DIGITISATION STRATEGY FOR THE AGRI-FOOD AND FORESTRY SECTOR AND RURAL AREAS

MINISTRY OF AGRICULTURE, FISHERIES AND FOOD

GOBIERNO DE ESPAÑA
MINISTERIO DE AGRICULTURA, PESCA Y ALIMENTACIÓN

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AND FORESTRY SECTOR AND RURAL AREAS

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EXECUTIVE SUMMARY

The Digitisation Strategy for the Agri-Food and Forestry Sector and Rural Areas (hereinafter, the Strategy) defines the strategic lines and measures necessary to boost digital transformation in the agri-food and forestry sector and rural areas, as well as the instruments planned to implement them.

Its main aim is to eliminate or reduce currently existing technical, legislative, economic and educational barriers, thereby helping an economically, socially and environmentally sustainable agri-food sector to lead and to actively repopulate rural areas, making them more attractive, lively, dynamic and diverse places that generate wealth and quality jobs, paying special attention to young people and women.

To do so, the following three strategic objectives have been set:

OBJECTIVE 01

To narrow the digital divide between rural and urban areas, as well as between small and large companies, aiming for all parties to be connected. To achieve this, work is to be done on connectivity in order to narrow the physical digital divide as regards infrastructure, and also on training to narrow the divide in adopting new technologies.

OBJECTIVE 02

To foster data use as an engine to boost the sector, addressing the interoperability of the sector's data and the openness of data, understanding the latter concept in the widest sense so as to encourage this openness in the Public Administration, in research and in the private sector.

OBJECTIVE 03

To boost business development and new business models, taking into account Industry 4.0 and the opportunities for economic diversification provided by new technologies. To do so, it is essential to bolster the digital innovation ecosystem as a key aspect in modernising the sector, and to provide advice for digital adoption in Knowledge and Innovation Systems in the agri-food and forestry sector and rural areas, in addition to fostering new business models, which often arise on applying and adopting technologies in certain fields.

Furthermore, horizontal activities will be carried out within the Strategy's system of **governance, monitoring and stimulation,** which is intended to guarantee that they are implemented. This system also aims to foster interaction, knowledge transfer and cooperation among the parties involved, capitalising on the results, monitoring them using indicators, and evaluating them.

In addition to working within the Ministry of Agriculture, Fisheries and Food's **scope of power,** the Strategy puts forward measures that also bring other public policies into the agri-food and forestry sector and rural areas. These policies have an influence on digital transformation by sector and territory, and are implemented by the General Administration of the State and other levels of Public Administration within the scope of their powers.

There is no set deadline for implementing the Strategy. Each of the objectives is broken down into strategic lines that are carried out via measures. These measures are in turn instrumentalised via specific activities that are set out in the **biennial Action Plans** according to the budgets available and which will enable the Strategy's progress to be adapted to the real situation at all times.

The reason for drawing up the Strategy rests on the need to support digital transformation in the agri-food sector, which plays a strategic role in the economy as a whole and is a vector of rural development. Taking into account the sector's fragmented structure and the characteristics of the population in rural areas, via specific activities the population in such zones will be able to bolster its potential to tackle today's challenges by adopting digital processes in such zones within their economic activity and social fabric. This is especially true as regards the challenge of active repopulation and the creation of dignified, attractive jobs and livelihoods.

The creation of quality jobs in the agri-food and forestry sector and in the rural economy, together with the development of new business models via digital technology, are key factors in making these rural areas more appealing places to live and work. They are essential to tackle today's challenges, such as: the climate; the environment; globalisation of the markets; safe, quality food; the development of the bioeconomy and the circular economy, etc.

The Strategy's approach is integrated with other European and Spanish public policies in the field of digitisation.

In the context of the European Union, it is in line with the post-2020 Common Agricultural Policy's cross-cutting objective of modernisation, which involves innovation and digitisation as key elements to achieve it and to create Agricultural Knowledge and Innovation Systems (AKIS), and which must be addressed in order to tackle the aforementioned

goal of modernisation. It is coherent with its specific objectives and with the initiatives underway in the current programmed period, both via the instruments on which the European Innovation Partnership (EIP-Agri) relies for agricultural productivity and sustainability, and via action promoted by the European Network for Rural Development to develop Smart Villages. It is also in line with the European Commission's Startup Europe initiative to interconnect local startups' ecosystems on a European scale.

Nationwide, it is closely linked to other strategies such as the Spanish Strategy for Science, Technology and Innovation 2013-2020 (*Estrategia Española de Ciencia y Tecnología y de Innovación*), the Programme for the Extension of Next Generation Broadband (PEBA-NGA, *Programa de Extensión de Banda Ancha de Nueva Generación*); the National Plan for Smart Territories (*Plan Nacional de Territorios Inteligentes*); the Agenda for Change (*Agenda para el Cambio*), the Connected Industry 4.0 Strategy (*Estrategia de Industria Conectada 4.0*); and other strategies being drawn up such as the Strategic Framework for SME Policy 2030 (*Marco Estratégico en política de PYME*). The Ministry of Agriculture, Fisheries and Food has carried out a process of interlocution and coordination with the ministerial departments which, within the scope of their power, carry out activities to implement activities fostering synergy or which are related to the content of this Strategy.

Furthermore, the Strategy contributes to the National Strategy against the Demographic Challenge (*Estrategia Nacional frente al Reto Demográfico*), given that many of the measures planned in the context of the Strategy are aimed at making rural areas more dynamic, attractive and diverse via activities that generate wealth and employment while fostering quality conditions for work and life in such areas.

One particularly noteworthy action among those preceding and promoting the creation of the Strategy is the Focus Group on Digitisation and Big Data for the Agri-Food and Forestry Sector and Rural Areas, and the "Digitisation and Smart Rural Territories: for a smart, intelligent, dynamic and connected rural world" event, whose conclusions can be seen in the Añora Declaration.

The participatory process of drawing up the Strategy included specific consultations aimed at other levels of Public Administration, representatives from the sector and parties involved in the digital transformation process, culminating in a public consultation in February 2019.

On taking into account the context of related public policies and the needs perceived by the sector in this field, the Strategy aims to efficiently address the main concerns in a coordinated way in order to help digitise the sector and the rural territory via well-defined objectives, lines and measures.

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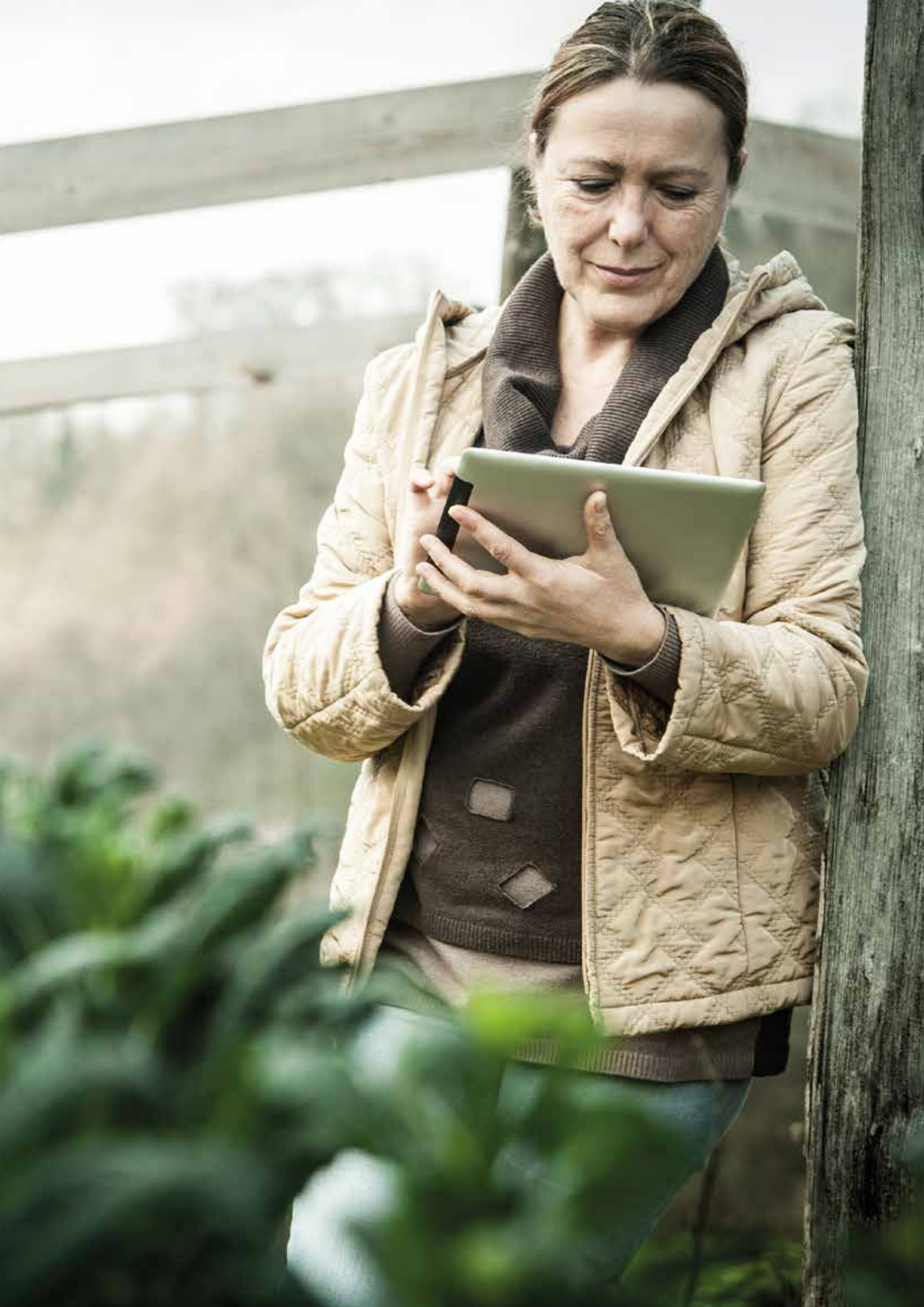

BACKGROUND AND **RATIONALE**

The agri-food sector in Spain and rural areas

The **Spanish agri-food sector** is made up of 900,000 agricultural farms[1] and over 31,000 food companies[2], of which 95% are SMEs, with 80% of the companies employing fewer than 10 workers[3].

Its leadership in world markets, its export potential (with over 50 billion euros[4]), its contribution to creating wealth and employment (2.6 million jobs[5]), the fact that it is the main economic activity in rural areas and its direct relationship with the success of other sectors such as tourism and services all make it a **strategic sector for the Spanish economy** (GVA of 107.743 billion euros from the agri-food sector, accounting for 9.6% of GDP[6]).

From the **territorial and social** point of view, Spanish rural areas occupy 84% of the land but only 16% of the population live there. In the Iberian Peninsula there is 66,000 km² of continuous land with population densities of fewer than 8 inhabitants/km², which the European Union (EU) classifies as "very sparsely populated areas". These account for about 1,350 municipalities, half of which have even fewer than 100 inhabitants. Spanish rural areas are under a significant threat from depopulation and have become elderly and male, since the first to leave are women and young people.

As concluded in the work by the Focal Group on Digitisation and Big Data for the Agri-Food and Forestry Sector and Rural Areas, and specifically as regards "Challenge 1: Tackling rural depopulation, fostering the introduction of young people and narrowing the digital divide", in order to build territories that are complex, systemic, adaptable, efficient, competitive and sustainable, there is a need for a significant economic and financial dimension, political will, a minimum of social capital and a notable level of commitment.

1—Farm Structure Survey, INE, 2016.

2—Number of food companies according to CNAE codes 10 and 11. 2018.

3—Central Business Register, INE, 2018.

4—Data drawn up by the General Sub-Directorate for Analysis, Coordination and Statistics, MAPA (the Agri-Food System's Contribution to the Spanish Economy), 2018.

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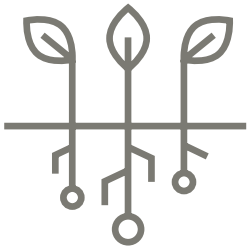


THE CHALLENGES FOR RURAL AREAS AS REGARDS BOTH THE TERRITORY AND SECTORS **MUST BE TACKLED VIA DIGITAL ADAPTATION** TO ACHIEVE LIVELY RURAL AREAS WITH A COMPETITIVE, SUSTAINABLE SECTOR

Digitisation as a way to help strengthen the agri-food and forestry sector and rural areas

The future of the economy in general involves digitisation[7]. The territorial and sectorial challenges for rural areas must therefore be tackled via digital adaptation if they are to achieve lively, dynamic and populated rural areas with a competitive sector that is economically, socially and environmentally sustainable. This must be part of the solution to depopulation, helping generate quality jobs and added value in rural territories, as well as economic activity.

We currently find ourselves in a context with two factors that may boost digitisation in the agri-food sector and rural areas: the existence of facilitating technologies that can be adapted to the specific needs of the agri-food sector, and the availability of accessible, reliable technologies within the sector.

- The existence of digital facilitators will allow for progress in digitally transforming the sector and rural areas. These digital facilitators are the different technologies that make it possible for new processes to exploit all of the potential of digitisation. Specifically, when applied to the sector, they are technologies that enable the agri-food sector and rural areas to be connected and smart, with a comprehensive view of the chain. They include the Internet of Things (IoT), big data, blockchain and artificial intelligence[8].

7—According to the report **Digital Transformation** (*Transformación digital,* January 2017) by AMETIC (Association of Electronics, Information and Communications Technologies, Telecommunications and Digital Content Companies), in 2025 digitisation will contribute 2.5 billion euros to the Spanish economy, reduce costs in the Public Administration by 20% and raise industry's productivity by up to 20%.
https://ametic.es/sites/default/files//TD-Vision%20y%20Propuesta.%20AMETIC.pdf
According to the report **Digital reinvention. An opportunity for Spain** (*La reinvención digital. Una oportunidad para España*, Mckinsey and COTEC, July 2017), digitisation may have an impact of 1 to 2% on Spain's GDP up to 2025. The digital economy accounts for 5.6% of Spain's GDP, although only 13.5% of the digital potential is being tapped. The report also underlines that most digitised sectors improve their productivity faster than less digitised sectors. It highlights that agriculture in Spain has a technical potential for automation of 57% (fourth behind the hospitality industry, manufacturing, and transport and logistics), above all in activities related to physical tasks and data gathering and processing.
http://cotec.es/media/La-reinvenci%C3%B3n-digital-de-Espa%C3%B1a.pdf
In a report published in 2018, the COTEC foundation emphasises that robotics, geopositioning and big data have proven to be extremely useful in stemming wastage of water and excessive use of chemicals in the agricultural sector.
http://informecotec.es/media/Informe-Cotec_2018_versi%C3%B3nweb.pdf
On the other hand, according to the report **Study on the state of digitisation in Spanish companies and Public Administrations** (*Estudio sobre el estado de digitalización de las empresas y Administraciones Públicas españolas*) carried out by Vodafone, the fear of high costs is the main factor holding back companies from digitisation. The report indicates that the level of digitisation and the ease for introducing it is much greater in high-tech sectors than in traditional ones, and within each sector it is greater in big companies than in SMEs.
https://www.observatorio-empresas.vodafone.es/wp-content/uploads/2018/09/Resumen-Ejecutivo-OVE-2018.pdf

8—IoT, **The Internet of Things:** This is based on everyday objects being permanently connected among each other and the cloud, where information and relevant data they collect from their environs is deposited to be subsequently analysed.

- The availability of accessible, reliable technologies within the sector: the development of the Sentinel group of satellites that began in 2014 as part of the Copernicus programme headed by the European Commission has made new technologies such as satellite images and advanced remote sensors available to Public Administrations and the sector reliably and in a way that makes them accessible. Furthermore, progress has been made in adaptation and usage of global navigation, drones, sensors, robots and more at prices the sector can afford. All of this has been fostered and accelerated by growing digital connectivity, which enables everything to be connected to everything else, and by the opportunities opening up for innovation. This all means an improvement in working conditions in the sector's production activities (quality of life and backup resources for decision-making)[9].

These stimulus factors encourage Public Administrations as well as the business sector, civil society and consumers to use these technologies in:

- Better matching supply to demand;
- The search for greater efficiency and sustainability in processes and in the use of resources;
- Improvements in decision-making processes and anticipating them;
- Mitigation of volatility in the markets and production;
- Anticipation of market crisis scenarios and demands from society; Interaction with consumers and ease of access to information.
- Interaction with consumers and ease of access to information.

Big data: This is a term that describes a large volume of data, whether structured or not, that cannot be processed or analysed using traditional processes or tools. This technology is relevant because it enables huge volumes of data from different sources to be analysed, leading to an improvement in decision-making processes and strategic positioning for the Public Administration and companies.
Blockchain: This is a kind of technology that provides a secure system to register transactions in a digital database that removes intermediaries, reduces transaction costs, enables faster transactions even in real-time, ensures immutable data entries and provides access to the database for all who participate in the network. It has become a technology that has created great expectations. Without a doubt, it will be an essential facilitator in improving the efficiency of the food supply chain.
Artificial intelligence: This refers to machines simulating human intelligence processes. Such processes include machine learning systems that will enable supply to be adapted to demand accurately, successfully, with fewer risks and greater efficiency, and to learn consumers' preferences better and take decisions to develop a food supply chain that is more efficient, balanced and geared towards the market's needs.

9—In keeping with Challenge 1 for the Focus Group on Digitisation and Big Data for the Agri-Food and Forestry Sector and Rural Areas, as mentioned in the introduction to Objective 1, Narrowing the digital divide.

It should be noted that this technological progress represents a significant opportunity for the visibility of rural areas, creating new possibilities for recreation, entrepreneurship, new business models, conditions and quality of life, welfare, healthcare and the creation of and access to quality jobs, enabling such areas to become attractive and stable for young people, women and families.

More predictive, accurate systems can be developed by: structuring a smart, connected agri-food sector with a comprehensive view of the chain; the introduction of smart agriculture; Industry 4.0 and e-commerce; IoT; and lastly, the use of big data to improve decision-making. This will bolster the positive effects and mitigate the negative ones for economic, social and environmental sustainability in the sector and the territory.

Action to digitise the sector promoted on a European scale:

The European Commission's **Initiative for a Digital Single Market**[10], launched in May 2015, aims to ensure that the economy, industry and job market benefit fully from digitisation.

The **Cork 2.0 Declaration: A Better Life in Rural Areas**[11], of 6 September 2016, points to digitisation as one of the vehicles to promote a better life in rural areas.

European Parliament Resolution of 7 June 2016 on enhancing innovation and economic development in future European farm management[12], known as the **Huitema Report**, delves into the possibilities of big data, IoT and digitisation in general in agriculture. Also, **European Parliament resolution of 7 June 2016 on technological solutions for sustainable agriculture in the EU**[13]**, the McIntyre Report,** underlines the potential of these elements.

10—European Parliament resolution of 19 January 2016, Towards a Digital Single Market Act (2015/2147(INI)). https://oeil.secure.europarl.europa.eu/oeil/popups/ficheprocedure.do?lang=en&reference=2015/2147(INI)

11—Cork 2.0 Declaration: A better life in rural areas: https://ec.europa.eu/agriculture/sites/agriculture/files/events/2016/rural-development/cork-declaration-2-0_en.pdf

12—European Parliament Resolution of 7 June 2016 on enhancing innovation and economic development in future European farm management (2015/2227(INI)): https://oeil.secure.europarl.europa.eu/oeil/popups/ficheprocedure.do?lang=en&reference=2015/2227(INI)

13—European Parliament Resolution of 7 June 2016 on technological solutions for sustainable agriculture in the EU 2015/2225(INI): https://eur-lex.europa.eu/legal-content/GA/TXT/?uri=CELEX:52016IP0251

In its **Communication on the future of Food and Farming of 29 November 2017**[14], the European Commission underlined that support for knowledge, innovation and technology will be essential for the Common Agricultural Policy (hereinafter CAP) if it is to be ready for the future.

Based on that document, the European Commission has drafted regulations to define the future CAP. Within the draft regulations that set out rules on support for the strategic plans to be drawn up by Member States under the 2021-2027 CAP, Article 5 states that the three general objectives "shall be complemented by the cross-cutting objective of modernising the sector **by fostering and sharing of knowledge, innovation and digitalisation** in agriculture and rural areas, and encouraging their uptake". Furthermore, among the specific objectives there is the need to "enhance market orientation and increase competitiveness, with **greater focus on research, technology and digitisation**".

This cross-cutting modernisation objective is referred to in Article 95 in the CAP's strategic plans, indicating that they must contain "a description of the elements that ensure modernisation of the CAP." Article 102 on modernisation develops this concept, indicating that said description must highlight the elements with which the plan supports modernisation of the agricultural sector and the CAP, in particular a description of their contribution to achieving the cross-cutting objective concerning **knowledge and innovation** in Article 5 on general objectives, especially via:

- **a description of the organisational set-up of the AKIS (Agricultural Knowledge and Information Systems)** designed as the combined **organisation and knowledge flows** between persons, organisations and institutions who use and produce knowledge for agriculture and interrelated fields
- a description of how the advisory services, research and CAP networks will work together within the framework of the AKIS, and how the advice and innovation support services are provided.
- **a description of the strategy for the development of digital technologies in agriculture and in rural areas and for the use of these technologies** to improve the effectiveness and efficiency of the plan's activities.

THE CAP'S GENERAL OBJECTIVES (2021-2027) SHALL BE COMPLEMENTED BY THE CROSS- CUTTING OBJECTIVE OF **MODERNISING THE SECTOR BY FOSTERING AND SHARING OF KNOWLEDGE, INNOVATION AND DIGITALISATION IN AGRICULTURAL AND RURAL AREAS AND ENCOURAGING THEIR UPTAKE.**

14—Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. COM (2017) 713. The future of food and farming. https://ec.europa.eu/agriculture/sites/agriculture/files/future-of-cap/future_of_food_and_farming_communication_en.pdf

Article 6 of the Regulation proposal sets out the **nine specific objectives of the CAP**, which are[15]:

- Support viable farm income and resilience across the Union to enhance food security;
- Enhance market orientation and increase competitiveness, including greater focus on research, technology and digitalisation;
- Improve the farmers' position in the value chain;
- Contribute to climate change mitigation and adaptation, as well as sustainable energy;
- Foster sustainable development and efficient management of natural resources such as water, soil and air;
- Contribute to the protection of biodiversity, enhance ecosystem services and preserve habitats and landscapes;
- Attract young farmers and facilitate business development in rural areas;
- Promote employment, growth, social inclusion and local development in rural areas, including bio-economy and sustainable forestry;
- Improve the response of EU agriculture to societal demands on food and health, including safe, nutritious and sustainable food, food waste, as well as animal welfare.

