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# Book of Abstracts

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# Orals

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# ARE BETTER SUSTAINABLE FIRMS MAKING MORE MONEY? DEPENDENCY BETWEEN ECONOMIC, ENVIRONMENTAL, SOCIAL AND CORPORATE GOVERNANCE PERFORMANCE

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Our article aims at shedding light on the relationship between financial performance and other dimensions of Corporate Social Responsibility (CSR) by conducting a firm-level study based on a sample of global corporations. Our analysis is based on ASSET ESG dataset in 2012. The dataset provides extra-financial information that is comparable across companies. Based on the collection of over 250 key performance indicators, ASSET4 measures firm performance in the four main CSR pillars: economic, environmental, social and governance. The empirical regularities characterizing dependence between firms economic, environmental, social and governance performance are identified using a Canonical Vine Copula model. Copulas allow a flexible characterization of the dependence structure between random variables; care has to be taken when modeling the dependence between more than two variables. For the bivariate case, a wealthy range of well-studied copulas exists. In contrast, there are a very limited number of higher dimensional models. Vine copulas are specially recommended in multivariate settings. They consist of multivariate graphical models based on bivariate copulas, where each pair-copula can be chosen independently from the other pairs, which confers the vine models great flexibility in modeling dependencies. This flexibility allows for asymmetries and tail dependencies. Canonical vines are appropriate when a key variable that governs interactions in the data-set is identified; economic performance is selected as the root of our Canonical Vines. To our knowledge, this is the first work assessing dependence between four dimensions of CSR. It is also the first work that adopts a flexible copula approach for such purpose. Results from copula analysis suggest a rather strong positive relationship between three CSR dimensions: economic, social and environmental. This may suggest that a reduction in resource use and emissions are likely to lead to a decline in production costs and/or an increased or less elastic demand that will improve firm's economic results. Results are also suggestive that improvements in employment quality, human rights, community, and product responsibility will also bring higher economic profits. These could come through higher employee satisfaction and retention, enhanced firm reputation, less elastic demand, among others. In contrast with environmental and social performance, corporate governance actions don't hold a strong positive relationship with higher economic results. While a positive dependency between governance and financial performance exists, it is substantially lower relative to the dependencies discussed above. Firms that underperform in both economic and governance dimensions are the ones putting higher efforts into obtaining better financial results and establishing better links with shareholders and stakeholders. To summarize, the four main pillars of CSR are positively interconnected, thus showing how improvements in one pillar will lead to improvements in the rest of the pillars. The degree of interdependence is, however, not homogeneous, being high for the cluster comprising economic, social and environmental dimensions. While governance is found to have a small positive link with economic results, it does not seem to be interconnected with higher social and environmental performance levels.

## DEMAND FOR FOOD DIVERSITY IN ROMANIA

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The investigation of food diversity in Romania cannot be made by exclusively applying the methodology specific to the developed countries, where most food products are purchased, as this would exclude the food consumption from own resources, the contribution of which is quite significant for certain households. The present research work applied food diversity measurement tools (Count Measure and Transformed Berry Index) in parallel for two data sets obtained from the Household Budget Surveys for the first quarter of the year 2011, i.e. for the amount of products bought by the households and separately for the amount of products effectively consumed on the households. There are some important differences in the food diversity of the actual food consumption in comparison to the purchased food quantities, the number of food items being higher in the case of actual consumption. The econometric analysis of 7843 households suggests that diversity increases with respect to income and that a female household head has a positive influence on diversity measure, both in the case of purchases and of consumption. Food diversity does not seem to be influenced by the residence area (urban vs. rural) in any of the two approaches, but measures of diversity are higher for the households located in developed counties and lower in less developed counties.

