DIGITISATION: ECONOMIC AND SOCIAL IMPACTS IN RURAL AREAS

D6.5 DESIGN AND IMPLEMENTATION OF THE RDF REPORT

MAY 2023

LETICIA ABARCA (AEIDL), SERAFÍN PAZOS (AEIDL)

DESIRA receives funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 818194.

D6.5 DESIGN AND IMPLEMENTATION OF THE RDF REPORT

Project name	**DESIRA | Digitisation: Economic and Social Impacts in Rural Areas**
Project ID	818194
H2020 Type of funding scheme	Research and Innovation Action (RIA)
H2020 Call ID & Topic	H2020-RUR-2018-2 / RUR-02-2018 Socio-economic impacts of digitisation of agriculture and rural areas
Website	www.desira2020.eu
Document Type	Deliverable
File Name	D6.5 Design and implementation of the RDF report
Status	Final
Authors	Leticia Abarca (AEIDL), Serafín Pazos (AEIDL)
Work Package Leader	AEIDL
Project Coordinator	UNIPI

Table of contents

1. Introduction 1

2. Description of the Rural Digitalisation Forum 1

3. Membership and methodological explanation 2

4. Activities 2

4.1. First RDF Meeting: 2

4.2. Second RDF Meeting. 6

4.3. Webinar: BOOSTING SUSTAINABLE DIGITALISATION IN AGRICULTURE, FORESTRY AND RURAL AREAS BY 2040 9

4.4. Third RDF Meeting: Policy workshop 12

4.5. Foresight exercise with JRC 15

4.6. Contribution to the Long-Term Vision for Rural Areas by the RDF working groups. 16

5. Online community: Facebook group and VRE communities. 17

5.1. Facebook group community. 17

5.2. VRE Communities 19

6. Challenges and successes 20

7. Conclusion 22

1. Introduction

This document describes the activities developed for the DESIRA Rural Digitisation Forum (RDF) for the 48 months of implementation of the project. This document aims to document the structure, the components, the activities of the RDF and its outcomes as set out in the Grant Agreement. This includes an overview of the activities developed, the stakeholder engagement, the objectives fulfilled and the achievement of the outcomes of the project.

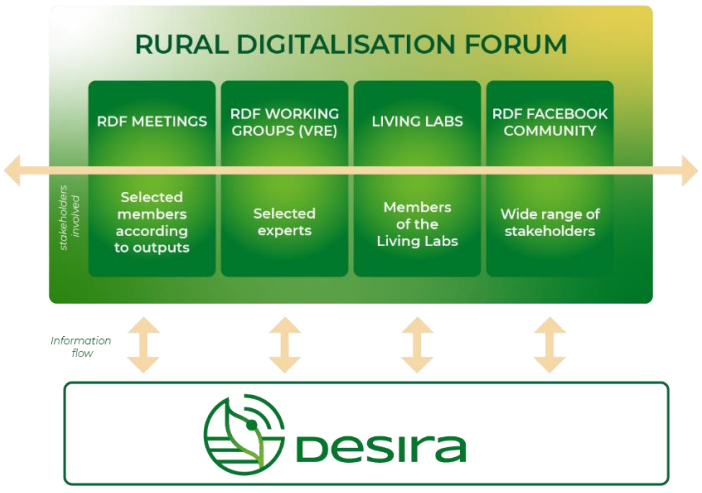
2. Description of the Rural Digitalisation Forum

The Rural Digitisation Forum (RDF) is a platform designed to engage stakeholders from across Europe in the research activities, development, and dissemination of DESIRA project outputs and products related to digitisation in rural areas. The RDF offered a space for stakeholders to participate and provide feedback on the project's findings, share experiences, ideas, and recommendations, and draw relevant conclusions that could be communicated across Europe.

To engage stakeholders, the RDF offered various platforms, including virtual and physical options, such as face-to-face meetings, webinars, working groups, and online platforms. The virtual platform was developed in the Virtual Research Environment (VRE), where stakeholders could form dedicated working groups, exchange ideas, and engage with experts both within and outside of DESIRA.

The RDF also offered a private DESIRA community on Facebook and a LinkedIn group where stakeholders could exchange content and ideas and provide feedback. Additionally, there were three RDF face-to-face meetings implemented by specific WP leaders, each with plenary sessions and working groups to maximize interaction.

The RDF aimed to engage stakeholders based on their individual interests. Therefore, stakeholders could choose between active or neutral participation, which allowed stakeholders to contribute to research activities or be informed about the project's outputs and relevant information about DESIRA, respectively.



3. Membership and methodological explanation

The RDF has been open to a wide range of stakeholders, including policy makers, public authorities, stakeholder organisations, researchers, advisors, local action groups, NGOs, enterprises, representatives of other H2020 projects, third-sector organisations, and representatives of the DESIRA Living Labs. The RDF validated methodologies, compared findings from different Living Labs, carried out an EU-level scenario exercise, and contributed to the development of policy recommendations. The participation on the RDF[1] events and activities as been as follows:

RDF Events	No of registered participants
First meeting	84
Second meeting	79
Webinar	134
Third meeting	132
Foresight	47
Facebook group	417
VRE thematic groups	85

4. Activities

4.1. First RDF Meeting:

The Rural Digitalisation Forum set up by DESIRA held its first meeting online on 10 September 2020.

The event gathered 84 attendees from different backgrounds (research, public authorities, SMEs, stakeholders' organisations, and members of National Rural Networks…) from 22 EU Member States (including one from Georgia).

In this first RDF meeting, participants:

- exchanged views about the results of the Pan-European assessment on the digitalisation of rural areas carried out by DESIRA.

[1] A general number of participants of the RDF cannot be provided, due to methodological limitations and in order to avoid double counting of recurring participants, numbers are offered only by RDF activity.