Out of these, Objective 2 expressly refers to technology and digitisation as elements to ensure market orientation.

On a European level, the **2020 strategy for smart, sustainable and inclusive growth in the EU**[16], presented in 2010, acts as a boost for innovation in European policies. Its aim was to ensure that the economic revival of the European Union (EU) following the economic and financial crisis is supported by a series of reforms in order to build solid foundations for growth and job creation by 2020. One of its three priorities is smart growth: economic development based on knowledge and innovation. To do so, one of its objectives is to achieve investment of 3% of the EU's GDP into research and development. Given the breadth of the 2020 Strategy's

IN THE FUTURE CAP'S STRATEGIC PLANS, THE MEMBER STATES **MUST INCLUDE**, AS REGARDS THE AKIS, **A STRATEGIC DESCRIPTION TO DEVELOP DIGITAL TECHNOLOGIES IN AGRICULTURE AND RURAL AREAS**

15—Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL establishing rules on support for strategic plans to be drawn up by Member States under the Common agricultural policy (CAP Strategic Plans) and financed by the European Agricultural Guarantee Fund (EAGF) and by the European Agricultural Fund for Rural Development (EAFRD) and repealing Regulation (EU) No 1305/2013 of the European Parliament and of the Council and Regulation (EU) No 1307/2013 of the European Parliament and of the Council https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52018PC0392

16—EUROPE 2020 A strategy for smart, sustainable and inclusive growth [in the EU]. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=LEGISSUM:em0028

objectives, the European Commission proposed seven flagship initiatives as catalysts for progress in each priority matter.

As part of the 2020 Strategy mandate, the "Innovation Union" initiative was set up in order to improve the general conditions and access to finance for research and innovation and to guarantee that innovative ideas can become products and services that generate growth and jobs. Its goal is to re-focus public R&D&I policy on the challenges faced by our society: climate change, energy and the efficient use of resources, healthcare, demographic evolution, etc.

Under the umbrella of this initiative, the Commission launched "European Innovation Partnerships" between national and EU levels in order to accelerate the development and roll-out of the necessary technologies to achieve the objectives set. In this context, the **European Innovation Partnerships (EIPs)** were coined as a new concept seeking to speed up knowledge transfer and innovation. These associations involve and coordinate the parties involved in the process of innovation at all levels: EU, national and regional.

Out of the five created, the **European Innovation Partnership for Agricultural Productivity and Sustainability, EIP-Agri**, aims to tackle this sector's challenges, improving competitiveness by speeding up knowledge transfer and innovation within the agri-food sector. The EIP-Agri is instrumentalised via the thematic networks and multi-actor projects of the Horizon 2020 Research and Innovation Programme[17], within the EU's research policy[18], and the creation of operational groups implementing innovate projects via the cooperation measure[19] of the CAP's rural development programmes[20].

THE EUROPEAN INNOVATION PARTNERSHIP FOR AGRICULTURAL PRODUCTIVITY AND SUSTAINABILITY, EIP-AGRI, AIMS TO TACKLE THIS SECTOR'S CHALLENGES, IMPROVING COMPETITIVENESS **BY SPEEDING UP KNOWLEDGE TRANSFER AND INNOVATION WITHIN THE AGRI- FOOD SECTOR.**

17—Horizon 2020 is the EU's biggest research and innovation programme and its financial instrument to carry out innovation. Within this programme's "Rural Renaissance" call, there is an activity called "Taking advantage of the digital revolution", which will contribute 107 million euros in the 2019 and 2020 calls to develop the single digital market. Furthermore, Horizon 2020 is based on a multi-party approach, i.e. the projects that get funding must be geared towards real problems or opportunities that citizens have to address. This means that in addition to the stakeholders in rural areas and the Agri-Food and Forestry Sector, the other parties involved in the innovation process must be included, such as the scientific community, universities, companies, etc.

18—This policy is to continue in future via the proposal "Horizon Europe" Research and Innovation Framework Programme for the period of 2021-2027, with an estimated budget of 97.6 billion euros (3.5 will be earmarked as part of the InvestEU Fund). It is based upon three pillars: Open Science, Global Challenges and Industrial Competitiveness, and Open Innovation. The second pillar includes five cluster themes, including one concerning food and natural resources.
https://ec.europa.eu/commission/sites/beta-political/files/budget-proposals-research-innovation-may2018_en.pdf

19—For the programming period 2014-2020, the Member States and regions plan and implement their Rural Development Programmes, in which they may opt to implement the cooperation measure for the EIP-Agri and accompany it with advisory and investment measures.

20—Regulation (EU) No. 1305/2013 of the European Parliament and of the Council of 17 December 2013, on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) and repealing Council Regulation (EC) No. 1698/2005.
https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2013.347.01.0487.01.ENG&toc=OJ:L:2013:347:TOC
Title IV contains provisions for the EIP on matters of agricultural productivity and sustainability, objectives, operational groups and their tasks, and in Article 53 on the EIP network.

At the heart of the 1st Standing Committee on Agricultural Research (SCAR), which is tasked with coordinating agricultural research in Europe, since 2010 the working group (a strategic one since 2014) on Agricultural Knowledge and Innovation Systems (SWG SCAR-AKIS) has focussed on improving the running of these systems, prioritising the strengthening of interaction with the CAP's initiatives involving innovation, cooperation and contact networks.

Digitisation and innovation are pre-eminent in the European Commission's agenda, as seen in the Agri Innovation Summit 2017, promoted by the European Commission (EIP-Agri network and the European Network for Rural Development), the Government of Portugal and others, and which saw active participation from the Ministry of Agriculture, Fisheries and Food (hereinafter, MAPA) and other Spanish organisations from certain sectors. Held in Lisbon in October 2017, it concentrated on aspects such as raising awareness about opportunities arising from innovation and digitisation for agrarian and rural economies, supporting them through rural development programmes and contributing to post-2020 innovation policies for agriculture and rural areas, based on Point 7 of the Cork 2.0 Declaration: Boosting knowledge and innovation.

THE SMART VILLAGE CONCEPT IS BASED ON THE ROLE OF PEOPLE IN RURAL AREAS AS PROMOTERS OF PRACTICAL SOLUTIONS IN SOLVING DIFFICULTIES AND TAKING ADVANTAGE OF NEW OPPORTUNITIES THAT ARISE LOCALLY, **BY MEANS OF DIGITAL TECHNOLOGIES, TELECOMMUNICATIONS, INNOVATIONS AND A BETTER USE OF KNOWLEDGE**, TO THE BENEFIT OF THE INHABITANTS AND COMPANIES.

As regards the territory, the European Commission is currently working on **Action For Smart Villages**[21]. This concept is based on the role of people in rural areas as promoters of practical solutions in solving difficulties and taking advantage of new opportunities that arise locally, by means of digital technologies, telecommunications, innovations (not only technological ones) and a better use of knowledge, to the benefit of the inhabitants and companies.

21—EU action for Smart Villages.
https://ec.europa.eu/agriculture/sites/agriculture/files/rural-development-2014-2020/looking-ahead/rur-dev-small-villages_en.pdf

In the context of the Cohesion Policy 2014-2020, in 2013 the Commission presented the legal basis defining the **Research and Innovation Smart Specialisation Strategy**, RIS3[22] with the aim of making innovation a priority for all regions, concentrating on creating synergies and on improving the innovation process and getting all parties involved. The Strategies, defined on a national or regional scale, set out priorities for creating competitive advantages by developing and adapting the strengths of research and innovation to business needs in order to tackle the emerging opportunities and advances in the market coherently while at the same time avoiding duplicating and fragmenting the efforts.

As part of the European Commission's strategy to achieve a Digital Single Market, there is an initiative called Startup Europe whose objectives aim to connect the different stakeholders involved in founding and developing startups in order to generate local ecosystems in this field. Within Startup Europe, there is already an initiative to foster startup strategies locally via StartupCity Hubs in Europe. Following suit, Startup Europe aims to foster a new specific line in rural areas via Startup Villages. The latter initiative is mentioned and promoted in the Digital Single Market Strategy.

Action to digitise the sector taken on a national scale:

Taking into account this context and following the model established at the heart of the EIP, MAPA created the **Focus Group on Digitisation and Big Data for the Agri-Food and Forestry Sector and Rural Areas**[23] with the main goal of exploring practical, innovative solutions in response to problems and opportunities related to digitisation of the agri-food and forestry sector and rural areas. The aspects addressed included: a diagnosis of the situation in the sector and barriers hindering its digitisation; identification of the key parties involved, the roles they play and ones they can play in future; identification of incentives to break down barriers, geared towards each of the fundamental parties taking part in the process of digitising the agri-food and forestry sector and rural areas; a review of the state of the art of research and innovation; identification of the practical needs and possible orientations for future research and innovation

THE FOCUS GROUP ON DIGITISATION AND BIG DATA FOR THE AGRI-FOOD AND FORESTRY SECTOR AND RURAL AREAS WAS ABLE TO COUNT ON 43 EXPERTS FROM ALL OVER SPAIN AND FROM ALL THE FIELDS INVOLVED IN THE DIGITISATION PROCESS, ADDRESSING THE DIFFERENT ROLES TAKING PART IN THE PROCESS

22—Innovation Strategies for Smart Specialisation.
http://ec.europa.eu/regional_policy/sources/docgener/informat/2014/smart_specialisation_en.pdf

23—The Focus Group's tasks were held from November 2017 to July 2018.

MAPA presented the preliminary results from the Focus Group on Digitisation and Big Data in a seminar organised by the EIP-Agri network (Jūrmala, Latvia, April 2018) about enabling farmers for the digital age: the role of Agri-Food Knowledge and Innovation Systems.
http://www.redruralnacional.es/documents/10182/417111/Maquetacion_Interior-VERSION_LARGAweb. pdf/e7662acd-2811-42f1-8fff-c409b76f90d2

in order to foster digital transformation in the sector and rural areas; and the creation of a manual or toolbox for the end user (farmer, agri-food or forestry company, etc.) to boost digital transformation in the sector and rural areas. They were tasked with identifying barriers, needs, incentives, instruments and good practices, defining the strategic lines for digitising the sector and rural areas. The main strength of this Focal Group was its participatory approach involving many parties and disciplines, which enabled work to be carried out by a group of motivated experts committed to digitising the sector.

This group was able to count on 43 experts from all over Spain and from all the fields involved in the digitisation process, addressing the different roles taking part in the process. To begin the tasks, the following eight challenges were set:

- **Challenge 1:** Tackling rural depopulation, fostering the involvement of young people and narrowing the digital divide;
- **Challenge 2:** Sustainability, improved productivity and logistics;
- **Challenge 3:** Monitoring, early detection of plant and animal diseases, development of network alert systems, and treatment of pests and diseases;
- **Challenge 4:** Sustainable forestry management and preventing, detecting and extinguishing fires;
- **Challenge 5:** Equitable distribution of added value throughout the chain and fostering rural development;
- **Challenge 6:** Globalisation and competitiveness in the markets;
- **Challenge 7:** Consumer demands in terms of information and participation in the supply on the market;
- **Challenge 8:** Management of the CAP.

The tasks carried out by this Focus Group have amongst others formed the basis for drafting the **Digitisation Strategy for the Agri-Food and Forestry Sector and Rural Areas**.

Reinforcing the territorial aspect of the tasks implemented as regards digitisation, on 31 May 2019 in Añora (Córdoba) MAPA held the conference entitled “Digitisation and Smart Rural Territories: For a smart, dynamic and connected rural world”, in which experts gave talks on different

24—Añora Declaration (31 May 2018).
http://www.redruralnacional.es/documents/10182/465544/DeclaracionAnora.pdf/14bb48ed-264a-4564-8d16-cb6d6a7bd5cb

subjects. The conclusions from the event can be found in the **Añora Declaration**[24], and they have also been taken into account in drafting the Strategy. The Añora Declaration underlines the importance of attracting talent, especially entrepreneurial talent, including professionals from all sectors, to rural areas by providing services similar to cities. Given the multidisciplinary focus, cooperation is required from public and private sectors and civil society. There is also the need for suitable telecommunications infrastructure and the right training and education to use the available technology with a view to revitalising and repopulating rural areas.

In the area of rural development policy, 177 operational groups have been funded via two calls (in 2016 and 2018) through the activities in the context of the **EIP- Agri** carried out in the **National Rural Development Programme 2014-2020 (EAFRD)** (hereinafter NRDP). Of these groups, 77 have planned innovations to focus on digitisation and adopting new kinds of technology. There are also plans to finance innovative projects, reserving specific credits in the calls to boost innovations in this field[25].

One aspect of the rural development programmes to consider as regards implementing this strategy is the National Rural Network (NRN). This is a platform involving the main players in rural areas whose mission is to boost development in such areas. The NRN creates a common setting with the goal of spreading information about Rural Development Programmes (RDPs), communicating the opportunities offered to those who may benefit from them, and strengthening alliances among people, entities and the Public Administration.

As part of the work being carried out nationwide as regards digitisation in the sector and rural areas, MAPA actively participates in forums that address the implications of digitisation of the sector on a European level in order to design the instruments and measures to be developed as per the CAP and the post-2020 process, such as via Horizon 2020 and the upcoming Horizon Europe. For these purposes, MAPA's representation is notable in the Permanent Subgroup on Innovation for Agricultural Productivity and Sustainability belonging to the European Rural Networks' Assembly in the Strategic Working Group of the Standing Committee of Agricultural Research (SCAR) on Agricultural Knowledge and Innovation Systems (SWG SCAR-AKIS) and in the European Network for Rural Development's Working Group on Smart Villages.

25—At the time of publishing this document, the first call with a total credit of €12 million is in the decision phase, in which 50% of the projects proposed for approval are putting forward innovations focusing on digitisation. A second call is planned for €25 million with 20% of said credit reserved for projects focusing on digitisation.

As for applying **smart specialisation strategies**, in Spain there are 24[26] digital innovation hubs (DIH) recognised that are linked to the agri-food and forestry sector and rural areas, spread out over the country. There are also European SmartAgriHubs projects that utilise, strengthen and connect the local European DIHs to create an interconnected ecosystem in which all of the interested parties will work together in the different phases of innovation. To facilitate the work, all of the SmartAgriHubs' DIHs have been grouped into nine regional European groups. The Andalusian Department of Agriculture, Livestock, Fisheries and Sustainable Development is leading the Regional Cluster Iberia by coordinating the activities of the project in that territory, in which 20 DIHs in Spain and Portugal are taking part. It is also coordinating the development of a European DIH observatory, with over 400 digital innovation ecosystems expected to participate. Most of these DIHs have arisen within the context of collaboration clusters financed by the Commission itself or by different European initiatives with different types of management and joint participation in these clusters from universities, science parks, technological hubs, Public Administration itself, business associations from the sector, and others. The DIH Andalucía Agrotech initiative is particularly relevant. With its regional vision and agri-food specialisation, it has been launched based on the experience of the thematic partnership in Traceability and Big Data for Smart Specialisation.

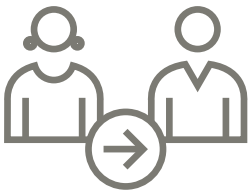
Other elements to be considered in implementing this Strategy are the different technological platforms whose subject matter is in line with the agricultural sector and Information and Communications Technologies (ICT).

26—The European Commission has a "Smart Specialisation Platform" that has a search engine for digital innovation hubs: http://s3platform.jrc.ec.europa.eu/digital-innovation-hubs-tool
Using this search engine with a filter for agriculture, hunting, forestry and the agri-food industry, the 24 innovation hubs can be found at the time of writing the current Strategy: http://s3platform.jrc.ec.europa.eu/digital-innovation-hubs-tool?p_p_id=digitalinnovationhub_WAR_digitalinnovationhubportlet&p_p_lifecycle=0&p_p_state=normal&p_p_mode=view&p_p_col_id=column-1&p_p_col_count=1&formDate=1541420252396&freeSearch=&countries=9&evolStages=3&marketSectors=1&marketSectors=14

Synergies of the Strategy with other activities:

The digital transformation of the Spanish economy can be seen broadly in the implementation of various initiatives carried out by the General Administration of the State.

In fact, through interlocution with other departments, action will be taken in synergy with other initiatives and strategies of interest for the agri-food sector, such as the **Programme for the Extension of Next Generation Broadband (PEBA-NGA)**; the **Plan to provide coverage to enable access to high-speed broadband services of 30 Mbps** to be implemented by the mobile network operators[27]; the **subsidies to hire services to access fixed high-speed broadband at 30 Mbps**[28] in remote places; and the **National Plan for Smart Territories**, all promoted by the Secretary of State for Digital Progress (hereinafter SEAD) of the Ministry of Economy and Business. The same department has been working on strategic documents for the 2030 horizon in industrial matters and especially for SMEs[29], which account for a significant swathe of the agri-food and forestry sector and rural areas, as well as being potential catalysts for activities involving digitisation and innovation.



THROUGH **INTERLOCUTION WITH OTHER DEPARTMENTS**, ACTION WILL BE TAKEN IN SYNERGY WITH OTHER INITIATIVES AND STRATEGIES OF INTEREST FOR THE AGRI-FOOD SECTOR

As regards the **Digital Agenda for Spain**[30], the Strategy stated in this document helps support most of the six goals it sets out, especially those concerning:

- Developing the digital economy for growth, competitiveness and internationalisation of Spanish companies;
- Boosting the R&D&I system in ICT;
- Promoting digital inclusion and literacy, and training for new ITC professionals;

The current Strategy also contributes to compliance with the **Connected Industry 4.0 Strategy** and its plan of action, whose main lines are:

- Guaranteeing knowledge and the development of skills in Industry 4.0;
- Fostering multidisciplinary collaboration;
- Boosting the development of a supply of digital facilitators;
- Promoting activities suited to launching Industry 4.0.

27—Order ECE/1166/2018, of 29 October. https://www.boe.es/diario_boe/txt.php?id=BOE-A-2018-15341

28—Call for direct allocation of subsidies to hire high-speed fixed broadband services at 30 MBbps. https://perfilcontratante--red--es.insuit.net/perfilcontratante/busqueda/DetalleLicitacionesDefault.action?idLicitacion=6587&visualizar=0

29—Strategic Framework for SME Policy 2030 (MINCOTUR, https://plataformapyme.es/SiteCollectionDocuments/EstrategiaPYME/Marco_Estategico_Politica_PYME_2030.pdf).

30—Digital Agenda for Spain. https://avancedigital.gob.es/planes-TIC/agenda-digital/DescargasAgendaDigital/Plan-ADpE_Agenda_Digital_para_Espana.pdf

In the context of the **United Nations' 2030 Agenda for Sustainable Development**, the **Agenda for Change** was published in February 2019. It explains a proactive economic public policy geared towards economic, environmental and social sustainability with structural reforms in six areas of activity: (i) education and training; (ii) protection of natural capital and leveraging the environmental transformation opportunities; (iii) productivity of technological capital through innovation and entrepreneurship; (iv) efficiency and equity of the labour market; (v) territorial vertebration and equal opportunities and (vi) institutional quality and efficiency of the public Administration in its relationship with citizens and companies.

Its diagnosis section highlights digitisation and the agri-food sector as opportunities for development in the Strategy's horizon.

There is mention of the agri-food sector's potential to address a technological transition to improve its competitiveness and sustainability, with greater efficiency in the use of resources.

This Strategy is an instrument to achieve said goal, and it also helps compliance with the **2013-2020 Spanish Science, Technology and Innovation Strategy**[31] throughout its four general objectives and many of its 18 specific objectives:

- To foster and promote talent and its employability;
- To foster excellence in scientific and technical research;
- To support business leadership in R&D&I;
- To foster R&D&I, targeting society's challenges.

Implementation of the Strategy via biennial Action Plans will enable possible synergies to be studied with other initiatives that are currently being created or will be carried out.

To diagnose the current situation before drawing up this Strategy, an analysis was also taken into account that was carried out by the **Economic and Social Council** (CES) in its 1/2018 report "**Rural Areas and their Social and Territorial Structuring**"[32]. Some of the conclusions drawn from said report are as follows:

31—Estrategia Española para la Ciencia, la Tecnología y la Innovación. (Spanish Strategy for Science, Technology and Innovation) 2013-2020.
http://www.ciencia.gob.es/stfls/MICINN/Investigacion/FICHEROS/Estrategia_espanola_ciencia_tecnologia_Innovacion.pdf

32—Report: Rural Areas and their Social and Territorial Structuring.
http://www.ces.es/documents/10180/5461461/Inf0118_Conclusions_EN.PDF

- Only with a comprehensive approach that favours economic and employment growth, improvement in agricultural structures, rural infrastructure, educational plans and social services can there be population settlement and stability, especially among young people and women.
- There is still a digital divide between urban and rural areas, especially as regards broadband connections.
- The CES proposes making a special effort in rural areas to achieve the objectives as regards coverage in the Digital Agenda, extending the network of public Internet centres, training people to use ICTs and fostering help for technical innovation in rural areas.
- The productivity and income generated in the primary sector are susceptible to improvements in techniques and performance, mainly through innovation.
- A technological renewal or incentives plan would be useful to adopt digital solutions to make sales easier, not forgetting the need to ensure access to sufficient funding to introduce these new technologies.

This strategy must also contribute to compliance with the goals of the National Strategy against the Demographic Challenge, currently being drafted.

The Strategy's content complements other strategic action instruments already up and running, contributing to greater efficiency for all of them, since there are components for synergy among them all. It also therefore boosts the efficiency and use of other public policies, though clearly more heavily towards the agri-food and forestry sector and rural areas which, after implementing the Strategy, will have experienced clear progress and improved their strategic position in the Spanish economy and in the context of the EU.