## DOES “NEW ENTRANTS IN AGRICULTURE” MEANS NEW MEMBERS FOR AGRICULTURAL COOPERATIVES?

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Common Agricultural Policy pays particular attention to the decline in the number of farmers in the European Union. For this reason, there have been established plenty of different policy measures and motives in order to support not only the new farmers' initial establishment but also the structural adjustment of their holding afterwards. For example “young farmers” have to submit a detailed business plan for the development of their farming activities as well as to attend special training courses. However, there exist no motives exclusively designed for new farmers' who are willing to establish a cooperative for their activities. The main objectives of this paper are firstly to investigate the characteristics of the new farmers according to their participation in agricultural cooperatives and secondly to identify what makes new farmers to participate actively (or not) in Agricultural Cooperatives. Both research questions will advance the knowledge of policy-makers and practitioners of new farmers' expectations and perceptions and through them, to come to distinctive conclusions about the measures and the actions that are needed in order to promote agricultural cooperatives as a viable solution for new entrants in the agricultural sector. For this reason, a survey took place in different regions in Greece (northern, central, and southern) during an educational course designed for new farmers. More specifically, a structured questionnaire was developed and distributed among 250 young farmers of northern, central and southern Greece. All of them participated in the measure 112 'Setting up of young farmers' (Common Agricultural Policy, Pillar II). The first results of the survey indicate low trust to cooperative organization leading to low rates of active participation and commitment to agricultural cooperatives in Greece. Key words: Greece, Agricultural Cooperatives, New Farmers, Common Agricultural Policy.

# FOOD SECURITY, SUSTAINABLE AGRICULTURE AND MIGRANTS' INTEGRATION. REFLEXIVE GOVERNANCE AND ITS RESULTS ON FOOD POLICY: THE CASE OF BARIKAMÀ COOPERATIVE IN ROME

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Nowadays, food insecurity and poverty are the most important challenges that all modern economic systems have to confront. The aim of this paper is to investigate the role of reflexive governance in dealing with two of the most crucial issues in the Mediterranean Countries: food security and migrants' integration. Regarding food security, the Post 2015 Agenda presented by the United Nations at the Sustainable Development Summit sets the New Sustainable Development Objectives to be reached by 2030. The first two Objectives are the eradication of extreme poverty and "Zero Hunger" program, which is to reach food security through a sustainable agriculture. The UN's approach takes new acceptations of "food security" into account and considers not only the availability of food, but also other relevant issues, such as economic and physical access to food, food safety and stability. An essential contribution to the debate is offered by the Nobel Prize-winning economist Amartya Sen. In his studies on famines, Sen shows that "hunger" is related to the economic access to food, rather than the physical availability of food itself. The Mediterranean Countries are facing both the growing concerns about food insecurity and migrants' integration issue. The case of the Barikamà Cooperative discussed in this paper will show how agriculture could be a valid ally in the battle against poverty, food insecurity and social exclusion. In fact, the civil society organizations can help to reach the New Sustainable Development Objectives. All members of the Cooperative are migrants from Sub-Saharan Africa. When they first came to Italy, their life and working conditions were unacceptable; they lived in degrading and unhealthy households and were forced to settle for insecure jobs. Now, however, thanks to the Cooperative they sell certified organic yoghurt in Rome. The Italian food movement called Solidarity Purchasing Groups (GAS - Gruppi di Acquisto Solidali) turned Barikamà into an economic and social reality through a pre-financing practice. The local community support fostered the empowerment and the advancement of migrants' capabilities and generated a virtuous circle of development. The migrants learnt to speak Italian and acquired new working skills, and this allowed them to earn dignified incomes. Today, Barikamà also allows people with physical and mental disabilities to work. According to the civil society perspectives, small and medium-sized and craft-based production enterprises are more flexible than large-scale, industrial-like enterprises in adapting to the changing market conditions. The virtuous circle established between the Cooperative and the food movement is an example of reflexive governance, and its existence was made possible thanks to the policy spaces opened by the Italian Government for the growing Food Movements (Financial Law, 2008). The Barikamà experience demonstrates how a policy that promotes the collaboration between different forms of civil society can positively influence the quality of life, the community and local development, contributing to the struggle against poverty and food insecurity. Key Words: Food Security; Sustainable Agriculture; Migrants' Integration; Reflexive governance; Barikamà experience, Italy. Bibliografy Alkire, S. (2002), *Valuing Freedoms: Sen's Capability Approach and Poverty Reduction*, Oxford University Press, Oxford Anania G. (2015), *La sicurezza alimentare nel negoziato Wto sull'agricoltura*, *Agriregionieuropa* 40: 39-42 Crisci G., Fonte M., Diara S. (2015), *Barikamà: Resistance through food*, *Second International Conference on Agriculture on Urbanizing Society*, 14-17 September, Rome. Edwards M. (2011), *The Oxford Handbook of Civil Society*, Oxford University Press. Ericksen P. J. (2007), *Conceptualizing food systems for global environmental change research*, *Global Environmental Change*, 18(1):234–245 Fao (1996), Rome

