

179th EAAE Seminar

*Food Policy Modelling as an Effective and
Expeditious Response to Today's Urgent Issues*

Abstracts Book



European Association of the
Agricultural Economists (EAAE)



Mediterranean Agronomic
Institute of Chania (MAICh)

Mediterranean Agronomic Institute of Chania (MAICh)
Chania, Greece, 9 - 10 September, 2021

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Oral presentations

THURSDAY, 09 September 2021

Session 1A

SESSION 1A

The agro-food sector in an era of quick changes

Room: **THALES**

Chair: Jose Maria **Gil**

The contribution of informal and citizen-driven food initiatives in the post-Covid-19 food system in 9 European cities

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The COVID-19 pandemic has had immediate and severe impacts on the farm-to-fork value chain because of the lockdown measures to contain the virus and the subsequent economic recession. A substantial contribution to overcoming these problems came from innovative solutions in agri-food systems, and more will be required to foster the transition towards a sustainable and resilient food system in the post-lockdown era. Whether it is still uncertain how fundamental and long-lasting the changes dictated by the pandemic will be and which structures and systems will remain after the emergency, this paper seeks to investigate potential transformation trajectories linked to informal and citizen-driven innovative food initiatives in changing the post-Covid-19 food system. Examples of innovation in the agri-food systems include technological and digital innovations but also green channels connecting fresh food producers with urban centres, local Food Hubs, community-supported agriculture, initiatives to reduce food waste and foster recycling, education projects for students and teachers, training for kitchen staff in school canteens, e-commerce solutions. Using quantitative and qualitative approaches, we map various innovative initiatives, not only technological, relevant to the transition of food systems in different countries, and collected data on the type, degree, capacity of innovation, and citizens' involvement. We explore their trajectories, obstacles and enabling factors and whether and how these initiatives can shape the future's regional food system and play a pivotal role in the transition in the post-Covid-19 era. The analysis of the collected data highlights several overlaps and synergies between the goals and outcomes of innovators' activities and the actions needed to overcome the challenges posed by the pandemic.

THE IMPACT OF COVID-19 ON THE CATALAN AGRO-FOOD SUPPLY CHAIN

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An unprecedented crisis has forced the European countries to impose lockdowns and to declare states of alarm. These restrictions have had an important impact on the normal activity of companies. The agri-food sector has not been an exception, despite having been declared as an essential economic activity. This research article aims at assessing the impact of COVID-19 on the Catalan agri-food supply chain between March and November 2020. An analysis of the potential impacts and measures adopted during this period are described in detail, illustrating, the most relevant impacts and responses by key supply chain links. To do so, data were collected through a survey distributed among different key stakeholders, especially for companies that produce, process and distribute food (at the wholesale and retail level) in Catalonia. The impact of Covid-19 on the supply chain could be larger than previous disruptions (e.g., the economic crisis of 2008). All supply chain links have been affected by the pandemic in terms of the supply of raw materials, labor, production surplus and loss of sales. The flow of products and services has suffered operational restrictions that have entailed additional costs for companies in the agri-food sector due to the strong restrictions regarding the movement of goods, the reduction in consumption, the increase in raw materials prices, transport limitations and necessary investments in sanitary protection equipment. On the other hand, we found evidence that the agri-food supply chain in Catalonia has shown a degree of resilience amid the pandemic to meet the basic requirements of feeding a confined population. The resilience of different supply chains links to the pandemic is a key factor toward a sustainable agri-food sector.

The impact of COVID-19 lockdown and consumers' risk preference and perceptions on food purchasing and consumption behaviour in Spain

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The COVID-19 pandemic is a big challenge for global food security and it changes consumers' food purchasing and consumption behaviour. This research not only investigates Spanish consumers' food purchasing and consumption behaviour during the lockdown but also from a point of sustainability. Data are collected from a semi-structured questionnaire which is distributed online among 1203 participants. The total food consumption (C), food expenditure (E) and purchase food with sustainable attributes (S) as three dependent variables are measured and binary logistic models are estimated. Results show that gender, age, employment status and experience are associated with total food consumption and expenditure during the lockdown. In addition, consumers' risk perceptions, shopping places, trust level in information source and risk preference are highly important factors in consumers' preferences and behaviour. Consumers' objective knowledge regarding COVID-19 influences expenditure. Consumers' trust level in information from the health professionals and scientists is higher than that from government and News. Furthermore, family structure is only related to expenditure, while the place of residence only influences food consumption. The mood is associated with expenditure and purchase food with sustainable attributes. Household size affects purchasing behaviour towards food with sustainable attributes. This research provides references for stakeholders that helps them to adapt to the new COVID-19 situation.

Session 1B

SESSION 1B

Food security and food waste reduction

Room: EPICURUS

Chair: Stefano **Corsi**

Reducing food waste through institutional innovations: scenarios of food loss and waste reduction through a virtuous use of withdrawal

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Food Loss and Waste (FLW) reduction is one of the major challenges to be met by 2030 (SDG 12.3). To reach this target, all actors along the entire food value chain should play a role. The LOWINFOOD consortium, by adopting a multi-actor participative approach, has foreseen selected technological, social, managerial, and organizational innovative solutions to be tested and upscaled to allow market replication. This paper illustrates the case of an institutional innovation implemented in Italy, namely a software linking the agricultural sector with charities in the Emilia-Romagna Region (EER) since 2012 and currently managing food donations all over Italy. The software works with market's withdrawal of the Common Agricultural Policy (CAP) (EU Regulation 2017/892), and it directly connects surplus food with beneficiaries, delivering 100% of the intervention price to farmers if the product reaches a charity, or the 50% if it is sent to plants for ethanol production. The EU Commission, the Ministry of Agriculture, the European Court of Auditors, and the Italian finance police can access the software anytime and check on the transparency of the process. ERR reports that, out of the 166.179 tons of product withdrawn for emergency situations between 2012 and 2018, 66% has been donated to charities, and 25% has been sent to ethanol production. One of the project's tasks is to replicate the innovation in other Mediterranean countries. Therefore, this paper aims at assessing the innovation potential for replicability using data from institutions managing the CAP funding and OPs/APOs (EU Directive 2018/851). In particular, we will analyze the number of withdrawals of specific Mediterranean countries and outline potential scenarios for the application of the innovation, thus examining potential food recovery, compensation for farmers, and environmental sustainability. NOTE: LOWINFOOD has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement (G.A. NO 101000439). The views and opinions expressed in this document are the sole responsibility of the authors and do not necessarily reflect the views of the European Commission.

Why go on vacation to Crete? Assessing the role of local cuisine

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This research aims to assess British and Russian tourists' consumer attitudes and preferences, in relation to Cretan cuisine, evaluating at the same time the overall gastronomic experience. For this purpose, we clarified crucial factors leading to the aforementioned final choice. Taking into consideration relative previous studies, a bilingual three-part questionnaire was created (British and Russian), and distributed to 249 respondents, of whom 126 were British and 123 were Russian tourists. The vast majority of both Russian and British tourists were totally satisfied with the island's overall gastronomic experience. More specifically, the most significant factor, extracted from the Principal Component Analysis (PCA), for the selection of Crete as a final destination for vacation was the Cretan cuisine. British tourists are more willing to experience Cretan cuisine and visit local restaurants. Russian visitors though had a better knowledge of Cretan cuisine and gastronomy issues and were more ready-to-order a dish that they had never tried before. Russian tourists expressed their intention to adopt Cretan foodstuff and recipes at their homeland and revisit Crete in the near future. This is not the case at the same intention level for the British ones. The education level of respondents is significantly interrelated with the importance of Cretan cuisine, but also an alternative gateway to get in touch with the tradition and culture of the island. Finally, it is evident that the Russians emphasize more the aforementioned issues compared to British tourists.

A multifactor and multidisciplinary approach for the development of Integrated Urban Food Policies (IUFPs). The case study of Bari

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UFPs aim at providing a roadmap for the future growth of the community, including food issues in a comprehensive plan, and improve the urban/metropolitan food system to guarantee access to healthful and affordable foods for all residents and visitors, within a sustainability framework. In European countries different forms of urban poverty and food insecurity can occur, in the last years an increase in the number of people dependent on food assistance was observed and the Covid-19 pandemic has increased the criticalities resulting in new forms of poverty. The main issues of UFPs concern the modes of production and consumption, economic equity and social justice, logistics and governance, etc. and a comprehensive and integrated approach that combines infrastructure improvement, health promotion, and community participation is needed. According to the Milan Urban Food Policy Pact, the most recognized UFP framework, the implementation of an Integrated Urban Food Policies implies the participation of different local actors and stakeholders and the contribution of diverse expertise. The present work proposes a multifactor and multidisciplinary approach for the development of the Integrated Urban Food Policies in the city of Bari. The methodology is based on the collection of quantitative and qualitative, primary and secondary data, the development of synthetic indexes (e.g. poverty index, self-sufficiency index), the production of thematic maps overlapping and combining different contents. Second, the involvement of local niche initiatives, focused on social innovations, provides an interesting bottom-up point of view and helps to orientate the initiatives toward the shift of the urban food system aimed at a more inclusive approach. Finally, the public debate with representatives of the civic association and citizen groups assures a wide participation. This work proposes an innovative approach at the IUFPP implementation, aiming to become a model for Mediterranean cities and towns.

