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ORIGINAL RESEARCH ARTICLE

Evaluating the impacts of COVID-19 pandemic on Italian and regional agri-food systems: Case study in the Marche Region, Italy

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ABSTRACT

The study intends to analyze the situation of the agri-food systems in Italy over a one-year period (2020–2021) of the pandemic caused by COVID-19, with a focus on the Marche Region in the North-Center of Italy. The study presents the economic situation prior to the pandemic (2019), with an analysis of quantitative and qualitative data on the most relevant sectors of the agri-food systems. The scope is to investigate, from a socio-economic dimension, the impacts on the agri-food sectors and estimate the alterations occurring in production and consumption during and after the Italian lockdown from March to April 2020. The analysis mainly compares the two-year momentum (2019–2021) of the demography of the agri-food companies and showcases current trends. This analysis of the Italian agri-food system demonstrates that the pandemic and the territorial restrictions severely affected the sectors and altered some of the usual market trends. The pandemic caused disruptions in the distribution of inputs, extension services, and cooperative services, also leading to a shortage of labour. Factors such as market accessibility, postharvest value addition, pricing, and product shortages played a crucial role in shaping the market supply during this period of upheaval. The findings obtained by this preliminary study could be important in supporting decision-makers and producers in shaping new policy strategies for possible future crises.

Keywords: agri-food system; small and medium-sized enterprises; covid-19 pandemic; food security; food quality; Mediterranean diet; Marche Region

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1. Introduction

The COVID-19 pandemic is considered by the scientific community as one of the most unique opportunities to better understand social phenomena and their repercussions on economic, historical, cultural, and environmental contexts[1]. The situation of the agri-food sector in Italy after the spread of COVID-19 and the related socio-economic restrictions has received increased attention, especially due to the numerous and repeated closures of economic activities and the territorial restrictions.

According to the Institute of Services for the Agricultural Food Market (ISMEA), during the first two months of the total lockdown in Italy (March–April 2020), the agri-food sector showed a contraction along the entire value chain, from the primary production phase to the retail sales one. This was mainly due to the imposed total blockage of the Hotel-Restaurant-Café/Catering (HORECA) sector, as well as the elimination of tourist flows on the internal market and the severe contraction in food exports[2].

According to the National Agency for Tourism of Italy (ENIT),

foreign tourism for 2020 dropped by around 50%, resulting in an estimated loss of around 30 billion euros of food consumption out of 250 billion euros of total national food consumption, of which half of the total is due to foreign tourism in Italy[3].

The measures undertaken to contain the spread of the COVID-19 pandemic had important consequences, including food production and supply chain disruptions, consistent food shortages, disrupted access to inputs and services, food losses, and loss of employment and incomes. At the global level, the pandemic has influenced some food supplies more than others, both in exports and imports[4], and the most severe impacts have been registered for fresh food, such as fruits and vegetables. For example, in Canada, fruits and vegetables have been the most impacted as produce growers and distributors were forced to move food supplies from food service to the retail channel[5]. At the European level, the trade of food commodities among Member States has been disrupted, and imports and exports have encountered repeated closures due to national and international trade restriction policies[6].

Therefore, COVID-19 could still present an opportunity to address multiple long-term objectives for the national recovery, including the return to a strong local food system, the increase in adoption of policies to reinforce the resilience of the agri-food systems to future health crises, and the implementation of sustainability and food security, especially related to food availability, food quality, food loss, and waste reduction. In addition, the pandemic forced food companies to re-evaluate risks and opportunities, to redefine priorities, and to adjust not only production but also the entire food value chain[7].

When compared to other European Member States, the Italian agri-food production sectors demonstrated high resilience to the critical situation by guaranteeing a steady food supply to final markets during the lockdown[8]. Nevertheless, severe difficulties occurred, particularly in the fruit and vegetable sectors, since the finding of foreign labours for harvesting operations in the scheduled calendars was arduous due to travel restrictions from other countries, resulting also in food waste[2]. For dairy and meat products, the closure of the HORECA canal entrained serious problems as well as resulted in a decrease in such food demand. These problems resulted in an increase in the prices of the agri-food sectors, especially for raw material provisions. Moreover, the HORECA stoppage in March–April 2020 caused a 93% drop in the turnover of food retail sales, with estimated losses of more than 34 billion euros, and the growth in retail sales (+3.1%) only partially offset the losses in non-domestic consumption[9].

This study aims to elucidate the situation of the agri-food sector, focusing on an overall analysis of the main food productions touched by the negative effects of the COVID-19 pandemic at national and regional levels by analyzing the Marche Region case study.