With the aim of boosting the efficiency of this Strategy and other instruments, as it was being drawn up a procedure was developed for interlocution and advice among the different parties involved in the sphere of the measures considered, i.e. Public Administrations, taking into account the powers established for each department and unit, as well as how they fit in the corresponding strategic activities, representatives from the sector (producers, industry groups, technological companies, etc.) and other parties involved in the digital transformation process (universities, research centres, non-governmental organisations, etc.). This process of dialogue to draw up the document resulted in a public consultation in February 2019. The interlocution carried out is described in Annex I.

OBJECTIVES AND THEIR IMPLEMENTATION

OBJECTIVES AND THEIR IMPLEMENTATION

- **The general goal of the Digitisation Strategy for the Agri-Food and Forestry Sector and Rural Areas is to eliminate or reduce currently existing technical, legislative, economic and educational barriers, thereby helping an economically, socially and environmentally sustainable agri-food sector to lead and to actively repopulate rural areas, making them more attractive, lively, dynamic and diverse places that generate wealth and quality jobs, paying special attention to young people and women.**

It must be orientative in establishing stances with a view to future planning in the EU Framework Programme for Research and Innovation (Horizon Europe) and the CAP post-2020, in which innovation and digitisation are essential elements to comply with their specific objectives.

Lastly, the current Strategy covers measures within the powers of the General Administration of the State, with no detriment to the necessary coordination and complementary powers with public policies carried out by the other levels of Public Administration within the scope of their own powers, which are essential for the digital transition of the sector and the territory to be effective.

The Strategy's general goal is addressed via **three specific objectives**. In order to comply with these, measures have been defined and grouped into strategic lines within each objective (Table 1).

These three objectives are to be achieved via a cross-cutting package of governance and stimulation measures together with a monitoring plan using indicators to check on the level of compliance and impact of the activities planned.

The measures established contribute to the eight challenges identified in the tasks prior to drawing up the Strategy (Focus Group on Digitisation and Big Data) and to the nine objectives of the CAP post-2020). The contributions are described in Section 4 of this document.

Implementation of the Strategy involves activities that will be carried out by direct implementation by MAPA and via support from existing activities, as well as with coordination and collaboration from other levels of Public Administration involved. The activities are to be addressed via biennial Action Plans that will enable the planning to be adapted to the real situation at all times.

The planned roll-out over time for the current Strategy's activities can be found in Section 4 of this document.

TABLE 1. Specific objectives, strategic lines and measures planned within the Strategy

Specific objective	Strategic line	Measure
01 Narrowing the digital divide	L1. Connectivity	M1. Coordination to improve connectivity
		M2. Dissemination and advice in the sector as regards existing formulas for connectivity
	L2. Training	M1. Fostering the inclusion of digitisation in formal education
		M2. Non-formal continuous education and skills acquisition
		M3. Attracting young people and women as stable inhabitants in rural areas
02 Fostering the use of data	L1. Interoperability	M1. Fostering collaboration to improve interoperability by capitalising on existing initiatives on a European level
		M2. Interoperability projects that respond to specific problems in which interregional stakeholders cooperate
	L2. Open data	M1. Open data in Public Administrations
		M2. Public research data
	L3. Data from the value chain and environmental data	M1. Support for the Code of Conduct to exchange and use agricultural data and data from the chain
		M2. Promoting incentives to digitise farm logbooks
		M3. Cooperatives as data gatherers
		M4. Spanish and European consumption data
		M5. Collaboration to improve the Common Agricultural Policy's Integrated Administration and Control System
		M6. Fostering automatic collection of existing geospatial data on greenhouse gas emissions and removals from land use, and processing it
03 Boosting business development and new business models	L1. Strengthening the digital innovation ecosystem	M1. Fostering Digital Innovation Hubs (DIHs)
		M2. Innovative Public Procurement
		M3. Fostering collaboration among knowledge hubs, technological companies, and companies from the sector
		M4. Support for introducing the Living Labs method into Spain
	L2. Advice on digital adoption in the agri-food and forestry sector and rural areas' Knowledge and Innovation Systems	M1. Fostering knowledge and information exchange among digital advisers
		M2. Advice for SMEs and startups in their process of digital adoption
		M3. Bolstering advice via events and demonstration activities
	L3. Fostering new business models	M1. Platform for digital entrepreneurship in rural areas
		M2. Fostering telework
		M3. Coordination between Public Administrations to bring in line aid for entrepreneurship in rural areas
		M4. Dissemination of European initiatives linked to digitisation in the spheres of Smart Villages, rural entrepreneurship and Startup Europe
		M5. Boosting development of a Smart Rural Territories ecosystem. *Startup Villages*

Governance and stimulation

Evaluation, monitoring and review

OBJECTIVE 01

NARROWING THE DIGITAL DIVIDE

Rationale behind the activities:

Barriers to digital transformation in rural areas

As debated in the Cork 2.0 European Conference on Rural Development (Cork, September 2016), insufficient connectivity coupled with a lack of skills and adequate training are the main barriers to rolling out the digital transformation in the sector and rural areas.

Therefore, the **Cork 2.0 Declaration: A better life in rural areas (2016),**

which provides a framework for the future of the policy and activities in the field of European rural development, points out that "the rural economy and rural businesses will depend increasingly on digitisation as well as knowledge workers who make the most of the digital transformation and enhance rural production in a sustainable manner" and that "Particular attention must be given to overcome the digital divide and develop the potential offered by connectivity and digitisation of rural areas."

During the work by the Focus Group on Digitisation and Big Data fostered by this Ministry, in the debates on Objective 1, "Tackling rural depopulation, fostering the involvement of young people and narrowing the digital divide", it was noted that "there is not so much a divide in implementing digitisation as a lack of generalised use of it. This lack of access is due to both economic and educational factors."[33]

Potential for improvement in rural areas (DESI report)

In its latest report for Spain in 2018, published in May of that year, the **Digital Economy and Society Index**, DESI[34], indicates that Spain is tenth out of the 28 EU Member States. Its score increased due to better performance in all of the dimensions measured by the DESI.

33—Focus Group on Digitisation and big data for the agri-food and forestry sector and rural areas: (*Grupo Focal sobre digitalización y Big Data en los sectores agroalimentario y forestaly el medio rural*) http://www.redruralnacional.es/documents/10182/417111/Maquetacion_Interior-VERSION_LARGAweb. pdf/e7662acd-2811-42f1-8fff-c409b76f90d2

34—The Digital Economy and Society Index (DESI) is a compound index published every year by the European Commission since 2014. It measures the progress of EU countries towards a digital economy and society, using a set of relevant indicators about the combination of digital policies in Europe. It is made up of five main policy areas that include 34 general indicators:

The results for Spain are good in connectivity thanks to the broad availability of fast and ultrafast fixed and mobile broadband, and the increase in introducing them. Nevertheless, connectivity in rural areas is not sufficiently complete. There are levels far lower than the national average in the population hubs as well as in unpopulated territory. In particular, the latter poses a significant barrier not only for settling population, but also for carrying out agri-food, forestry and economic activity, a significant proportion of which is outside the population hubs in rural areas.[35]

Spain has improved as regards training of human capital, even if it is slightly below the average. This is a matter of great importance that affects the need to address the divide in adopting digital technologies. In fact, according to the last country report from the DESI Indicator, 50% of the Spanish population does not have basic digital skills. In the primary sector, 80% of agricultural farm owners have learnt only through practice (Eurostat, July 2016). As a result, a greater effort is needed in education, especially in training that combines this particular sector with technology.

Despite the rising demand in the job market, the supply of ICT specialists is still below the EU average. Spain has, however, made the most of the advances as per utilisation of digital technologies by companies. More Spanish companies are resorting to the social networks, electronic invoices, cloud services and e- commerce.

As can be seen in this report, Spain occupies one of the highest positions in terms of electronic administration, placing it in an excellent position to enable Public Administrations to leverage digital transformation of the economy.

The existence of high-speed telecommunications infrastructure in rural areas, coupled with digital skills training for the inhabitants, is necessary to narrow the digital divide and increase rural areas' capacity for exploiting their digital potential.

THE EXISTENCE OF HIGH- SPEED TELECOMMUNICATIONS INFRASTRUCTURE IN RURAL AREAS, COUPLED WITH DIGITAL SKILLS TRAINING FOR THE INHABITANTS, IS NECESSARY TO NARROW THE DIGITAL DIVIDE AND INCREASE RURAL AREAS' CAPACITY FOR EXPLOITING THEIR DIGITAL POTENTIAL.

Connectivity: fixed broadband, mobile broadband, fast and ultrafast broadband, broadband prices; **Human capital:** basic skills and use of the Internet, advanced skills and development; **Use of the Internet service:** use of content by citizens, online communication and transactions; **Integration of digital technology:** business digitisation and e-commerce; **Digital public services:** e-Government and e-Health. https://ec.europa.eu/digital-single-market/en/desi

35—Every year, a report on broadband coverage is published (https://avancedigital.gob.es/banda-ancha/cobertura/Paginas/informes-cobertura.aspx). In the last one in 2017, there is a comparison on pages 80-81 of the national total for its different forms, with the total in rural areas.

There are educational needs in order to make the digital transformation of rural areas and the agri-food and forestry sector come true, which must be met via formal and informal education. These needs, as well as the quality of their interactions, are taken into account in the Strategy. Education, in a context in which young people feel keener on digital professions, may help make the sector and rural areas more appealing to them.

Strategic lines:

- **01. L1.** Connectivity
- **01. L2.** Training

01 Línea estratégica 1

Conectividad

Having identified connectivity (in population hubs and in the territory with agri-food activity) as the essential basis to provide other services (public or corporate), and taking into account that it is a necessary, essential though not sufficient condition to digitise rural areas, the Strategy has measures to improve connectivity. MAPA will implement these mainly by coordinating activities with the competent Public Administrations.

As analysed by the Focus Group on Digitisation and Big Data in its Challenge 1, "Tackling rural depopulation, fostering the introduction of young people and reducing the digital divide", the lack of Internet connections throughout very significant swathes of territory is a factor that hinders the provision of other types of services. This strategic line attempts to foster said connectivity, using the technologies and technical conditions most suited to respond to the need in each case.

The authority for ensuring connectivity such as the powers over regulation, promotion and development of telecommunications and information technologies, as well as for ensuring the rollout of public electronic communications networks and the provision of a universal service of telecommunications, is all under the responsibility of the General Directorate of Telecommunications of the SEAD (Secretary of State for Digital Progress) of the Ministry of Economy and Business[36]. Therefore, the measures in this Strategy are intended to bolster public policies taken up by said ministry, raising awareness about them in the agri-food and forestry sector and rural areas. This is done so that on the one hand the

36—Royal Decree 1046/2018, of 24 August, implementing the basic organic structure of the Ministry of Economy and Business:
https://boe.es/boe/dias/2018/08/25/pdfs/BOE-A-2018-11840.pdf

existing services are used, and on the other, the needs and context of the sector and rural areas can be conveyed to the ministry in order to be able to provide a reasonable solution in terms of cost-profit for those providing the service, within a reasonable amount of time and at market prices for the end users.

Measures:

- **O1. L1. M1.** Coordination to improve connectivity
- **O1. L1. M2.** Dissemination and advice in the sector as regards existing formulas for connectivity

AGRICULTURAL AND FORESTRY ACTIVITIES ARE OFTEN CARRIED OUT IN TERRITORIES FAR FROM POPULATION HUBS. **IT IS NECESSARY TO PROVIDE THESE AREAS WITH CONNECTIVITY TO ENABLE THEM TO ADOPT DIGITAL PROCESSES AND APPLY NEW INFORMATION TECHNOLOGIES** USING THE MOST SUITABLE TECHNOLOGICAL SOLUTION TO RESPOND TO EACH NEED

O1. L1 Measure 1

Coordination to improve connectivity

Agricultural and forestry activities are often carried out in territories far from population hubs. It is therefore necessary to provide these areas with connectivity to enable them to adopt digital procedures and to apply new information technologies using the most suitable technological solution from those available to respond to each need at all times. To do so, greater coordination is desirable between MAPA and SEAD, the municipalities and the operators in order to bring about coverage in the territory beyond the population hubs, taking into account the different technologies available: fibre optics, satellite access and other radio- communication technologies that together may help mitigate the effects of low connectivity perceived by the sector.

As for MAPA, its specific coordination activities are:

- **Conveying the sector's demands to the competent bodies and operators.**
- **Helping the needs of the agri-food and forestry sector and rural areas to be considered in the calls for aid for the increase in connectivity being promoted and managed by the SEAD.**

01. L1 Measure 2

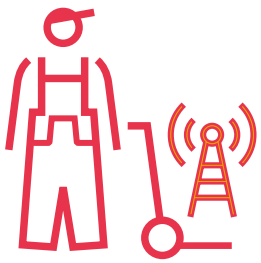
Dissemination and advice in the sector as regards existing formulas for connectivity

SEAD is fostering coverage in populations in rural areas and in the territory with other types of technologies different from those that are widespread among the population. Having detected that many of these initiatives are not sufficiently well- known in the agri-food and forestry sector or in rural areas, MAPA will carry out dissemination activities for SEAD's initiatives concerning connectivity in rural areas via vehicles such as the National Rural Network.

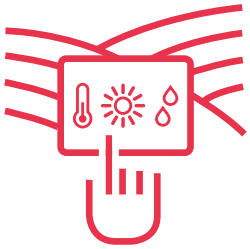
Based on the Focus Group tasks and interlocution with the sector, MAPA is aware of the demand from rural area inhabitants, especially among businesspeople in the agri-food and forestry sector, for obtaining adequate connections for the places in the territory where they truly carry out their activity. This difficulty also affects the technological companies that develop applications needing certain coverage in order to be made available to users, which in turn makes it difficult to adopt digitisation processes in the rural territory's economic activities.

MAPA, in coordination with the Public Administrations with the relevant powers, will implement these activities:

- **Distributing informative material, bulletins, etc., and organising events, workshops etc. to bring together those supplying and demanding telecommunications services in rural areas where there is the possibility of connecting the agri-food sector and players in rural areas with the relevant parties such as recognised official operators registered in SEAD, to ensure coverage in the territory. These informative activities will serve to disseminate the different plans for aid existing at state and autonomous regional level in order to extend broadband via fibre optics, satellite broadband and other technologies, and new formulas to improve connectivity and introduce it to ensure it is available at affordable prices.**
- **Fostering advice services to facilitate connectivity in the territory so that the end users may adopt the digitisation process demanded in the most suitable way and with information about the services offered by different telecommunications operators in their region, which respond to the necessary technical characteristics for the chosen technological solution, as well as informing about the associated costs.**



FORMULAS WILL BE DEVELOPED TO BRING TOGETHER THOSE SUPPLYING AND DEMANDING TELECOMMUNICATIONS SERVICES IN RURAL AREAS



AGRICULTURAL AND LIVESTOCK FARMERS, FORESTRY MANAGERS AND INHABITANTS OF RURAL AREAS MUST DEVELOP NEW SKILLS, APPROACHES AND MECHANISMS TO IMPROVE KNOWLEDGE EXCHANGE WITH THE NEW PARTIES INVOLVED IN THE ECONOMY.

01 Strategic line 2

Training

From the point of view of the population, in order for digitisation to be a useful instrument the inhabitants of rural areas must develop the necessary skills as end- users of its different applications. It is not only a matter of the necessary technology being available (narrowing the digital divide, addressed in the previous strategic line), but of introducing the technology into the everyday tasks to be carried out in the agri-food and forestry sector and rural areas (narrowing the adoption divide).

In the sector in Europe, agricultural systems are evolving towards a value chain approach to meet the demands of citizens and consumers, as well as the responsibilities and commitments necessary for social, environmental and economic sustainability.

For agricultural and livestock farmers, forestry managers and inhabitants of rural areas, this means that they need new skills, new approaches and mechanisms to improve knowledge exchange with the new economic players. Collaboration is required to foster closer interactions between the Public Administration, companies, farmers, the academic world and civil society.

To do so, it is necessary to take action in formal education (vocational training and university education) and in non-formal education so that professionals in the sector who have recently graduated or who have years of experience may acquire the necessary skills for the technologies to become an inseparable part of their daily work and of the way of managing their farms and industries in the sector.

Medidas:

- **O1. L2. M1.** Fostering the inclusion of digitisation in formal education
- **O1. L2. M2.** Non-formal continuous education and skills acquisition
- **O1. L2. M3.** Attracting young people and women as stable inhabitants in rural areas

01. L2 Measure 1

Fostering the inclusion of digitisation in formal education

Considering that in digital transformation of the economy, society evolves faster than the curricula set out in the formal education system, work must be done to introduce new curricula orientations in universities and vocational training to strengthen the connection between these two educational spheres and to improve their interactions with other relevant parties in the system.

The aim of this measure is to train agricultural students in matters linked to digitisation by **improving the interaction between higher education and vocational education in agriculture, with research, agricultural advisers and the agri-food and forestry sector and rural areas**. This is done via networking, sharing knowledge and experience about digitisation, new technologies and massive data management in order to make the digital transformation effective and real.

To do so, MAPA will foster the inclusion of digitisation needs and demands in new academic curricula in order to introduce subjects necessary to train future graduates in matters related to the digital transition of the sector. It will carry out activities in collaboration and coordination with the competent ministerial departments, in particular with:

- **The Ministry of Science, Innovation and Universities (hereinafter MICINN) for university education (bachelor's and master's degrees)..**
- **The Ministry of Education and Vocational Training for vocational training.**

MAPA and the MICINN[37] will foster the inclusion of subjects or content on digitisation, new technologies and massive data management in the study plans of agricultural and forestry schools and in their lecturers' education plans in order to give future graduates (bachelor's, master's, PhD) and lecturers the necessary knowledge about the digital transition of the agri-food and forestry sector.

37—On drawing up the Strategy, there has been interlocution with different units and departments of the General Administration of the State (Annex I), doing so with the Ministry of Science, Innovation and Universities being consulted as regards their powers and especially with this measure (Royal Decree 865/2018 of 24 August, implementing the basic organic structure of the Ministry of Science, Innovation and Universities).

Moreover, the Ministry of Education and Vocational Training, in collaboration with the autonomous regions' educational authorities, will continue fostering the digital skills of teachers, students and institutions, as well as teacher training and innovative digital education projects.

THE USE OF NEW INSTRUMENTS COMPLIMENTARY TO THE TRADITIONAL ONES IS ESSENTIAL IN RESTRICTING THE DIGITAL TRANSFORMATION'S POSSIBLE EFFECTS ON THE SECTOR'S STRUCTURAL DIVIDE, BY MEANS OF COLLABORATION AMONG SMALL AND MEDIUM- SIZED AGRICULTURAL AND LIVESTOCK FARMERS, AND COOPERATIVES AND SMES IN THE AGRI-FOOD SECTOR AND IN RURAL AREAS

01. L2 Measure 2

Non-formal continuous education and skills acquisition

Currently, the new methods for non-formal continuous education in the agri-food sector are geared more towards learning based on practice and entrepreneurship, combining in-person classes with online classes, sessions and tutorials.

With this orientation, the intention is to use new instruments to complement traditional ones in order to implement a series of activities aimed at promoting continuous education geared towards acquisition of new digital skills (by the parties involved in the Knowledge and Innovation Systems in the agri-food and forestry sector and rural areas). It is also aimed at the management and use of data, as well as fostering collaboration and a culture of cooperation in order to create an ecosystem in which useful, accessible and reliable data can be shared. This aspect is essential in limiting the possible effects of digital transformation on the sector's structural divide, via collaboration among smaller and medium-sized agricultural and livestock farmers, agri-food cooperatives and SMEs, and rural areas.

The need for continuous education adapted and scaled to the users' level, the need for training and information about Industry 4.0, the lack of qualified staff and the end users' low skills level have been identified in previous works[38] as the main educational barriers to fostering a digital transition in the sector.

The intention is to aim the training at three fundamental parties:

- Professionals from the sector
- Directors and managers of agri-food cooperatives and industries
- Agricultural advice services

38—Barriers identified in the Focus Group on Digitisation and Big Data to tackle the adoption divide: http://www.redruralnacional.es/documents/10182/417111/Maquetacion_Interior-VERSION_LARGAweb. pdf/e7662acd-2811-42f1-8fff-c409b76f90d2

Synergy-based measures related to the Spanish Social Economy Strategy 2017- 2020 (EESS)[39] will be contemplated, especially Measure 25: Holding events, courses and seminars for training in ICT applied to the social economy, which forms part of Activity Axis 6, "Boosting the Digital Economy".

Simultaneously, use will be made of the experience and programmes underway to carry out educational activities in entrepreneurship and new models for business and marketing linked to digitisation, which are currently being offered by different public[40] and private entities.

This measure will be implemented by means of direct action by MAPA and by promotional activities in coordination with other public and/or private entities.

Within the programme for rural development, the following is planned:

- **Non-formal professional training and acquisition of the necessary skills to overcome the barriers identified for the digital transition, as well as to provide technicians in the use of digital data, qualified and authorised observers for data processing and technicians in Industry 4.0.**
- **Workshops, events and seminars concentrating on collective action that will enable a group of users (SMEs and startups) to be explained the advantages and methods necessary to introduce technological solutions and raise awareness about aid programmes to foster the use of ICTs, or aimed at boosting digital entrepreneurship, or else capitalising on the Strategy's activities.**
- **Demonstrations in the field on the functionality of activities in the sphere of digitisation to be communicated to a target group, complementing this with the creation of a platform of exemplary, pioneering farms and agri-food SMEs and startups.**

39—Spanish Social Economy Strategy (*Estrategia Española de Economía Social 2017-2020*, EESS). Implemented by the Ministry of Labour, Migrations and Social Security. Official State Gazette, 20 March 2018. https://www.boe.es/boe/dias/2018/03/20/pdfs/BOE-A-2018-3857.pdf

40—For example: Red.es, ICEX Spain Exports and Investments, etc.

In addition, MAPA has planned training activities for directors and managers of agri-food cooperatives and industries to enable a digital culture to be developed among the decision-taking bodies, which will speed up the digital transformation process. These activities provide a boost to training in the digital sphere via the different targeted activities that MAPA carries out through the training programme in the agri-food chain and collaboration agreements with the operators in the sector.

MAPA plans to collaborate with the Ministry of Economy and Business as regards aid for the training in digitisation it provides, with the aim of conveying the sector's specifics in its calls and of raising awareness in the sector about their existence.