- got a common understanding of the key conceptual foundations of the project, namely digital transformation, digital game changers and socio-cyber-physical systems.
- discussed the practical implications of the mapping and taxonomy of digital technologies based on the analysis of about 600 digital tools and applications from across the EU.
- learned about the draft set of socio-economic and sustainability indicators for measuring the impacts of digitalisation in agriculture, forestry, and rural areas.

Participants from different backgrounds contributed with their views, experiences and perspectives to move forward in the development of some of the DESIRA outcomes, such as the Pan European Assessment on Digitalisation, the Conceptual and Analytical Framework, the Socio-Economic Sustainability Indicators, and the Taxonomy of digital technologies.

Following introductions by professor Gianluca Brunori, DESIRA coordinator and Enrique Nieto from AEIDL, a discussion on the state of digitalisation in Europe was led by Michael de Clerq, from Ghent University (BE). The preliminary results of the assessment on the state of digitalisation of rural areas show that:

- It is relevant to get the whole picture. However, with the available data, it is difficult to represent the image of digitisation at the regional level. The starting point of data availability is connectivity. Having the whole picture requires more time and finding paths to complete the data gaps.
- Broadband coverage by itself is not an inclusive solution for rural areas. There are many more elements that determine the path and the outcome of digitalisation. Broadband is the basis but the internal capacity of the community to add value to the available structure is fundamental.
- There are some cultural problems, and it is crucial to capture information about skills, human capital, and digital capacity. The digital divide is not just due to a lack of infrastructure. The cultural gap between different generations needs to narrow.

Lurissa den Dulk, Wageningen University (NL) led an exchange on **DESIRA's conceptual and analytical framework for the assessment of socio-economic impacts of Digitalisation, focusing on the implications for practitioners of** Digital transformation, Digital Game Changers and Socio-Cyber-Physical Systems (SCPS).

She underlined that it is necessary to unravel what is meant by digital transformation, which proceeds from digitisation to digitalisation, in agriculture, forestry and rural areas. A successful digital transformation requires a continuous process to co-design digital services and to respond to the needs of the territory.

The object of transformation is a Social-Cyber-Physical System (SCPS). Digital technologies are a key element in digital transformation, and some of the technologies that are embodied

into a SCPS are potential (digital) game-changers. In a SCPS, the different domains can overlap creating different degrees of complexity.

In DESIRA, the term Digital Game Changers is understood to mean digital or technological entities that create positive or negative disruption in the three domains of agriculture, forestry, and rural areas/life. She highlighted that any disruption in the system can make things go differently.

In the ensuing discussion, the following takeaways were collected:

- Disruptive technologies do not work the same in all applications and in one place or another. The uniqueness of the systems leads to different outcomes. There are differences in education, at a social and cultural level that must be considered. Then, it is vital to capture the diversity and to recognise that digital game changers can unfold differently for different farming systems.
- The CAF helps to understand aspects such as environmental impacts (intended or unintended). Also, it is important to note that information technologies are much more flexible than other technologies. Information technologies can be designed in many different directions. With the concept of SCPS, technological developers must consider systems that combine social aspects with technological aspects. One of the CAF's important messages is that technologies are not rigid; they can be shaped to better contribute to society in an intended way.
- The concepts presented are tangible and transparent, and the part of co-production is interesting. The decomposition of the system into components is considered useful to implement it.
- Usability should be part of the discussions of DESIRA Living Labs, as well as the prevention of intellectual divides. It is important to consider Responsible Innovation in the approach, taking into account aspects such as social inclusion. Living Labs will accommodate that flexibility in their work.
- During the last two decades there have been advances. Recently, the transformation has focused on education and training services in place. The emphasis has been on creating the local digital capacity to deliver national, regional, and local policies related to digital transformation. It is important to accompany the transformation processes with participation and having citizens involved in initiatives and processes.
- It is important to consider the digital capacity of people, the digital connection, but also community involvement in planning the future.

During the afternoon session, **Kirsten Gaber** (KIT-ITAS, Germany) explained the draft set of Socio- Economic & Sustainability Indicators (SESI) and sustainability areas for measuring the impacts of digitalisation on sustainable development and covering the three domains of DESIRA's project: agriculture, forestry, and rural areas.

The draft set of indicators has been designed based on the methodology called the

Integrative Concept of Sustainable Development (ICoS) and in coherence with the hypotheses and analytical questions of the Conceptual Analytical Framework (CAF).

Kirsten Gaber outlined the importance to work individually with each stakeholder and to know, per stakeholder, which are the most relevant indicators. Also, as the DESIRA project has 20 Living Lab, each of which will have around 15 stakeholders participating within them, the reduction to just 5 indicators identified per stakeholder will allow for a concise assessment. The results per LL will be analysed to understand which 5 indicators were indicated most often to be the most relevant, and these 5 will represent the LL and contribute to an overall set of indicators per domain.

Manlio Bacco (CNR, Italy) and **Silvia Rolandi** (UNIPI, Italy) presented the proposal for mapping and Taxonomy of digital technologies and their implications.

The objective is to support Living Labs in their work by providing a toolkit (under development) composed of an inventory of digital tools collected by DESIRA; the application scenarios; the understanding of the digital technologies in use by tools, and the qualitative evaluations of socioeconomic impacts of the digital technologies.

DESIRA is looking at different digital technologies that are used as digital tools in different application scenarios (under the three domains of the project agriculture, forestry, and rural areas). Once the digital technologies, and their application context, have been identified, a series of socio-economic impacts will be determined. The presenters reflected on the potential of digital technologies to change the game understanding them as Digital Game Changers (DGCs).

The inventory of digital tools has collected more than 600 digital tools of interest for agriculture, forestry, and rural areas through an online survey over the past months. It is a searchable inventory that includes the different domains, the understanding of the digital technologies used by digital tools and the qualitative assessment of socioeconomic impacts.