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# OIL PALM, WAGE LABOR, AND RURAL ECONOMIC DEVELOPMENT: INSIGHTS FROM INDONESIA

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During the past few decades, oil palm became one of the most grown crops in the equatorial. The rapid expansion of oil palm cultivation has aroused critical debates concerning possible negative environmental and social impacts. However, especially in terms of social impacts very little empirical evidence is available. Based on recent survey data, we analyze the effects of oil palm expansion on the incomes of rural laborers in Indonesia. Previous studies have looked at the income effects on smallholder farm households, but impacts on rural laborers have not been analyzed. This is considered a research gap, because rural laborers belong to the poorest population segments in Indonesia. Our data suggest that oil palm plays a significant role for rural economic development. Econometric models shows that working in oil palm plantations has a higher positive income effect for labor households than working in other crops or alternative employments. Accordingly, those households that work in oil palm have higher living standards than those that do not. These effects hold true for both, laborers working in smallholder plantations and large-scale plantations. Yet we also find that various institutional factors, such as the type of labor contractual agreements and land ownership rights, play an important role for the magnitude of the income effects. Socioeconomic variables such as household size, gender of the household head, and education matter for the type of employment and the magnitude of employment incomes. We conclude that the oil palm expansion in Indonesia can benefit farm households and rural labor households alike. Further analysis will look at the effects of oil palm expansion on income inequality.

# QUANTITATIVE OR QUALITATIVE FOOD SECURITY FOR TUNISIA?

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In Tunisia, as in most of the southern Mediterranean countries, food security policies were intended to increase production to meet the growing demand of the population and to reduce the food deficit rate (35% in average per year). This choice was based on the adoption and expansion of an intensive model of production and the policy of subsidizing basic commodities to protect the purchasing power of consumers. However, the improvements in terms of food availability and its diversification, have led to an overuse of natural resources, biodiversity degradation and progressive disappearance of specific local products. At the consumer level, these policies have changed food consumption, which became mainly constituted by processed products foods with high-energy contents and low nutritive qualities thus contributing in the increase of chronic diseases such as obesity, diabetes, cardiovascular diseases and causing 50% of deaths in the last decade. This article aims to analyze the impact of the food security policy on the change of consumption compared to the Mediterranean diet model, which traditionally characterized Tunisia until the 80's. In this paper, we will try to propose alternative policies for qualitative food security. The trend analysis of food consumption is based on data obtained from the national consumption survey covering the period 1985-2015. The measure of consumption distortion is appreciated by regrouping food products in different categories through cluster analysis and by calculating the amplitude of the deviation of the average consumption (per capita) observed over the period compared to the base year 1985. For each group of products, identification of factors explaining the consumption gap was analyzed through a linear regression taking in consideration the price, income, environment and production. The results highlight the differences in consumption trends between products classified into three groups: Group 1: with low and negative growth, constituted by cereals, vegetables, beef meat and sugar; Group 2: with medium growth, constituted by dairy products, fruits, seed oils, ovine meat; Group 3: with high and positive growth such as poultry, fish and eggs. The products with negative effects on health were identified in groups 2 and 3 with a high and medium growth and healthy products were in the group1 with negative growth. Therefore, the rich cereal fiber products (durum wheat, legumes and vegetables) have declined compared to high protein products such as red meat, eggs, milk and seed oil. The analysis of the determinants of consumption habits revealed the significant effect of price with higher elasticity for subsidized goods, also of income effect which strongly appears in animal proteins and supply, which is mainly affecting milk and olive oil due to recent increase of domestic production. Consumer behavior also depends on environment (urban or rural zone) which showed a significant difference between groups. This analysis confirms the diversion of food consumption compared to the Mediterranean model and the trend towards a model which threatens food security of population. Hence, Tunisia requires consistent and appropriate measures for more qualitative food policy.