Session 1C

SESSION 1C

Innovation and ICT in agriculture

Room: THALES

Chair: Dimitrios **Diamantidis**

Factors affecting farmers' decision to adopt innovative circular farming practices and solutions in EU

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The agricultural and livestock sectors are facing several challenges to meet the current EU environmental standards and objectives. Reducing Greenhouse Gas (GHG) emissions and ensuring that a large share of nitrogen, phosphorus, and potassium are coming from renewable sources is one of the major policy aims. In this context, farmers are continuously seeking to adopt innovative strategies and solutions to ensure more sustainable food production systems. Adopting innovations and technologies based on the circular economy concept may improve resource efficiency, allow the reuse and recovery of nutrients, reduce the negative effect of emissions on soils, water, and air. The farmers' decisions to implement the innovative management solutions depend mainly on the initial investments, benefit and costs, farm structure, farmers' socio-economic characteristics, external markets conditions, environmental and risk attitudes among others. Understanding the driven factors of adoption may guarantee the long-term viability of the proposed solutions and thus their integration into the agricultural policies frame. This study aims to identify the determining factors and barriers that affect farmers' adoption of several Circular Agronomy solutions in an exploratory study of a sample of farmers in 5 different countries of the EU. A semi-structured questionnaire was designed according to a depth review of literature about farmers' adoption of sustainable technologies in Europe, such as the adoption of organic agriculture, manure treatment and use of manure-based fertilizers, and various soil and water conservation measures. Preliminary results showed that the level of acceptance of the proposed innovations is highly related to farmers' economic motivations and objectives. The cost of the investment, return on investment rate, institutional support, risk, and environmental attitude play a relevant role in the adoption decision. Results of the adoption preferences may assist policy-makers in designing more specific and efficient measures and tools that may help farmers to face the current environmental challenges and social needs.

Evaluating SMEs readiness to embrace innovative projects through a clustering approach

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As innovation has garnered substantial attention on corporate success and sustenance, organizations must evaluate internal contexts to determine potential innovative practices and benefits. Furthermore, firms needed to investigate the determinant factors of innovation preparedness as organizational innovation practices were catalyzed through internal elements (climate, culture, intention, and structure). As such, this study aims to evaluate small and medium firm preparedness to adopt and execute collaborative innovative projects with a future cluster and strategically compartmentalize organizational properties. Firm preparedness impacts on organizational intentions, advantages, and attributes were also examined. Specifically, firm preparedness was assessed using three factors (culture, atmosphere, and motivation). The study data were obtained from 70 companies generating labeled products in Morocco. For example, the organizations were homogeneously categorized following the initial raw scores of organizational preparedness predictors with integrated hierarchical and non-hierarchical (K-means) algorithms. Resultantly, three clusters highlighting the extent of firm preparedness to execute collaborative innovative projects were identified. The identified clusters varied in organizational sub-sectors, such as experience (corporate age), and observation. As firm preparedness was associated with observed advantages and aims, the outcomes expanded firm preparedness comprehension of innovative projects. Following the necessity to incorporate novel implementations in a dynamic setting, the research insights could facilitate future studies. As such, this paper aided organizational businesses in comprehending the correlations among firm preparedness and attributes and innovative projects. The study outcomes also demonstrated the necessity to adapt advantageous and innovative project mechanisms for companies with little or moderate experience while responding to latent concerns through various organizational clusters.

Governing digitalization in the EU agricultural sector.

Enabling factors and hurdles

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Technological advancement plays a crucial role in building circumstances of sustainable economic development and innovation as a major driver of growth, especially within the COVID-19 pandemic era. At the same time, agricultural sector holds a special and strategic position in the process of a country's economic development, and therefore to the policy-making process, not only due to its vitality as a food supply sector but also due to its interconnection and linkage with various activities in the food industries' supply chain. As digitalization has entered the agri-food sector, the new technologies create the context not only for improving agricultural productivity but also to deal effectively with some of the most pressing international problems related to, population growth and climate change. Although, several European countries are making significant efforts to adjust their agricultural sectors in the digital era; and despite the evolving favourable framework provided by the EU to this end, Greece has been repeatedly found to lag behind in terms of adopting new technologies and incorporating them into the production process. Therefore, the purpose of this research is to analyse the reasons behind the lag of the Greek agricultural sector toward its digital transformation. By employing sectoral innovation system approach and with the use of relevant policy process frameworks, the role and interactions of involved stakeholders are examined, in order to highlight the enabling factors and hurdles, towards the incorporation of innovation and digitalization in the agricultural sector of Greece. By way of desk research analysis, literature review on the specific issue of interaction between sectoral system of innovation in the case of agricultural sector, its digitalisation, and decision-making and policy process analysis. Reference will also be made to EU's relevant documentation, including the Natural resources and environment - legal texts and factsheets for the Multiannual financial framework 2021-2027, as well as information and data from the agricultural European Innovation Partnership (EIP-AGRI) portal.

Twitter as indicator of new trends in the digital transformation process of the agri-food sector

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Innovation in the agri-food sector is essential to respond to new challenges related to sustainability, changing demand, increased competition, or the current pandemic scenario. The use of new digital technologies, such as IoT, Big Data, AI or blockchain, provides new opportunities to face these threats. Today, it is almost inevitable for any company to adopt some level of digital transformation to strengthen their competitive position. However, the transition towards digitalization could be more complex in the agri-food sector characterized by small and medium enterprises, problems of generational removal, as well as, a supposed limitation of ICT skills and engagement. Taking this context, the main objective of this research would be to assess the levels of engagement towards digital transformation by the different food chain actors across different countries. Twitter API is used to gather tweets related to the digital transformation process in the agri-food sector across the world. For this purpose, we will analyse tweets containing the words digitalization, blockchain, IoT, big data, AI, agri-food or smart agriculture. The retrieving and analysis of tweets will be conducted by R and MAXQDA software, by coding them based on the phases of innovation adoption. It will allow us to perform a qualitative descriptive approach by means of content analysis, that linked to a sentiment analysis, could give us an initial description of the adoption level of digital solutions on the agri-food sector, topics discussed and barriers identified. Moreover, the author's profile and location will be used to analyse the effect of external factors (e.g. position in the agri-food chain or country's agri-food sector characteristics) on digitalization level, using econometric modelling. Therefore, the results of this research could provide an overview of the current and future digitalization adoption trends in the agri-food sector and calibrate the influence of social networks impact.

SESSION 2A

**Policy measures for climate change mitigation and
adaptation in agriculture**

Room: THALES

Chair: George Vlontzos

Climate Change Extreme events and Risk Assessment in the Agricultural Sector

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The climate change is a global problem with impact on the frequency and intensity of natural hazards such as hurricanes, extreme draught or flooding. Relevant data related to the climate change in Central Europe and especially in Germany indicate a temperature increase as well as an increase of precipitation intensities and of periods of drought with impact on infrastructure, agriculture and consequently on the overall economy, environmental sustainability and social wellbeing. Extreme flooding in Central Europe occurred in August 2002 is selected in this contribution as an example to illustrate damage to agriculture networks and other infrastructures which were on an unprecedented scale. The objective is to present a risk informed methodology used in other sectors of civil and environmental engineering and to show how can the approach applied to the agricultural sector. First statistical models available for occurrence of extreme events are critically reviewed. The method of moments and the method of maximum likelihood are implemented to analyse the data and to answer frequent questions related to return period corresponding to the observed flood (water) level. The associated consequences divided into a) direct and indirect economic losses, b) societal consequences and c) environmental impacts are discussed. The guidance on how to estimate and combine these consequences is provided. The state of the art regarding risk acceptance criteria and state of practice on risk management procedures is briefly presented including environmental risk acceptance criteria based on recovery time versus occurrence frequencies. An example for a possible performance matrix in terms of acceptable degree of damage for specified consequence (damage) classes is proposed. Conclusions for future developments are finally drawn, offering a platform for advancing interaction between environmental, agricultural and civil engineers as well as between authorities and practitioners.