From the inventory, DESIRA has derived a map of application scenarios, meaning the technical context in which a digital tool is used, the involved actors, and the interactions among the actors and with the digital tool.

Manlio Bacco highlighted that some basic conditions are needed for digitalisation to occur - such as ICT infrastructures, connectivity, and networks – and enablers - such as digital skills and investments. If both are in place, digital technologies are potential digital game changers. Their joint use (integration) can amplify the effects.

He also explained that a key enabler of integration is the Cyber-Physical Systems (CPS) paradigm. DESIRA looks to CPSs as a conceptual model or reference framework, and it opens to the physical-digital-physical loop.

Finally, Silvia Rolandi described the identification of typologies and clusters of socio-

economics impacts in relation to the selected digital technologies identified as potential game changers.

Lastly, three Horizon 2020 projects related to digitalisation in rural areas were presented: SHERPA (Sustainable Hub to Engage into Rural Policies with Actors), SmartAgriHubs, and RURITAGE (Heritage for Rural Regeneration). DESIRA is seeking to create synergies with these projects to optimise the work developed in the field of digitalisation of agriculture, forestry, and rural areas.

All the presentations and briefings summarising the results of DESIRA are available at the event page.

Participant profile	No of registered participants
Researcher	43
SME	13
EU/National/Regional stakeholder	12
National Rural Network	2
Public Authority	12
Local Action Group	3
EU Institution	2
Advisor	2
Farmer	1
NGO	1
Total	84

4.2. Second RDF Meeting.

The second RDF meeting, held on December 7th, 2021, and February 8th, 2022, consisted of a foresight exercise conducted in two workshops. The exercise aimed to establish connections between the DESIRA Living Lab scenarios up to 2031 and the Long-Term Vision for rural areas in 2040. The exercise had three specific objectives:

1. To analyse the DESIRA scenarios considering the EU Long-Term Vision 2040.
2. To enhance the scenarios developed by DESIRA local stakeholders.
3. To develop a comprehensive EU-level vision on digital rural areas that complements the Long-Term Vision.

The activity was structured in two workshops, which took place on 7 December 2021 and 8 February 2022. Bringing together around 30 stakeholders from different backgrounds each session (research, public authorities, SMEs, stakeholders' organisations, members of National Rural Networks), the exercise was intended to create linkages between the 2031 scenarios developed by DESIRA Living Labs and the European Commission's long-term vision for rural areas. Building on the existing approach (stronger, connected, more resilient rural areas that foster well-being, and prosperous rural areas), DESIRA aimed to add a fifth element: the vision for digitalisation of rural areas.

On 7 December 2021, the first workshop of the EU RDF foresight exercise was held. The event featured presentations from highlevel speakers, who introduced the necessary context for the exercise. Around 30 experts from different backgrounds, spread across breakout rooms, discussed how digitalisation could affect the different areas of action that are part of the Long-Term Vision for rural Areas.

The second workshop of the RDF scenario planning exercise was held on 8 February 2022. The RDF experts came together to contribute to the work of DESIRA on the Scenario Planning, linking it to the long-term vision for rural areas. During the second half of 2021, 20 DESIRA Living Labs carried out scenario planning workshops, in which they developed plausible narratives of what the future could look like, by 2031 considering known drivers of change that have specific effects over time. DESIRA has synthesised this work in a report that compares the different scenarios by type of region, sector/subsector, and type of game-changer.

Several key proposals came from the experts gathered by these two RDF meetings on the issues of Governing digitalisation in rural areas:

- Balance the roles of governments and markets as drivers of digitalisation.
- Develop digital platforms that enable collaboration and cooperation of rural areas, knowledge exchange, peer-topeer learning and capacity building.
- Develop online platforms to support access to local food and sustainable products.
- Encourage strong cooperation with different types of stakeholders (telecom operators, local authorities, rural citizens, researchers).
- Introduce and enhance financial regulation and financial support for connectivity. Reinforce the role of extension services on technical and subsidies advice.
- Establish indicators to monitor impacts of digitalisation.
- Creating a conducive environment for sustainable digitalisation: Implement housing policies and social services to attract and retain people. Improve environmental standards, needed for agricultural production and environmental management.

- Empower municipalities, through skilled human resources, joining forces with other municipalities, getting technical support from higher levels, and promoting bottom-up decision-making.
- Enhance coordination and interoperability between different administrations.
- Adapt environmental regulation to acknowledge digital realities. Improve representation for rural populations at the political level.
- Foster the role of programmes such as LEADER to emphasise digitalisation opportunities.

Gianluca Brunori, coordinator of the project, summed up the lessons learned during these meetings.

Digitalisation will not automatically lead to a better future, so we need to identify a clear vision on how we want rural areas to be, and how digitalisation can support this vision. It is important to understand what contributes to a good quality of life in rural areas: social services, remote working, mobility, and connectedness.

Quality of life is linked to vibrant communities that have a sense of community and self-identity, healthy social relations, and institutional capacities. Sometimes it is also strongly linked to the quality of the environment.

Digitalisation can address everything: providing feedback and information concerning the state of the environment, improving the social capital by communication means, integrating services between local administrations, providing data to speed bureaucratic activities up, and robotisation to relieve people from hard manual work or as a solution to staff shortages in rural areas.

There is a need to stimulate the creativity and capacities of technology developers. Rural futures and solutions should be different from urban ones. The process should be driven by a bottom-up approach to create change.

National and international organisations could act as enablers of social innovation at the local level, and as connectors to link local initiatives together and to improve learning processes among them. This process must be steered, and local initiatives should be integrated. In this sense, visions have a strong influence on creating integration by leaving space for communication between organisations.

