



Agriculture in Spain and Southern Europe

Agriculture remains a key sector both socially and economically. This case study focuses on the impact of changing climate on agriculture in Spain, and how new technologies could help the farmers adapt to climate change. Although it focuses on the Spanish context, many of the conclusions are applicable across various EU countries where the characteristics of the agricultural sector are similar to those in Spain, namely a large share of farms being run as small family businesses, an ageing workforce, population decline in rural areas, significant use of seasonal migrant labour and lack of educational opportunities resulting in a lower level of digital skills among rural populations.

Overview

Agriculture is one of the most important sectors of the Spanish economy. In 2017, agriculture accounted for 2.7 per cent of GDP (down from 3.9 per cent in 2000). Between 2000 and 2017, agricultural production in Spain grew by approximately 1.6 per cent per annum. During the same period (2000–17), employment in the sector declined slightly, from 882,000 workers employed (5.3 per cent share of employment) in 2000 to 750,000 workers (4 per cent of total employment) in 2017. The economic importance of the agro-industrial sector (including all activities linked with agriculture such as food processing, distribution etc) is even greater, accounting for 11 per cent of GDP and 14 per cent of total employment in Spain in 2016.¹¹⁴

In Spain, as well as many other parts of Europe, small-scale farmers are heavily reliant on EU subsidies and vulnerable to growing competition from non-EU countries. They are also dependent on a migrant workforce whose availability is vulnerable to disruption. The small size of farms, together with limited digital skills and access to further training, present financial and skills-related barriers to the adoption of new technologies that could improve resilience and productivity in unfavourable climatic and demographic conditions. In such contexts, strong support will be needed to enable farmers to embrace new technologies and alternative farming methods that will improve their ability to adapt to climate change and growing market pressures.

Interactions with megatrends

Technology is increasingly used in agriculture to enhance productivity while reducing the environmental impact and resource use stemming from agricultural activities.

Technology can support farmers in facing challenges such as extreme weather, volatile prices, changes in consumer behaviour, natural disasters and diseases.¹¹⁵

Technology could have the potential to increase productivity and meet higher demand, while supporting adaptation to climate change. New technologies include the Internet of Things – ie the growing use of digitally connected devices (allowing greater monitoring capacity, efficiency and higher quality of products), robotics (to collect data about chemical and water use, and to select plants with better traits), AI (to support yield prediction, disease detection, weed detection, water management and soil management) and big data (to improve farm production practices and enhance the efficiency of the supply chain). Digitalisation of agriculture can help Spanish farmers to alleviate the negative effects of some major problems, such as water scarcity. Indeed, modern irrigation techniques are already widespread and make use of sensors, data processing and information analysis.

Spain is facing a problem of shrinking population in rural areas. Between 2000 and 2018, the rural population decreased by 10 per cent, while the total population increased by 15 per cent. Rural areas in Spain are also ageing: only 4 per cent of farm owners were less than 35 years of age in 2016, 14 per cent were 36–44, 51 per cent 45–64 and 31 per cent were over 65. These factors increase the importance of seasonal migrant labour. Ageing could pose a problem in terms of updating the skills of older workers in view of the deployment of digital technologies in agriculture.

Climate change will have a deep impact on agriculture. Rising temperatures and the increased likelihood of extreme weather events will affect crop yields. Spain already faces high risks of desertification due to the characteristic of its soil. Rising temperatures, lower volumes of precipitation and more frequent droughts and bushfires could put three million hectares of land at risk of desertification in the next 50 years, and by the end of this century, 80 per cent of Spain's territory could be at risk of desertification. To address environmental challenges in a high-impact sector, technological solutions capable of reducing emissions, optimising the use of fertilisers, and reducing the quantity of land, energy and water exploited will be fundamental.¹¹⁴

Implications for jobs and skills

In order to successfully exploit the solutions offered by technologies in agriculture, the workforce must be equipped with advanced technical skills and be capable of implementing and managing innovative systems. Therefore, in the future, farmers will need a multidisciplinary skillset, including the ability to control machinery as well as knowledge of informatics, robotics, meteorology, chemistry and biology.¹¹⁴

Various interventions are required to improve the digital skills of the agricultural labour force. Education in high-tech skills needs to be boosted, and a higher level of lifelong learning must be implemented to allow workers to keep up with the speed of technological change. Changing the professional profile of farmers to a more digital one could help attract younger workers. New forms of learning are also needed, such as virtual and blended learning (a mix of face-to-face and virtual learning), Massive Open Online Courses (MOOC) offered by universities and peer-to-peer learning. Forms of long-distance learning (eg based

on smartphone apps) could be particularly useful for agricultural workers and small-scale farmers who may be unable to participate in costly and time-intensive traditional training formats.¹¹⁶

Rural areas require special attention in terms of education, since they show relatively high drop-out rates and relatively low tertiary education rates. Rural workers who wish to upskill or reskill face a double challenge: bridging the educational gap with the urban population while learning new skills which might not be readily available in the local educational system.¹¹⁶

The European Commission acknowledges the challenges faced by younger farmers and suggests a set of policies to support generational renewal such as: income support and investment support for young farmers; promoting cooperation and exchanges of assets and knowledge between older and younger workers; and promoting training and educational exchange in the field of agriculture.¹¹⁷

Case Study

Adapting to climate risks: how digital and AI skills can strengthen the resilience of wine-making in Spain

Grupo Bodegas Palacio 1894 is one of ACCIONA's business lines with more than 100 years producing and ageing quality wines in Spain in world-known regions, such as Rioja or Ribera del Duero. ACCIONA has a century of experience of a dynamic market and understands that vineyards are vulnerable to the growing challenges of a changing climate. ACCIONA's research and development unit is therefore collaborating with its winery business to test and adopt adaptation and mitigation technologies to address climate risks. Through the 'Aggregate Farming in the Cloud' (AFarCloud) project, the company is studying the application of cloud-based, sensor and drone technologies to monitor soil texture, moisture and water stress in its vineyards, and help promote precision viticulture management. Ultimately the project should increase efficiency and reduce farm labour costs and risks. In turn the development of such projects will provide new and more specialised job profiles.



Fruit picker selecting grapes in Spanish vineyard (Photo Credit: Grupo Bodegas Palacio 1894).