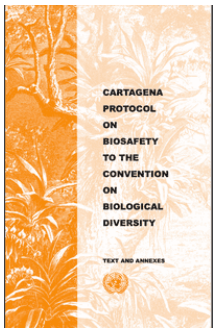
Source: https://eur-lex.europa.eu/EN/legal-content/summary/convention-on-biological-diversity-cartagena-protocol-on-biosafety.html



European Union

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CONVENTION ON BIOLOGICAL DIVERSITY — CARTAGENA PROTOCOL ON BIOSAFETY

What are the aims of the protocol and the decision?

The Cartagena protocol to the 1993 Convention on Biological Diversity is based on the precautionary principle. It aims to prevent any harm to biological diversity when living modified organisms are transferred, handled or used, especially across borders. It takes into account risks to human health.

The Council decision gives the EU's legal approval to the protocol.

Key points

Each signatory to the protocol:

- ⌘ adopts the necessary and appropriate legal, administrative and other measures to implement their commitments;
- ⌘ ensures that the development, handling, transport, use, transfer and release of any living modified organisms prevents or reduces the risk to biodiversity;
- ⌘ may take additional measures to protect the conservation and sustainable use of biological diversity;
- ⌘ is encouraged to take account of the work and expertise of international bodies specialising in risks to human health;
- ⌘ may participate in bilateral, regional and multilateral agreements and arrangements, including with non-signatory countries, providing these do not lower levels of protection;
- ⌘ must apply appropriate mechanisms, measures and strategies to control identified risks;
- ⌘ cooperates to identify living modified organisms that could have harmful effects;
- ⌘ cooperates to develop human and institutional resources to protect biosafety and raise public awareness;
- ⌘ must notify affected or potentially affected countries, the Biosafety Clearing-House and, if necessary, relevant international organisations of any incident in its jurisdiction which could cause cross-border harm;
- ⌘ ensures the safe handling, packaging, identification and transportation of exported living modified organisms, along with the necessary documentation;
- ⌘ provides the Biosafety Clearing-House with details of its national laws, risk assessments, decisions and other information the protocol requires;
- ⌘ implements appropriate domestic measures to prevent and penalise illegal trade in living modified organisms;
- ⌘ may withdraw from the protocol 1 year after giving written notification.

The protocol applies to all international movement, transit, handling or use of living modified organisms that could harm biological diversity and human health, except for human medicines covered by other international agreements or organisations.

A specific procedure applies to living modified organisms for direct use as food, feed or processing. A country which decides that an item may be used or sold on its domestic market, which might then also be exported, must provide detailed information (set out in Annex II) to other signatories through the Biosafety Clearing House.

The protocol provides for risk assessments based on scientifically sound methodologies (Annex III).

A national focal point in each country liaises with the secretariat established by the convention. Specified national authorities carry out the administrative tasks the protocol requires.

A Biosafety Clearing House is established to:

- handle the exchange of scientific, technical, environmental and regulatory information;
- help signatories, particularly those most in need, to implement the protocol;

The conference of the parties, involving all the convention's signatories, reviews the protocol, assesses it every 5 years, recommends measures to be taken and sets up subsidiary bodies.

CHALLENGES AND OPPORTUNITIES OF AGRICULTURE DIGITALIZATION IN SPAIN

Source: https://doi.org/10.3390/agronomy13010259

[...]

1. Introduction

[...]

Figure 2 shows the weight of agricultural GVA (Gross Value Added) on the economy as a whole in Spain in 2017, and compares it with five other large European countries, and with the European Union (EU) average. As can be seen, Spain is the country that registers the highest percentage of GDP (Gross Domestic Product) from this sector, above Germany, Italy, the Netherlands or France. Furthermore, Figure 3 shows that in 2021 Spain was the fourth largest exporter of agricultural products in the European Union. However, the weight of agri-food exports over total goods was greater in Spain than in the rest of the countries analyzed, with 19%. Therefore, in a country like Spain, where agriculture is a strategic sector of the economy, the socio-economic concerns of digitalization are more pronounced. For this reason, in recent years, studies have begun to be published on the possible impact of digitalization in urban and rural areas of Spain. Employment opportunities, gender equality and education in rural areas are among the development factors that can be greatly affected by the strengths and weaknesses of the country's agrifood industry, due to the importance of this sector in the Spanish economy.

According to published data, technological progress could already empower countries like the Netherlands to achieve three times more productivity per square meter of tomato cultivation and seven times more productivity per square meter of cucumber compared to Almeria (in Spain). Hence, the Spanish government has called for the implementation of a plan for disruptive changes in the productivity of the agricultural industry based on digitalization.

To reach this ambition, farmers need to disruptively change their practices and improve their capabilities to keep themselves aligned with new technologies and innovative methods. In the global panorama, digitalization has accelerated the industrial revolution and has given rise to new trends in the agricultural industry, incorporating the concepts of industry 4.0, the new methods of cost reduction in the production, the welfare 4.0, the new vertical and horizontal integration schemes of the value chain and the environmental protection plans. Several reports of the achievement have been published in Australia, India, Spain, Maghreb, USA, among others.