Participant profile	No of registered participants
Public authority/policy-maker	6
EIP Operational Group	1
EU institution	3
Research	29

EU/National/Regional stakeholder organisation	4
EU-funded projects	5
Local Action Group (LAG)	3
NGO	3
Business (agricultural, agri-food, forestry)	3
Business (diversified or non-agricultural businesses)	2
SME	5
Advisor/Innovation broker/intermediary	2
Farmer	1
Other	12
Total	79

4.3. Webinar: BOOSTING SUSTAINABLE DIGITALISATION IN AGRICULTURE, FORESTRY AND RURAL AREAS BY 2040

On 30 June 2021, the DESIRA Rural Digitalisation Forum (RDF) held a webinar to discuss the role of digitalisation in the European Commission's long-term vision for rural areas (LTVRA), and the policy support needed to ensure that digitalisation leads to the sustainable development of rural areas. With this EU initiative - developed through a participatory process with rural actors which included a public consultation, stakeholder-led events and an ENRD conference among others - the European Commission launches a holistic vision that proposes a new Rural Pact and a Rural Action Plan with several flagship initiatives to help rural communities and businesses reach their full potential by 2040. DESIRA contributed to this process by capitalising on the knowledge produced so far in the project, and gathering the views of experts of the DESIRA RDF on how digital technologies can contribute to build desirable futures for rural areas by 2040 (See more information here). The RDF also proposes seven guiding principles that need to be applied in order to boost sustainable digitalisation in agriculture, forestry and rural areas:

- Ensure the basic conditions for digitalisation, in terms of human capital, infrastructure and economic gains.
- Anchor digitalisation to the Sustainable Development Goals (SDGs).
- Adapt digitalisation to different contexts, through a participatory and place-based approach.

- Favour digital inclusion to ensure no one is left behind Develop digital ecosystems, by promoting the role of digital hubs, innovation brokers, LAGS, etc.
- Develop adaptative governance models, that are proactive instead of reactive.
- Design policy tools for sustainable rural digitalisation, as Regional Digitalisation Agencies or Agricultural and Rural Knowledge Innovation Systems (ARKIS).

Juan Velasco from the Directorate-General for Agriculture and Rural Development (DG AGRI), European Commission introduced some of the evidence gathered by the European Commission to build the LTVRA. He outlined the importance of this initiative for Europe as a whole, as rural areas cover 80% of the EU territory, and are home to almost 150 million of European citizens. The public consultation highlighted several challenges faced by rural areas, for which action is needed: the lack of access to quality public services and infrastructure compared to urban areas; limited employment opportunities, and poor digital and transport connectivity. Digitalisation could be a game changer to tackle these issues. However, only 60% of rural households have access to broadband coverage of 30Mbps or above, compared to an average of 80% in the whole EU territory. This is a challenge, especially in today's post-pandemic context. Mr Velasco explained that connectivity involves much more than broadband access, and to guarantee a sustainable future for rural areas, digital skills of citizens and rural businesses should accompany the deployment of broadband infrastructure. Mr Velasco also highlighted the funding mechanisms that the European Commission has in place to promote digital connectivity. The new Common Agricultural Policy (CAP) will require farmers to adopt digital solutions, alongside many other tools. The European Agricultural Fund for Rural Development (EAFRD) has provided support for the last decade to promote digital connectivity. Other mechanisms include the European Regional Development Fund (ERDF), the Connecting Europe Facility (CEF) and, recently, the Recovery and Resilience Fund, 20% of which will be earmarked to strengthen digitalisation.

DESIRA coordinator Professor Gianluca Brunori presented DESIRA's contribution to the longterm vision for rural areas, which outline experts' views for boosting sustainable digitalisation of agriculture, forestry, and rural areas.

He explained that digitalisation is a socio-technical process which involves infrastructure, application contexts, services and devices, and that civil society, public administrations and private businesses embody these elements. The interactions between them produce certain effects and outcomes. However, from a policy point of view, the digitalisation process should commence from the needs of society, and the expected and desired outcomes from the digital transformation process.

Mr Brunori stressed that digitalisation is not beneficial per se, as it entails certain risks (such as loss of autonomy, increased surveillance, security risks, etc.). That is why DESIRA understands digital technologies as the means to an end, and not an end itself.

Fabio Bartolini from the University of Ferrara (IT). presented the preliminary results of the DESIRA Needs, Expectations, and Impacts (NEI) report, in which the 21 DESIRA Living Labs (LLs) participated. The survey and interviews carried with the different stakeholders involved in the LLs show that there is a clear urban-rural divide in terms of digitalisation, especially in

relation to access to digital public services, participation of women in digital contexts, and digital skills to use technologies.

- Rural digitalisation targets should be set up at all levels of power (EU, national, regional, and local) and should go beyond infrastructure and broadband deployment and encompass other important aspects such as skills and access to digital technologies.
- Ensure that policies supporting digitalisation do not trigger or widen the rural-rural divide. Existing dynamic rural areas will actively boost digitalisation processes in their territories. There is a risk that a results-based policy may just target support areas that can produce quick results, while leaving behind those that do not have the capacity to embark on digital transformation on their own. Particular attention should be given to ensuring that areas lagging can access support to take advantage of digitalisation. Otherwise, there will be an increase in development inequalities between different rural areas.
- Policies should support digitalisation, but not at any cost. Digitalisation draws a lot of policy attention, presenting a growing risk of developing instruments that support the deployment of digital technologies for the sake of it. Policies should be designed to facilitate digital transformation, following a holistic approach of social, environmental, and economic sustainability. This requires time and a comprehensive assessment of the territorial conditions, to enable communities and business to seize the available opportunities and avoid the risks digitalisation might post.
- Digital infrastructure and digital skills are the preconditions for digitalisation. As a basic condition, broadband coverage and infrastructure need to be ensured, especially in remote rural areas. However, this is not enough. Policies should be oriented toward guaranteeing human capital, by providing training in the appropriate use of digital technologies. Capacity building and awareness raising are not only essential for end-users, but also for policymakers and innovation brokers or connectors, to understand the benefits of digitalisation and its application, and to present and explain its use to different communities and sectors.
- Support is needed for local cooperation in digitalisation in a variety of rural fields. A call was made for policy instruments that allow communities to cooperate among each other, and with DIHs, ICT companies, innovators, knowledge centres, etc., enabling the creation of local innovation ecosystems. These cooperation projects should aim to maximise the bottom-up approach (local know-how, assets, etc.) while integrating the top-down approach (knowledge external to the communities, e.g., technological options, ICT design, etc.)