2. Method

In this study, we analyzed and highlighted key national-level trends, with a specific emphasis on offering insights into the production, consumption, and retail sectors. A cause-effect analysis of correlations between production and employment, consumption and consumers' habits and health, and implications for the retail sector is presented, with the objective of providing a comprehensive analysis of the national agri-food trends and implications.

The methodology used is mostly data-oriented when analyzing production trends, while a more qualitative approach is undertaken when analyzing consumers' behaviors and socio-economic implications for the agri-food sector.

Data have been collected and elaborated using the main national and international statistical databases (e.g., ISTAT, SISTAN). For regional statistics, a formal institutional request has been made to the Chamber of Commerce of Macerata (Marche Region) in order to obtain the most available data for the agri-food sectors.

Additional data have been collected through reports' analysis made by sectoral national bodies, such as Coldiretti.

Some data collection limits occurred due to a general lack of data. Thus, the analysis has been made on harmonized and validated data on specific time series and on elaborations of national statistics.

Additionally, we elaborated on statistics related to the major productions affected by the pandemic in the Marche Region and presented data on the demography of agri-food companies and employment rates in order to further provide a socio-economic analysis of the sector.

The comprehensive analysis of the agri-food situation in Italy and in the Marche Region was made through the most available data and resources. In particular, the regional analysis showcased a general decline for the sector despite its validated resilience. Lastly, a scenario of potential policies and solutions was presented, outlining steps to be taken for the sustainable development of the agri-food sector in the long term.

3. Results and discussion

3.1. Socio-economic trends in Italy

An overview of national statistics and socio-economic trends in the agri-food sector during the lockdown has the scope to be a starting point to analyze and better assess the principal sectors and categories affected by the pandemic and to monitor the trends over the year. In fact, the major gaps identified thought a sector-specific statistical analysis of available data will help in a further analysis of the regional dimension in the Marche Region. Thus, the results of the agri-food statistical analysis presented herein could serve as a canvas for the definition of the main policy and economic interventions, particularly at the regional decision-making processes.

Among the main agri-food economic activities, the fisheries and wine sectors encountered major difficulties due to the closure of the HORECA and the changes in consumers' habits, who privileged nourishments for domestic use, such as non-perishable foods and more economic products. This trend led to economic losses in wine production and a decrease in fisheries provisions[10].

In fact, the lack of fish demand from restaurants resulted in a decrease in fishing activities, with consequent economic losses, especially for small-scale fisheries, which in Italy account for more than 80% of the total fish catch[11], while the wine sector faced the collapse of demand in traditional client countries, with severe repercussions also on the management of wine stocks for the next year harvest[12].

Despite the economic crisis in Italy and the closure of the HORECA sector, one of the positive aspects of this critical period is related to consumers and their change in food habits when analyzing the overall national trends. In fact, according to Coldiretti, which is the main Italian association of agricultural entrepreneurs, household spending on food products has continued to grow during the lockdown in Italy when compared to 2019 (+11%)[13].

From a health perspective, according to a study conducted by the University Tor Vergata, consumers abandoned the so-called "junk" food, with a reduction in the consumption of salty snacks, carbonated and sugary drinks, processed meat, baked goods, and packaged sweets, preferring ingredients for home-cooked meals. This trend has also continued in the post-pandemic, and it is expected that in the future there will be a modification in the citizens' approach to healthy and quality food, which will result in new market opportunities for producers[10].

The local dimension has been privileged by consumers, with a national overall increase of +6.5% in the economic value of food purchases in small shops when compared to 2019[12,18].

Despite this positive trend, a part of citizens also faced a new dimension of poverty due to the loss of jobs caused by the pandemic and encountered problems in buying quality food, such as foods rich in important nutrients for human health (e.g., proteins)[12].

When analyzing the retail sales sector, if we compare April 2020 to April 2019, retail sales in the agri-food sector recorded a +6.1% in economic value and +2.9% in volume, of which, for example, large-scale distribution was +6.9%, discount shops +9.3%, and small shops +11.2% (elaboration on ISTAT and Coldiretti dataset, 2020).

Retail sales of packaged food products in 2020 had an increase of +18% compared to the same period of last year (March–May), and, overall, they increased by a further +3% compared to the first month of the emergency (February). This trend is due to the necessity to store non-perishable food during the lockdown period as a psychological sense of security perceived by citizens.

In general, in Italy, the major trends of consumers in 2020 compared to 2019 have been: an increase in home deliveries (+160%); a recovery of the local businesses that also quickly organized home deliveries; a significant change in purchasing habits by consumers who have changed their food routine, preferring cereals, legumes, and ingredients for home-made cooking (e.g., flour, eggs, oil, cheese, tomatoes, etc.); and a steady purchase of medium-low cost wine (elaboration on ISTAT dataset, 2020).