Analysing the impact of economic growth, energy intensity, agri-food trade on CO₂ emission: the case of the European Union

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Carbon dioxide emissions are the highest anthropogenic contributors of greenhouse gases to global warming. In line with the trends of growing world population, expanding economy and trade, the carbon dioxide emission expected to increase in the future. Resulting in the ratification of the Paris Agreement, the European Union committed to decarbonizing its economy by 2050. In the pathway of carbon neutrality, significant greenhouse gas reduction is essential. Behind the EU, the other part of the world pursues a different climate strategy. The paper investigates the explanatory factors of CO₂ emission in the European Union and non-EU countries using an econometric panel regression model between 1960 and 2019. The estimated model investigates the impact of economic growth, energy intensity, agricultural trade on carbon dioxide emission. The research applied static and dynamic panel estimations methods. The results confirm the validity of the Environmental Kuznets Curve for EU and non-EU countries. Considering energy intensity, estimates have shown that an increase in the Energy intensity level of primary energy stimulates CO₂ emissions. The expansion of international agri-food trade decreases the CO₂ emissions indicating the problem of exporting pollution from the EU to third countries. Finally, estimates showed that it is a difference in the strength of factors of the GHG emission between the EU member states and non-EU countries.

Adaptation of agricultural holdings to climate change: An impact assessment for the production plan of Central Macedonia in Greece under different climate scenarios

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Assessing the impacts of climate change on agricultural production has always been a difficult area of study, as it is not easy to predict and interpret the future farmers' decisions. The aim of this research was to assess the impacts of climate change on the farmers production plan and to determine the adaptation of agricultural holdings to the predicted changes. The research was carried out in the region of Central Macedonia in Greece with a presentation of different production plans and their level of adaptation to climate change. For this purpose, various climate change scenarios were studied, and a mathematical programming model was developed. The results were simulated to the years 2025 and 2030.

SESSION 2B

Dealing with future challenges in agriculture

Room: EPICURUS

Chair: Maria **Glibetic**

Arable agriculture under climate change and the Post-2020 Common Agricultural Policy: the case of Podlaskie Region

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The objective of the study is to evaluate farmers' crop mix decisions under climate change and different policy scenarios (e.g. forthcoming CAP) for arable cropping farms in the east part of Poland (Podlaskie Region study case). Portfolio analysis is implemented in mathematical programming in order to achieve this objective. As farmers face a wide set of risks, these days amplified by the climate change, which they preferably want to avoid or reduce there is a question on the extent of risk aversion, an ubiquitous characteristic of farmers' behavior, nevertheless region and activity-specific [1]. Parametric and non-parametric methods have been used in the literature to determine this parameter [2], in this paper a heuristic process will be applied [3, 4] based on the observed optimal cropping plan, using historical data (yield, price) for the specific country region (including similar climate or market condition). Portfolio analysis has been used in farm management [2], in order to define the optimal production plan, for example, the allocation of land to arable crops under uncertainty. Subsequent research was applied to answer the question of farmers' response to the policy. Mathematical programming evaluated previous policy reforms rightly predicting adverse impacts, i.e. that support decoupled from production would lead farmers to abandon cultivation [5-7]. A similar investigation is taken in this study adapting models [8, 9] to account for current conditions to investigate the effect of measures considered in the context of the post-2020 CAP (i.e. flat rate, environmental subsidies) for the arable crop farms in Podlaskie region in the east of Poland. To achieve this objective the analysis is resumed in three steps: 1) the mathematical programming model building including detailed policy constraints, 2) integration of farm input data to the model and 3) deployment of climate change possible scenarios based on pedoclimatic models. In the first step portfolio analysis for crop mix selection is implemented during the construction of the mathematical programming model, including utility, percentage of absolute deviation, and revenues from the crop production functions. Farm model data is prepared based on information provided from extensive research on the life-cycle assessment of arable crops in representative Polish arable farms. The stochastic element related to the climate change will be captured by means of yield time-series data (observed and estimated). EURO-CORDEX project data scenarios of climate change are used in this study to consider possible climate change impacts on arable crop production. Main results from the study: calculated yields for sampled farms for arable crops based on the climate change scenarios and time-series historical data, efficient frontiers of risk-return spectrum for each examined farm, and Risk aversion coefficients for the sampled farms. The most important contribution of the portfolio model is related to arable crop rotations concerning maize that is one of the staple crops strongly affected by frequent drought episodes due to climate change. Various policy measure specifications result in somewhat different results without altering the overall picture. Reference: 1. Gómez-Limón, J.A., Arriaza, M. and Riesgo, L. (2003). An MCDM analysis of agricultural risk aversion. *European Journal of Operational Research* 151, 569-585. 2. Hardaker, J. B., Huirne, R. B. M., J. R. Anderson and G. Lien (2004). *Coping with Risk in Agriculture*, CAB International: Wallingford, UK, 332 p. 3. Brink, L., and B. McCarl, 1978. The tradeoff between expected return and risk about corn-belt farmers, *American Journal of Agricultural Economics* 60, 259-263. 4. Louhichi, K., Ciaian, C., Espinosa, E., Perni, A. and Gomez y Paloma, S. (2018). Economic impacts of CAP greening: application

Session 2B

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Green deal: Beyond a new era of agricultural exceptionalism?

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The European Commission launched the new strategy for the Union to mitigate the effects of climate change and once again agriculture is among the most important arrows in the quiver of the policy maker to meet this challenge. For years, the so-called vision of "agricultural exceptionalism" has marked the trajectory of new policies for the sector. If from 2010 a setback was expected with the arrival of a "post-exceptionalist" era (Greer, 2017), today, with the ambitious challenges proposed by the Green Deal and related strategies such as farm to fork and biodiversity, agricultural exceptionalism returns to be at the center of the European political framework. The exceptionalism of the agricultural sector and the importance attributed by European policy makers have led to the sedimentation of institutional infrastructures and networks that have favoured the defence of the sectoral interests (Skogstad 1998). During the years, the CAP reforms have brought only incremental and not radical transformations (Greer, 2013) aimed at promoting the transition from a productivist and protectionist policy to a more market and environmentally sensitive intervention model (Burrel, 2006). This aspect has been central in the rhetorical construction that accompanied the whole long reform process towards the new CAP 2021-2027, highlighting how wide is the gap that prevents the CAP from being strongly integrated with European environmental policy, despite the most distorting part of European support to the agricultural sector has been definitively reduced and it is evident that the environmental commitments of beneficiaries have grown over time. The aim of this paper is to analyse the changes in the CAP history in order to clarify the framework in which the debate on the evolution of agricultural exceptionalism takes place.

Competitiveness, Sustainability Performances and Policy Options in the Sheep Meat Sector of Mediterranean countries

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Several economic analyses confirm that the development of a national economy is historically linked on the success of domestic production and the skills of local producers to compete effectively on international markets while maintaining a significant level of sustainability for their resources. The objective of this study is to analyze the competitive performance of selected Mediterranean countries (France, Spain, Italy, Greece, Turkey, and Slovenia) for the sheep meat sector over the period 2005-2019 and to define the related sustainability performance concept (at the environmental, social, and economic level) in order to recommend priorities and orientations for policymakers and researchers towards the further improvement of the sector. Sheep meat sector was chosen as a topic of this study due to its traditional role in these Mediterranean countries and the importance of its consumption especially in some specific periods. The competitiveness was carried out by assessing trade indices (EMS, IMS, RCA, RMA, RTA, NEI, GL) while a cluster analysis was also run in order to classify groups of studied countries with similar features. The results indicate that a satisfactory competitive performance can be observed in Spain and Greece, which were found to be extensively export oriented in the sector. France is characterized by negative dynamics of competitiveness even if it has a high export value. The rest of the countries show comparative disadvantage with weak trade indices.

Towards improving sustainable food systems for healthy diets and nutrition in central and south eastern Europe

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The objective was to assess, evaluate and recommend priorities in policy development that are most relevant to sustainable food systems in Central and South-Eastern European countries (CSEE) for healthy diets. An online questionnaire related to 8 thematic areas relevant to food system elements was created and distributed to 17 CSEE countries to identify the current status. Representatives from 15 countries from various institutions from the agri-food-nutrition-health sector completed the questionnaire and took part at the Symposium on Sustainable Food Systems for Healthy Diets in Central and South Eastern Europe (CSEE) countries, with integrated training on food consumption data collection and strengthening the thematic regional networking 15-17 October 2018, Belgrade Serbia <https://www.capnutra.org/events/>. The regional overview of food system elements in CSEE countries revealed various challenges and opportunities to support food systems transformation for healthier diets in Central and South-Eastern Europe. Conclusions and recommendations for evidence based policy were made by an expert panel from 26 countries, representing a wide range of stakeholders, government officials, research and academic institutions, EFSA and specialized United Nations agencies including FAO and UNICEF, formalized in the Belgrade Declaration for strengthening regional capacities on sustainable food systems for healthy diets and nutrition in Central and South Eastern European region. These recommendations proposed a number of specific actions points to improve policies and capacity building related to governance and public health nutrition, the food supply chain and food environment, consumer behavior, research, education, and training of professionals, networking, sharing knowledge, and experiences for establishing the collaboration between capacity development networks. Encouragement and guidance for countries to focus on further food system transformations and policy implementation in the line with International frameworks, the ICN2, the 2030 Agenda for Sustainable Development and the UN Decade on Nutrition with technical support and capacity development from the UN specialized agencies are needed.