01. L2 Measure 3

Attracting young people and women as stable inhabitants in rural areas

For the population to settle in rural areas, it is necessary to attract young people and women, not forgetting the current inhabitants. Developing skills aimed at these population groups will bring about a more attractive environment for them and generate added value to help populate such areas.

THE AIM IS TO CONSOLIDATE THE ROLE OF **YOUNG PEOPLE AND WOMEN AS AGENTS FOR CHANGE** AND FOR THEM TO BE THE VEHICLE TO TRAIN FARMERS AND INHABITANTS OF RURAL AREAS WHO ARE NOT DIGITAL NATIVES

Young people born in the digital era are valuable human capital that may be useful for two goals: boosting the digital skills that exist in the agri-food sector and rural areas, and making this activity more attractive for young people and women by adopting digital transformation processes, thereby helping them to enter the agri-food sector and rejuvenating the rural population.

This measure is intended to empower young people and women to take part in the digital transformation process in the agri-food and forestry sector and rural areas, and to improve the knowledge exchange processes among farmers in different regions of Spain, which will enable them to gain new experience and ways of working without having to travel. This is fundamental for agricultural farmers to adopt new technologies and for them to create networks with agricultural and livestock farmers, and SME and startup managers and businesspeople in the sphere.

- To do so, MAPA will directly boost and implement action in coordination with agricultural organisations, co-operatives and local action groups with the aim of consolidating the role of young people and women as agents of change for them to become the vehicle to educate farmers and inhabitants in rural areas who were not born into the digital era. It will do so by implementing the consecutive phases of identification of trainers, holding training courses aimed at them so that they learn methods about the processes of passing on skills and specific training, as well as educational activities at the supra-regional level aimed at agricultural and livestock farmers, workers in the agri-food industry and forestry, and inhabitants of rural areas, as well as fostering the creation of networks.
- Consideration is also given to capitalising on the activities of sharing experience among young people carried out by MAPA, which seeks to improve the knowledge exchange processes between farmers from different regions of Spain, which in turn will allow them to gain new experience and ways of working in situ, which is fundamental for farmers to adopt new technologies.

BY OPENING UP DATA, THE PUBLIC ADMINISTRATION MAKES A VALUABLE CONTRIBUTION TO CIVIL SOCIETY NOT ONLY DUE TO THE TRANSPARENCY IT GIVES BUT ALSO BECAUSE IT CREATES NEW BUSINESS OPPORTUNITIES

OBJECTIVE 02

FOSTERING THE USE OF DATA

Rationale behind the activities:

The purpose of data collection must be to generate value and facilitate decision- making, so accuracy is important when analysing it. When implementing the IoT in practice in the agri-food sector and making use of this massive data collected thanks to the widespread use of big data technology, we can find data from different sources that may be structured or not: agricultural and livestock farmers, cooperatives, agri-food industries, technological companies, machinery companies, Public Administrations, universities and research centres.

The growing range on offer from manufacturers of different devices with innovative tools on IoT platforms for the agri-food and forestry sector and rural areas, means that interoperability is quickly becoming a cause for concern.

By opening up data, the Public Administration makes a valuable contribution to civil society, not only due to the transparency it brings, but also because it creates new business opportunities, especially in the infomediary sector[41], which is growing ever bigger and more powerful in Spain. It also helps the Public Administration by improving the data offered[42].

41—According to the 2016 ***Characterization Study of the Infomediary Sector*** published by the National Observatory for Telecommunications and the Information Society, ONTSI, the infomediary sector is a "group of companies that become intermediaries for information in general, analysing and processing information from the public and/or private sector to create added value products for third companies or citizens that help to take decisions effectively, and more."
https://www.ontsi.red.es/ontsi/sites/ontsi/files/121001_red_007_final_report_2012_edition__vf_en_1.pdf

42—Various reports mentioned in this generation of value. Among others:
The ***2016 Characterization Study of the Infomediary Sector***
https://www.ontsi.red.es/ontsi/sites/ontsi/files/121001_red_007_final_report_2012_edition__vf_en_1.pdf
The reuse of open data: an opportunity for Spain (*La reutilización de datos abiertos: una oportunidad para España*), July 2017, COTEC Foundation for innovation.
http://informecotec.es/media/INFORME_REUTILIZACION-DE-DATOS.pdf
Digital Economy and Society Index 2018, country report for Spain, *European Commission*.
http://ec.europa.eu/information_society/newsroom/image/document/2018-20/es-desi_2018-country-profile-lang_4AA8143E-CA74-9BD7-2FBD36EBA0B95CCB_52357.pdf
Open data: Strategic guide for its implementation and minimum data sets to publish (*Datos abiertos: Guía estratégica para su puesta en marcha y conjuntos de datos mínimos para publicar*), 2017, Spanish Federation of Municipalities and Provinces.
http://femp.femp.es/files/3580-1617-fichero/Gu%C3%ADa%20Datos%20Abiertos.pdf

Furthermore, in the agri-food sector internationally, food is a challenge now and will be in future, as is the generation of a sustainable agricultural sector. One of the key aspects to tackle this challenge is data sharing. For this reason, the organisation Global Open Data for Agriculture and Nutrition (GODAN) was created, which is backed by various governments and the United Nations Food and Agriculture Organisation (FAO) with the aim of supporting data exchange about agriculture and nutrition in order to address the challenge of guaranteeing world food security.

To do so, it is necessary for the Public Administration to foster the role of collective data management for the sector, establish incentives for public use of data for research and knowledge generation, back a data repository and establish a common strategy for interoperability.

Strategic lines:

- **02. L1.** Interoperability
- **02. L2.** Open data
- **02. L3.** Data from the value chain and environmental data

02 Strategic line 1

Interoperability

In order to prevent end users from becoming linked to closed-off technologies and/or platforms based on captive business models, the intention is to foster interoperability of the data by making agreements on common and compatible languages (onthologies, semantics, standardised languages and the use of open interfaces).

Platforms must be developed that allow clients to migrate when they see the opportunity of better services and products, thereby fostering the development of a dynamic, robust agri-food technological ecosystem where SMEs and startups can also compete and develop, and end users (agricultural and livestock farmers, and agri-food cooperatives and industries) can have the freedom to choose the tools they believe most suited to their needs within the market, thus avoiding the creation of captive markets or their investments becoming obsolete.[43]

FOSTERING INTEROPERABILITY WILL LEAD TO A BETTER, MORE SOLID DECISION-MAKING CAPACITY, WITH A VIEW TO INTRODUCING NEW TECHNOLOGIES AND DEVELOPING NEW SERVICES IN FARMS, COMPANIES AND RURAL AREAS.

43—From the conclusions of the working group on interoperability held within the Focus Group on Digitisation and Big Data:
http://www.redruralnacional.es/documents/10182/417111/Maquetacion_Interior- VERSION_LARGA-web.pdf/e7662acd-2811-42f1-8fff-c409b76f90d2

Fostering interoperability, therefore, will lead to a better, more solid decision-making capacity, with a view to introducing new technologies and developing new services in farms, companies and rural areas.

Measures:

- **O2. L1. M1.** Fostering collaboration to improve interoperability by capitalising on existing initiatives on a European level
- **O2. L1. M2.** Interoperability projects that respond to specific problems in which interregional stakeholders cooperate

O2. L1 Measure 1

Fostering collaboration to improve interoperability by capitalising on existing initiatives on a European level

On a European level, there are currently different initiatives[44] that are working to improve the interoperability of data gathered by sensors and processed by platforms in the agri-food and forestry sector. They are initiatives involving multiple parties from the business and research worlds, and in many cases from several countries.

The aim of these information systems is for the use of interoperable technologies to enable an improvement in productivity, sustainability and added value for production processes in the agri-food sector.

- **Dissemination activities will be carried out to raise awareness about the existence of these initiatives and encourage the sector to adopt these solutions and other similar ones.**
- **The intention is to boost and support the sector's collaboration with these initiatives for future activities that may be carried out in this field in the matter of standardisation in Spain and internationally.[45]**

44—For example:
API-Agro (France): This is an initiative from the agricultural world that aims to interconnect the parties in the public and private sectors and create a federation of them through an independent technological platform in order to develop innovations with a vision of efficient, responsible agriculture.
FIWARE: This is an open code platform's set of components to speed up the development of interoperable smart solutions in different sectors (industry, power, agri-food, etc.).
IoF2020: *Internet of Food and Farms 2020* is a multinational, public-private consortium made up of 71 members whose goal is to develop solutions backed by IoT technology for the agri-food sector. It intends to bring about disruptive change, very significantly improving the productivity and sustainability of agricultural and livestock practices. Its mission is to demonstrate the added value of using devices of all kinds connected to the Internet that can be managed and controlled remotely by different parties in the agri-food chain.

45—For example, the UNE in Spain and CEN, CLC, ETSI, ISO, IEC, ITU, etc. internationally.

02. L1 Measure 2

Interoperability projects that respond to specific problems in which interregional stakeholders cooperate

The intention here is to bring about initiatives, proposals and projects which, through specific problems related to the interoperability of data from the sector, enable innovative solutions to be found that may then be broadened or extended on applying them to the sector.

- **Within the context of the cooperation measure for which the EIP-Agri is used in rural development programming, there will be encouragement and backing given to innovative projects developed by operational groups on the supra-regional level that provide solutions to the problems and needs of the sector as regards the interoperability of data and platforms.**
- **MAPA will promote competitions about interoperability and the use of data.**

02 Strategic line

Open data

Today, the Open Government initiatives can be found in all the countries in our socio-economic surroundings. Their three fundamental principles are: transparency, collaboration and participation. In this context, the reuse of public information is essential to achieve open government. In Spain, the reuse of information from the public sector has been regulated since 2007[46].

The aim of the regulation on reuse is for much of the public budget allocated to carrying out studies, reports, documents, data gathering, etc. to benefit society by publishing them, so that specialised companies can create products and services with added value based on the data, documents, etc. published by the Public Administrations.

In the prior work by the Focus Group on Digitisation and Big Data, the opening up of data from Public Administrations andresearch was identified

46—Firstly with *Law 37/2007 of 16 November on the reuse of information from the public sector*, and subsequently with its adaptation with *Law 18/2015 of 9 July, amending Law 37/2007 of 16 November on the reuse of information from the public sector*, to include the change to EU regulations (Directive 2013/37/EU). Law 37/2007 was implemented in terms of regulations with Royal Decree 1495/2011, which due to the adaptation of the Law in 2015 is now being redrafted in order to publish up-to-date regulations.

as an important lever to enhance digital transformation in the agri-food sector by fostering the creation of new products and services among private companies. It is important to encourage the use of public data to boost digitisation of the sector and guarantee the quality and reliability of the data as a basic premise in order for the use and analysis of it to be conclusive. Everything related to the reuse of data is considered to be crucial for generating greater economic and social value for the data upon sharing it, and thereby stimulating digitisation processes. At the same time, the sector can be stimulated as regards improving data exchange and usage to generate new technologies and services which in turn generate new business opportunities and provide value for the sector and rural areas. That is why Public Administrations, with their policies of data openness and information reuse, give access to the information necessary to implement new solutions and foster innovation.

Rural development and the agri-food and forestry sector can benefit from the publication of open data and the opportunities generated from it. Not only does it provide access to the information for producers; it also favours development of an ecosystem of infomediaries who combine ICT skills with their knowledge of local problems, and are therefore able to offer information of added value for their clients (for example, agricultural producers).

This is why it is important for public policies to enable added value to be provided and generated for society in general and the sector in particular, by reusing information from the public sector and opening up data.

Measures:

- **O2. L2. M1.** Open data in Public Administrations
- **O2. L2. M2.** Public research data

OPEN DATA RESIDING IN THE SPHERE OF PUBLIC ADMINISTRATION IS AN EFFECTIVE **LEVER TO DEVELOP TECHNOLOGIES LINKED TO APPRECIATION, MANAGEMENT AND USE OF DATA**

O2. L2 Measure 1

Open data in Public Administrations

Open data residing in the sphere of Public Administrations is an effective lever to develop technologies linked to appreciation, management and use of data, and it generates new business and social opportunities. MAPA and other Public Administrations have many databases of interest for the sector, some of which are already available to the public in reusable formats.

Strengthening the open data policy already launched in previous activities will foster the development of new business models and products based on data, thereby benefiting the sector.

In this vein, MAPA has launched initiatives to more intensively, efficiently and effectively share and use its own data handled internally by the ministry so that, as a result of analysing the data used internally, more sets of data than those currently published can be offered as open data. The aim is to offer new datasets in demand in the sector which MAPA believes to be of use and which may be introduced into products in the infomediary sector, in turn enabling new commercial products and/or services to be generated with added value for their end users.

- **MAPA will foster the opening up of data concerning the sector. This includes data for which the ministry itself is responsible as well as data from other Public Administrations with authority on the matter. Priority will be given to data that is in most demand by society or which provides most value to the sector, in order to stimulate consumption and the use of data to generate new products and services and increase the tools available for businesspeople in the agri-food and forestry sector and rural areas.**

02. L2 Measure 2

Public research data

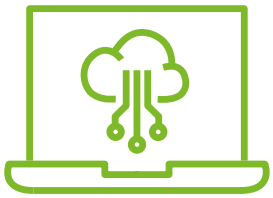
The aim of open science is to give all citizens access to scientific research. Within this, there is a distinction between open access (open availability of scientific publications) and open data (open availability of the results of research and of the methods and algorithms used).

Article 37 of Law 14/2011 on Science, Technology and Innovation[47] has a provision about open access publication, stipulating that all researchers whose activity has been mainly funded by the General State Budgets must publish via open access an electronic version of the content accepted for publication in research journals. To do so, the development of open access institutional repositories is fostered for publications by research staff in public agents of the Spanish Science, Technology and Innovation System (SECTI), as well as their connection with similar initiatives in Spain and internationally.

47—*Law 14/2011 of 1 June, on Science, Technology and Innovation*: https://www.boe.es/buscar/act.php?id=BOE-A-2011-9617

The Spanish Strategy for Science, Technology and Innovation 2013-2020 introduces open access to data and microdata, as well as to publications and results from research financed with public funds, including the drafting of guidelines providing their own repositories or shared ones.

The National Plan for Scientific and Technical Research and Innovation 2017-2020 follows the principle of transparency and accountability by including open access to the results and data from research subsidised with public resources, imposing the obligation to deposit the works published in scientific journals and financed through the State Plan into institutional and/or international repositories. Optionally, the funded R&D&I projects may include a plan for managing the research data, by which this data will be deposited in institutional, national and/or international repositories, while observing the necessary protection for reasons of confidentiality, security and commercial exploitation of the results via industrial property and intellectual copyrights. In any case, the results of research susceptible to protection by patents or another formula must be preserved. The aforementioned Plan includes promoting an open R&D&I model as one of its goals.



THE ACCESSIBILITY OF SCIENTIFIC RESEARCH FOR ALL CITIZENS **AIMS FUNDAMENTALLY TO FOSTER THE OPENING UP OF RESEARCH DATA** SO AS TO HAVE DIRECT USES, FOR EXAMPLE, TO DEVELOP TOOLS TO SUPPORT DECISION-MAKING IN THE AGRI-FOOD AND FORESTRY SECTOR

In this context, this measure aims fundamentally to foster the opening up of data so as to have direct use, for example, to develop tools to support decision-making in the agri-food and forestry sector..

- **MAPA, in collaboration with the MICINN, will carry out activities in support of opening up research data in the sphere of agri-food, forestry and rural areas, with a view to the stakeholders in the sector using them. To do so, action can be taken such as establishing obligatory requirements in order to receive public subsidies for research, incentive mechanisms (for example, giving awards to researchers who apply them), facilitator mechanisms such as the creation of infrastructures, definition of standards, raising awareness, a regulatory framework for intellectual property, industrial property, etc.**

02 Strategic line 3

Data from the value chain and environmental data

The current situation of the agri-food chain's structure in Spain enables quality, healthy foodstuffs and products to be available with numerous health checks and traceability. A great amount of data is generated throughout this production and distribution process.

The emergence of technology in the agri-food sector on the one hand allows a lot of data to be collected thanks to sensors on farms (precision farming) and in the industry (traceability, food safety, etc.) via IoT, and on the other, to have the capacity to process that data, whether via traditional information systems or systems backed by big data technology[48]. This use of technology helps improve decision-taking by the heads of farms based on data[49], as became apparent in the work by the Focus Group on Digitisation and Big Data in its Challenge 2, "sustainability, improved production and logistics" on analysing the situation of technology to improve production and specifically the tools to help support decision-making and the management of databases.

The use of data is also a key instrument in generating added value, thereby helping a more environmentally sustainable sector to take the lead. The capacity to process this data also helps enhance decision-making in this sphere. In this vein, Regulation 2018/84150[50] regulates the obligations to monitor emissions and removal of greenhouse gases from land use, land use change and forestry. The use of technology to automatically obtain the existing geospatial data and process it (Copernicus programme, remote sensing etc.) may also help bolster the information currently available for compliance with said Regulation and for the data related to the monitoring indicators planned in the future CAP.

48—The European Commission was behind the creation of the Alliance for Internet of Things Innovation, AIOTI, in order to create dialogue between the interested European parties within the IoT market. Within the alliance itself, there is a working group on Smart Farming and Food Security (WG06). It has drawn up a report entitled "Smart Farming and Food Safety Internet of Things Applications – Challenges for Large Scale Implementations" (http://ec.europa.eu/newsroom/dae/document.cfm?action=display&doc_id=11818), which includes the idea that using digital technologies in agricultural farming will bring benefits such as an increase in productivity, a rise in profitability, a reduction in the environmental footprint, etc., and will also improve food safety.

49—Conclusions concerning Objective 2, Sustainability, improved production and logistics, from the Focus Group on Digitisation and Big Data.

50—EU Regulation 2018/841 of the European Parliament and of the Council of 30 May 2018 on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry in the 2030 climate and energy framework, and amending Regulation (EU) No 525/2013 and Decision No. 529/2013/EU.

THE MEASURES IN THIS STRATEGIC LINE ARE GEARED TOWARDS STRENGTHENING DATA SHARING AMONG THE DIFFERENT PARTIES AND LINKS IN THE CHAIN, WHICH WILL ENABLE BETTER USE OF THE INFORMATION AND FOR TECHNOLOGIES TO SPREAD

The measures in this strategic line are geared towards strengthening leadership in the sector on a world level, thanks to this data sharing among the different parties and links in the chain, which will allows for better use of the information and for technologies to spread.

Measure:

- **02. L3. M1.** Support for the Code of Conduct to exchange and use data from agriculture and data from the chain
- **02. L3. M2.** Promoting incentives to digitise farm logbooks
- **02. L3. M3.** Cooperatives as data gatherers
- **02. L3. M4.** Spanish and European consumption data
- **02. L3. M5.** Collaboration to improve the CAP's Integrated Administration and Control System
- **02. L3. M6.** Fostering automatic collection of existing geospatial data on greenhouse gas emissions and removals from land use, and processing it

02. L3 Measure 1

Support for the Code of Conduct to exchange and use agricultural data and data from the chain

One of the main aspects to foster data exchange in the agri-food sector and in rural areas is to generate trust via suitable **governance that allows for protection of privacy, property rights and security in exchanging and using data.**

In this vein, and with no detriment to the fact that in future there may be specific legislative projects implemented, MAPA will back the initiative for self-regulation in the sector in order to take advantage of and increase the value of the data. This involves establishing a Code of Conduct for exchanging and using agri-food data aimed at the different parties in the chain (agricultural organisations, co-operatives, agri-food industries, input providers, agricultural machinery companies, technological companies and other parties in the chain) in order for them to subscribe their own code of good practices in using agricultural data or to encourage adhesion to the code recently adopted[51] on a European level by Copa- Cogeca, CEMA and other operators.

51—EU Code of conduct on agricultural data sharing by contractual agreement. https://copa-cogeca.eu/img/user/files/EU%20CODE/EU_Code_2018_web_version.pdf

- **To do so, MAPA will provide the means deemed necessary to bring together all of the interested parties, at the sector's proposal, in order to back the work carried out by some of the interested parties, disseminate it, encourage it to be adopted, and take part in the subsequent monitoring of it as an observer.**

02. L3 Measure 2

Promoting incentives to digitise farm logbooks

Farm logbooks are documents that must be filled in by the beneficiaries of aid based on the current CAP's conditionality rules and in compliance with Royal Decree 1311/2012[52]. They are mostly kept on paper. Although the Spanish Autonomous Communities have the authority over them, their digitisation on a national scale would generate very valuable data for the sector and help manage it on farms.

MAPA, in collaboration with the Autonomous Communities, published a harmonised and voluntary model[53] of the farm logbook with the aim of getting a national system of traceability and hygiene up and running in primary agricultural production. However, each Autonomous Community may establish another model.

It is desirable to promote and coordinate the adoption of digital, harmonised farm logbooks in the Autonomous Communities so that, in addition to streamlining management of them, valuable data on a national scale may be generated and use made of it for farmers to take decisions.

In this vein, there is already a market for technological companies that have developed solutions along these lines. This should be taken into account when adopting digitised farm logbooks.

- **MAPA will foster the development of working groups with experts from the Autonomous Communities in which common elements will be established to encourage and support users to adopt digital farm logbooks, as well as activities to disseminate the advantages of using them.**

PROMOTING AND COORDINATING THE ADOPTION OF DIGITAL FARM LOGBOOKS, IN ADDITION TO STREAMLINING MANAGEMENT OF THEM, **GENERATES VALUABLE DATA ON A NATIONAL SCALE AND USE MADE OF IT** FOR FARMERS **TO TAKE DECISIONS.**

52—Royal Decree 1311/2012, of 14 September, establishing a framework for action to achieve sustainable use of plant protection products:
https://www.boe.es/buscar/act.php?id=BOE-A-2012-11605

53—The form is available on MAPA's website and the Autonomous Communities' websites:
https://www.mapa.gob.es/es/agricultura/temas/sanidad-vegetal/modelo_de_cuaderno_de_explotacion_tcm30-57925.doc

02. L3 Measure 3

Cooperatives as data gatherers

Agri-food cooperatives play an essential role in structuring the supply of agricultural produce in Spain. Although until now the main flows generating value in cooperatives' activities have been economic ones with goods and products, their current structure also makes it necessary to consider the flow of data and knowledge. Taking this data flow into account will mitigate the possible digital divide that may arise due to the emergence of new technologies, thus enabling them to be adopted more efficiently from the grassroots.