2. Background

The study of the pre-industrial economy of Spain demonstrates the relationship between inequality in labor income and education. Since the incorporation of Spain to the European Union, the agricultural sector has gone through different processes of modernization and reconstruction and an attempt has been made to fill the gap of socio-economic inequality due to globalization. The tasks accomplished have had an impact on urbanization, rural social equalization and the reduction of precariousness and economic vulnerability. However, the modernization process that has been started recently with the divide-prevention target has become the division-production element. Recent studies show the impact of digital skills and internet access as the factor in expanding the socio-economic environment.

Nevertheless, access to digital services such as cloud services and social networks are among the factors that no longer reduce inclusion gaps. It is evident that from the moment in which we are to the point expected in 2050, there will be a great difference in the variation of purchasing power in the world, the process of urbanization at a global level, the variation of lifestyle, the use of new technologies, infrastructure, energy efficiency, employment opportunities, etc. While Spain has a moderate trend towards achieving goals in the Mediterranean region, income inequality, economic disparity, the digital divide and the gender gap are greater than the EU average.

In Spain, 14.2 percent of the population is active in agriculture and associated food industries. In addition, a large part of Spain's foreign trade belongs to agricultural and food technology, which could reach 17,430 million euros in 2017. It is estimated that the total accumulation of Spain for 30 years until the 2050 horizon reaches 17 million euros, three times more than the period ending in 2017. For this reason, the government has announced different packages to support biosecurity, sustainability and competitiveness in agriculture and livestock (for example, the economic plan published on 2 November 2021 by the Ministry of Agriculture, Fisheries and Food).

However, the sustainability and competitiveness of agriculture and livestock in the high-speed digitalization process in the world also requires a change in the human resource factors of the people involved in the agricultural sector, so that the use of digital technology in rural areas can be facilitated. A sufficient number of experts and technicians are needed in the digitalization of agriculture, a sufficient number of service providers for farmers and a market at scale to meet the requirements of the agricultural and food industry. While government motivation packages will help defray the cost of machinery, software, and connectivity, recent studies show that resistance to new technologies is due in part to a lack of perceived benefit from adopting them.

Therefore, in addition to the investment required in the acquisition of internet coverage, software and connectivity, special investment must be made for the up-skilling and training of farmers, so that they become familiar with digital technology. Meanwhile, a high percentage of farmers still do not consider the investment of time, energy and money to digitize their activities to be a necessary act, and in the shadow of the financial damage caused by the COVID-19 pandemic, are unwilling to get involved in the process required for the adoption of technology.

Furthermore, most farmers are wary of the possible use and disclosure of their data and do not trust the possible acts of interoperability that could be performed with them. The last problem is the level of education of Spanish farmers to employ advanced digital gadgets on the farm.

Therefore, it is important that Spanish farmers know all the opportunities that the digitalization process can bring. Digital agriculture will provide farmers with IT-based infrastructures for a higher level of market participation. Using the precise information about the product and the production process, a direct link between the producer and the consumer will be created. Therefore, production waste within the distribution chain will be lower and the value chain will have higher efficiency. With the higher level of data and information in the value chain, the decision-making process will be optimized and administrative processes will be improved. With optimized decisions, the quality of the products will be higher and green production regulations will be better-respected.

3. Challenges

According to the objectives of the European Commission (declared on 20 December 2021), rural areas throughout Europe should have the same capacity for connection, resilience and prosperity by 2040. These rural areas are expected to become benefit from digital infrastructure in a wide range of services, be resilient to climate change and economic crises, and improve the added value of farming and agri-food activities.

Following the EU declaration, societies must work together to balance inclusion, sustainability, competitiveness, resilience, quality of life and well-being. The Commission's Gender Equality Strategy 2020–25 has also paid attention to the inclusion of women and vulnerable groups in rural areas in terms of quality of work and education. Therefore, the digitalization process must be carried out together with the implementation of policies that help achieve the objectives of improving social equity in urban and rural areas.

Cluster 4 of the Horizon European Programme is dedicated to Digital, Industry and Space, developing world-class technologies to serve the needs of all types of European Industries, including agriculture. Therefore, the actions supported under this destination aim to provide high-performance solutions that business will trust and adopt to maintain their competitiveness and maximize their contribution to environmental sustainability. These solutions include IoT, Artificial Intelligence (AI), robotics, block-chain and edge computing. On the other hand, the Horizon Europe mandate for Cluster 6 (Food, Bioeconomy, Natural Resources, Agriculture and Environment) is to provide opportunities to enhance and balance environmental, social and economic goals and direct economic activities toward sustainability. Innovation and digitalization in agriculture are key to achieving these goals.