When analyzing the overall agri-food sectors in Italy, after a negative performance in the added value (–1.6%) when compared to the year 2019, the pandemic caused an additional contraction. In fact, in 2020, production in the agri-food sector decreased in volume (–3.2%) and in added value (–6%). In particular, the negative effects of the pandemic had a serious impact on the secondary activities of agriculture (–20.3% in volume). Only for the forestry sector, there was an increase in production (+0.4%) and in the added value (+0.7%), while fisheries decreased by –8.8% in production and –5.3% in the added value[14].

Furthermore, the pandemic has led to adopt restrictive measures for the export of food (i.e., cereals), with important repercussions on companies and on price trends not only on national but also on international markets. For the food industry, the production index in 2020 decreased by –5.3% compared to March 2019 (elaboration on the National Institute of Statistics—ISTAT dataset, 2020).

3.2. Analysis on agri-food trends in the Marche Region

In 2019, the agri-food sector in Italy (agriculture, forestry, fisheries, and food industry) compared to 2018 marked an overall increase in the added value of +1.0% at current prices and +0.1% in volume, while in the second quarter of 2020, it had a reduction of the added value of –4.8% compared to the same period of 2019[14].

The agri-food sector accounted for 4.1% of the added value of the entire national economy in 2019, of which 2.2% was in the primary sector and 1.9% was in the food industry[14].

When analyzing one of the most affected sectors, the fishing sector in 2019 had an increase in production with +1.7% and in economic added value with +1.6% compared to 2018, while in 2020 the demand in volume of caught fish decreased by –30% compared to the same period in March–May of 2019 (data elaborated on the ISTAT dataset, 2020).

Therefore, despite the difficulties caused by the restrictions, the Italian agri-food sector managed to consolidate its weight within the national economic framework in 2020[14].

In the Marche Region, the added value of the agri-food system compared to the total economic national value accounted in 2018 for an economic value of 1.8% (Marche Region dataset, 2019). In 2019, the overall value of the agri-food sector, estimated over the total of all the regional economies, accounted for 17.7%, resulting the second most important economic sector in the region[15].

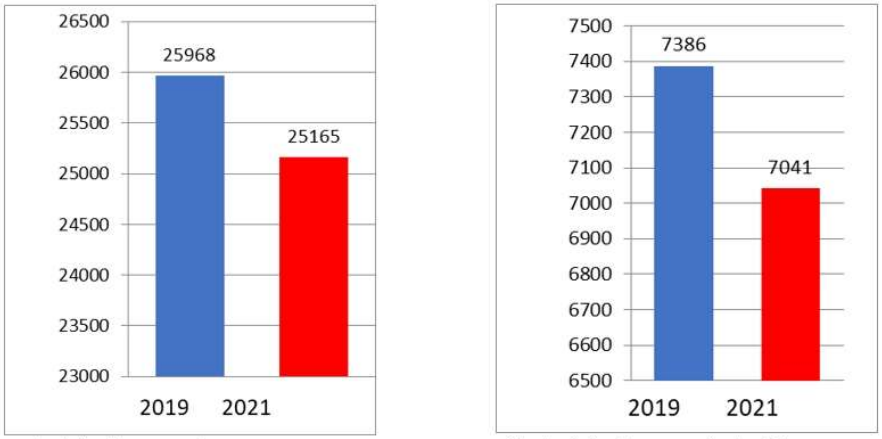
In spite of pandemic restrictions, regional agri-food exports resulted in a loss of only –0.5% if we compare the years 2020 to 2019 (data elaboration from ISTAT, 2020)[16].

A current statistical analysis of the agri-food sector of the Marche Region shows that a post-COVID-19 situation is not easy to analyze due to a lack of updated statistical data available, especially for production and consumption in Ateco sector A (agriculture, forestry, and fisheries). The Italian Ateco code corresponds to the statistical classification of economic activities in the European Community (NACE). Therefore, the study takes into consideration the Ateco sectors, which showed significant alterations, and presents the most updated statistics, taking into consideration more than a one-year time of reference, analyzing data from December 2019 to March 2021.

In order to assess socio-economic impacts, the demography of agri-food companies has been analyzed, focusing also on a gender evaluation, while the analysis of the employment rate has been important in monitoring the impacts on active labour.