SESSION 2C

Trends and policies affecting the structure of the agro-food
market and trade

Room: ARISTOTLE

Chair: Klaus **Salhofer**

Assessing the role of Measure 6.1 start-up for young farmers in export orientation: Evidence from Greek agricultural sector

Staboulis Christos, Natos Dimitrios, Tsakiridou Efthimia, Gkatsikos Alexandros, Mattas Konstadinos

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Over the last years, the CAP has been more active on the front of generational renewal, providing Member States with funding instruments to support young farmers in the setting-up and viability of their activity. This kind of support targets the restructuring of the agricultural sector and the modernization of the rural population by providing incentives to facilitate initial investments for the establishment of the farm. For Greece, the main national priorities are the improvement of economic performance of agricultural holdings as well as the entry of skilled farmers into the agricultural sector. The aforementioned factors have as an impact the enhancement of farm viability and competitiveness and given that those factors affect directly export volume in all sectors of economic activity, this study aims to examine the effect of the start-up aid for young farmers on the desirability of the beneficiaries to be more export oriented in comparison with non-beneficiaries. The analysis also provides useful insights by highlighting key requirements that allow young farmers to grow their performance and take advantage of the various export opportunities that are available within the sector.

Strengthening the position of farmers in the value chain - selected findings from Austria

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The current reform of the Common Agricultural Policy aims to strengthen the position of farmers in the value chain. Setting up producer organisations has been a means traditionally. Only recently, the EU has intervened through two measures: a) by outlawing unfair trade practices and b) by improving market transparency so that the information situation to detect possible violations of fair competition is improved. In competition policy, market concentration plays a major role in this context, as it is a criterion for the possible merger of companies. In Austria - as in many other EU countries - there are still hardly any empirical findings on market concentration in agriculture and in downstream sectors and its consequences. In this paper we examine different segments of meat markets in Austria. Our results show a less concentrated market for live cattle, but with increasing concentration (measured by herd indexes). The downstream stage of slaughterhouses shows much higher concentration between 2016 and 2020. An increase in market concentration can also be observed in the pork markets. Overall, the Austrian meat market can be described as moderately concentrated for the period 2016-2020, whereby the situation in the individual segments differs greatly in some cases. The results form the starting point for a qualitative analysis of the competitive situation of the markets and provide comparative values. The paper ends with an outlook on the potential benefits of the agricultural markets transparency initiative.

The Impact of Size, Intensity and Natural Conditions on Productivity in Dairy Farming

Eva Scheichel, Klaus Salhofer, Ulrich Morawetz

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Since the reduction in the intervention prices of skimmed milk powder and butter between 2004 and 2008 and the expiration of the milk quota in spring 2015, dairy farms in the EU have operated in a much more competitive market environment. In this study, we investigate the productivity levels and developments of different groups of dairy farms in Austria, a country with a small-scale structure and natural disadvantages in agriculture. To do so, we use a group and chain-linked productivity index, which allows us to compare both the total factor productivity (TFP) and TFP growth of groups of dairy farms, differentiated by size, the intensity of production and natural conditions.

We derive the following results: First, productivity growth in the dairy sector in Austria was on average 1.31% p.a. between 2003 and 2016.

Second, we find significant differences in productivity depending on farm size. These differences are particularly pronounced between very small farms and others but less pronounced between medium-sized and large farms, keeping in mind that even the latter are, on average, relatively small compared to many other countries. While the differences between small farms and other farms increased in the last 14 years, medium-sized farms were able to keep up with their larger counterparts and even close the gap to some extent. Third, similar patterns, though slightly less pronounced, are derived for intensity, measured in yield per cow and year. Especially, very extensive farms lack behind and further fall behind, while medium-intensive farms are able to keep up with their high-intensive counterparts or even close the gap.

Fourth natural disadvantages can be compensated to some extent but not if they become too severe. There is some convergence in the productivity between farms with no disadvantages and those with minor and medium disadvantages, but farms with severe and extreme disadvantages are clearly lagging behind. Moreover, these differences accelerated over time.

Fifth, there is evidence that the abolition of the milk quota system in spring 2015 has led to higher growth rates across most of the groups.

Poster Session

Poster Session

THURSDAY, 09 September 2021

The importance of meat production in the economic performance of intensive dairy farms

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Dairy sector is characterized by the predominance of intensive production systems that depend heavily on capital endowments, purchased feedstuff, and hired labor. These dairy farms do not operate only under intensive patterns but are also highly specialized in the production of a single output (milk). However, these highly specialized dairy farms are exposed to financial risks related to lower farm revenues and limited liquidity, jeopardizing their survival. This trend of intensification and specialization in dairy farming has sparked our interest in studying the economic impact of meat production in dairy cow and sheep farms, which could constitute an alternative source of income. Most cattle and sheep farms, which are specialized in milk production, also produce meat, but usually its contribution to gross revenues is treated as trivial. This study seeks to start a debate on the importance of meat production in the economic performance of intensive dairy farms. The paper applies an economic analysis based on data from 47 cattle and 15 sheep intensive farms that rear Holstein cows and Chios sheep. The contribution of meat and milk in gross revenues is estimated, and their impact on the economic performance of the farms is assessed. Moreover, the production cost of meat is estimated. Results show that sheep farms are more flexible than cow farms, since the contribution of milk to total output is 57.7% compared to the 87% in cow farms, indicating an increased level of risk aversion for sheep farmers. The share of the value of meat in gross revenues is 6.2% and 8.4% in cow and sheep farms, respectively. Acknowledgement. This research has been co-financed by the European Union and Greek national funds through the Operational Program Competitiveness, Entrepreneurship and Innovation, under the call RESEARCH – CREATE – INNOVATE (project code: T1EDK-05479).

Agent-based support tool for the development of agriculture policies

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Modeling policies efficiently can facilitate well-targeted and evidence-based decision-making by policymakers. Therefore, agricultural policy assessment and design can be significantly impacted by enhanced policy modeling capabilities. The AGRICORE project is developing a highly modular computational tool, introducing various novel elements in agricultural policy modeling due to its use of state-of-the-art modeling techniques and ICT advancements. This tool aims to contribute to improving policy design, as well as facilitate agricultural impact assessment and monitoring. Our methodology is based on an agent-based modeling (ABM) approach, considering decision-making autonomy at the farm level, thus modeling each farm to assess its objectives and its environmental conditions, making decisions in its own context. A key aspect of this approach is that it enables the simulation of interactions between farms and various factors that include environment, rural integration, ecosystem services, land use-related factors and the general market model. It also facilitates the consideration of geographical scaling, allowing for modeling on various scales – from regional to global. Computationally, this methodology is utilizing the latest developments in fields such as big data, mathematical solvers, artificial intelligence algorithms and cloud-based computing. In this way it aims to achieve optimal parameterization and calibration of the model, improved mimicking of the farmers' behavior and the farms' interactions and credible impact assessment of policies and global events. Finally, this tool will be highly customizable and along with its modularity and its release as an open-source project, this will enable its further development by any interested institution in an easy and transparent way, updating, improving and integrating the tool as necessary.

Optimal Water Allocation of Paphos Irrigation Project Based on Crop Water Production Functions

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The optimal irrigation water management and irrigation scheduling consider the effectiveness of irrigation water use in crop yield. When the available water supply is limited, increased irrigation efficiency can result from optimal sequencing of crop water deficits. The relationship between crop yield and water supply was investigated. In this study, a comparative analysis of three crop water production functions (multiplicative model of Jensen, additive and multiplicative model of Doorenbos and Kassam) was performed. An optimization model for water allocation of the Paphos Irrigation Project in Cyprus was developed. The model's objective function maximizes the total farm income, which is based on crop-water production functions, production cost, and crop prices. The decision variables were the crop areas and the water availability along with the time interval, which included the growth period of the crop. The optimization problem is non-linear and solved by LINGO software. The total irrigation water requirements for all crops were estimated by CROPWAT software. The outcomes of the optimization model show that the optimal net profit was similar between the two objective functions, which used the multiplicative approaches. The model also showed that the optimal net profit was reduced in the case of additive model of Doorenbos and Kassam. The optimization model can be used as a decision support tool for cropping patterns of an irrigated area and for irrigation scheduling. The crop water production functions are useful in evaluating alternative irrigation strategies for the achievement of optimal irrigation water management.