# TOWARDS A COMMON UNDERSTANDING OF AGRO-FOOD PRODUCTS ECONOMIC SUSTAINABILITY: INSIGHTS FROM APULIA REGION, ITALY

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There is a huge potential for the development of agricultural sector in Mediterranean territories by focusing on the valorisation of typical and traditional products, which represent the cornerstone of the well-known Mediterranean diet. However, this potential remains largely unexploited due to many legal, organisational, communication and marketing constraints. Combining tradition, innovation and sustainability can help better communicating the unique attributes and characteristics of typical products to consumers. Actually, more and more attention is paid to the sustainability of typical agro-food products. However, while producers associate a particular importance to economic sustainability, more weight is associated by consumers to the environmental one. As for economic sustainability, it is mainly related to profitability for producers while accessible prices for consumers. This creates a trade-off between consumers and producers and policy should mediate in order to find a balance between these different sustainability understandings and aspirations of two important actors of the agro-food chain. This is a concrete challenge also for the government of Apulia region (south-eastern Italy). Developing a shared and sound approach for the definition, assessment and dissemination of environmental, economic, socio-cultural and nutrition-health sustainability in relation to the Apulian typical agro-food system can help addressing this challenge and also serve as a tool for the valorisation of regional typical products and as a driver for development and growth of the entire territory. In the framework of Agriculture & Quality programme 2013-2015 of Apulia region, a pilot project was performed to develop appropriate and measurable indicators to assess the sustainability of Apulian products adhering to the quality scheme "Quality Products of Apulia". The paper aims to highlight the methodological approach adopted, the sustainability criteria identified and indicators selected to assess the economic sustainability of Apulian quality agro-food products. Economic sustainability can be defined as the capacity to effectively combine resources in order to generate sustainable economic growth for enhancing the quality of products and local services thus rural community livelihood. In particular, economic sustainability of a product or an agro-food supply chain is the ability to generate income and employment on an ongoing basis. Identified criteria of sustainability are related to income, employment, investment, and production factors profitability and productivity. According to these criteria, indicators easily measurable at the farm/company level were identified. These relate to products and services diversification, commercial riskiness index, localization index, investment and innovation propensity, labour and capital profitability, and output enhancement capacity. A scoring system was developed for each indicator referring to each product and supply chain; from 0 (unsustainable) to 10 (very sustainable) with 5 corresponding to sustainability benchmark or reference value. The sustainability benchmarks will be reviewed and updated over time based on

monitoring of companies involved in the quality scheme. The challenge ahead is to see how these indicators referring to products or businesses can be used for assessing the sustainability of food supply chains in the different Mediterranean territories. Keywords: Economic sustainability, Quality, Local agro-food products, Indicators, Apulia region

# THE “SOPHISTICATION” OF AGRO-FOOD IMPORTS FROM THE MEDITERRANEAN COUNTRIES: COMPETITION OR COMPLEMENTARITIES?

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The role of quality has been increasing in many agricultural and food markets. Competing on quality is seen as an alternative to simple price competition and it is a way for increasing profits. The economic literature on international trade has recently introduced the concept of sophistication defined as the content of a good in terms of technology, design, intrinsic quality, branding, scale economies (and consequent market power of the seller) and any other factor affecting value (Fontagné et al., 1999). The sophistication level of exports is capable to describe the degree and the kind of competition that a product is facing in world markets, thus explaining the level of remuneration of inputs. Applications of these indices have been made for analyzing the positioning and performance of different Countries and/or products on the international markets. Such exercises have highlighted pros and cons together with some limitations associated with the use of the indices (beyond those already cited, see: Rodrik, 2006; Antimiani et al., 2012; Carbone et al., 2015). We look at goods sophistication associating it to imports rather than exports. We base on few considerations: i) looking at the destination markets allows to avoid the influence of localization factors other than per capita GDP; ii) destination markets are the actual competitive arena that products are going to meet; iii) focusing on imports narrows the definition of the relevant markets and thus allows for more accurate analysis. The main objective of the paper is to compare Mediterranean countries in terms of their competition on the markets of importing Countries, on the underlying assumption that the level of sophistication of the markets where Countries export is a key variable in the competitive advantages of exporting Countries. The dataset for the exercise includes 95 agro-food items aggregated starting from 700 COMTRADE HS 1996 at 6 digit level. The new indices we propose are the following: 1) CONSY<sub>i</sub>. This is the sophistication index for imported good *i* where the per capita income of importing Country *j* is weighted by the role of country *j* as an importer of good *i* on international markets. The higher is the role of high income countries in the imports of a good the more sophisticated is the product. We pose that the income level of the destination markets for a product indicates the kind of competition that the product would likely meet. For products such as citrus, fresh vegetables, olive oil, peeled tomatoes and bakery, all relevant for Mediterranean Countries, we build a specific CONSY<sub>iMCj</sub>. This allows assessing the sophistication of the clients of each exporting Market. 2) Starting from CONSY we build IMPY given by the weighted values of the CONSY vector of the whole set of imports of a Country, where the weights are the shares of imports performed by the Country for each product. The IMPY indices measure the overall level of sophistication of the imports of a given Country, thus, giving an idea of the kind of market an exporter finds in that country.