- **MAPA will hold specific events for cooperatives to share methods and new practices in order to encourage the use of data to back decision- making.**

02. L3 Measure 4

Spanish and European consumption data

MAPA has had open data about food consumption in Spain since 2001[54]. There are also other public and private publications[55] about food and consumption in Spain, which could be bolstered depending on the demands from the sector.

With citizens and consumers being the focus of the intentions as regards diet, food and health, it is necessary to integrate other qualitative and quantitative aspects to help the agri-food sector develop by using new predictive technologies to foster a healthier society.

In the forestry sector, MAPA has data on the production and consumption of products deriving from timber, as well as other products from forests. Some of this is published as open data (Forestry Statistics Yearbook, *Anuario de Estadística Forestal*[56]), though progress in knowledge is

54—Data on food consumption published annually by the Food Consumption and Distribution Observatory. https://www.mapa.gob.es/es/alimentacion/temas/consumo-y-comercializacion-y-distribucion-alimentaria/observatorio-de-consumo-y-la-distribucion-alimentaria/

55—Publications such as the annual report on *Food Production, Industry, Distribution and Consumption in Spain* (MERCASA), data on food consumption from the European Food Safety Authority (EFSA), the EU Menu project implemented by said entity to harmonise consumption data throughout Europe, and the work carried out by the Spanish Food Information and Control Agency (AICA) in Spain.

56—*Anuarios de Estadística Forestal*. (Forestry Statistics Yearbook) https://www.mapa.gob.es/es/desarrollo-rural/estadisticas/forestal_anuarios_todos.aspx

necessary in line with other initiatives such as the Bioeconomy Strategy[57] and legislation enacted concerning legal trade of timber[58].

Today, a great amount of data is generated from consumers related to consumption habits and trends (for example, preferences for certain kinds of products, packaging, etc.). Most of this data stays in the distribution chain in the links nearest to the consumer. Adopting digitisation processes that enable this data to be shared and exported throughout the agri-food and forestry chain would generate value not only in the wholesale and retail distribution links, but also in the processing and production links. Thus, products could be obtained that are more suited to consumers' demand (in terms of characteristics, quantity, etc.), thereby helping to satisfy them as well as increasing the added value and profit for all links in the chain. Indirectly, it would also help European and Spanish public policies' sustainability goals, above all in reducing food waste and tackling climate change.

TODAY, **A GREAT AMOUNT OF DATA IS GENERATED FROM CONSUMERS RELATED TO CONSUMPTION HABITS AND TRENDS**. MOST OF THIS DATA STAYS IN THE DISTRIBUTION CHAIN

- **This measure will help to obtain and distribute consumption data (for example, trends, consumers' perception, etc.) throughout the agri-food and forestry chain, which is necessary on both Spanish and European levels. To do so, activities are being considered such as fostering innovative projects via aid to the EIP-Agri's operational groups in the context of the rural development programmes, providing a response to this need, competitions of ideas, best practices dissemination events, etc.**

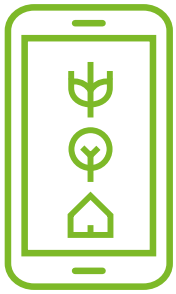
02. L3 Measure 5

Collaboration to improve the CAP's Integrated Administration and Control System.

The Integrated Administration and Control System, IACS, is the CAP's governance tool. On a European scale, new digital models are being adopted to help improve it.

57—The Spanish Bioeconomy Strategy – 2030 Horizon (*Estrategia española de Bioeconomía Horizonte 2030*) http://bioeconomia.agripa.org/download-doc/102163

58—Regulation (EU) No. 995/2010 of the European Parliament and of the Council of 20 October 2010, laying down the obligations of operators who place timber and timber products on the market. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32010R0995&from=EN



USING THESE NEW TECHNOLOGIES TO CONTROL THE CAP'S AID WILL MAKE IT EASIER TO MANAGE, **PROGRESSING IN MONITORING THE PERFORMANCE OF AGRICULTURAL PRODUCTION WITH MORE RELIABLE, INTEROPERABLE DATA THAT CAN BE EXTENDED TO THE REST OF THE AGRICULTURAL SECTOR**

As identified by the Focus Group on Digitisation and Big Data[59], the evolution towards monitoring agriculture and the CAP is an irreversible process for the mid- to-long term, given that the necessary technology and information are already available for the CAP and farmers to use. Using these new technologies to control the CAP's aid will make it simpler to manage it, while at the same time progressing in monitoring the performance of agricultural production with more reliable, interoperable data that can be extended to the rest of the agricultural sector under the CAP umbrella.

To do so, it is desirable to take advantage of the system's potential for digitisation.

- **MAPA takes part via the Spanish Agrarian Guarantee Fund (FEGA) as a CAP aid Paying Agency in the H2020 NIVA project. It does so in collaboration with Paying Agencies or Coordinating Agencies from nine Member States, as well as other partners from different Public Administrations, private companies and universities, encouraged by the EU's new regulations regarding checks via monitoring[60], and the Agriculture and Rural Development Commissioner's plans for the future of the CAP.**
- **The H2020 NIVA project[61] involves demonstrating the application of digital tools (whether existing but unrelated or from new sources) to improve in applying the CAP, while at the same time developing new opportunities for farmers and agri-food and forestry industries to improve their procedures and techniques. All of this is done for a more competitive and environmentally sustainable sector.**

59—Objective 8. Management of the CAP

60—Commission Implementing Regulation (EU) 2018/746 2018/746 of 18 May 2018 amending Implementing Regulation (EU) No 809/2014 as regards modification of single applications and payment claims and checks. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018R0746&from=GA

61—Project included within European project *"RUR-2018-20: Digital solutions and e-tools to modernize the CAP"*, and also within the Horizon 2020 Framework Programme for Research and Innovation. https://ec.europa.eu/programmes/horizon2020/what-horizon-2020

02. L3 Measure 6

Fostering automatic collection of existing geospatial data on greenhouse gas emissions and removals from land use, and processing it.

It is believed that in order to maximise the benefits of implementing this Strategy, it is worth addressing Spain's needs as regards the obligations for monitoring emissions and removals of greenhouse gases from land use, land use change and forestry, in compliance with Regulation (EU) 2018/841[62].

To do so, and in order to reinforce, complement and improve the information currently available, automatic data-gathering will be fostered to obtain the existing geospatial data and process it (Copernicus Programme, remote sensing etc.).

This effort will also serve to bring about synergies with the CAP which, in the current negotiation proposal for 2021-2027, includes monitoring and evaluation indicators along such lines.

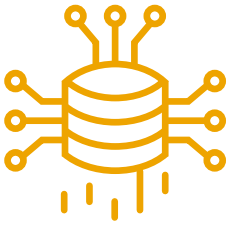
- **In order to implement this measure, a line of collaboration will be set up with the heads of the Ministry for the Ecological Transition (MITECO) in order to: process geospatial data on emissions and removals of greenhouse gases from land use; study ways of collecting such data using existing instruments at European and Spanish levels (Copernicus, remote sensing, etc.); and support decision-making and compliance with the stipulations of the Regulation on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry in the context of action as regards climate and energy until 2030[63].**

62—EU Regulation 2018/841 of the European Parliament and of the Council of 30 May 2018 on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry in the 2030 climate and energy framework, and amending Regulation (EU) No 525/2013 and Decision No. 529/2013/EU

63—See ref. no. 63.

OBJECTIVE 03

BOOSTING BUSINESS DEVELOPMENT AND NEW BUSINESS MODELS



DIGITAL TRANSFORMATION IN THE AGRI-FOOD AND FORESTRY SECTOR AND RURAL AREAS **MUST FOSTER BUSINESS DEVELOPMENT AND BRING ABOUT NEW BUSINESS MODELS** THAT ENABLE ECONOMIC ACTIVITY TO BECOME ESTABLISHED AROUND THESE SECTORS

Rationale behind the activities:

Digital transformation in the agri-food and forestry sector and rural areas must foster business development in this field and bring about new business models that enable economic activity to become established around these sectors in rural areas as a source of quality jobs, paying special attention to young people and women, thereby helping to make rural areas active and lively places that can attract population to them.

Digitisation of the business fabric helps improve competitiveness, consolidating it while fostering internationalisation and the creation of quality employment. The modernisation of Spanish rural and agri-food production fabric goes hand in hand with the development of a competitive technological sector capable of launching digital tools, services and products.

Historically, adopting new technologies has helped increase the size of farms, since it makes it possible to reduce production costs and creates opportunities for expansion. Furthermore, bigger farms often adopt the technology earlier, partly because of their capacity to take advantage of economies of scale and greater access to capital.

However, it is necessary to consider the peculiarities of small and medium-sized farmers and small and medium agri-food industries and cooperatives, which make up the backbone of the sector in Spain.

A priori, it may seem that ICT technologies have a neutral effect on the structural divide in the sector, given that access to them is not very expensive. Nevertheless, the need to develop skills to interpret data, establish greater levels of control and incorporate smart technology may lead to an increasing divide if it is not accompanied with certain inclusive measures. For this reason, it is important to foster a culture of collaboration among small and medium-sized farmers and agri-food industries and cooperatives.

The innovative ecosystems fostered by associations and development groups already present in rural areas and with demonstrable experience are especially important in implementing innovative approaches and methods.

Relying on entities that already have consolidated structures and resources to implement innovative measures will serve to optimise resources and multiply their effects, taking into account the potential of platforms, networks and demonstration or knowledge exchange activities among peers, as well as models for co-creation and co-development of innovative initiatives.

Líneas estratégicas:

- **03. L1.** Strengthening the digital innovation ecosystem
- **03. L2.** Advice on digital adoption in Knowledge and Innovation Systems for the Agri-Food and Forestry Sector and rural areas
- **03. L3.** Fostering new business models

03 Strategic line 1

Strengthening the digital innovation ecosystem

In Spain there is traditionally more innovation in the agri-food industry than in the primary sector. Indeed, the Spanish agri-food industry is one of the sectors that invests most in innovation, whereas the primary sector's spending on innovation is one of the lowest. It is thus necessary to make an effort to bring the level of the primary sector's innovation ecosystem up to that of the agri-food industry, not forgetting the necessary backing for the latter to continue.

Some structural reasons for the scarce introduction of ICT in farms[64] can be found in the digital divide in rural areas and the lack of interoperability mentioned above. Moreover, other digital products and services take a certain approach in their initial design, which then makes it difficult for them to be adopted by the end users (for example, projects driven by an emerging technology and not by real demand from agricultural farmers or end users). In order to adopt digital technology efficiently, it is therefore preferable for companies that develop digital products and services in agriculture to use more participative design methods that are more geared towards results.

This requires an effort to include farmers' expectations in a representative way, using collaboration strategies in thisprocess with aggregators or intermediaries, and getting the primary sector involved not only as a simple receptor of technologies but as a co-creator of specific products and

AN EFFORT IS NEEDED TO INCLUDE AGRICULTURAL FARMERS' EXPECTATIONS IN A REPRESENTATIVE WAY, USING **COLLABORATION STRATEGIES WITH AGGREGATORS OR INTERMEDIARIES, INCLUDING THE PRIMARY SECTOR AS CO-CREATOR OF SPECIFIC PRODUCTS AND SERVICES TOGETHER WITH TECHNOLOGICAL PROVIDERS**

64—During the work by the Focus Group on Digitisation and Big Data for the Agri-Food and Forestry Sector and Rural Areas, more than 40 barriers were identified linked to technical, economic, educational and legal aspects: http://www.redruralnacional.es/documents/10182/417111/Maquetacion_Interior-VERSION_LARGAweb. pdf/e7662acd-2811-42f1-8fff-c409b76f90d2

IT IS NECESSARY TO **GENERATE SYNERGIES AND SHARE INFORMATION AND SKILLS** AMONG THE DIFFERENT DIGITAL INNOVATION HUBS SO THAT THE EXISTING ONES CONNECT, AND TO SPECIFY A USEFUL FOCUS FOR THE SECTOR

services together with the technology providers.

In the current context of Agricultural Innovation and Knowledge Systems, and within the framework of Community policies, it is essential to strengthen the flow of knowledge among the different stakeholders and connecting structures.

With the measures contemplated in this strategic line, the intention is to foster an innovative digital culture within the agri-food sector.

Medidas:

- **O3. L1. M1.** Fostering Digital Innovation Hubs (DIH)
- **O3. L1. M2.** Innovative Public Procurement
- **O3. L1. M3.** Fostering collaboration among knowledge hubs, technological companies, and companies from the sector
- **O3.L1. M4.** Support for introducing the Living Labs method into Spain

O3. L1 Measure 1

Fostering Digital Innovation Hubs (DIH)

Spain, following the initiative[65] implemented at a European level, has different DIHs in most Autonomous Communities, some of which are linked to the agri-food sector. It is necessary to generate synergies and share information and skills among them so that the existing ones connect and to specify a useful focus for the sector.

- **MAPA will back this collaboration, which will contribute to an improvement in business performance and better articulation and stimulation of the agri-food DIHs operating at a regional, national and European level to adopt digital technologies more quickly and inclusively, becoming an interlocutor with the EU for the hubs specialising in digital innovation in the Spanish agri-food sector.**

65—The European Commission launched the first initiative related to the industry within the context of the Digital Single Market on 19 April 2016. Based on and complementing the different national initiatives to digitise the industry, the Commission will act to foster new investments in digitisation of the industry and to support the creation of better framework conditions for the digital industrial revolution. One of the most important pillars of the work to digitise European industry is the activity to develop a network of DIHs. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016DC0180&from=EN

03. L1 Measure 2

Innovative Public Procurement

One of the goals of Innovative Public Procurement is to foster business innovation and an improvement in public services by introducing innovative goods and services. This way of understanding public procurement[66] has been developed successfully in Spain in sectors such as healthcare (FID-Salud Programme[67]) and tentatively in the agri-food sector, with initiatives in some Autonomous Communities[68]. MAPA's intention is to promote this mechanism in collaboration with the competent departments in order to encourage this approach in supporting specific innovations as regards digitisation.

In collaboration with the competent departments, MAPA will encourage information about this Innovative Public Procurement approach to be disseminated and shared, so that both the sector and Public Administrations become familiar with it, thereby fostering its development in the agri-food sphere.

MAPA will carry out a sectorial analysis to identify the matters in the Agri-Food and Forestry Sector and rural areas that are most suitable for support through Innovative Public Procurement.

03. L1 Measure 3

Fostering collaboration among knowledge hubs, startups, technological companies and businesses in the sector

The Agricultural Knowledge and Innovation Systems (AKIS) describe how the people and organisations that generate, share and use knowledge and innovation for agriculture and related areas connect with each other in the different regions and Member States. These people and organisations are farmers; centres for research, knowledge and education; companies

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66—For the first time, the obligation has been established for the contracting bodies to ensure that the planning of the adjudication criteria enables high quality work, supplies and services to be obtained, specifically by including quantitative, environmental, social and innovative aspects linked to the purpose of the contract as described in *Law 9/2017 of 8 November on Public Sector Contracts*, which transposes Directives 2014/23/EU and 2014/24/EU from the European Parliament and of the Council of 26 February 2014. https://www.boe.es/buscar/pdf/2017/BOE-A-2017-12902-consolidado.pdf

67—*FID-Salud Programme*, developed by the Ministry of Health, Consumer Affairs and Social Welfare. https://www.mscbs.gob.es/profesionales/innovacionSanitaria/compraPubInn.htm

68—The initiatives underway are: the INNOLIVAR project in Andalusia, whose aim is to increase competitiveness, international positioning, technological capacity, and improvement in the technical side and profitability of olive farming and its business sector; and the CIVIL.UAVs.INITIATIVE in Galicia, whose technological Objective 1 is geared towards efficient management of land resources, agriculture, livestock farming and biomass.

from thetechnological sector; agricultural advisers and their organisations; the media used for communication; Public Administration and the other relevant parties in the process. Collaboration among all of these parties to improve the flow of knowledge and innovation will help achieve the objectives provided for in the CAP.

In the context of establishing the EIP's operational groups and implementing innovative projects under the auspices of the rural development programmes through the cooperation measure, small innovation ecosystems are created in which knowledge centres, startups, technological companies and companies from the sector all collaborate to tackle a specific problem or take advantage of an opportunity that uses an innovative solution, also generating knowledge of interest for an entire sector or subsector.

- **Taking advantage of these kinds of innovative activities focusing on aspects concerning digitisation, MAPA will create partnerships on a greater scale, fostering their participation in thematic networks and multi- actor projects in the H2020 Framework Programme.**
- **In collaboration with the MICINN , MAPA will carry out activities to bolster the connection with technological centres for skills learning, connectivity and encouragement for digitisation related to the DIHs, as well as with other innovative or technological parties whose aims are in line with agriculture and which are located near rural areas with a regional scope, and also with the Research Results Transferral Offices (OTRIS) of universities and research centres.**

TAKING ADVANTAGE OF THE CREATION OF COLLABORATIVE AND OPEN INNOVATION ECOSYSTEMS AIMED AT USERS IN A REAL-LIFE ENVIRONMENT GENERATED IN LIVING LABS, THE AIM IS TO **HELP GENERATE THESE SOCIAL INNOVATION PROJECTS**

03. L1 Measure 4

Support for introducing the Living Labs method into Spain

Given that there is currently a great availability of new technologies and services with the potential to facilitate progress towards digital transformation of the sector, it is believed that in order to bring them to the market successfully it is necessary to promote pilot project initiatives via interactive processes that foster co-creation and co-development.

Taking advantage of the creation of collaborative and open innovation ecosystems aimed at users in a real-life environment carried out in Living Labs, the intention is help generate these social innovation projects via the activities within the context of the H2020 Framework Programme and the rural development programmes.

The already-existing structures in the territory will be considered when applicable to reach the set objectives.

- **Via the FAIRshare project[69], MAPA takes part in developing methods and monitoring the 30 Living Labs planned on a European level. Once this methodological development has been tested, backing will be given to introduce the method in Spain by creating Living Labs with a supra-regional scope, specialising in different sectors.**
- **Furthermore, MAPA will coordinate with the competent Public Administrations and relevant organisations and entities to foster the development of Living Labs. These types of initiatives will also be encouraged by supporting the EIP-Agri's innovative projects.**

03 Strategic line 2

Advice on digital adoption in Knowledge and Innovation Systems for the Agri-Food and Forestry Sector and Rural Areas

The regulation proposal for the future CAP stipulates[70] that the advice services for farms will cover economic, environmental and social aspects and will provide up- to-date technological and scientific information drawn up based on research and innovation. They should be integrated in the interrelated services of farm advisers, researchers, farmers' organisations and other interested parties within the Agricultural Knowledge and Innovation Systems (AKIS).

In this context, the marketing cooperatives and companies, the big suppliers to the agricultural sector (machinery, seeds, agrochemicals, etc.) and the independent digital technology and service providers that access the farmers individually or via service and supply channels, all fit the profile of digitisation agents for the activities of agricultural and livestock farmers, forestry managers and agri-food industry SMEs. Collaboration between these parties is therefore necessary and there is an important role to be played

69—The FAIRshare project (Findable, Accessible, Interoperable, Re-usable and Shareable Digital Advisory Tools) was chosen to be funded by the European Commission in the context of Horizon 2020 Rural Renaissance. The project's general objective is to ensure that the community of agricultural advisers use digital tools and services. To do so, FAIRshare aims to involve, train and empower the community of independent agricultural advisers by exchanging tools, expertise and rationale. FAIRshare's scope includes improving productivity and sustainability in agriculture, activities to support innovation, the development of digital skills, a stronger European and regional AKIS, and faster implementation of new technologies with better social inclusion.

70—Article 13 of the draft for a Regulation of the European Parliament and of the Council, establishing rules on support for strategic plans to be drawn up by Member States under the Common Agricultural Policy (CAP Strategic Plans) and financed by the European Agricultural Guarantee Fund (EAGF) and by the European Agricultural Fund for Rural Development (EAFRD) and repealing Regulation (EU) No 1305/2013 of the European Parliament and of the Council and Regulation (EU) No 1307/2013 of the European Parliament and of the Council. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2018%3A392%3AFIN

by companies with robust solutions that facilitate interoperability, know the sector and are very committed to accompanying the different parties involved in this big challenge.

THE ADVICE MUST BE AIMED AT **FOSTERING MODERNISATION OF THE FARMS, CONSOLIDATING COMPETITIVENESS, SECTORIAL INTEGRATION, INNOVATION, MARKET ORIENTATION AND BUSINESS INITIATIVE** THROUGH DIGITISATION

One of the obstacles identified in the work by the Focus Groups on Digitisation and Big Data was the great fragmentation of the supply on offer and the lack of independent advice. At the heart of the SCAR-AKIS working group, reinforcement of advisory services is seen as essential to set up these systems. The regulation proposal for the 2021-2027 CAP includes "the development of digital technologies in agriculture and rural areas" within the sphere of advice services for farms[71] in keeping with the strategy for developing digital technologies in agriculture and rural areas and for the use of said technologies in order to improve the efficiency and effectiveness of the Strategic Plan interventions.

To do so, the advice must be aimed at fostering modernisation of the farms, consolidating competitiveness, sectorial integration, innovation, market orientation and business initiative through digitisation.

Medidas:

- **03. L2. M1.** Fostering knowledge and information exchange among digital advisers
- **03. L2. M2.** Advice for SMEs and startups in their process of digital adoption
- **03. L2. M3.** Bolstering advice via events and demonstration activities

03. L2 Measure 1

Fostering knowledge and information exchange among digital advisers

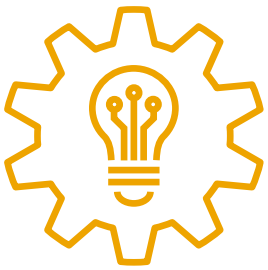
The sector's advisory needs are ever more diverse and not only related to agricultural and forestry techniques, butalso to those concerning matters of business management, entrepreneurship, facilitation, collaboration, cooperation and other soft skills. This is why it is necessary to explore the influence of digitisation and big data on the changing role of advisers and to use digital platforms to create advice groups and public-private collaboration structures that enable the different entities

71—Articles 13 and 102 of the Proposal for a Regulation of the European Parliament and of the Council, establishing rules as regards help for strategic plans that must be drawn up by the Member States in the context of the CAP (CAP Strategic Plans), financed by the European Agricultural Guarantee Fund (EAGF) and the European Agricultural Fund For Rural Development (EAFRD), and repealing EU Regulation 1305/2013 of the European Parliament and of the Council and EU Regulation 1307/2013 of the European Parliament and of the Council. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2018%3A392%3AFIN

and regions to collaborate efficiently. These networks of advisers must support agricultural and livestock farmers, forestry managers, agri-food SMEs and startups and other parties in rural areas in the process of business development for their farms, with the required skills and even by generating transnational advice service networks.