Session 3A

SESSION 3A

Remote

Room: **ARISTOTLE**

Chair: Franz **Sinabell**

Wet acid scrubber as abatement system of emission in pig barns: Life Cycle Assessment in the framework of the Life MEGA project

Conti Cecilia, Costantini Michele, Bacenetti Jacopo, Orsi Luigi, Stellini Claudia, Ganzaroli Andrea,
Guarino Marcella

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The project “Smart computing system to monitor and abate the indoor concentrations of NH₃, CH₄ and PM in pig farms” (LIFE-MEGA) (LIFE18 ENV/IT/000200) aims at developing and testing different abatement technologies to reduce the emissions inside the pig barns. Pig rearing is responsible of considerable emissions of ammonia and dust. These emissions negatively affect the animal welfare, the health of workers and, finally, are responsible of environmental concerns. In this study, using the Life Cycle Assessment approach, the environmental performances of pig meat production considering the installation of a wet acid scrubber inside pig barns were evaluated and compared with the business-as-usual scenario where no abatement solutions are adopted. The impacts were evaluated for 1 kg of meat as functional unit and considering a “cradle to farm gate” perspective; primary data were collected by surveys at farm and interviews with the farmer. Secondary data were retrieved from databases (e.g., Ecoinvent®) or estimated using emissions models (e.g., IPCC equations for the emissions of ammonia, dinitrogen monoxide and methane related to animal rearing, slurry storage and application). The results show how the scrubber positively affects all the environmental effects related to ammonia emissions (e.g., acidification, particulate matter formation and eutrophication) while worsening the depletion of mineral and fossil resources (mainly due to the consumption of electricity and citric acid and to the manufacturing and maintenance of the scrubber) and having a negligible effect on climate change. A further improvement of the environmental performance of the wet acid scrubber could arise by the valorisation of the ammonium citrate produced (by precipitation) in the scrubber tanks as well as by an optimisation of the scrubber working time.

Urban agri-food policies in the Southern Mediterranean

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Urbanisation is one of the most important drivers of change in agri-food systems in the Southern Mediterranean countries (viz. Algeria, Egypt, Libya, Morocco and Tunisia). Meanwhile, policy plays a central role in agri-food systems transformation. This makes studies on urban agri-food policy particularly relevant. Therefore, this review analyses the state of research on urban agriculture and food policies in the Southern Mediterranean. A search performed in June 2021 on the Web of Science yielded 212 records and 31 eligible documents were included in the systematic review. The paper analyses both how urban agri-food policies are addressed and the main topics analysed as well as the features of the addressed agri-food policies. The analysis of the scholarly literature suggests that, despite increasing interest, there is still a gap in the research field. Most of the selected documents deal with the impacts of urbanisation (cf. urban sprawl) and policy responses in terms of land use planning and zoning as well as urban agricultural production; only a few articles address policies in other stages of the food chain such as distribution (e.g. wholesale markets), consumption (e.g. food subsidies, non-communicable diseases) and food waste. In general, neither a food system approach (recognising linkages between production and consumption) neither a territorial approach (recognising urban-rural linkages) is adopted. Moreover, policy responses to mitigate the impacts of the COVID-19 pandemic on food and nutrition security in urban areas are so far overlooked. The COVID-19 pandemic stressed the need to pay more attention to food policy to foster transition towards sustainable and resilient urban agri-food systems. The interdependent and interlinked food-related challenges that the Southern Mediterranean countries face call for adopting a food system approach not only in the design of effective, efficient and sustainable policies but also in policy studies to take into account synergies and trade-offs.

Modelling and measuring outdoor amenities

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Empirical studies conducted at the end of the 20th and the beginning of the 21st century significantly contributed to the explanation of the relevance of the concept of outdoor amenities for socio-economic development of rural areas. Natural benefits and other qualities of a rural environment that improve living conditions have been identified as key factors for the successful transformation of rural economy and the growth of rural population, income and employment. Their importance has been additionally heightened during the COVID-19 pandemic. The “quality” of rural physical, social and economic environment is in the focus of our analysis. The basic research objectives are connected with the identification of the core components that characterize amenities in the rural context and methods that can be used for measuring rural outdoor amenities. The main research question is defined as follows: How do rural outdoor amenities affect the decisions of the population and employers regarding the location for living, recreation and conducting business? The paper provides an overview of the composite indexes developed so far which are used to classify rural areas. Furthermore, the paper contains the empirical research conducted in Serbia. The total amenity value of each rural area in Serbia is estimated by using econometric methods for cross-sectional data. The amenity composite index is formed in order to map the distribution of specific outdoor amenities across rural areas in Serbia. Improving the “quality” of rural environment can be seen as one of the key elements for smart, sustainable and inclusive development.

A novel traceability approach to reinforce sustainable agri-food supply chains

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Food is vulnerable to a range of hazards at any stage of the food supply chain and a potential failure can affect significantly the safety of the products. Additionally, new hazards and risks are emerging on a regular basis, mainly due to economically motivated adulterations; for example, mad cow disease and horse meat scandals. Traceability systems offer a solution to these concerns. However, existing traceability systems fail to respond to every issue and to address the needs/perspectives of all the stakeholders involved. Therefore, the current work proposes a novel approach providing assurance to the consumer about the safety of food products, supporting simultaneously all the stakeholders throughout the supply chain. The novelty of the proposed approach is also based on an original integrated Decision Support System (DSS) employing Internet of Things (IoT) - enabled sensing technologies and data analytics. The specific objectives of the proposed approach involves: (1) consumer attitudes, expectations, and behaviour towards food safety; (2) a holistic analysis of sustainable agri-food supply chains, mapping this way the processes and practices towards food safety, quality, and authenticity; (3) development and establishment of tools and guidelines for actors in the agri-food sector, to guarantee the safety of food products; (4) integration IoT technology (sensors, data management, etc.) as key for data gathering and management; (5) development of food safety assessment Decision Support System; (6) impact assessment of the proposed tool from an economic, environmental, social and governance perspective. The above aims ensure an innovative and effective traceability system for both the safety of the consumers and the sustainability of the supply chain stakeholders (i.e. producers, manufacturers, and traders).

Incorporating the abolishment of the historical payments in the CAP strategic plan: The case of Greece

Kremmydas Dimitrios, Tsiboukas Konstantinos, Nellas Leyteris

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The CAP is heading towards another reform based on the Commission's proposal published on June 2018 and to the provisional political agreement reached by the European Parliament and Council. The Member States (MS) will have increased subsidiarity for planning and implementing CAP, establishing a 'strategic plan' (SP). One issue of the CAP strategic planning for the Greek case is related to dealing with the historical model of payments. The abolishment of the historical model implies the equation of all payments per hectare for each agronomic region in Greece. An unequal level of payments per hectare is difficult to justify under the CAP's rationale and the abolishment seems to be the most reasonable option. However, it raises the following two problems: - High payments per hectare are mainly received by small farms. Thus, any flat rate regime will reduce drastically the level of payments of small farms. - Certain types of farming are very dependent on the current level of payments. Any alteration of the payment regimes may lead to driving those farms to exit agricultural activity. The objective of this paper is to evaluate the abolishment of the historical model under the increased flexibility given in the strategic planning context. We examine three different scenarios. Our baseline is the continuation of the convergence of the current CAP. One scenario is the immediate abolishment of the historical model and its replacement with a regional flat payment per hectare. The second scenario is a stricter convergence model of payments, where all farms will get to the 85% of the regional average payment per hectare. Both scenarios are complemented with two options; one where redistribution is active and one where it is not. The results of the paper are used to show the effects of the different scenarios across economic sizes and types of farming and to reveal the trade-offs between the social and economic objectives of the CAP.

Playing with the Mediterranean Diet: may little changes benefit the environment without compromising health?

Cavaliere Alessia, [De Marchi Elisa](#), Frola Enrica Nadia, Bacenetti Jacopo, Orlando Francesco, Banterle Alessandro

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The projected population growth by 2050 is expected to cause substantial changes in the food consumption habits, especially in developing countries. The global food demand will increase considerably, and the dietary patterns are expected to shift towards increasing consumption of animal-based foods, posing increasing pressure on the food system (Vitale et. al., 2021). To alleviate such pressure it is essential to find and encourage the adoption of sustainable dietary patterns, that can preserve the environment and assure consumer health. This paper has a threefold aim. Firstly, the analysis aims at exploring whether the current food consumption of the Italian population is in line with the Mediterranean Diet (MD) recommendations, eventually highlighting product-specific variances. The MD, in fact, is amply recognized as a sustainable diet. Secondly, the paper aims at assessing the environmental impact of current Italian food consumption and compare it with the MD model. Thirdly, starting from the MD, the paper aims at modeling different dietary scenarios in order to assess whether even small changes in the MD model may contribute to increase the environmental sustainability of food consumption, meanwhile preserving the nutritional adequacy of the diet. The current food consumption of the Italian population is assessed based on the latest available food consumption data provided in the Italian Household Survey (2017), that are compared with the MD dietary guidelines provided by CREA. The environmental impact of both the current diet of the Italian population and the MD diet as recommended by CREA are measured using the Life Cycle Assessment. Finally, alternative dietary scenarios and their related impacts are evaluated and compared using GAMS. Preliminary results suggest that scenarios like the pseudo-pescatarian seem to have the ability of preserving the diet quality, meanwhile improving the environmental indicators.