As shown in **Figure 1a**, it is possible to detect a decrease in the number of active companies in Ateco A (–3.09%), that accounts for a loss of 803 units if we compare data between the end of March 2021 and the end of December 2019; specifically, 25,968 companies active in the agriculture, forestry, and fisheries sectors as of 31 December 2019, and 25,165 active companies as of 31 March 2021 (data from the Chamber of Commerce of Marche dataset, June 2021)[15].

A significant decline has also been analyzed in the number of active companies led by women in the agriculture, forestry, and fisheries sectors (**Figure 1b**), with a decrease of –4.7% (345 companies lost between December 2019 and March 2021), timely no. 7386 companies as of 31 December 2019 and no. 7041 companies as of 31 March 2021 (Chamber of Commerce of Marche dataset, June 2021)[15].



a. Agri-food companies **b**. Agri-food companies lead by women

Figure 1. Demography (no.) of agri-food companies by category in the Marche Region (Source: elaboration on Dataset Chamber of Commerce of Marche).

In regard to the number of employees in Ateco sector A (**Figure 2**), due to the pandemic, there was a significant loss (–6.68%) in their number during the first lockdown, going from 23,472 units in the fourth quarter of 2019 to 21,903 units in the third quarter of 2020.

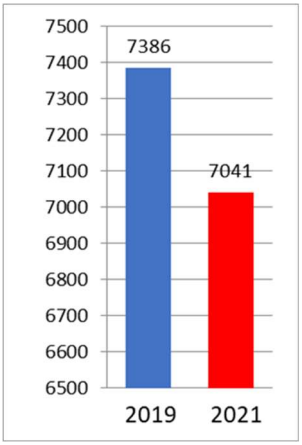


Figure 2. No. of employees in the agri-food sector in the Marche Region.
Source: Elaboration on Dataset Chamber of Commerce of Marche.

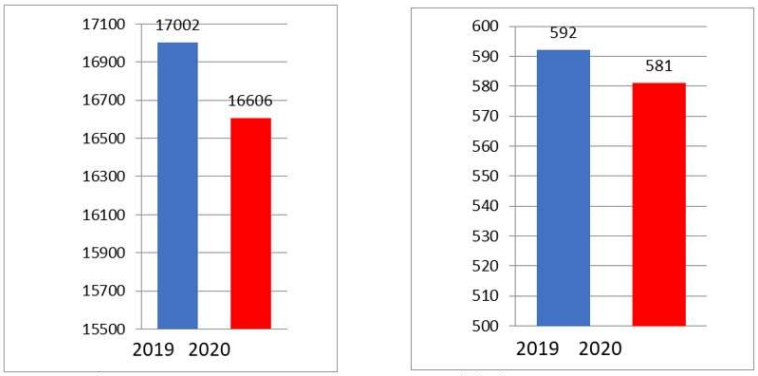
Thanks to the reopening and the financial aid provided by the Italian government, their number recovered in 2021, with 22,619 units in the first quarter of 2021 (Chamber of Commerce of Marche dataset, June 2021)[15].

Comparing to the same time period of reference (December 2019–March 2021), it is significant to estimate a recovery in the number of employees, with a general loss of –3.63% (Chamber of Commerce of Marche dataset, June 2021)[15].

When analyzing the main sectors that encountered major alternations in the Marche Region, specifically cereals and fisheries, the time period of reference is the first lockdown of the activities. This has the scope to better assess the alterations in production patterns related to import and export trends. In particular, the analysis on cereal productions relates to the consequence of exports alterations, while the analysis on fisheries refers to the closure of the HORECA sector.

As shown in **Figure 3a**, one of the sectors that has experienced a significant decline due to the decrease in exports and despite the significant national demand is the cultivation of cereals (Ateco A 01.11.1), with a decrease of –2.33% in the number of companies going from 17,002 at 31/12/2019 to 16,606 at 30/09/2020 (Chamber of Commerce of Marche dataset, November 2020)[15].

For the same time period, for fishing activities in marine and inland waters and related services (Ateco A 03.11, **Figure 3b**), there was a decrease of –1.86%, specifically from 592 companies to 581 (Chamber of Commerce of Marche dataset, November 2020)[15].



a. Cereals **b**. Fisheries

Figure 3. Demography (no.) of agri-food companies by sector in the Marche Region.
Source: Elaboration on Dataset Chamber of Commerce of Marche.

If we analyze the sector more in general, the agri-food sector generates an added value equal to 1.8% compared to other national activities and counts 2.8% employed people in the sector at the regional level

(source: Marche Region dataset based on ISTAT data processing, years 2018 and 2019)[16].