This challenge also involves the development of advisory skills corresponding to data flows via regional, national and transnational Agricultural Knowledge and Innovation Systems (AKIS) to generate trust in the end users as regards matters such as big data and artificial intelligence, and the use made of them.

- **MAPA will foster the creation of a national Spanish platform including the interested parties (impartial public and private advice services) that will facilitate knowledge exchange in a structured way in the digital sphere and identify the needs as regards educational and demonstration activities to be carried out in person.**
- **Complementing this, as a partner in the H2020 FAIRshare project, MAPA will work to obtain: inventories of digital tools and services as support for decision-making, analyses of critical factors for success and obstacles to carrying them out, a catalogue of good practices, and exchange visits to share experience, in collaboration with other benchmark organisations in Europe and Spain.**



ADVICE FOR SMES AND STARTUPS IN DIGITISATION MUST DEAL WITH ENQUIRIES ABOUT SOLUTIONS OR METHODS TO **IMPROVE BUSINESS MANAGEMENT USING ITCS AND HELP REVIEW THEIR PRODUCTION PROCESSES** TO ADOPT DIGITISATION

03. L2 Measure 2

Advice for SMEs and startups in their process of digital adoption

One key aspect in advice for digital adoption is setting up a service for SMEs and startups which on the one hand deals with enquiries about solutions or methods to improve business management using ITCs (presence on the Internet, social networks and online marketing, e-commerce, relationship with third parties, economic and business management, digitisation of services and solutions, digital entrepreneurship, etc.) and on the other helps them to review their production processes to adopt digital solutions.

The advice service must be provided based on evaluating the specific situation of the party being advised, not merely by providing information.

- **MAPA will foster and support the creation and registration of Digital Transformation Offices with a supra-regional scope that will provide an advice service for the sector in adopting digitisation procedures that help improve agricultural practices, modernise farms, improve competiveness, sectorial integration, innovation, market orientation and more, thereby supporting the provision of the service itself. These services will be extended to other activities carried out in rural areas that are not exclusively agricultural.**
- **The activities will be carried out within the context of the rural development programmes.**
- **The potential effect will be taken into account of activities carried out in support of entrepreneurship by the Ministry of Industry, Trade and Tourism via the Entrepreneur Service Points[72].**

03. L2 Measure 3

Bolstering advice via events and demonstration activities

In order to improve the process of technology being adopted by rural territories, agricultural and livestock farmers and agri-food sector industries and cooperatives, it is crucial to consider carrying out demonstration activities to clearly show the economic viability of the investments and to become familiar with the innovative activities (technologies and services) in situ that are linked to the digital transformation of the agri-food sector.

To do so, it is necessary to begin by identifying representative demonstration farms by sectors and subsectors. New technologies can be generated and tested under commercial conditions on these farms.

- **MAPA will create demonstration networks in which to learn in situ the innovative aspects of the new technologies implemented.**
- **Based on the method developed in the European AgriSpin project (funded via the H2020-FAIRshare project in which MAPA participates as a partner), exchange visits will be organised on agricultural and livestock farms and forestry land, and in cooperatives, industries and rural areas.**

72—The Ministry of Industry, Trade and Tourism has an *Electronic Entrepreneur Service Point*, PAEe, which enables companies to be created electronically, as well as a network of *Entrepreneur Service Points* that can lend support to the different measures being carried out through the Strategy. The PAEe provides information services related to information on funding via a database with all of the information on public aid and financial instruments.

- **To complement their advisory work planned in Measure O3.L2. M2, the Digital Transformation Offices will hold events that will explain to groups of SMEs and startup users the advantages of technological solutions and the methods required to introduce them, as well as to raise awareness about activities by other competent Public Administrations to foster the use of ICTs, as well as collective activities aimed at boosting digital entrepreneurship.**
- **The spheres to be addressed include those identified in previous work[73] such as smart farming, the creation and use of toolboxes, new business opportunities aimed at settling population in rural areas, the use of ICTs to introduce or improve bioeconomy or circular economy processes, monitoring and early detection of diseases, sustainable forest management, new distribution mechanisms, e-commerce, short supply chains, blockchain traceability, improvement in industrial processes, better knowledge of consumer trends, etc..**

03 Strategic line 3

Fostering new business models

The digitisation of the economy brings with it the development of new business models and new forms of social and business organisation that will change the way citizens relate to each other and with public and private entities. The companies and inhabitants in rural areas must get ready and plan ahead to be able to reap the benefits of the opportunities provided by digitisation of the agri-food sector and rural areas, in order to enable inclusive development and an improvement in the inhabitants' quality of life.

As set out in the Añora Declaration[74], it is necessary "not only to place value upon **innovative talen**t in rural areas, but also to **attract it and retain it**, offering entrepreneurial and job opportunities, thereby settling population in rural areas, especially young people. **Teleworking** and **coworking**, which digitisation makes possible in rural areas, may help to develop this talent in the context of initiatives related to innovation and social entrepreneurship."

THE DIGITISATION OF THE ECONOMY BRINGS WITH IT THE DEVELOPMENT OF NEW BUSINESS MODELS AND NEW FORMS OF SOCIAL AND BUSINESS ORGANISATION THAT WILL CHANGE THE WAY CITIZENS RELATE TO EACH OTHER AND WITH PUBLIC AND PRIVATE ENTITIES.

73—*Focus Group on Digitisation and Big Data for the Agri-Food and Forestry Sector*: http://www.redruralnacional.es/documents/10182/417111/Maquetacion_Interior-VERSION_LARGAweb.pdf/e7662acd-2811-42f1-8fff-c409b76f90d2

74—*Añora Declaration* (31 May, 2018). http://www.redruralnacional.es/documents/10182/465544/DeclaracionAnora.pdf/14bb48ed-264a-4564-8d16-cb6d6a7bd5cb

Companies need to get equipped with ICTs, opening up to e-commerce and consolidating Industry 4.0 to leverage change in the sector's digital business models.

It is essential for the competent Public Administrations to coordinate with each other in matters of labour legislation in order to promote new business models so as to give long-term support for these entrepreneurial initiatives implemented in the agri-food and forestry sector and rural areas[75].

The measures proposed in this strategic line are aimed at helping generate new business opportunities in the agri-food and forestry sector and rural areas, creating quality employment and an ecosystem of rural entrepreneurship.

Medidas:

- **O3. L3. M1.** Platform for digital entrepreneurship in rural areas
- **O3. L3. M2.** Fostering telework
- **O3. L3. M3.** Coordination between Public Administrations to bring in line aid for entrepreneurship in rural areas
- **O3. L3. M4.** Dissemination of European initiatives linked to digitisation in the spheres of Smart Villages, rural entrepreneurship and Startup Europe
- **O3. L3. M5.** Boosting development of a Smart Rural Territories ecosystem. Startup Villages

75—For example, see the inclusion of incentive measures to foster self-employment via the amendment to Law 20/2007 of 11 July on the Self-Employed Workers' Statute, (Article 31 and Article 31 bis), via Royal Decree-Law 28/2018 of 28 December on the revaluation of public pensions and other urgent measures in social, labour and employment matters.

03. L3 Measure 1

Platform for digital entrepreneurship in rural areas

Systems must be set up in which new business models and digital entrepreneurs have a space, so it is necessary to foster rural areas that are modern, more dynamic and diversified. These systems must be capable of connecting rural territories' supply and demand with their potential inhabitants, helping to bring about new business models, attracting talent to the territory and generating new opportunities.

To do so, the existing initiatives and the structuring of the Internet platforms and those that may arise in the field of digital entrepreneurship in rural areas will enable supply and demand to be accessible to all parties in these territories and among the potential entrepreneurs who settle in them.

The way these platforms work must attract new population to the rural environment so as to favour these digital entrepreneurship initiatives. These online spaces for entrepreneurship may offer resources such as how to start up a digital business, show success stories, report on access to funding, and more.

Due to their knowledge of the territory, the local Public Administrations and Local Action Groups can play a relevant role in stimulating this platform.

- **MAPA will foster the creation of a rural entrepreneurship community specialising in the digital sphere, backed by a platform. The key aspects identified for this website platform's success are: using social networks, positioning their themes in the Internet, setting up a registry of digital entrepreneurs, mentoring for those signed up, and stimulating the platform, as well as an evaluation of the platform by the general public. This should not only increase the number of followers, but also foster interaction among them with measures such as support for other entrepreneurs in the sector, creating networking events and fostering agreements and alliances.**

CONNECTING SUPPLY AND DEMAND AMONG RURAL TERRITORIES AND THEIR POTENTIAL INHABITANTS HELPS FOSTER NEW BUSINESS MODELS, ATTRACTING TALENT TO THE TERRITORY AND GENERATING NEW OPPORTUNITIES.

03. L3 Measure 2

Fostering telework

In Spain, only 13% of companies offer telework, compared to 32% in Sweden and 37% in Denmark, which clearly shows there is significant room for improvement in access to this kind of work.

Telework is always considered beneficial for work/life balance, but for rural areas it may also be a significant catalyst to increase the population since it enables the inhabitants to access jobs without commuting to the workplaces in areas where the need to do so may be a hindrance.

- **MAPA will carry out coordination activities to foster the adoption of types of teleworking[76] for the inhabitants of rural areas, as well as providing an incentive for workers in companies with head offices in cities to move to rural areas and continue their work.**

03. L3 Measure 3

INVESTMENT IN LINES OF DIGITAL ENTREPRENEURSHIP IN RURAL AREAS IS CARRIED OUT THROUGH THE DIFFERENT PUBLIC ADMINISTRATIONS WITH LOCAL, REGIONAL AND NATIONWIDE AUTHORITY

Coordinación entre Administraciones para acercar líneas de ayuda al emprendimiento al medio rural

Investment in lines of digital entrepreneurship in rural areas is made through the different Public Administrations with local, regional and nationwide authority. It is therefore desirable to give support to foster entrepreneurship and development of new business models and initiatives linked to digitisation and social innovation through the instruments available implemented by other ministerial departments.

Activities backed to foster entrepreneurship through measures such as gaining venture capital and talent have a significant effect, helping to benefit from aid for technological innovation, an improvement and bolstering of funding systems for entrepreneurship, and better tax conditions. To do so, it is necessary to take into account the unique nature of digital rural startups, given the specific conditions of a sector with a greater degree of fragmentation and dispersion, less ease for connectivity in the territory, low population density and long distances from certain services.

76—In accordance with the provisions of *Royal Legislative Decree 2/2015 of 23 October, approving the recast text of the Law on the Workers' Statute* (Article 13 on teleworking; and Article 34 on working hours), as well as any other applicable provision that affects the implementation of this measure.

- **In coordination with the competent bodies, MAPA will help convey the context (i.e. needs and demands) of rural areas and their companies related to the lines ofaid in matters of digital entrepreneurship. It will also carry out awareness-raising activities about the lines of aid that may contribute to rural entrepreneurship.**
- **As for agricultural taxation, work will be done to improve and monitor the tax measures favouring entrepreneurship in rural areas, especially as regards the involvement of women and young people in such areas. Digitisation will be promoted so as to be included among the provisions of said tax measures.**

03. L3 Measure 4

Dissemination of European initiatives linked to digitisation in the spheres of Smart Villages[77], rural entrepreneurship and Startup Europe

In the EU, the following initiatives are being carried out regarding the use of digital tools in rural areas and the agri-food sector:

— Smart Villages
— Smart rural entrepreneurship
— Startup Europe

In 2017 the European Commission launched **EU Action for Smart Villages[78]**, announcing a series of initiatives as part of development in rural areas, regions, research, transport, energy, and policies and funds earmarked for digitisation. In this context, the Commission's approach has been to focus the term Smart Villages on people. The idea is for people in rural areas to take the initiative to find practical solutions to the challenges they face and to take advantage of the new opportunities

77—The term "Smart Villages" is used due to the eventual different connotations its meaning could have compared to the term *Territorios Rurales Inteligentes* ("Smart Rural Territories") used by the Secretary of State for Digital Progress in the National Plan for Smart Territories.
The terminology used by the European Commission is closer to the term "Intelligent Community" currently used in the United States (www.intelligentcommunity.org/what_is_an_intelligent_community), which explains that Intelligent Communities are those that due to crisis or planning have understood the huge challenges and opportunities of the globalised economy with broadband infrastructures, and have taken conscious decisions to create an economy capable of prospering within it. They are not necessarily big cities or famous technological centres. They are located in both developing and industrialised countries, and in both cities and rural areas.

78—EU action for Smart Villages.
https://ec.europa.eu/agriculture/sites/agriculture/files/rural-development-2014-2020/looking-ahead/rur-dev-small-villages_en.pdf

that are transforming rural areas towards the digital economy, as well as making rural areas more attractive. In this context, "smart" means innovating and using digital technologies when appropriate, using them as a means, not an end in themselves, and making the most of their potential while understanding them to be just another tool.

As for rural entrepreneurship, in the context of the EU Action for Smart Villages the European Commission created a working group on smart rural entrepreneurship. Business innovation can appear not only in urban environments but also in rural areas. However, in order to exploit said rural entrepreneurial opportunities, it is necessary to create an environment in which to develop them: a culture of rural business innovation, broadband connectivity and skills training in digital technologies. The latter two are addressed in the first strategic objective of this Strategy, whereas the former falls under fostering business development and new business models. Startup Europe is an initiative from the European Commission within the context of achieving the Digital Single Market.

Its priority objectives are to:

- Connect different stakeholders[79] like startups, investors, accelerators, female entrepreneurs, corporate networks, universities, etc.
- Connect local startup ecosystems by supporting regional initiatives such as Startup Europe Week and Startup Europe Regions Network
- Help startups enter other markets[80]
- Celebrate entrepreneurs' success[81]. There are successful cases of these initiatives in Spain that despite their potential are not managing to inspire other groups in rural areas or entrepreneurial or innovation circles.

▶ **With this measure, MAPA will raise awareness of these European initiatives and their associated funds so that they may serve as inspiration to adapt them to the situation in Spain. To do so, different types of activities can be carried out such as events, seminars, delivering leaflets, etc.**

79—The Startup Europe Map (http://www.startupeuropemap.eu/map/) shows how the startup players are connected in the European ecosystems.

80—Silicon Valley (for example, SEC2SV: Startup Europe Comes to Silicon Valley initiative), India (for example, the Startup Europe India Summit), Africa (Startup Europe Comes to Africa initiative, soon) and the United Arab Emirates (soon).

81—*Tech All Stars, Europioneers* and *StartUp Europe Awards*.

- **In collaboration with the competent Public Administrations and relevant entities, MAPA will systematically record successful cases in Spain linked to these matters, disseminating them throughout Spain and Europe to raise awareness among the public about these success stories and thereby placing value on the achievements, to serve as inspiration for others.**

03. L3 Measure 5

Boosting development of a Smart Rural Territories ecosystem. Startup Villages

In addition to these initiatives addressed by the European Commission as regards the aforementioned EU Action for Small Villages, there are nationwide initiatives linked to these matters, specifically related to Smart Rural Territories, either through provincial Public Administrations, regionally or nationwide.

In this vein, developing an ecosystem of Smart Rural Territories could bring about opportunities materialising in the form of startups that improve the living conditions of people in rural areas, generating new business and entrepreneurial opportunities in such areas. This may occur either locally or via interactions there may be in the local area, province, Autonomous Community, nation or world, helping to keep up the activity in the territory and hence repopulating, thereby ensuring that private and public services are provided in rural areas.

StartupCity Hubs in Europe is an initiative by the Startup Europe Partnership intended to promote the development of locally interconnected startup strategies, connecting medium-sized entrepreneurial European cities and supporting them to become startup cities[82].

This idea is also intended to be transferred to rural areas via Startup Villages to interconnect hubs in rural areas.

THE DEVELOPMENT OF AN ECOSYSTEM OF SMART RURAL AREAS COULD **BRING ABOUT OPPORTUNITIES TO IMPROVE THE LIVING CONDITIONS OF PEOPLE IN RURAL AREAS**

82—More information at https://startupeuropepartnership.eu

- **MAPA will collaborate with the competent or relevant Public Administrations and entities to carry out activities in this sphere. Within this context, the plan is to carry out different types of activities such as boosting the implementation of pilot projects that take into account the rural socio-economic context as well as the exemplary nature they may have for future initiatives. Furthermore, implementation or participation in awareness-raising activities is considered (events and seminars, distribution of publications, etc.).**
- **MAPA will collaborate with the relevant authorities (European Commission, local authorities and other parties); it will boost the creation of Startup Villages to back entrepreneurship, foster the creation of startup ecosystems within and between rural hubs, and help them to develop and establish themselves, all at the heart of a network analogous to the existing one for the StartupCity initiative, but transferred to the rural world.**
- **To implement this measure, the intention is to have the backing of Horizon Europe (Pillar III known as "Open Innovation") and its analogous instruments in successive programming periods.**

GOVERNANCE, MONITORING AND STIMULATION OF THE STRATEGY

GOVERNANCE, MONITORING AND STIMULATION OF THE STRATEGY

To ensure this Strategy is implemented suitably, collaboration and cooperation mechanisms are established among the parties involved to enable an efficient coordination structure to be set up among the different parties.

By means of a Strategy Evaluation, Monitoring and Review Plan, the results are assessed and necessary adaptations made depending on the results and on the future situations of the Strategy's context, taking into account the fast evolution experienced by digital solutions for the agri-food and forestry sector and rural areas.

The Strategy is to be launched based on biennial Action Plans, which will include its three objectives and contain the specific implementation of the strategic lines and the adaptation to the timing of the measures in the Strategy according to the budget.

Furthermore, public participation is intended to be given a boost and to capitalise on the results of the activities carried out in the biennial Plans through a series of stimulation activities.

THE STRATEGY IS TO BE LAUNCHED BASED ON BIENNIAL ACTION PLANS, WHICH WILL INCLUDE ITS THREE OBJECTIVES AND CONTAIN THE SPECIFIC IMPLEMENTATION OF THE STRATEGIC LINES AND THE ADAPTATION TO THE TIMING OF THE MEASURES IN THE STRATEGY ACCORDING TO THE BUDGET

System of governance

The General Subdirectorate of Innovation and Digitisation (SGID) of the MAPA's General Directorate of Rural Development, Innovation and Forestry Policy is responsible for developing and launching the biennial Action Plans.

The Public Administrations involved in developing the Strategy and its Action Plans shall participate via a Strategy Coordination Committee, which is set up as a technical work committee (and not as a collegiate body). It is to be made up of representatives from:

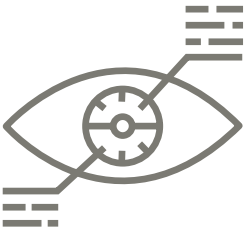
- the different MAPA units with authority in the matters addressed by the Strategy
- the units with authority in aspects of the Strategy from the following departments:
  Ministry of Economy and Business
  Ministry of Science, Innovation and Universities
  Ministry for the Ecological Transition
  Ministry of Education and Vocational Training
  Ministry of Finance
  Ministry of Labour, Migrations and Social Security
  Ministry of Industry, Trade and Tourism
- One representative from each of the three Autonomous Communities which will be designated every year by a rotating system provided for in the Coordination Committee Regulations, which shall be approved simultaneously with the publication of the first biennial Action Plan.

The Coordination Committee will determine the participation of representatives from the sector and other parties involved in Working Groups on specific aspects of the Strategy. Interlocution and coordination will be ensured with the working groups that have already been launched by other parties in the sphere of digital transformation in the sector.

Independent evaluators will monitor, evaluate and review the Action Plans upon which the Strategy is structured, and the results will be included in the Action Plan following the one being evaluated.

Mechanisms will be established to favour open participation by parties interested in the evolution of the Strategy, guaranteeing the transparency of its implementation to make it a dynamic, lively Strategy that can reflect the relevant changes in keeping with future needs.

A Digitisation **Observatory for the agri-food and forestry sector and rural areas** will be created:



A **DIGITISATION OBSERVATORY FOR THE AGRI- FOOD AND FORESTRY SECTOR AND RURAL AREAS** WILL BE CREATED

- It is dependent on the **General Subdirectorate of Innovation and Digitisation** and is created to carry out some of the latter's entrusted tasks concerning implementation of MAPA's functions[83] as per digitisation, in coordination with other ministerial departments with authority in the matter of digitisation and smart territories.
- The Observatory's **mission** is to be the entity to turn to for analysing and monitoring the digitisation of the agri-food and forestry sector and rural areas. The ultimate purpose is to improve their competitiveness and promote digital transformation in the sector by producing a system of indicators as well as researching, recording and analysing the sector's situations, public policies and trends as regards digitisation. The competent Public Administrations and the sector itself will thus be given complete, simple, clear and up-to-date information.
- To comply with its mission, it may carry out the following functions:
  - Monitor the advances, barriers, challenges and opportunities for digitising the sector, classifying the priority sectors and groups in terms of this digitisation. To do so, it may draw up a system of indicators, studies and reports; evaluate the evolution of the public policies implemented by the different Public Administrations in the sphere of the Observatory; analyse the main initiatives in the international sphere; create working groups, etc.
  - Monitor the development and effective reinforcement of the digital agri-food technological business ecosystem.