Oral presentations

FRIDAY, 10 September 2021

SESSION 4A

The role of cooperatives in agri-food sector

Room: **THALES**

Chair: Nikos **Kalogeras**

Strategic Direction of the Agricultural Cooperative "STEVIA HELLAS": Aspects of members and executives

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The paper investigates the role of strategy on cooperatives emphasizing on the case study of the STEVIA HELLAS Cooperative. The basic aims of the research are: a. to examine whether the members and executives of the cooperative are positive towards the cluster – based strategy model that the specific cooperative is willing to adopt, b. relationships among members and cooperative. A qualitative survey was conducted with the use of a Likert – type questionnaire consisting of questions about personal information, strategy and commitment issues among Stevia Hellas cooperative and its members. 15 questionnaires were collected through personal interviews and analyzed with the use of SPSS program. The results reveal that 60% of the members were positive towards the creation of a new cluster – strategy plan. 56% of the members think that the cooperative must geographically and economically grow and the cluster method is a great and efficient way to achieve it. Of course there is an important need for better unity within the cooperative, focusing on the specific strategy, that the cooperative must achieve with an in depth analysis of the cluster – based strategy to its already existing members but also for entrance of new younger members that the cooperative seek to add. Though, there is one limitation of the study with that being the small sample of the questioned.

Analyzing visitors' satisfaction at the National Park of Samaria

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We study visitors' satisfaction at the National Park of Samaria in Crete. The National Park of Samaria contributes to the local economy by attracting thousands of tourists every year. Therefore, it is vital for the local authorities to understand which aspects of the visiting experience tourists prioritize. We utilize the Multicriteria Satisfaction Analysis (MUSA) method, which is an ordinal regression-based multicriteria decision analysis approach. The MUSA method can analyze ordinal data, and thus, provide a more accurate satisfaction analysis, without an arbitrary quantification of ordinal info. We collected data during the summer of 2020 by interviewing departing visitors from Samaria Gorge. The total sample was 316 respondents. Visitors are highly satisfied by the National Park, while they are mostly satisfied with the resting spots, the landscape, the available time and the safety of the path. The most important criteria are the resting spots and the available time. The least important are the price of the ticket, the nearby shops and the guides' performance. Keywords: visitor satisfaction, National Park of Samaria, Samaria Gorge, Multicriteria Satisfaction Analysis (MUSA)

Branding Tourism Destinations through Sustainability Performance: experiences from the Mediterranean region

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Under the emerging market reality of the COVID-19 era, there appears a perceived need for a certain standardization within the supply and management of agricultural and food products/services, environmental products/services, and tourism products/services. Yet, destinations have the option to turn to sustainability as conceptual and management framework for unique place branding and identity development. The international literature thrives in a variety of contexts and analysis frameworks, making interdisciplinary research a rich venue of in-depth, yet individual destinations' sustainability assessment. Yet, the great paradox here relates to the interpretation of sustainability by means of an equally equivocal and vague concept such as competitiveness. This research aims to highlight the importance and utility for destination branding that stems from the clustering of destinations based on their similarities rather than comparing them in terms of their performance. In this regard, it aims to identify those dynamics and attributes that enhance sustainability at destination level and may support the development of an identity regardless of the geography or the product on offer. The study builds on secondary data from 11 destinations in 8 Mediterranean countries. The analysis led to the formulation of three main sets of evaluation indicators: (a) environmental footprint, implying the effects and impacts of tourism on the environmental resources of the destinations; (b) destination-dependency on tourism; and (c) locals' prosperity, not limited to the generated GDP but further incorporating elements of social and psychological carrying capacity. Findings indicate three to four main distinct clusters of destinations based on destinations' cultural and natural resources; seasonality of supply; typology of prevailing accommodation and profile of tourists. The cluster-branding of tourism destinations in terms of sustainability performance is feasible and can support destination managers and decision makers to differentiate their product in the global market.

What Drives Cooperatives' & Member-owned Firms' Performance?

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Cooperative members maintain the entrepreneurial lead for themselves (i.e., their own business –first layer of entrepreneurship) and view the cooperative firm as a task organization in a common front-office (i.e., cooperative firm – second layer of entrepreneurship) that achieves differentiation in response to rapid market challenges. In this paper, we study the impact of: a) member-owned business characteristics (size; debt/equity ratio), and member attitudes (market-orientation, entrepreneurial-orientation, risk-taking) on the performance of member firm (at farm level: 1st layer) ; and b) members' choices about intra-organizational (ownership, control, and benefit allocation) and attitudes for strategic attributes (market-orientation, entrepreneurial-orientation, risk-taking) on cooperative's organizational performance (at cooperative level: 2nd layer). Using data from 158 agribusiness cooperative members in the Netherlands, we demonstrate that strategic attributes have a greater influence on both, member – owned firm' s and cooperative's organizational performance than intra-organizational attributes. Moreover, the results indicate that members' attitudes for risk-taking and market oriented behavior have a greater impact on cooperative's performance rather than their own firm's performance. In contrast, members' attitudes' for entrepreneurial-orientation have a greater impact on their own firm's performance rather than cooperatives' performance. Cooperative members seem to take a full entrepreneurial lead at their own business (1st layer), while they seem to assign the task for more market-oriented strategies and risk-taking behavior to the cooperative level (2nd layer). This may reveal the incentive of member-producers to participate in a task organization in a common front-office with a strong entrepreneurial lead

SESSION 4B

Modelling dealing with the Agricultural Policy Assessment

Room: ARISTOTLE

Chair: Ahmet Ali KOC

Is CAP's Young Farmers Scheme an effective policy tool for regional growth?

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Aging population in Europe has affected rural territories with depopulation, social disturbance and economic underachievement. The Young Farmers scheme is a vital measure of the CAP Pillar II (Rural Development Plan) and aspires to counter this trend by supporting the establishment of young farmers in rural areas all over Europe. However, the importance of the measure for regional growth has been neglected so far and has focused mainly on the development of the agricultural sector rather than the whole economy. As a Social Accounting Matrix (SAM) collects detailed data on transactions between economic agents and the circular flow of income, it is most suitable for economy-wide policy analysis either through multi-sector linear models (multiplier) estimation or as a database for more complex CGE models. In the context of the AGRICORE project, a SAM is constructed to ex-post assess the socio-economic impact of sub-measure 6.1 "Establishment of Young Farmers" payments in Greece with respect to geographical disaggregation for NUTS-2 classification. Income distribution, economic output and employment increase are examined to identify the socio-economic effects of young farmers presence in regional economies with a special focus on household disaggregation (age, gender). Latest available data were obtained from the Hellenic Statistical Authority for 2019 and the Ministry of Rural Development and Food (young farmers data) to calibrate the SAM, while the Rural Development Plan 2014-2020 payments to young farmers in Greece were used to estimate job creation, income generation and economic remuneration for each region.

Young farmers scheme in Greece: Geographic inequality and policy implications

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Common Agricultural Policy support – via the Young Farmers Scheme - on the new generation of European farmers is not only influenced by the sheer necessity of mitigating the effects of an ageing rural population in European agriculture. Supporting the new generation of European farmers is also pointing at other agricultural objectives - the future improvement of European agriculture competitiveness as well as the assurance of food supply for the next decades. Within CAP, the Rural Development Programme for Greece, for the 2014-2020 period, projected a total of 339 million Euros for the Young Farmers Scheme as portrayed to the Measure 6.1. This allocation, accounting roughly for the six percent of the total budget of the Programme, was influenced from the natural constrains that the Greek agriculture is facing (more that 70 percent of agricultural land is covering areas of natural constrains), the significant rates of unemployment faced by Greece (16.3 percent in 2020) well above the average EU rate (7.3 percent) as well as the need for rejuvenating Greek rural population (only 5.2 percent of farm managers are above 35 years old). The present study assesses the influence of the Young Farmers Scheme applied in Greece (during the 2016-2017 period) examining its geographic disparity among less favored and mountainous areas and the subsequent socioeconomic profile of scheme's beneficiaries. The performed empirical analysis is suggesting that the Young Farmers Scheme attracted young farmers significantly diversified at a geographical and socioeconomic level. The character of the rural area (less favored or mountainous) seems to play a significant factor to the attractiveness of the Young Farmers Scheme for the next rural generations in Greece while the drawn policy recommendations are affecting the related policies for the new CAP.