There are approximately 6800 farms in the Marche Region, accounting for 3.2% of Italian farms, and the overall Utilized Agricultural Area (UAA) is approximately 471,000 hectares, equal to 3.7% of the national total UAA[15,17]. In the Marche Region, the UAA dedicated to organic agriculture accounts for 21% over the total[15,17] and this is a positive trend when aiming at achieving the European goal in the Green Deal of 25% organic agriculture.

In the Marche Region, companies are especially Small and Medium-sized Enterprises (SMEs) and the small-scale dimension is prominent in the territory, accounting for around 94% of micro-companies with up to 9 employees[15].

The Marche Region has peculiar pedoclimatic characteristics, and the agri-food companies are scattered from mountains, hills, and the cost. As previously shown, the lockdown caused major problems for companies, especially for the most vulnerable and for those aligned with exports. This means that resilience should be boosted at the regional level and in line with the national situation of recovery from the pandemic[19,20].

The analysis on statistical data allows to better assess the main gaps to overcome in the regional agri-food sector, being a starting point for the definition of the main future interventions to be undertaken by policymakers.

In particular, as presented in **Figures 1–3**, the principal difficulties have been encountered by firms, especially employees and women working in agri-food companies. In fact, as shown in **Figure 1b**, companies led by women have suffered the most, with a loss of around 5% of companies. From a social analysis, this could represent the negative result of the closure of schools as an indirect cause, where women had to choose between work and family care. Also, the national restrictions led to some closure of activities, which led to a significant loss of jobs in the Marche Region, especially during the lockdown (around –7%). Therefore, the economic subsidies given after the first lockdown in Italy have been useful in restoring the situation, with a new gain in jobs of around 3%. As shown in **Figure 3**, the most affected sectors in the Marche Region have been the cereal production, which is mainly due to the loss of exportations in other counties, and the fisheries sector due to the closure of HORECA and the alterations in consumers' habits.

4. Conclusions

For the agri-food sector, the long-term response at national and regional levels should support producers and the entire system in building self-reliance for the sake of food security, which entails shortening supply chains in order to reduce current vulnerabilities while strengthening local food systems to reduce dependence on imports[21]. The return to a more robust local food supply and a shorter supply chain, where possible, can build resilience for current and future global threats.

The pandemic highlighted the importance of the local dimension of food provision and transformation, so that the traditional agriculture systems currently adopted in the Marche Region have received increased attention in the context of sustainable food production at the national level (e.g., organic, conservation agriculture, and agroforestry)[20].

Thus, it is crucial to maintain and foster more sustainable systems by supporting producers in the transition. This can support the recovery of the agri-food system while also reflecting important cultural values and regional traditions. Expanding on this point, it is important to build value chains that are complementary to agriculture and fisheries, such as agro-tourism or products linked to local culture and traditions. Local knowledge and innovation in the agri-food sectors need to be linked and enhanced to build resilience to future health crises and to climate change threats[22].

Analysis on data showed that small-scale companies, especially those managed by women, encountered significant problems. Thus, it is important to shape innovative and easy-to-use financing mechanisms, especially those conceived for the most vulnerable, that integrate agriculture and health challenges, such as COVID-19. Both private and public sector mechanisms are central to implementing a sustainable post-COVID-19 long-term recovery. Among the possible solutions, it is fundamental to review the bureaucracy process to access funds and temporarily lessen taxes; fiscal and monetary policies are needed to support farmers and households, provide insurance, scale-up social protection, and prevent job losses in the agri-food system[20].

The use of delivery systems oriented to the sustainability of packaging needs to be integrated also in the agri-food sectors with the scope to reduce barriers for smallholder farmers in reaching consumers and end-users, though specific financial mechanisms such as the ones provided by Measure 16.1 of the national PSR (European Rural Development Plan).

The agri-food system in Italy is articulated and fully integrated with the principles of the Mediterranean diet, which is a sustainable approach to food production and consumption.

The new scenario in consumers' demand for healthy and high-quality food resulted in adherence to the Mediterranean diet and, thus, in the opening of new scenarios for producers in the agri-food system. These cultural values helped in the tightness and recovery of the national and regional agri-food systems despite the threats of the pandemic. Since the COVID-19 crisis will not remain a one-off, it is crucial to address research and policies in the long run, in order to cope with future instability within the sector.

Author contributions

Conceptualization, GB; methodology, GB; software, GB and GC; validation, GB, GS and SV; formal analysis, GB; investigation, GB; resources, GB; data curation, GB and GC; writing—original draft preparation, GB; writing—review and editing, GB, GS, SV and GC; visualization, GB; supervision, SV; project administration, GB and SV; funding acquisition, SV. All authors have read and agreed to the published version of the manuscript.

Conflict of interest

The authors declare that they have no conflict of interest.

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