Participant profile	No of registered participants
Researcher	54
SME	12
EU/National/Regional stakeholder	7
National Rural Network	4
Public Authority	11
Local Action Group	8
EU Institution	3
Farmer	3
NGO	3
Other	29
Total	134

4.4. Third RDF Meeting: Policy workshop

On November 15th, 2022, the Rural Digitalisation Forum (RDF) of DESIRA (Digitisation: Economic and Social Impacts in Rural Areas) held its third meeting to collaborate on a policy roadmap for sustainable and inclusive rural digitalisation. Over 60 experts and more that 100 registered participants from various backgrounds, including research, public authorities, SMEs, stakeholders' organizations, and members of National Rural Networks, came together to prioritize and validate DESIRA's list of policy recommendations, as well as identify success factors, barriers, and the roles of different actors during implementation. The discussion's outcomes were integrated into the DESIRA Policy Roadmap, building on the project's work on policy, such as the national policy analyses and policy briefs. Additionally, a third session was held to introduce the DESIRA Ethical Code and launch the reflection on what ethical and moral issues should be included in the report, which is set to be delivered by the end of the project.

Professor Mar Delgado from the University of Cordoba (ES) introduced the work that DESIRA has been carrying out regarding policy analysis. The project developed 15 national policy analyses in the countries represented at the project.

Relevant policy proposals regarding rural digitalisation were identified, as well as gaps. This list has been validated through different events (Rural Pact, Smart AgriHubs Final Conference, and DESIRA policy auditions developed by Living Labs).

DESIRA analysed EU policies that influence rural digitalisation from a double perspective: how rural development and cohesion policies are addressing digitalisation in rural areas, and how the EU digital policies consider rural areas, or if they do it at all.

Partners also analysed national policies in the DESIRA countries, particularly how digitalisation policies are being implemented (in terms of context, preparedness, capacity…) but also whether the impact of these policies can be assessed.

Four areas of work were identified: Digitalisation strategies and rural, digitalisation strategies, Broadband strategies, Digital literacy, and Digital trust.

DESIRA preliminary results show that there is insufficient (accessible) data, particularly when we talk about policy impact assessment; comprehensive rural digitalisation policies to examine are also limited and the targets for the 1st European Digital Agenda have not been achieved in rural areas. DESIRA also found important gaps in transposing EU policies to rural areas: policy adoption is quite uneven, and it depends too much on the capacity to integrate and implement policies; administrative complexity; whether countries are pioneers or followers (for followers was easier, as they had much more experience to rely on); and timing - how to align these policies with national context and priorities.

The 2030 Path to the Digital Decade has been established to leave no one behind, but this objective is still far from being achieved. The urban-rural digital divide exists for infrastructure and skills. COVID-19 has been a "digitalisation push", enhancing progress in distance learning, e-health, e-administration, etc. However, the gap between wealthier and poorer groups has been widened by the pandemic, which puts rural areas in a more disadvantaged position.

According to the latest Digital Economy and Society Index (DESI 2022), 8.5% of households are not covered by any fixed network, while 32.5% are not served by any NGA technology. In rural areas, only 46% of the rural population have basic digital skills, compared to the 61% in cities. This gap is worsened by the gender gap, as well as demographic challenges (ageing, depopulation).

DESIRA is now working on a Policy Roadmap, identifying policy recommendations around four blocks of action.

Silvia Rolandi (UNIPI) introduced the preliminary work into building the DESIRA Ethical Code. The scope of this report, that will be available by the end of the project, is to raise awareness about ethical related issues in rural digitalisation, including a shared vision, values, and principles for digitisation in agriculture, forestry, and rural areas. On an interactive session, participants were asked to exchange views about ethical issues related to applying digital technologies in a rural context. Most of the responses were related to data, data management, data sovereignty and data governance.

During the discussion participants raised the issue of farmers providing data on crop variety performance that can be used by large seed companies. Farmers' power balance within the market has reduced due to the use by retailers of the data they collect.

Another point that emerged was the extent to which digital platforms that are offered without training or advice are fair. When digital tools are used by farmers and advisors, they assume

the data collected belongs to them. hey, assume it is their data. Data ownership is usually not clear, nor the use of that it will be given to collected data further down the line. At the same time, access to local data is limited because of data protection issues, and this affects the extent we can research local approaches and practices.

The event also featured Juan Manuel Velasco, from DG AGRI.D1 Rural Areas and Networks (European Commission) as the keynote speaker. He made a presentation on the role of digitalisation in CAP Strategic Plans which were about to be launched in January 2023. Mr Velasco highlighted that all Member States (MS) have developed digitalisation strategies under the cross-cutting objective of knowledge, innovation, and digitalisation. These strategies aim to address key aspects such as the digital divide, barriers to the uptake of digital technologies, skills and data availability, and the funding gap.

However, Mr Velasco noted that further reinforcement and monitoring is often needed to ensure that these strategies are effective. MS have drawn up interventions tailored towards digitalisation to address identified needs and have considered synergies with other national/private and EU funding instruments, such as the RRF, ERDF, EAFRD, DEP, and Horizon Europe.

Despite these efforts, Mr Velasco pointed out that there has been limited consideration of digital technologies as an enabling tool for other CAP objectives, particularly for environment, climate, and rural-related objectives. Additionally, the needs of rural areas have been scarce in the planning of these strategies.

Overall, Mr Velasco's presentation highlighted the importance of digitalisation in the CAP Strategic Plans, but also the need for further action to ensure that digitalisation is fully integrated into other CAP objectives and that the needs of rural areas are adequately addressed.