A Synthesis on Agent-Based Impact Assessment Models from the Perspective of the EU Rural Development Policy (RDP) Measures

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The second pillar of the EU's CAP aims at fostering agricultural competitiveness, the sustainable management of natural resources; limiting the contribution of agriculture to climate change and developing a climate-resilient agriculture, as well as reaching a balanced territorial development by maintaining employment. Countries are faced with the challenge of selecting the best tools among a large set of policy instruments to reach these goals. This challenge is aggravated by the very heterogeneous character of the societal demands and economic and institutional structures of the countries. From the empirical perspective, the impact analysis of the second pillar policies in this heterogeneous context appears a difficult task. So far policy impact assessment regarding the agricultural sector and rural areas has been carried out by partial and general equilibrium type models, sector models and econometric approaches. On the modelling front, one drawback is that the mentioned methodologies lack the ability to deal with the heterogeneous nature of farm structures. The latter may require employing modular modelling platforms composed of specialized tools addressing specific objectives. In turn, modular modeling platforms can be used to assess the inter-relations between natural resources and economic activities. In comparison to the above mentioned sector/region based platforms, the use of agent-based approaches, which consider spatial, social and economic heterogeneity and risk behavior of farms, have increased recently. In addition, these platforms can be integrated with others with an interdisciplinary view which certainly becomes the strength of the tool employed in these analyses. The aim of this paper is twofold. First, a comparison between the traditional impact assessment approaches with agent-based platforms with respect to their second pillar modeling capacity is carried out. Second, the contribution of the modelling tools developed in the AGRICORE project to the existing agent-based models will be sketched.

SESSION 4C

Sustainable policies and practices in farming and rural
development

Room: **HERACLITUS**

Chair: Linde **Götz**

Initiating agro-ecological transitions: Taking steps toward sustainable resource management to increase economic viability in mid-sized arable grain-protein-oil cropping farms in Hungary

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Biophysical conditions for crop production in Hungary are generally considered to be good. However, extreme weather events, water shortage during the growing season, climate adaptation and, in particular, deterioration of soils poses increasing environmental challenges to farmers. In Hungary the deterioration of soils is an outstanding environmental challenge, therefore adopting soil conservation farming practices are considered as a first step for market oriented arable farming systems towards transition to agro-ecological farming systems. We mapped stakeholders and assessed the context of information, material- and knowledge flows, as well as the practice and policy aspects of soil conservation farming. As a result of the multi-actor platform stakeholder engagements first steps have been taken in collecting views on the barriers and needs for change to promote the transition of soil conservation farming practices. Innovative design changes to existing rural development measures have the potential to successfully promote transitions to soil conservation farming if accompanied by measures of research and advisory development, raising public awareness and demand for crops produced this way. The EU the environmental and climatic expectations are expected to increase in the next cycle of the CAP, therefore the topic of soil conservation farming is justified to be a priority and requires to get prepared for the development of appropriate interventions in the national CAP Strategic Plan. Acknowledgements: UNISECO ('Understanding and Improving the Sustainability of Agro-Ecological Farming Systems in the EU') has received funding from the European Union Horizon 2020 research and innovation programme under grant agreement 773901

Factors influencing the willingness-to-buy for CRISPR/cas gen-edited tomatoes: Evidence from a case study in Germany

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The willingness-to-buy is identified within a choice experiment which was repeated 4 times. Consisting of 4 choice sets, with breeding and production technology, pesticide requirement and price as the tomato attributes. Information on the CRISPR/Cas breeding method was orally provided between experiment 1 and 2 (“information intervention”). Led by a senior CRISPR/Cas researcher, participants were taken to a greenhouse S1 laboratory in between experiment 2 and 3 to inspect and touch CRISPR/Cas gen-edited tomato plants (“sensory experience intervention”). Additional information on CRISPR/Cas was provided and questions answered. One week later participants filled in a shortened version of the questionnaire including the choice experiment (“follow-up survey”) aiming to check stability of the choices. Data on 32 participants was gathered November 2020 at the Leibniz Institute for Plant Biochemistry (Halle). 44% (14) of the respondents were employed as scientists, 18 as non-scientists. The participants’ knowledge of the CRISPR/Cas method is limited, but 94% stated interest to improve it. We identify 19 participants to have changed their choice at least once in round 2 and 3 of the choice experiment: 5 of them were scientists (36% of scientists) while 13 of them were non-scientists (72% of non-scientists). Interestingly, none of the participants having changed their choice usually buy organic tomatoes. Following the “information intervention”, 11 participants chose more CRISPR/Cas tomatoes compared to the first round. Following the “sensory experience”, 7 respondents decreased their choices for CRISPR/Cas tomatoes. Overall, 13 participants have increased and 4 decreased their choices for CRISPR/Cas tomatoes in the fourth compared to the first round of the experiment. To increase acceptance of food from CRISPR/Cas bred plants, providing information on the new technology is key, confirming existing literature. Science communication should target people who have little knowledge on the technology and have not yet formed an opinion on the technology.

Achieving food security via resilient agri-food supply chains in the UAE: a conceptual framework

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Food security is one of the most elusive and sought-after objectives world-wide. It reflects a country's self-sufficiency and its citizens' wellbeing and now—in the COVID-19 pandemic era—more than ever, has become an almost unreachable mission. In the MENA (Middle East and North Africa) region, Food security is heavily and adversely affected by the scarcity of freshwater resources, regional conflicts, and rising temperatures, among others, which affect the availability of food significantly. The United Arab Emirates (UAE) is ranked relatively favorably with respect to food security (21st global ranking, based on the 2019 FS score). The index, however, does not reflect natural resources and resilience, where the UAE is ranked 106th, which makes the agri-food supply chains vulnerable to unforeseen disruptions. For example, following the global eruption of the COVID-19 pandemic, exporters of key field crops have placed export restrictions on their produce (e.g., Vietnam on rice, Russia on wheat, and India on onions). Achieving food security, initially requires making the food system more resilient by understanding its vulnerabilities. The current paper presents a conceptual framework on the key enablers for the UAE Agri-food supply chains to obtain the necessary resilience and consolidate food security through improving policy-making capacity. The proposed approach involves assessment of main vulnerabilities in a global context; the factors that have an influence on the vulnerability of food systems will be investigated identifying the main global drivers that affect the local food systems. In the case of UAE, the paper focus on the products that consist the National Food Basket, as defined by the UAE National Food Security Strategy. The proposed framework could be applied for the design and implementation of an early warning system concerning food security related incidents.

SESSION 5A

Data, tools and models to measure the environmental and economic performance of agriculture

Room: **THALES**

Chair: Georgios **Kleftodimos**

Capturing the role of income support in the survival of pastoral farms: A comparative study of three Mediterranean areas

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Agro-pastoral farms in EU Mediterranean exhibit a high level of heterogeneity in terms of species reared (bovine, sheep, goats, pigs, horses); sizes (from a few livestock units to large farms); products (milk, cheese, meat) and patterns of land use. One of their common characteristics, however, is that they draw much of their income from support schemes through the Common Agricultural Policy (CAP). Most of these payments are not targeted to agro-pastoral farms and are linked to the provision of specific services or are more generic and common to other livestock systems. The purpose of this paper is to provide a comparative analysis of the sources and role of income support for agro-pastoral farms in three EU Mediterranean settings: Catalonia (Spain), Sardinia (Italy) and Mountain Ziria (Greece). For each case study, a local typology was constructed and a comparative technical and economic analysis was conducted across types, based on data from questionnaire interviews of typical farms. "Average" typical farms differed in terms of revenue and cost structure, which reflected the differences in their organization and objectives. Farms in Greece were dairy and sold most of their milk to local industries and had considerably higher costs for forage and concentrates. In Sardinia, farms were also dairy but transformed a significant part of their milk on-farm, while they also reared other species. Catalanian farms were specialized in meat production, with a larger diversity of species. In all areas, income support stood for a significant part of total income, especially in Catalonia and Sardinia. Although this contribution varied across types, almost all farms would lose their viability if income support was not provided. The paper discusses how positive examples from each case study can be used to design policies either to reduce the dependence of farms on subsidies or to increase their economic performance. The paper is part of PACTORES project (ERANETMED2-72-303) which is co-funded by Greece and the European Union.

The dynamics of farm income: The case of olive farming in Spain

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Although ensuring a “fair” income for farmers has been a permanent objective of the European Common Agricultural Policy, no regulation defines so far, a reference level for what should be understood by a viable income. To bridge this gap, firstly, this paper proposes a farm typology based on different income levels, classifying farms as profitable, viable, and vulnerable. Considering this typology, the objectives of the paper are, first, to analyze the evolving of farm income during a 10-year period in a sample of Spanish olive farms, determining the factors that influence interannual movements of individual farms among income categories, and second, to predict future income categories of individual farms under several market, climate, and policy scenarios. For these purposes, a methodological approach combining the Markov chain model with a partial proportional odds model is proposed. Factors found influencing the dynamics of income of these farms are: a) off-farm uncontrollable factors such as the olive oil prices, the annual weather conditions, and the CAP direct payments; b) farms’ features (agronomic suitability, productive specialization, intermediate consumption intensity and outsourcing strategy); and c) farmers’ characteristics (age and agricultural training). Future scenarios evidence the largest changes in farms’ typology according to variations in olive oil prices as well as a high dependence of CAP direct payments; however, the profitability of Spanish olive farms is rather resilient to the future impacts of climate change. This paper contribution can yield useful outcomes as the method can be easily replicated operating the same data source in any other farming sector and member state within the EU, allowing suitable comparative studies to be carried out. Policymakers can also obtain valuable data in order to propose the design and implementation of policy instruments and take decisions about CAP support.