83—Royal Decree 904/2018, of 20 July, creating the basic organic structure of the Ministry of Agriculture, Fisheries and Food, and amending Royal Decree 595/2018, of 22 June, establishing the basic organic structure of the ministerial departments: https://www.boe.es/diario_boe/txt.php?id=BOE-A-2018-10245

- Publish an annual situation report intended to be a benchmark for digitisation of the sector. This information may be considered in developing public policies and in implementing activities related to digitisation of the sector. Identification of good practices, solutions and trends.
- Monitor public policies carried out in this matter.
- Disseminate information drawn up by the Observatory itself.
- Ability to act as interlocutor for Public Administrations (Spanish and international), institutions and the sector, for which it may take part in sectorial networks and joint projects in collaboration with national representatives or ones from other countries.
- Collaborate with sectorial organisations and associations, Public Administrations and other parties involved, as well as experts for ad hoc activities, in order to carry out the above functions.
- Any other action related to the Observatory's mission and the above functions attributed to it..

The activities and measures implemented by the **Strategy Coordination Committee** and by the **Digitisation Observatory for the agri-food and forestry sector and rural areas** will be introduced without increasing funding, remunerations or other costs of staff at the service of the Public Administration.

The activities to be carried out by the Public Administrations as a result of this **Digitisation Strategy for the Agri-Food and Forestry Sector and Rural Areas** and which affect their staff shall be adapted to the basic applicable regulations on staff spending.

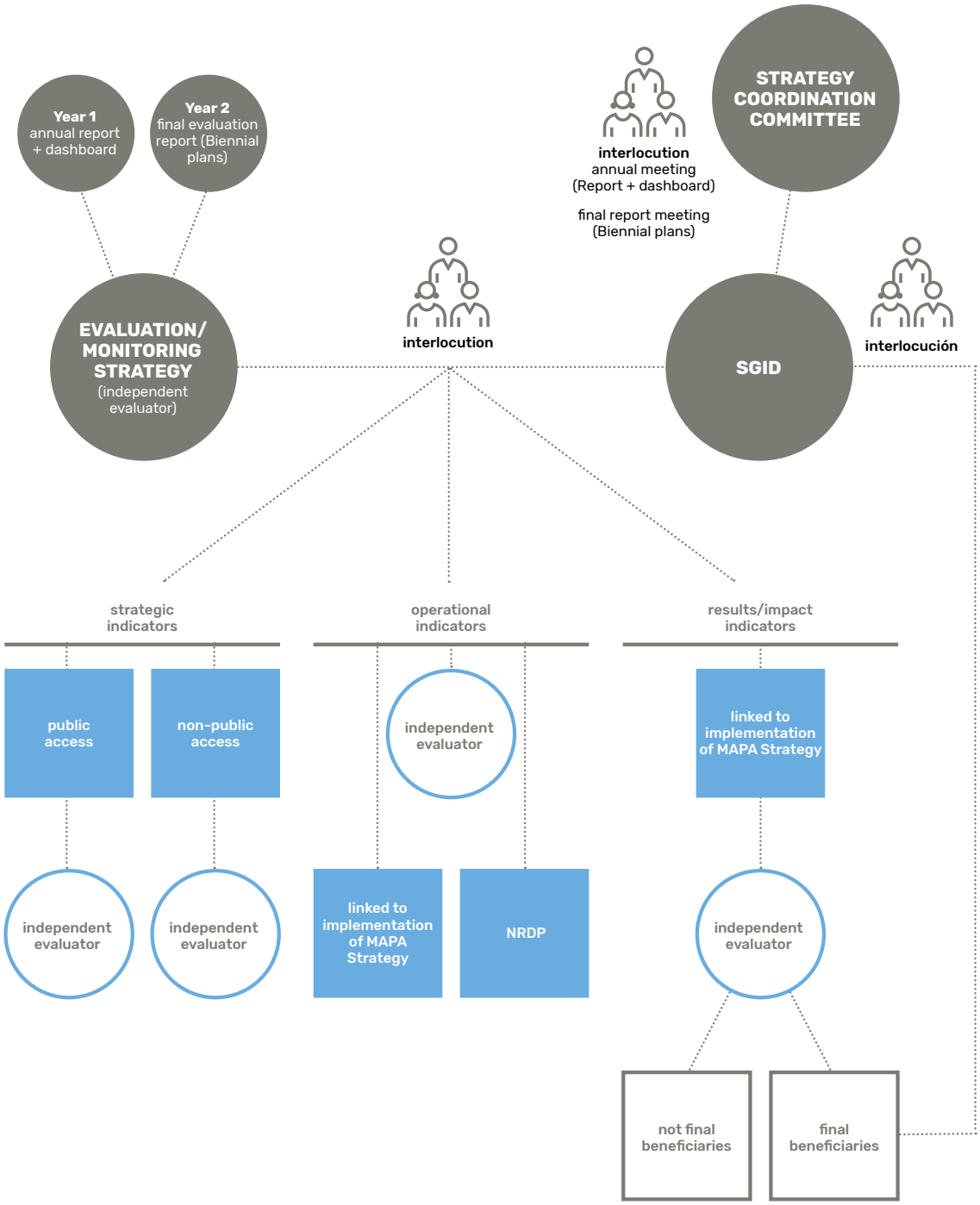
Evaluation, Monitoring and Review Plan

The Evaluation, Monitoring and Review Plan is to be made up of:

— **Evaluation Plan**
— **Monitoring Plan**
— **Review Plan**

The Evaluation, Monitoring and Review Plan will be implemented by an independent evaluating entity.

FIGURE 1. Organisation of the system for monitoring the Strategy



As regards the roles of the different parties involved, the main parties intervening in the Plan are:

— The **external entity** entrusted with carrying out the evaluation (evaluating entity), which will be designated at the time by the SGID. This will be the entity responsible for:

  - Providing the specific method to be followed by the evaluation
  - Creating the deliverables: Annual Evaluation Report and dashboard the first year, and the Final Evaluation Report the second year
  - Monitoring the set of indicators in the Evaluation Plan: context, operational and results/impact indicators
  - Carrying out continuous interlocution with the SGID

— The SGID, as coordinator for all of the parties involved in the evaluation process:

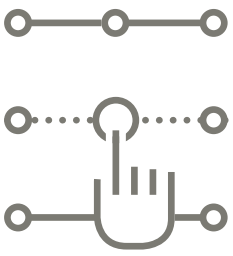
  - Interlocution with the Strategy Coordination Committee
  - Interlocution with the entity entrusted with the evaluation in keeping with the diagram shown in the Monitoring Plan
  - Interlocution with the bodies and entities with responsibilities as per supply or creation of information to create the indicators

— The **Strategy Coordination Committee** will play an eminently advisory role and validate the Strategy's protocols and results, as explained above.

— The **other parties** (cooperatives, final beneficiaries) will have a role focusing on providing information to create the indicators when required to do so.

Evaluation Plan

The Evaluation Plan described forms part of the first biennial Action Plan. It is proposed that it should be reviewed for the successive biennial Plans implemented in order to adapt to possible contingencies or changes (in terms of governance, the battery of evaluation indicators, etc.) that may arise.



THE EVALUATION SYSTEM PROPOSED **IS BASED** FUNDAMENTALLY **ON A BATTERY OF INDICATORS**

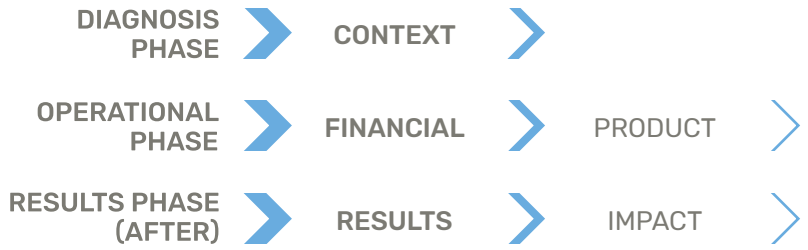
The evaluation will be carried out by an independent evaluating entity with continuous interlocution with the SGID as the head of this Plan. This evaluation will become operational by creating the following instruments:

- Annual Report, which will analyse the evolution of all the indicators, including context, operational and results/impact indicators.
- Dashboard, in order to detect possible deviations in the evolution of the operational and results/impact indicators, which in one way or another involve activities included in the Strategy (to this end, see the Review Plan)
- Final Evaluation Report at the end of the second year, which will contain the results of each biennial Plan

The indicators upon which the Evaluation Plan is based include a gender perspective.

The evaluation system planned is based fundamentally on a battery of indicators. On drawing up the indicators, three principal moments can be identified: as of when the intervention or programme is designed ("before"); when the activities are implemented ("during"); and until the intermediate and final results are evaluated ("after") (Figure 2).

FIGURE 2. Identification of the different types of indicators associated with the programmes' different stages of implementation



Therefore, for a proper system of evaluation and monitoring, it is proposed to take into account the following types of evaluation indicators::

- **Context indicators.** These give information about the baseline situation and it is also advisable to monitor their progress over time
- **Operational indicators**, which may be: a) financial, or b) for products, sometimes illustrating the process and also known as financial or physical implementation indicators
- **Result and impact indicators**, the fundamental difference between these being the benchmark time horizon and their level of generalisation.

The battery of indicators proposed is shown in Annex II.

Monitoring Plan

In order for the established Evaluation Plan to work properly, it is necessary to provide the Strategy with monitoring mechanisms as regards the responsibilities for extracting/gathering the indicators, and storing and evaluating the results. Given the different types of indicators and activities provided for in the Strategy, it has been decided to design a modular system enabling different scenarios to be considered.

IN ORDER FOR THE ESTABLISHED EVALUATION PLAN TO WORK PROPERLY, **IT IS NECESSARY TO PROVIDE THE STRATEGY WITH MONITORING MECHANISMS AS REGARDS EXTRACTING/ GAT HERING DATA AND STORING AND EVALUATING THE RESULTS**

- The SGID will carry out a three-fold interlocution: a) with the Strategy Coordination Committee; b) with the independent entity entrusted with carrying out the evaluation and monitoring of the system; and c) with the final beneficiaries and intermediate bodies, when necessary, in the operational and monitoring/result indicators.
- The monitoring system will be given different mechanisms depending on the indicators proposed. In this regard, and as seen in Figure 2, a distinction is made between:

  Context indicators. These indicators are not linked to the Strategy's activities, but are contextual.

  For this reason, they are indicators available through secondary sources. This being the case, it is also possible to distinguish two types:

  - Context indicators resulting from public access. The evaluating entity will be responsible for extracting, storing and monitoring them.
  - Context indicators available from secondary sources but which are not directly accessible except through a single farm (microdata). The evaluating entity entrusted with monitoring and evaluation will be responsible for storing and monitoring them.

  Operational indicators. As for operational (physical and financial) indicators, there are also two different types distinguishable:

  - Operational indicators related to the Strategy's activities directly linked to the final beneficiaries.
  - Operational indicators related to the Strategy's activities in which there is an intermediate body between the Independent Entity and the final beneficiary (for example, agricultural cooperatives). In any case, as in the previous scenario, the SGID will be entrusted with carrying out the first interlocution with the intermediate body, reserving this and storage of the indicators for the evaluating entity. The evaluating entity will provide the intermediate body with a platform where it can upload and monitor the indicators in order to unify and homogenise formats.

Results/impact indicators: Results/impact indicators directly linked to the rollout of the Strategy. In this case, three scenarios may appear: a) the indicator is gathered by the final beneficiary or the intermediate body (cooperative). In this case, it is the gatherer's responsibility to collect the operational indicators and transfer them to the evaluating entity, the SGID being responsible for initiating the interlocution protocol; b) the indicator already exists and is not generated by the Strategy's own activities, in which case the protocol is identical to the context indicators (example: reused data sets); and c) the indicator already exists and is generated by the Strategy's own activity, in which case it is the evaluating entity's responsibility to generate and monitor it (example: interactions on an entrepreneurship Platform).

Impact indicators are established to analyse the contribution of the Strategy's measures to the following aspects:

- Actively populating rural areas
- Actively populating rural areas with women and young people
- Protection and improvement of the environment, as well as mitigating and adapting to climate change

The activities in the sphere of monitoring coordinated by the SGID are to be included in an Annual Report in which all of the indicators' values will be updated and which the evaluating entity will draw up.

Review Plan

The Review Plan lays down two protocols:

— **Protocol 1:** Changes in the Evaluation and Monitoring System. This means that at the end of each biennial Plan the possibility will be considered of carrying out a review of the System as a result of possible variations in the Strategy's priorities

— **Protocol 2:** Detection of significant deviations in the proposed indicators, and launching of a set of corrective activities to address these deviations (correction protocol)

The Review Plan's basic tool is the dashboard, which involves creating a computer tool whose specific functions will also be explained by the evaluating entity that carries out the evaluation of the Strategy.

As regards the dashboard and indicators, three scenarios are proposed that correspond to the three types of indicators designed:

Indicadores de contexto. **Context indicators.** The dashboard will monitor the context indicators. However, given that these indicators are not linked directly to the Strategy's activities, in this case no alert protocol will be activated and thus no corrective measures will be carried out.

Operational indicators. Financial and product indicators related to activities carried out within the Strategy. Possible comparative deviations will be detected (maximum and minimum values) for the set objectives.

Result and impact indicators. Given that there will be quantitative objectives, a review protocol will be established, as well as the corrective measures deemed applicable.

IT IS CONSIDERED ESSENTIAL TO **ENSURE STIMULATION FOR THE STRATEGY** TO BE SUCCESSFUL

Complementary action to stimulate the Strategy

It is also considered essential to ensure stimulation for the Strategy to be successful. To do so, the following activities are proposed:

Events to capitalise on the results of implementing the Strategy

This Strategy includes different measures and activities whose results must be capitalised on and disseminated to ensure efficiency in using the resources and for them to reach the maximum number of interested parties in the sector.

To do so, events will be held to show results that are representative of the activities, which will serve to get interested parties involved in the digital transition process.

Digitisation awards

The awards are being created to boost the sector's mobilisation, thanks to the effect of seeking recognition for the work done and due to the incentive effect this has on other parties in the sector. To do so, awards will be proposed that recognise the most innovative and successful initiatives in digitally transforming the sector.

Three categories of awards will be defined in line with the Strategy's three strategic objectives: narrowing the digital divide, fostering the use of data, and boosting business development and new business models.

Toolbox for good practices

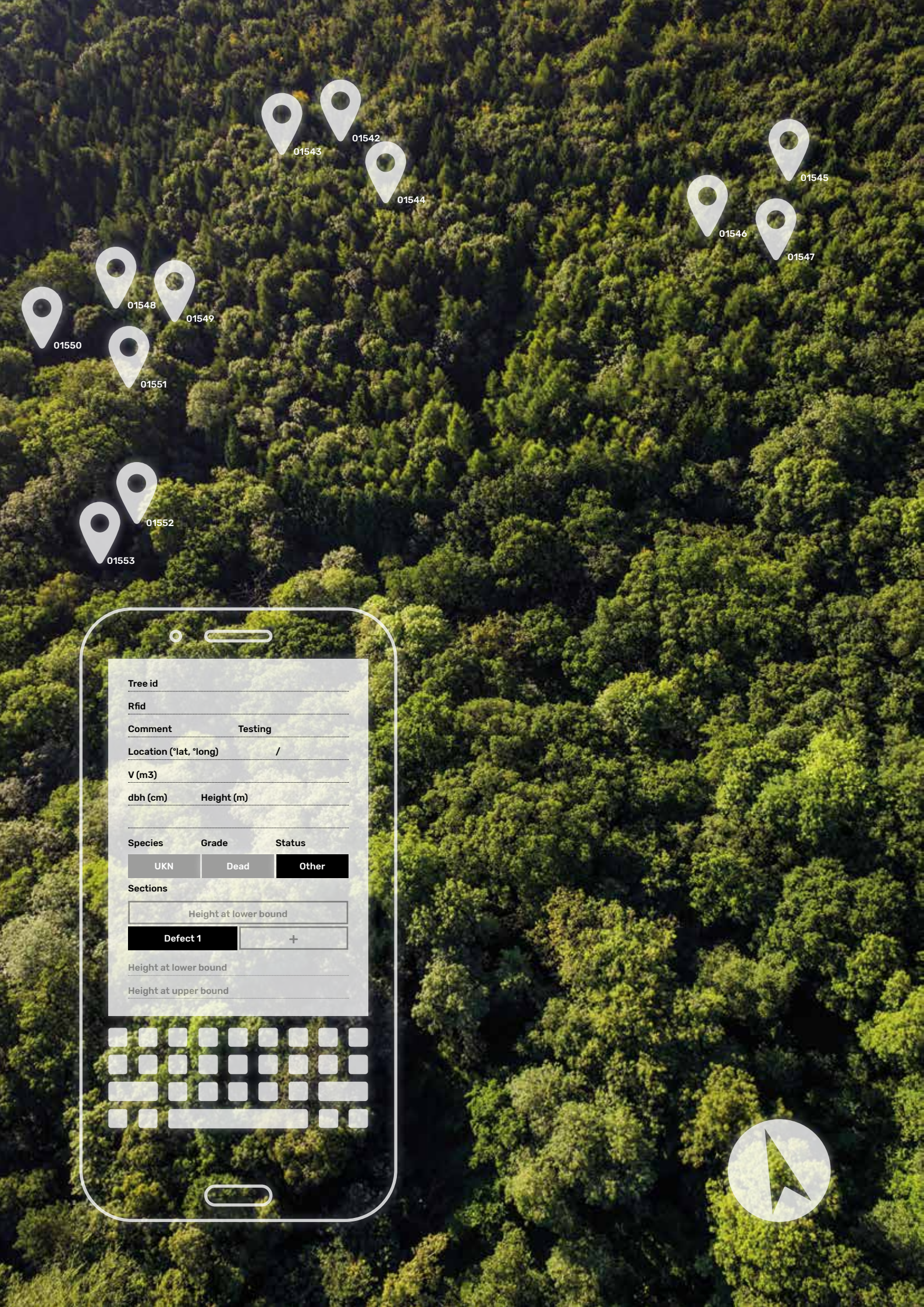
Appreciating good digitisation practices developed by end users may help the sector's digitisation itself.

In this vein, and to help stimulate the Strategy, a toolbox will be developed with the technologies used and good digitisation practices. This instrument will help knowledge exchange and make it simple to access relevant information in this sphere, thus promoting digital transformation among users.

The information gathered in this toolbox must be relevant for the sector, taking into account matters of interest such as improving profitability, the subsector it is applied to, usability or user experience, interoperability, etc., so that it truly motivates end users to adopt the practices.

Through the toolbox, MAPA will provide a means for farmers to be up-to-date with the technologies currently on offer, aware of their impact on optimising costs, improving productivity, reducing chemical agents for treating crops and reducing the consumption of water, fuel and other inputs.

When this toolbox has been established, it will be necessary to maintain and extend it to consolidate it as a useful tool. To do so, collaboration is planned with interested organisations relevant to the sector, as well as innovation entities and universities if applicable. The possibility is also considered of writing a newsletter to raise awareness of the toolbox and carry out similar dissemination activities with some regularity, listing the latest news about good practices gathered, as well as updates on technologies, innovations, trends etc.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THE STRATEGY'S **CONTRIBUTION** TO THE NEW CAP'S **OBJECTIVES** AND THE FOCUS GROUP'S **CHALLENGES**

THE STRATEGY'S CONTRIBUTION TO THE NEW CAP'S OBJECTIVES AND THE FOCUS GROUP'S CHALLENGES

The Strategy is drawn up with a view to the future, which is why it is essential to take into account its contribution to the objectives set for the agri-food and forestry sector and rural areas in the sphere of the EU and in challenges for Spain.

This is why the contributions have been identified that are provided by each of the measures for the nine specific objectives set out in the CAP post-2020 and for the eight challenges set in the analysis prior to drawing up the Strategy, based upon which the tasks of the Focus Group on Digitisation and Big Data were structured.

The contributions identified are shown in the tables below:

Contributions to the post-2020 CAP objectives

TABLE 2. Contribution from Objective 1, Narrowing the digital divide, to the objectives of the future CAP via measures proposed in the Strategy

		OBJECTIVES OF THE FUTRE CAP								
01 NARROWING THE DIGITAL DIVIDE		1: Support viable farm income and resilience across the Union to enhance food security	2: Enhance market orientation and increase competitiveness, including greater focus on research, technology and digitisation	3: Improve the farmers' position in the value chain	4: Contribute to climate change mitigation and adaptation, as well as sustainable energy	5: Foster sustainable development and efficient mana-gement of na-tural resources such as water, soil and air	6: Contribute to the protection of biodiversity, enhance ecosystem services and preserve habitats and landscapes	7: Attract young farmers and facilitate business development in rural areas	8: Promote employment, growth, social inclusion and local development in rural areas, including the bio- economy and sustainable forestry	9: Improve the response of EU agriculture to social demands on food and health, including safe, nutritious and sustainable food, reducing food waste, as well as animal welfare
L1. **Connectivity**	M1. Coordination to improve connectivity									
	M2. Dissemination and advice in the sector as regards existing formulas for connectivity									
L2. **Training**	M1. Fostering the inclusion of digitisation in formal education									
	M2. Non-formal continuous education and skills acquisition									
	M3. Attracting young people and women as stable inhabitants in rural areas									

Contribution to the post-2020 CAP objectives

TABLE 3. Contribution from Objective 2, Fostering the use of data, to the objectives of the future CAP via measures proposed in the Strategy

		OBJECTIVES OF THE FUTURE CAP								
O2 FOSTERING THE USE OF DATA		1: Support viable farm income and resilience across the Union to enhance food security	2: Enhance market orientation and increase competitiveness, including greater focus on research, technology and digitisation	3: Improve farmers' position in the value chain	4: Contribute to climate change mitigation and adaptation, as well as sustainable energy	5: Foster sustainable development and efficient management of natural resources such as water, soil and air	6: Contribute to the protection of biodiversity, enhance ecosystem services and preserve habitats and landscapes	7: Attract young farmers and facilitate business development in rural areas	8: Promote employment, growth, social inclusion and local development in rural areas, including the bio-economy and sustainable forestry	9: Improve the response of EU agriculture to social demands on food and health, including safe, nutritious and sustainable food, reducing food waste, as well as animal welfare
L1. **Interoperability**	M1. Fostering collaboration to improve interoperability by capitalising on existing initiatives on a European level									
	M2. Interoperability projects that respond to specific problems in which interregional stakeholders cooperate									
L2. **Open data**	M1. Open data in Public Administrations									
	M2. Public research data									
L3. **Data from the value chain and environmental data**	M1. Support for the Code of Conduct to exchange and use agricultural data and data from the chain									
	M2. Promoting incentives to digitise farm logbooks									
	M3. Cooperatives as data gatherers									
	M4. Spanish and European consumption data									
	M5. Collaboration to improve the Common Agricultural Policy's Integrated Administration and Control System									
	M6. Fostering automatic collection of existing geospatial data on greenhouse gas emissions and removals from land use, and processing it									

Contribution to the post-2020 CAP objectives

TABLE 4. Contribution from Objective 3, Boosting business development and new business models, to the objectives of the future CAP via measures proposed in the Strategy.