Thus, it is obvious that digital technologies, such as AI, cloud and edge computing, satellite sensitive services, robotics, drones, block-chain, IoT, 4G and 5G internet service and digital transportation, have the potential to enhance the agriculture efficiency, achieve greater sustainability, improve the quality of life in rural areas, and secure food production. Hence, the declaration of the future of agriculture in the EU is defined along the Horizon European Programme with the following objectives:

- Achieve intelligent and resilient agriculture
- Provide enhanced added value
- Reinforcement of environment protection and climate change issues
- Strengthen socio-economic growth in rural areas
- Achieve the expected results in the area of sustainable food production, considering both the branches of human and animal nutrition
- Provide greater attention to small and medium farmers and producers.

However, given the nature of the agri-food sector, the implementation of the digitalization process is not without its challenges. Main technical challenges identified that may hinder or impose barriers to the digitalization of agriculture in Spain are described below.

3.1. Technical Challenges

According to the McKinsey COTEC report, the agricultural sector in Spain has a technical automation potential of 57%. However, while part of the territory is connecting to 5G networks, others are still waiting to enjoy the benefits of broadband, as we have discussed in the previous section. If the digital gap between rural and urban areas is not closed first in terms of coverage or connectivity to the telephone network and the Internet, everything that is wanted to be done in the field of digitalization and data processing will be up in the air. The Spain Digital Agenda has set the goal that 100% of the population has 100 Mbps coverage in 2025.

In addition to improving connectivity, the use of technology and the service in rural areas mentioned above, it is also necessary to improve the compatibility of the data and the flow thereof to facilitate interoperability.

Clusters 4 and 6 of the Horizon European Programme envisage different data coming from farmers, livestock holders, and other agents related to the food production industries, such as transport, IT-based companies, machinery manufacturing/service companies, public administration, universities

and research centers, etc., as well as different digital technologies such as remote sensing IoT, Artificial Intelligence, robotics, block-chain and cloud and edge computing.

Therefore, from a technical point of view, it would be advantageous to use the same language and ontology in the stream of data. In case of having a platform to share the data, the best service and product provided could attract the consumer in a free and dynamic market. Hence, in the free market, small and medium-sized companies can develop through access to the same platform and through the same platform, search for possible technology for their businesses. Therefore, the compatibility and interoperability of the data will give the possibility of a better incorporation of technology and advanced solutions to small and medium farmers and producers.

4. Opportunities for the Future

4.1. Reaching the Sustainable Development Goals

The United Nations defined, in 2015, a roadmap towards equity and sustainable development with a horizon set at 2030. These are the so-called Sustainable Development Goals (SDGs). Digitalization is presented as a key process to achieve a more sustainable agriculture and to strategically address the challenges associated with the SDGs. Digitalization can help improve real-time monitoring of crops, providing early detection of pest infestations and disease outbreaks. It can also help to optimize yields and resources, and to obtain higher quality and healthier products. With the adoption of digital technologies across the broader spectrum of the economy, greater participation in the economy and labor market by women, the youth generation, and vulnerable social groups can also be achieved. In this way, the country will move towards greater equity and accelerate the achievement of the ambitions of the SDGs.

4.2. Environment Protection

The use of technology for the fusion of data and information will impact the decisions of farmers for better planning of the production process. It will also facilitate the notification of the health status of the animals and will integrate, in real time, other data of interest such as information on the atmosphere, soil data, fertilizers. The software will facilitate the integration of global information, so that the data can be used safely and accurately. Therefore, it is important that the software that is developed is compatible with the data system available in the different countries. These advances represent an opportunity to improve food security, animal safety, environmental protection and reduce the effects of climate change.

4.3. Food Security

Recent technological advances highlight the potential of digital technologies to play a critical role in food security. Thus, for example, various smart platforms have been developed to assess the sleep, temperature and feeding patterns of cattle to estimate their health status. With this type of intelligent platform, it will be possible to prevent diseases and infections among animals. These technological methods reduce the possibility of errors by human agents and raise the level of safety in food protection.

Similar technology has also been developed to detect contamination of fruits and vegetables easily and quickly. The method works on the analysis of the data taken by the farmers. In addition, the data can be used to inform the consumer about the origin of the product or for the detection and elimination of low-quality fruits. It will also help in the protection against diseases, it will facilitate the distribution processes and it will guarantee the quality of organic fruits. Therefore, the digitalization of the agriculture could open up new opportunities for gathering, integrating and analyzing data to predict, assess and manage food safety risks.

4.4. Improved Market Access

Digitalization of agriculture can facilitate market connections between different actors in the value chain, such as small farmers, cooperatives, producers and distributors of agricultural inputs, service providers, processors, buyers and traders of agricultural products, as well as national wholesalers and international exporters. It can also make it easier for farmers to share information, leading to more transparency about market locations and prices. Thus, digitalization can help increase consumer confidence, improve transparency, and reduce costs, time to market, and lost revenue due to a lack of accurate and timely market information, all of which translates in better market access conditions for farmers.