In his second intervention, Mr Velasco presented the Rural Digital Index, which was launched in response to a request for a rural-focused Digital Economy and Society Index (DESI), including remote areas. This expanded Index allows for the Commission to gather and disseminate data on rural DESI in a disaggregated and holistic way, providing a general score of MS digitalisation in rural areas based on three blocks: use of the internet, human capital, and broadband coverage.

The Rural Digital Index provides MS with the ability to make informed decisions on how and when to strengthen efforts to improve digitalisation in rural areas. However, Mr Velasco also noted that there are some limitations in the data collection process. For instance, enterprise/business data only records head office data without location information, and the enterprise component is not included in the rural DESI index. The report also focuses on the rural/urban breakdown, with broadband assessed almost everywhere, and the DESI report including the rural situation where relevant. Mr Velasco highlighted that the 2030 target of 1 Giga for everyone everywhere is quite challenging to reach, and he also he also acknowledged that there are limitations in the data collection process, and that reaching the 2030 connectivity target will be a challenging task in some rural areas.

Participant profile	No of registered participants
Public authority/policy-maker	13
EIP Operational Group	1
EU institution	5
Research	45
EU/National/Regional stakeholder organisation	6
EU-funded projects	3
Local Action Group (LAG)	3
NGO	5
Business (agricultural, agri-food, forestry)	7
Business (diversified or non-agricultural businesses)	5
SME	9
Advisor/Innovation broker/intermediary	5
Farmer	4
Other	15
Civil Society	6
Total	132

4.5. Foresight exercise with JRC

On 19 January 2023, DESIRA facilitated a foresight exercise on rural digitalisation in collaboration with the Join Research Centre and DG AGRI. The purpose was to explore how digitalisation can help shape rural areas' responses to future challenges, in order to support policymakers in considering long-term perspectives. It was organised back-to-back with the DESIRA (Digitisation: Economic and Social Impacts in Rural Areas) Horizon 2020 project. This was the last major event of this project before the DESIRA final conference in April 26 and 27 in Brussels.

The EU Joint Research Centre (Yulia Barabanova and Maciej Krzysztofowicz) provided the methodology for carrying out the various scenarios for future digitalisation that were considered in Ghent.

The 47 participants (DESIRA and SHERPA partners, EU, and Joint Research Centre officials as well as six rural digitalisation experts that came specifically for this exercise) were divided into seven groups where they considered various scenarios about territories, citizens, and the use of digital technologies in 2040. They explored roles of digitalisation in the context of this imagined future and how digitalisation can help address the challenges and what the pitfalls are for the various territories they considered.

This collective imagining between researchers, stakeholders, experts, and officials led to consider what would be the suitable digital strategy for a specific rural area under a future scenario based in resilience and another based in thriving communities.

A key finding was the disruptive nature of digitalisation, which acts both as a catalyser of new dynamics in rural communities helping them to access better services and improving social cohesion as well generating novel ways of individuals and connectivity with other areas.

Participant profile	No of registered participants
Researcher	23
SME	2
EU/National/Regional stakeholder	2
Public Authority	4
EU Institution	8
Advisor	5
NGO	3
Total	47

4.6. Contribution to the Long-Term Vision for Rural Areas by the RDF working groups.

Between October 2020 and January 2021, DESIRA worked on a contribution to the debate on the 'Long-term vision for rural areas' (LTVRA), developed under the scope of the experts' Working Groups of the European Rural Digitalisation Forum.

This contribution took the form of three documents that capitalised on the knowledge already developed in the project and of the views of members of the RDF and other relevant

stakeholders, ranging from other H2020 projects, academics, local developers, SMEs, etc, plus a fourth document summarising the main recommendations from the experts.

Key Digital Game Changers shaping the future of agriculture in 2040. This document focuses on the question 'How can digitalisation shape and influence the future of the agricultural sector in 2040?' in order to contribute to a sustainable, resilient and fair society.

Key Digital Game Changers shaping the future of forestry in 2040 This document focuses on the question 'How can digitalisation shape and influence the future of the forestry sector in 2040?' with a particular focus on the competitiveness of the sector and sustainability of forestry resources in Europe.

Key Digital Game Changers shaping the future of rural areas in 2040 This document focuses on the question 'How can digitalisation shape and influence the future of rural areas in 2040?' in terms of its impact on rural areas/life in a broad sense (services, mobility, education, demography, governance, social life, culture, infrastructure, the environment, non-agricultural business, etc.).

Experts' recommendations to boost sustainable digitalisation of agriculture, forestry and rural areas by 2040. This document outlines the seven principles highlighted by the RDF experts that should be considered in the future vision to guide sustainable digitalisation in Europe.

The preparation of these proposals benefited from the active participation not only of experts from the project and external ones, but also EU officials.

5. Online community: Facebook group and VRE communities.

5.1. Facebook group community.

The RDF community on Facebook is a vibrant and inclusive group that was established on 25 November 2019. Its primary aim is to bring together individuals who share an interest in rural development and Digitalisation, specifically focusing on how digital transformation can contribute to the progress of rural areas throughout Europe. The group welcomes participants from all backgrounds and encourages them to share their valuable experiences and insights related to rural development, as well as the Digitalisation of agriculture, forestry, and rural life. The group can be followed here: Rural Digitalisation Forum | DESIRA | Facebook

To maintain a high-quality discussion environment, the group operates as a private community with admission moderated by dedicated administrators. This approach ensures that the group

remains focused and relevant to its members. The primary language used within the group is English, but other languages are welcome.

DESCRIPTION OF THE GROUP ON FACEBOOK

This group was created to bring together people interested in the topic of #ruraldigitalisation and how it can further develop rural areas across Europe.

Everyone is welcome to share their experience related to rural development and the digitalisation of agriculture, forestry and rural life in particular.