		OBJECTIVES OF THE FUTURE CAP								
03 BOOSTING BUSINESS DEVELOPMENT AND NEW BUSINESS MODELS		1: Support viable farm income and resilience across the Union to enhance food security	2: Enhance market orientation and increase competitiveness, including greater focus on research, technology and digitisation	3: Improve farmers' position in the value chain	4: Contribute to climate change mitigation and adaptation, as well as sustainable energy	5: Foster sustainable development and efficient management of natural resources such as water, soil and air	6: Contribute to the protection of biodiversity, enhance ecosystem services and preserve habitats and landscapes	7: Attract young farmers and facilitate business development in rural areas	8: Promote employment, growth, social inclusion and local development in rural areas, including the bio- economy and sustainable forestry	9: Improve the response of EU agriculture to social demands on food and health, including safe, nutritious and sustainable food, reducing food waste, as well as animal welfare
L1. **Strengthening the digital innovation ecosystem**	M1. Fostering Digital Innovation Hubs (DIH)									
	M2. Innovative Public Procurement									
	M3. Fostering collaboration among knowledge hubs, technological companies, and companies from the sector									
	M4. Support for introducing the Living Labs method into Spain									
L2. **Advice on digital adoption in Knowledge and Innovation Systems for the Agri-Food and Forestry sector and rural areas**	M1. Fostering knowledge and information exchange among digital advisers									
	M2. Advice for SMEs and startups in their process of digital adoption									
	M3. Bolstering advice via events and demonstration activities									
L3. **Fostering new business models**	M1. Platform for digital entrepreneurship in rural areas									
	M2. Fostering telework									
	M3. Coordination between Public Administrations to bring in line aid for entrepreneurship in rural areas									
	M4. Dissemination of European initiatives linked to digitisation in the spheres of Smart Villages, rural entrepreneurship and Startup Europe									
	M5. Boosting development of a Smart Rural Territories ecosystem. Startup Villages									

Contribution to the challenges set by the Focus Group on Digitisation and Big Data for the Agri-Food and Forestry Sector and Rural Areas

TABLE 5. Contribution from Objective 1, Narrowing the digital divide, to the challenges set out by the Focus Group on Digitisation and Big Data for the Agri-Food and Forestry Sector and Rural Areas.
TABLE 6 Contribution from objective 2, Fostering the use of data, to the challenges set by the Focus Group on Digitisation and Big Data for the Agri-Food and Forestry Sector and Rural Areas

		RETOS ESTABLECIDOS POR EL GRUPO FOCAL SOBRE DIGITALIZACIÓN Y *BIG DATA* DEL SECTOR AGROALIMENTARIO, FORESTAL Y DEL MEDIO RURAL							
01 NARROWING THE DIGITAL DIVIDE		1: Tackling rural depopulation, fostering the involvement of young people and narrowing the digital divide	2: Sustainability, improved productivity and logistics	3: Monitoring, early detection of plant and animal diseases, development of network alert systems, and treatment of pests and diseases	4: Sustainable forestry management and preventing, detecting and extinguishing fires	5: Equitable distribution of added value throughout the chain and fostering rural development	6: Globalisation and competitiveness in the markets	7: Consumer demands in terms of information and participation in the supply on the market	8: Management of the CAP
L1. **Connectivity**	M1. Coordination to improve connectivity								
	M2. Dissemination and advice in the sector for existing formulas for connectivity								
L2. **Training**	M1. Fostering the inclusion of digitisation in formal education								
	M2. Non-formal continuous education and skills acquisition								
	M3. Attracting young people and women as stable inhabitants in rural areas								
02 FOMENTAR EL USO DE DATOS		1: Tackling rural depopulation, fostering the involvement of young people and narrowing the digital divide	2: Sustainability, improved productivity and logistics	3: Monitoring, early detection of plant and animal diseases, development of network alert systems, and treatment of pests and diseases	4: Sustainable forestry management and preventing, detecting and extinguishing fires	5: Equitable distribution of added value throughout the chain and fostering rural development	6: Globalisation and competitiveness in the markets	7: Consumer demands in terms of information and participation in the supply on the market	8: Management of the CAP
L1. **Interoperability**	M1. Fostering collaboration to improve interoperability by capitalising on existing initiatives on a European level								
	M2. Interoperability projects that respond to specific problems in which interregional stakeholders cooperate								
L2. **Open data**	M1. Open data in Public Administrations								
	M2. Public research data								
L3. **Data from the value chain and environmental data**	M1. Support for the Code of Conduct to exchange and use agricultural data and data from the chain								
	M2. Promoting incentives to digitise farm logbooks								
	M3. Cooperatives as data gatherers								
	M4. Spanish and European consumption data								
	M5. Collaboration to improve the Common Agricultural Policy's Integrated Administration and Control System								
	M6. Fostering automatic collection of existing geospatial data on greenhouse gas emissions and removals from land use, and processing it.								

Contribution to the challenges set by the Focus Group on Digitisation and Big Data for the Agri-Food and Forestry Sector and Rural Areas

TABLE 7. Contribution from Objective 3, Boosting business development and new business models, to the challenges set by the Focus Group on Digitisation and Big Data from the Agri-Food and Forestry Sector and Rural Areas

		CHALLENGES SET BY THE FOCUS GROUP ON DIGITISATION AND BIG DATA FOR THE AGRI-FOOD AND FORESTRY SECTOR AND RURAL AREAS							
03 BOOSTING BUSINESS DEVELOPMENT AND NEW BUSINESS MODELS		1: Tackling rural depopulation, fostering the involvement of young people and narrowing the digital divide	2: Sustainability, improved productivity and logistics	3: Monitoring, early detection of plant and animal diseases, development of network alert systems, and treatment of pests and diseases	4: Sustainable forestry management and preventing, detecting and extinguishing fires	5: Equitable distribution of added value throughout the chain and fostering rural development	6: Globalisation and competitiveness in the markets	7: Consumer demands in terms of information and participation in the supply on the market	8: Management of the CAP
L1. **Strengthening the digital innovation ecosystem**	M1. Fostering Digital Innovation Hubs (DIH)								
	M2. Innovative Public Procurement								
	M3. Fostering collaboration among knowledge hubs, technological companies, and companies from the sector								
	M4. Support for introducing the Living Labs method into Spain								
L2. **Advice on digital adoption in the agri- food and forestry sector and rural areas' Knowledge and Innovation Systems**	M1. Fostering knowledge and information exchange among digital advisers								
	M2. Advice for SMEs and startups in their process of digital adoption								
	M3. Bolstering advice via events and demonstration activities								
L3. **Fostering new business models**	M1. Platform for digital entrepreneurship in rural areas								
	M2. Fostering telework								
	M3. Coordination between Public Administrations to bring in line aid for entrepreneurship in rural areas								
	M4. Dissemination of European initiatives linked to digitisation in the spheres of Smart Villages, rural entrepreneurship and Startup Europe								
	M5. Boosting development of a Smart Rural Territories ecosystem. Startup Villages								

TIME HORIZON FOR THE STRATEGY

Implementation of the Strategy involves activities that will be carried out by direct implementation by MAPA and via support from existing activities, as well as with coordination and collaboration from other levels of Public Administration involved. Specific activities will be addressed in the biennial Action Plans according to the budgets available and they will enable the progress to be adapted to the real situation at all times.

The rollout over time for the measures must take into account that most of them are intended to be ongoing. Hence, once they have been launched they are considered to be active until the objectives have been completely achieved. The detailed timeline specifies the moment each measure is launched.

TABLE 8 Time horizon for the Strategy for the short, medium and long term

		LAUNCH		
		short term	medium term	long term
01. NARROWING THE DIGITAL DIVIDE				
L1. **Connectivity**	M1. Coordinación para la mejora de la conectividad			
	M2. Difusión y asesoramiento en el sector de las fórmulas de conectividad existentes			
L2. **Training**	M1. Impulso para inclusión de la digitalización en la formación reglada			
	M2. Formación continua no reglada y adquisición de competencias			
	M3. Atracción de jóvenes y mujeres como habitantes estables del medio rural			
02. FOMENTAR EL USO DE DATOS				
L1 . **Interoperability**	M1. Fomento de la colaboración para la mejora de la interoperabilidad capitalizando iniciativas existentes a nivel europeo			
	M2. Proyectos de interoperabilidad que den respuesta a problemas concretos en los que cooperen actores interregionales			
L2. **Open data**	M1. Datos abiertos en las Administraciones Públicas			
	M2. Datos públicos de la investigación			
L3. **Data from the value chain and environmental data**	M1. Apoyo al Código de Conducta para el intercambio y uso de datos agrícolas y de la cadena			
	M2. Promoción de incentivos por la digitalización de cuadernos de explotación			
	M3. Cooperativas como agrupadoras de datos			
	M4. Datos de consumo España y Europa			
	M5. Colaboración para la Mejora del Sistema Integrado de Administración y Control de la Política Agraria Común			
	M6. Fomento de la obtención automatizada de datos geoespaciales existentes sobre emisiones y absorciones de gases de efecto invernadero resultantes del uso de la tierra y su procesamiento			
03. BOOSTING BUSINESS DEVELOPMENT AND NEW BUSINESS MODELS				
L1. **Strengthening the digital innovation ecosystem**	M1. Fomento de los Centros de innovación Digital (DIH)			
	M2. Compra Pública Innovadora			
	M3. Fomento de la colaboración entre centros de conocimiento, empresas tecnológicas y empresas del sector			
	M4. Apoyo a la implantación de la metodología *LivingLabs* en España			
L2. **Advice on digital adoption in the agri-food and forestry sector and rural areas' Knowledge and Innovation Systems**	M1. Fomento del intercambio de conocimiento e información entre asesores digitales			
	M2. Asesoramiento a a PYMES y *startups* en el proceso de adopción digital			
	M3. Refuerzo del asesoramiento mediante jornadas y actividades demostrativas			
L3. **Fostering entrepreneurship and new business models**	M1. Plataforma para el emprendimiento digital en el medio rural			
	M2. Fomento del tele-trabajo			
	M3. Coordinación entre Administraciones para acercar líneas de ayuda al emprendimiento al medio rural			
	M4. Difusión de las iniciativas europeas vinculadas a digitalización en los ámbitos de *Smart Villages*, emprendimiento rural y *Startup Europe*			
	M5. Impulso al desarrollo de un ecosistema de Territorios Rurales Inteligentes. *Startup Villages*			

ANNEX I
LIST OF INTERLOCUTORS
IN THE PROCESS OF DRAWING UP THE STRATEGY PRIOR TO ITS PUBLICATION

GENERAL STATE ADMIMISTRATION

Ministry of Science, Innovation and Universities
Secretariat of State for Universities, Research, Development and Innovation
- General Directorate of Research, Development and Innovation
  - General Subdirectorate for Fostering Innovation
  - General Subdirectorate for Planning, Monitoring and Evaluation
- General Secretariat for Universities

Ministry of Economy and Business
Secretariat of State for Digital Progress
- Secretary of State for Digital Progress
- General Directorate for Telecommunications and Information Technologies
  - General Subdirectorate for Telecommunications Operators and Networks
  - General Subdirectorate of Information Society Development
- Red.es. Public Corporate Entity, dependent upon the Secretariat for Digital Progress

Ministry of Education and Vocational Training
Secretariat of State for Education and Vocational Training
- General Directorate of Vocational Education
  - General Subdirectorate for Continuous Orientation and Study
  - General Subdirectorate for Planning and Innovation of Vocational Training
- General Directorate of Evaluation and Territorial Cooperation
- National Institute of Educational Technologies and Teacher Training (INTEF)

Ministry of Labour, Migration and Social Security
Secretariat of State for Employment
- General Directorate of Self-Employment, Social Economy and Corporate Social Responsibility
- General Directorate of Labour

Ministry of Industry, Trade and Tourism
General Secretariat of Industry and SMEs
- General Directorate of Industry and SMEs

General Subdirectorate of Support for SMEs
- General Subdirectorate of Industrial Digitisation Collaborative Spaces

Ministry of Territorial Policy and Civil Service
Commissioner for the Demographic Challenge

Ministry of Agriculture, Fisheries and Food
General Secretariat for Agriculture and Food
- General Directorate of Rural Development, Innovation and Forestry Policy
- General Directorate for Agricultural Production and Markets
- General Directorate for the Food Industry
- General Directorate for Health in Agricultural Production
- Food Information and Control Agency.
- Regional Autonomous Body attached to the General Secretariat
- Spanish Agrarian Guarantee Fund (FEGA). Regional Autonomous Body attached to the General Secretariat

Ministry for the Ecological Transition

Ministry of Finance

AUTONOMOUS REGIONAL AUTHORITIES IN MATTERS OF MANAGING RURAL DEVELOPMENT PROGRAMMES

PARTIES INVOLVED IN DIGITISATION OF THE AGRI-FOOD AND FORESTRY SECTOR AND RURAL AREAS

Universities and research centres in matters related to the sector

Food Industry Representatives

Producers' Associations

Agricultural Professionals' Organisations

Technological firms that work in the sector

Related Non-Governmental Organisations

INTERESTED PARTIES RESULTING FROM THE PUBLIC CONSULTATION PROCESS

ANNEX II
EVALUATION PLAN INDICATORS

(*) (*) Value obtained taking into account the **CNAE 2009** codes **01** (agriculture, livestock, hunting and related services), **02** (silviculture and forestry management), **10** (manufacture of food products), **11** (manufacture of beverages) and **12** (manufacture of tobacco products).

(**) Value obtained taking into account **CNAE 2009 01-03**, **10-12.** The data is more aggregated and includes the **CNAE 03** corresponding to fishing and aquaculture.

TABLE 9. Context indicators to evaluate the Strategy

INDICATOR	Source	Last year available	Current data (Spain)	Current data (UE28)
A. Indicators of coverage				
Percentage of homes with rural fixed BB coverage	Urbanisation indicators, EUROSTAT	2017	63 %	68 %
Percentage of homes with rural mobile BB coverage	Urbanisation indicators, EUROSTAT	2017	60 %	40 %
Percentage of rural next generation network access (NGA)	Digital Agenda Scoreboard Key Indicators, (DAKI), European Commission	2017	Temporarily unavailable on the website	Idem
B. Indicators of connectivity, digitisation and environs				
Percentage of homes in rural areas with Internet connection	Urbanisation indicators, EUROSTAT	2017	78 %	82 %
Percentage of companies in the primary sector (CNAE 01 and 02) and agri-food industry (CNAE 10 and 11) with Internet connection	Survey on ICT and Electronic Commerce use in Companies , INE (Microdata)	2017	–	–
Percentage of companies in the primary sector (CNAE 01 and 02) and agri-food industry (CNAE 10 and 11): - That sell/purchase via e-commerce - That use some kind of robot - That invest in IoT - That invest in blockchain / Smart contract initiatives - Total spending on ICT	Survey on Companies' Use of ICT and e-Commerce, INE (Microdata)	2017	–	–
Masculinisation index in municipalities with a population of ≤ 30,000 inhabitants and a density lower than 100 hab/km^2	Census. Population by municipality. (Microdata)			There is no EU28 consolidated data
Ageing index in towns with a population of ≤ 30,000 inhabitants and a density lower than 100 hab/km^2	Census. Population by municipality. (Microdata)			There is no EU28 consolidated data
Overageing index in towns with a population of ≤ 30,000 inhabitants and a density lower than 100 hab/km^2	Census. Population by municipality. (Microdata)			There is no EU28 consolidated data
C. Productivity, R&D&I and training				
Productivity in the primary and agri-food sector (per hour worked)	National Statistics, (*Contabilidad Nacional*) INE (National Statistics Institute)	2017	24.800 €/h (*)	There is no EU28 consolidated data
Percentage of business spending on R&D&I over GVA (primary and agri-food sectors)	Statistics on business spending for R&D&I, from INE National Statistics, (*Contabilidad Nacional*) INE (National Statistics Institute)	2016	0,47% (**)	–
Percentage of companies with technological innovation activities over the total number of companies	Survey on innovation in companies, INE	2016	11,98% (**)	
Number of Digital Innovation Hubs (DIHs) with agri- capacities (and percentage over total)	Digital Innovation Hub Catalogue, Comisión Europea		26 55,3%	124 55,1 %
New Technological Centres and innovation support centres with agricultural capacities (and percentage over total)	Registry of Technological Centres and of Innovation Support Centres, Ministry of Science, Innovation and Universities		37 48,7 %	
Percentage of degree-holders in rural areas	Urbanisation indicators, EUROSTAT	2017	24,1 %	20 %
Percentage of early education leavers in rural areas	Urbanisation indicators, EUROSTAT	2017	20,8 %	10,9 %
Percentage of survival of companies created after three years in predominantly rural regions	Rural Development Indicators, EUROSTAT	2014	56,9 %	There is no EU28 consolidated data

TABLE 10. Operational indicators by the Strategy's strategic lines

INDICATOR	Source
A. The Strategy's product indicators	
01. L1: Connectivity: – Number of dissemination activities about connectivity. Breakdown by entities affected	MAPA
01. L2: Training: – Number of coordination activities for training – Number of training activities. Breakdown by entities affected, women and young people	
02. L1: Interoperability: – Number of dissemination activities about interoperability. Breakdown by entities affected	
02.L2: Open data. – Number of open data promotion activities. Breakdown by entities affected	
02. L3: Value chain data: – Number of dissemination activities about value chain data. Breakdown by entities affected	
03. L1: Strengthening the digital innovation ecosystem: – Number of coordination activities among parties in the digital innovation ecosystem	
03. L2: Advice on digital adoption in the agri-food and forestry sector and rural areas' Knowledge and Innovation Systems – Number of exchange visits made (implementing measure O3L2M1). Breakdown by women and young people – Number of activities carried out by the Digital Transformation Offices. Breakdown by entities affected, women, young people – Number of events and demonstration activities. Breakdown by entities affected, women, young people	
03. L3: Fostering entrepreneurship and new business models – Number of dissemination activities about rural entrepreneurship. Breakdown by entities affected, women, young people – Number of demonstration activities. Breakdown by entities affected, women, young people	
B. The Strategy's financial indicators	
01. L1: Connectivity: – Total public spending on dissemination activities about connectivity (annual total and percentage of implementation)	MAPA
01. L2: Training: – Total public spending on coordination activities for training (annual total and percentage of implementation) – Total public spending on training activities (annual total and percentage of implementation)	
02. L1: Interoperability: – Total public spending on dissemination activities about interoperability (annual total and percentage of implementation)	
02. L2: Open data – Total public spending on open data promotion activities (annual total and percentage of implementation)	
02. L3: Value chain data – Total public spending on dissemination of value chain data (annual total and percentage of implementation) – Total public spending on aid for cooperatives as data gatherers (annual total and percentage of implementation)	
03. L1: Strengthening the digital innovation ecosystem – Total public spending on coordination activities among parties in the ecosystem (annual total and percentage of implementation	
03.L2: Advice on digital adoption in the agri-food and forestry sector and rural areas' Knowledge and Innovation Systems – Total public spending linked to exchange visits (Measure O3 L2 M1) – Total public spending on activities links to the Digital Transformation Offices (total and percentage of implementation) – Total public spending on number of events and demonstration activities (total and percentage of implementation)	
03. L3: : Fostering entrepreneurship and new business models – Total public spending on dissemination activities about rural entrepreneurship (total and percentage of implementation) – Total public spending on demonstration activities (total and percentage of implementation)	

(*) If there are resources available, an analysis of the results of these measures is considered (NRDP and RDPs).

(**) The level of digitisation is obtained from the information extracted from a small questionnaire given to the user companies. This questionnaire must be filled in by the companies that use the Offices' activities as a requisite to be able to benefit from them.

TABLE 11. Result and impact indicators for activities considered in the Strategy and other related programmes

INDICATOR	Source
A. Result	
Number of complaints by telecommunications users in rural areas	Ministry of Economy and Business / Administrative and Economic Information Unit, SEAD
Number of open datasets ready to be exploited in rural areas	APORTA project (datos.gob.es) (326 open datasets)
Initiatives to exploit and reuse open data in rural areas	
Number of datasets gathered by co-operatives	Cooperatives
Number of new digital entrepreneurs in agri/primary sector/rural areas. Breakdown by women and young people	Digital entrepreneurship platform registry
Number of platform followers and summary of activity	
Creation of networks and participation in H2020 Framework Programme proposals. Primary, agri- and rural development sectors.	CDTI (Participation in H2020 or equivalent Framework Programme in agri- and rural development sectors)
Success rate / Returns in H2020 digitisation calls in primary, agri and rural development sectors	CDTI (Centre for the Development of Industrial Technology)
Number of projects headed in H2020 calls in primary, agri- and rural development sectors	
Number of new measures in the sphere of digitisation in the 2014-2020 National Rural Development Programme or equivalent programme instrument. Total public spending associated with them included in the 2014-2020 National Rural Development Programme (NRDP) or equivalent programme instrument (*)	MAPA, EIP-Agri
Number of supra-regional operational groups on digitisation and big data for the agri-food and forestry sector created under the auspices of the NRDP or equivalent programme instrument	
Number of general interest projects on digitisation and big data for the agri-food and forestry sector (run by the operational groups) implemented under the auspices of the NRDP or equivalent programme instrument	
Number of digitisation measures and spending contemplated in the autonomous regions' Rural Development Programmes	The Autonomous Communities' Rural Development Programmes (RDPs) or equivalent programme instrument
B. Impact	
Results from self-diagnosis of agri-food and forestry companies (CNAE 01, 02, 10 and 11) via HADA (Advanced Self-Diagnosis Tool to evaluate digital maturity)	Ministry of Industry, Trade and Tourism
Level of target entities' digitisation for activities implemented by Digital Transformation Offices (**)	Users/beneficiaries of activities contemplated in the Offices

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