Is it feasible a modification of feeding protocol in Greek dairy cattle industry? The case of CROPFEED project

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Nowadays, the sustainability of Greek dairy cattle farms is questionable due to the high production costs. Among these costs the most severe, especially for the small farms, is the feed costs, which is based mostly in imported protein fruits (mainly soybeans). In this context, the CROPFEED project funded by the EYDE ETAK examines the economic impact of the replacement of the imported protein fruits feeds by locally produced ones based on leguminous crops in the region of Thessaly. Consequently, the objective of this study is to examine farmers' adoption decisions towards the new feeds, as well as the economic and environmental impact of this adoption. In order to do so, a bio-economic model has been developed based on the model Orfee (Optimization of Ruminant Farm for Economic and Environmental assessment). The proposed model simulates: i) a large number of dairy cattle farms with or without crop production; ii) includes a gradient of production intensification or input reduction based on agro-ecological principles for dairy and crop production; iii) incorporates all relevant costs (e.g. labor, machinery, land, etc.); iv) integrates the current public policy framework; and v) provides an environmental assessment of the selected feeds based on GHG emissions and soil carbon sequestration. Moreover, in order to analyze farmers' adoption decisions towards the new feeds, different levels of policy incentives linked to environmental outcomes were examined. The results highlighted that the adoption of the locally produced feeds drove to significantly better economic and environmental outcomes. Furthermore, different level of incentives can be efficiently targeted to encourage the adoption of the new feeds and secure the sustainability of the sector.

Estimating the effects of an agricultural producer subsidy on the availability and accessibility of fruit, vegetables and pulses in France

Prosperi Paolo, [Kleftodimos Georgios](#)

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In the context of post-2020 renewal of the European Union (EU) Common Agricultural Policy, each Member-State has to identify, among others, its needs in relation to CAP objectives, and promote a cohesive intervention plan in order to meet these needs. A key goal that will need to be considered is to provide “food and health, including safe, nutritious and sustainable food”. In France this goal is confronted with two crucial challenges: the need to fulfil the national nutritional requirements; and the importance of supporting small-scale farms for the production of healthy and under-consumed and under-produced foods such as fruits, vegetables and pulses. Consequently, the aim of the present study is threefold. Firstly, it aims to provide a quantitative overview of production and consumption levels of fruit, vegetables and legumes in France and to relate those levels to current nutritional recommendations and potential self-sufficiency performance at a national scale. And secondly, it aims to provide an analysis of small-scale farmers’ responsiveness on different policy incentives towards the increase of the supply of pulses, and fruits and vegetables, by modeling and evaluating the potential impact of subsidies on production capacity of small-scale producers. Furthermore, it aims to show how this increase on the supply may affect the national consumption of the examined products. In order to do so, a standard computable general equilibrium (CGE) model has been developed by the use of the GAMS software. The results highlighted that both Small-Farmer-Schemes and Voluntary Coupled Payments can be efficiently targeted in order to mobilize small scale farmers to increase the production of fruit, vegetables and legumes. More specifically, this study shows that through these schemes the vegetables production could contribute to fulfil 90% of the gap to reach the national nutritional requirements, while for fruit this contribution reaches only 18% of the gap.

SESSION 5B

Modelling tools for Policy Analysis

Room: **ARISTOTLE**

Chair: Chema Jose Maria **Gil**

The Impact of Tax Policies on Alcoholic Beverages Demand in Turkey

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Turkey has been steadily increasing tax rates on alcoholic beverages since 2004. Rising tax rates had gradually generated more tax revenue for the government until 2013, however, it has slowly plateaued since then. Moreover, number of incidents due to the black-market products has been occurring more often while the tax rates are continuously rising and additional restrictions on the alcohol sales has been applied. This study aims to estimate the own-price, cross-price, and income elasticities of alcoholic beverages in Turkey using quarterly data for wine, beer and raki, and to simulate the impact of tax policies on alcoholic beverages demand. Turkey is a secular country with a high majority Muslim population. Although per capita alcohol consumption is low compared to European countries, it is one of the highest in the Middle East. In 2019, World Health Organization reports 1.18 liters per capita (+15 years old) pure alcohol consumption in Turkey. Alcoholic beverages are also noteworthy part of Turkish food culture such as raki (hardliquor from grape with anise) and boza (low alcohol-fermented wheat) have been commonly consumed since the Ottoman Empire. However, the aggressive tax policies and restrictions in alcoholic beverages sales in the last two decades has been decreasing the per capita pure alcohol consumption. The demand model coefficients are estimated using four differential demand models such as Rotterdam, NBR, CBS, and AIDS, and the model fits best to the data is selected using the general model which combines all four model properties together. Preliminary results show that own-price elasticities for all alcoholic beverages are inelastic, and consumers are more likely to increase alcohol consumption when their real income goes up. The results also suggest that the increasing tax rates would not necessarily reduce the per capita alcohol consumption in the short run.

The effect of financial and non-financial factors on the productivity and profitability of goat industry: A modeling approach to structural equations

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Goat farming is an important production sector of Greece, as it contributes to the family economy in rural areas. Despite the importance of goat industry, this sector has experienced economic difficulties due to poor management and increased production costs and as a result the sector relies reduced efficiency and low competitiveness. This study investigates the factors affecting the inter-organizational relationships in goat industry in Greece and assesses the influence that the financial and non-financial factors have on the financial performance of these firms. To identify the factors determining farmers economic performance, a structural equation model was used. Research hypotheses describing the effects between inter-organizational relationships in correlation to gross margin. The model hypothesizes that gross margin is predicted by labour in hours, loans, feed in kg, fixed capital expenditures, education level and the age of the farmers. Data were gathered from a questionnaire administered via a direct survey to goat farmers in the Greek regions of Thessaloniki and Larisa. The sample consisted of 272 farms and the survey took place during 2020. Results point out the direct and indirect contributions that these factors have to gross margin and by extension to productivity and profitability of the goat industry. Keywords: Structural Equation Modelling, financial and non-financial factors, financial management, gross margin, goat industry.

Understanding Heterogeneous Consumer Preferences for Intrinsic vs. Extrinsic Attribute Cues: The Case of Honey in Greece

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We study consumer preferences towards honey in Greece. Using best worst-scale analysis, the utility that consumers attach to specific intrinsic attribute cues (quality: taste, flavor, context, color; product origin, honey type) and extrinsic attributes cues (price and packaging) is elicited. Recognizing that consumers have not homogeneous preferences, a finite-mixture regression model is employed. With data from 471 consumers, we find that consumers strongly prefer honey's intrinsic characteristics (quality attributes, national origin, honey type) more than extrinsic attribute cues (price, package). Further, our findings indicate that consumers in Greece have a high ethnocentric attitude and they would rather prefer a differentiation towards honey type or organic honey rather than of honey's region of origin. Finally, the latent class results reveal that there are three distinct market segments: the "Trust Seeker", the "Type Seeker" and the "Rational Consumer". We further discuss marketing and consumer behavior theoretical and managerial implications. Keywords: consumer preferences, attribute cues, best-worst scale, latent class, honey, Greece

The effectiveness of a carbon neutral tax policy on the carbon neutral goal in Spain

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The European Commission has proposed a roadmap to make the EU carbon-neutral by 2050 affecting all sectors of the economy, including food. Among food products, empirical studies suggest that meat-based foods are a major contributor to greenhouse emissions whilst dietary fat and excess consumption of sugar causes non-communicable diseases. We propose that Spain can achieve a carbon-neutral food consumption from two perspectives: 1) by reducing household consumption of carbon-intensive foods through education, and 2) by allowing consumers to pay for the excess emission by buying emission credits from the EU trading system that could be achieved through a carbon tax scheme. Therefore, the goal of the present paper is to estimate the impact of a carbon-neutral consumption tax and assess its implication for consumer welfare, energy and nutrient intakes, and body weights. The analyses used home scan data on food purchases made by Spanish consumers in 2016 and 2017 collected by Kantar Worldpanel. Uncompensated and compensated or revenue-neutral tax policy scenarios are considered. Results are based on the calculation of food demand elasticities from estimating an incomplete EASI food demand system. The Spanish consumer would pay 131 Euros annually to become carbon neutral in food consumption. The uncompensated tax policy was found to be more effective in reducing the consumption of high carbon footprint foods. However, the average Spanish consumer saves between 1.6 - 3.9 percent of her initial expenditure on foods in the revenue-neutral tax scenario but loses 3.28 percent of her initial expenditure in the uncompensated tax scenario. In terms of emission, consumers will reduce their emission between 3.3 – 3.5 and 10 percent in the compensated and uncompensated tax scenarios, respectively. Daily calorie intake was reduced between 1 - 2 and 8 percent in the compensated and uncompensated scenarios, respectively. The distributional analysis shows that the impact of both policies varies by household life stage and region of residence.