Future members: if you wish to join the group, please reply to the required questions when requesting to become a member.
In order to keep this an open space for everyone, please make sure you keep in mind these simple rules:

1. Use English! If you post/share something that is in a different language, please provide a short English description so everyone can understand.
2. Make it count! Share ideas, examples or projects that are related to rural development and digitalisation. If there's no direct link, do explain in your post how you think it is related in fact to the topic of this group.
3. Don't spam! You've posted it once, don't do it twice.
4. Don't promote your own business or products! This is not a selling/buying group. We're here to explore ideas, debate and discuss our main topic.
5. Posts that are not specifically related to the core topic of this group will be immediately removed.

If you have further suggestions to improve these simple rules, please feel free to contribute in the comments section.

Thank you in advance for your understanding!

Since its inception, the RDF community has witnessed impressive growth and engagement. As of 30 April 2023, the group boasts an active and diverse membership, with a total of 417 passionate individuals who contribute their expertise and foster meaningful discussions on rural development and Digitalisation.

In addition to organizing various activities, the RDF community conducted several polls and surveys to gain deeper insights into its members and their interests. Participants were asked two key questions: "What is your primary motivation for joining the Rural Digitalisation Forum?" and "What are you most interested in?" Out of the total membership, 34 users actively responded to the poll, and the majority indicated that they joined the RDF Facebook group to connect with and learn from others, as well as to discover innovative ideas and practical examples.

Within the community, the main active members consist of personal accounts and other projects affiliated with Horizon 2020, including SmartAgriHubs, SHERPA, and RURALIZATION. Additionally, several EU organizations and projects are actively engaged in the RDF community on Facebook, such as Rethink, Next2Met Interreg Europe, and Interreg Carpedigem. These

collaborative entities contribute to the diversity and richness of discussions within the community, fostering a comprehensive exchange of knowledge and expertise.

The group has witnessed a remarkable engagement with a total of 340 posts shared by its members. The main topics approached include:

- DESIRA outcomes and results: The group actively shares updates and insights related to the outcomes and results of the DESIRA project, emphasizing its significance in driving rural Digitalisation.
- Information about new digital and technological solutions: Members contribute valuable information regarding the latest advancements and innovative digital solutions relevant to rural development, enabling others to stay informed and explore potential opportunities.
- General articles and reports by third parties: The group serves as a platform for sharing articles and reports authored by external sources. These resources cover a wide range of topics related to rural development and Digitalisation, fostering a comprehensive understanding of the subject matter.
- Information about events: Members actively share information about upcoming events, such as conferences, webinars, or workshops, that are relevant to the RDF community's interests. This ensures that members stay updated on valuable networking and learning opportunities.
- Questions or general comments: The group encourages open discussions by allowing members to pose questions, seek advice, and share general comments related to rural development and Digitalisation. This fosters a collaborative environment where members can engage in meaningful exchanges of ideas and experiences.

By encompassing these diverse topics, the group facilitates a dynamic and comprehensive information-sharing ecosystem, nurturing the collective knowledge and expertise of its members.

5.2. VRE Communities

DESIRA's RDF (Rural Digitalisation Forum) plays a pivotal role in coordinating virtual dedicated Working Groups (WGs) that focus on specific areas. These WGs are comprised of experts from DESIRA, Living Lab members, and distinguished external experts. The WGs are as follows: i) agriculture, ii) forestry and iii) rural areas/life.

Working group in VRE	Members

Agriculture	32
Forestry	29
Rural areas/life	24

The organization and activities of the Working Groups (WGs) within the Rural Digitalisation Forum (RDF) were well-defined and productive. Each WG had a dedicated space in the Virtual Research Environment (VRE) that facilitated direct engagement and online exchanges among members. The VRE also served as a working space for document development, archiving, and storage.

The composition of the WGs consisted of experts from both within and outside the DESIRA project. These experts actively contributed their expertise, time, and insights to the discussions and exchanges within the project. The selection of WG members was based on common criteria such as relevant expertise, motivation, and professional capacity. Additional experts were recruited through a specific call for experts within the RDF community.

Each WG comprised a limited number of members, typically between 20 to 30 individuals, representing various professional capacities. This included scientists, relevant stakeholders (e.g., farmers, EC representatives), advisors, and other actors from the agricultural sector (e.g., agri-businesses, NGOs). The selected members participated in the WGs in their personal or institutional capacity, without reimbursement for their work.

The coordination of each WG was assigned to a designated WG coordinator. The coordinators were responsible for leading the activities of their respective groups. The WG coordinators for each group were as follows: ILVO (Lies Debruyne) for WG Agriculture, PEFC (Antonio Brunori) for WG Forestry, and BSC - Baltic Study Centre (Talis Tisenkopfs) for WG Rural life.

The WGs engaged in various activities to contribute to the objectives of DESIRA. These included ongoing virtual interactions and exchanges within the VRE, allowing members to share news, opinions, articles, scientific publications, and information about events. The WG coordinators ensured the platform remained active by initiating discussions, launching polls, suggesting ideas, and encouraging activities such as article development and participation in conferences. Additionally, RDF online community and the WGs were fundamental to the production of several outcomes seen before, as the Contribution to the Long-Term Vision for Rural Areas.

6. Challenges and successes

Quite clearly the fact that the largest period of the life of DESIRA took place during COVID-19 pandemic clearly shaped the scope and extent of the RDF. This has happened in both ways. On the one hand, initial plans as set out in the initial project proposal had to be adapted

to a compulsory full online version of meetings due to the travel and meeting restrictions in all Member States in 2020, 2021 and part of 2022.

