement (OECD, 2016). It is an example of practices supported by public institutions working in partnership with the community and business, promoting the dissemination and scaling up of innovative 'green' business solutions, practices and community awareness.

6 Toffler (1980) defines prosumers as people who produce some of the goods and services entering their own consumption.

6. Conclusions

Changes in production and diversification of the rural economy is vital for the resilience of rural areas during the digital and green transition. There are several ways already explored by practitioners, researchers and policymakers leading to smart and sustainable changes in production and diversification of the rural economy, which support the strengthening of local communities and increase the attractiveness of rural areas as a place for living and conducting economic activities. However, with the development of new technologies, new solutions to the challenges faced by rural communities and new business models will need to be created in the coming years.

In this Discussion Paper, a state-of-art has been presented relating to the potential role in the green transition of entrepreneurship and the labour market, digitalisation and smart growth, as well as agricultural diversification and the response of rural communities to climate change. The opportunity to find a satisfactory job is a key issue for most people's settlement/ migration decisions, especially among young people. Therefore, the labour market situation and entrepreneurship support determine the potential of rural areas to stay vibrant.

New business opportunities have been emerging for rural areas and rural communities. They relate to digitalisation of the economy, green transition and development of bioeconomy and circular economy. Changes in rural economies are essential for the green transition (in the EU shaped by the European Green Deal and its elements – i.e. Farm to Fork and Biodiversity strategies) to succeed and contribute to climate change mitigation and adaptation as well as achieving the target of zero emissions. Moreover, without turning the rural economy into a green economy the long-term vision of vibrant rural areas and rural communities also cannot be accomplished.

These new development opportunities, like digitalisation, eco-tourism, agro-ecology, local products, Smart Villages, bioeconomy and circular economy, have been shown by numerous case studies as a chance for the EU rural areas. It has also been proven by the research studies that one-size-fit-all solutions do not work. Each EU rural community has its own specific natural endowment, historical and cultural heritage as well as economic and demographic situation, not to mention the level of peripherality, which determines access to public and private services. Therefore, application of changes in rural economies must be based on careful analysis of local needs and local potential. This can be done only when it is a bottom-up process engaging local communities. The role of the brokers and advisors becomes essential to connect the needs of the local actors with innovation centres.

This Discussion Paper provides a starting point for a lively debate on what changes the local community and local economy in each of the SHERPA Multi-Actor Platforms areas should undergo, based on their current situation, future trends and heritage. There is also the ambition that the Position Paper will include the recommendation for policy measures that could catalyse the welcomed transition of the local communities related to the MAPs.

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