On the other hand, and in consistency with the aims of DESIRA, the COVID-19 restrictions helped the carrying out of the RDF, both in terms of making it easier to invite key speakers from all over Europe, overcoming previous resistance by many full online meetings (as many had to go full online overnight for many personal and professional activities) but also in terms of increasing the frequency of meetings as well as (and this is rather critical) all preparatory meetings that go in the way of organising meetings such as the RDF. Still, even projects such as DESIRA that seek to promote digitalisation benefit occasionally from in-person meetings, as shown in the Foresight meeting in Ghent in early 2022, which allows for a series of informal and more spontaneous in-person meetings to consider a range of future scenarios on rural digitalisation that would have been almost impossible to organise in a full online meeting.

When it comes to the quality and scope of the events, there has been a positive response from both attendees and participants about the value and interaction of the RDF. A telling example of this is the fact that many non-project participants did attend several of the RDF meetings and discussions, even despite the time and preparation involved in actively participating in these meetings.

Perhaps a critical note would be that of overlap between the topics and findings discussed throughout the entire length of the RDF process. On the other hand, this iterative approach allows for revising the initial assumptions and testing them against new developments and findings being brought into the project.

Doing a final analysis of the contributions of the RDF, it has surpassed the expectations set up in its original planning (see table below), going even further and contributing to, not just the expected initiatives, to also other as the Long-Term Vision for Rural Areas 2024. This remarkably shows the added value of DESIRA and its Rural Digitalisation Forum.

Meeting	Expected outcomes	Achievement
First Rural Digitisation Forum **(M14 – Sept 2020)**	Contribution to Conceptual and Analytical Framework (CAF)	✓
	Contribution to Draft Taxonomy and Inventory of Digital Game Changers (TGC)	✓
	Contribution to the First list of Socio-Economic Sustainability Indicators (SESI)	✓
	Contribution to Draft Pan-European digitisation assessment report (PEA)	✓
Second Rural Digitisation Forum **(M26 – Sept 2021)**	Contribution to Comparative Scenario Assessment (CSA) Report	✓
	Contribution to Needs, Expectations and Impacts (NEI) report	✓
	Contribution to SESI synthesis reports	✓

Third Rural Digitisation Forum **(M40 -Dec 2022)**	Contribution to Policy Analysis and Policy Roadmap reports	✓
	Contribution to Ethical Code	✓

Finally, the Rural Digitalisation Forum (RDF) has reached the conclusion of its project with a fresh perspective. Among the primary challenges encountered by initiative as the RDF is the completion of the project and the potential gradual disengagement of its members. In order to prevent the loss of the valuable expertise and contributions accumulated over the course of the 4-year project, the RDF community is striving to transition into two distinct communities.

Firstly, the CODECS community will serve as a hub for all RDF members and stakeholders, inviting them to remain actively involved within this vibrant community. By joining CODECS, individuals can continue to participate and contribute to ongoing discussions and initiatives.

Secondly, RDF participants will also be invited to join the Rural Pact community. This community offers an wider platform for collaboration and engagement, providing opportunities to connect with like-minded individuals who share a common interest in rural development.

In summary, the RDF project is approaching its conclusion, but the commitment and collaboration fostered within the community will be carried forward through the establishment of the CODECS community and the potential collaboration with the Rural Pact community. By transitioning to these two communities, RDF members can sustain their involvement, preserve their collective knowledge, and continue working towards rural digitalisation and development.

7. Conclusion

The realisation of the RDF has been, despite the many challenges over the last four very unusual years a positive one both in terms of engagement and the findings that were put together.

Perhaps a good summary of main challenges and opportunities outlined by participants in the discussion groups organised within the RDF would be as follows.

The most prominent rural-urban divide is related to digital connectivity and access to quality internet. The divide also refers to the lack of skills and capacities to adopt digital technologies among rural citizens and businesses, which hampers the social and economic use of available infrastructure.

The cost to access, design and deploy digital technologies is particularly important when the application of new digital technologies is an obligation.

The existing variety of financial sources with different rules, deadlines, requirements, controls, etc., makes it very difficult for local stakeholders to access the funding opportunities needed for the design and deployment of new technologies.

Rural communities and municipalities have limited capacity and resources to drive the complex process of digitalisation. There is a need for supporting technical assistance to small or remote rural areas so they can identify, design, and implement digital technologies that respond to their needs and allow them to access the financial resources available to fund digitalisation.

Supporting the role of digital brokers (which can take different forms such as DIH, universities, SMEs, civil society organisations, LAGs, etc.) is key to ensuring all rural areas can have the capacity to embark on a digital transformation process.

Digitalisation is creating opportunities for rural businesses (agricultural and non-agricultural) to adapt their business models and reach out to new markets. It is also enabling the creation of new market opportunities in newly emerging sectors (nomad and remote workers, energy, e-health, mobility, etc.).

Digital technologies are offering the possibility to reduce distances and create the sufficient critical mass that allows the implementation of new models for the delivery of essential services in rural areas (public administration, education, health, care, mobility, etc.).

Digitalisation enables the application of new technologies that reduce of use of inputs (e.g., in agriculture, forestry or public administration), resulting in better incomes and, in certain cases reducing the impact on climate change and the environment.

Digitalisation might reshape the way rural areas and citizens interact with each other and create new and adaptive governance models. Increased social cohesion in rural areas is an essential aspect of enabling community-led innovation in all relevant rural fields. Also, it might facilitate access to new knowledge sources, practices, and examples and create spaces for co-creation and innovation.

Many of these and other elements discussed in the various RDF meetings will inform the DESIRA Policy Roadmap that together with the Ethical Code will improve the capacity of rural communities to reap the opportunities offered by digitisation and to improve resilience to related hazards by identifying and assessing existing policy instruments. In so doing it will address the main obstacles and policy gaps identified and aligns the digital game changers in agriculture, forestry and rural life to societal needs and will propose building blocks and policy pathways to support smart, inclusive, and sustainable digitisation of rural areas. Furthermore, the RDF community does not end with the administrative ends of DESIRA but continues working through both the CODECS Community and the Rural Pact Community.