# COST FLEXIBILITY OF CZECH AGRICULTURAL PRODUCERS

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The paper deals with an analysis of cost flexibility of Czech agricultural producers. In particular, the paper addresses the following research questions. The first relates to the curvature of the cost functions. The aim is to assess which production specialisation is more flexible. The second question deals with the cost flexibility components. We evaluate the role of scope, scale and convexity effect in different production groups. The third question relates to the differences between the small and large farms. Since the Czech agriculture is characterized by a significant production duality our aim is to assess the differences between small and large farms. The analysis is carried out using the FADN database and the micro level perspective, i.e. the micro-data base approach is used. We use the stochastic frontier approach and estimate stochastic distance function models for the main agricultural sectors. The models are formulated as input distance functions with three outputs and five inputs. In all models it is explicitly considered that agricultural production possibilities are affected by firm heterogeneity which impacts on the level as well as on the shape of the production possibilities. The analysis provides the inter- as well as intra sectoral comparison of Czech farmers. The results show that there are significant differences among the sectors. Moreover, due to the dual structure of Czech agricultural we found significant differences in the cost flexibility between small and large farmers or agricultural companies, respectively. In particular, the large farmers have higher cost flexibility than the small ones. The findings are discussed in terms of competitiveness and the possibility of valuation of produced particular agricultural public goods through the production approach. Specifically, the valuation is applied as a tradeoff between agricultural production and production of public goods.

# VALUING CONSUMER PERCEPTIONS OF OLIVE OIL AUTHENTICITY

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**ABSTRACT** The proliferation of counterfeit goods on the market, constantly, increases with considerable consequences for several economic sectors, including food industry. Authenticity of agri-food products, therefore, becomes a major concern for consumers given the increasing spate of food fraud reports across the world, with olive oil to be the leader in adulterations. Olive oil constitutes a valuable agricultural crop offering significant income to farmers, processors and traders. The high selling price of olive oil is the main reason for conducting adulteration, which often caused through false indications on the packaging (mislabeling) or by adding less expensive oils, leading to the degradation of quality and nutritional value of olive oil. On the other hand, consumers are well aware of the alteration induced in the nutritional value of olive oil by those activities and they are looking for authenticity signals during the purchase process. Authenticity, therefore, becomes an evaluation and decision – making criterion that guides consumer choices. The aim of this paper is twofold: to highlight the attributes in which Greek consumers attached great importance during the evaluation of olive oil's authenticity and secondly, through consumers' demographic segmentation, to gain a more detailed knowledge about the attributes that positively evaluated by consumers, for a greater understanding of consumer desires. Specifically, a class of models for ordinal data, namely CUB, has been studied due to the ability of comparing and clustering the rating distributions that consumers express about olive oil's features and due to the ability of detection significant similarities and differences in consumer responses. In addition, with the introduction of respondents' characteristics, like social, demographic and financially characteristics, CUB models allow the measurement of the influence that consumers' profile has in the assessment of authenticity in olive oil. In this case study, a survey of 603 consumers was carried out in metropolitan area of Thessaloniki. Participants were asked to rate the importance of a list which includes the extrinsic and intrinsic characteristics of olive oil, using a seven point Likert scale. The results showed that consumers attached great importance to taste, acidity, country and region of origin, olive variety, organic production and to origin certification in the evaluation of olive oil's authenticity. Furthermore, by the introduction of gender, age, marital status, and education level we gain a more precise knowledge about the influence which consumer's profile has in the evaluation of olive oil's authenticity. Specifically, women tend to give to country of origin greater importance than men, during the evaluation of olive oil's authenticity. The significance, also, increases about country and region of origin, taste and aroma, extra virgin, organic production and certification of origin, as the age increases. Additionally, single participants do not attach great importance to region of origin, acidity, extra virgin, organic production and certification of origin whereas, secondary school graduates tend to use intrinsic attributes like color and taste, indicating, also, confidence in authenticity of organic olive oil. Keywords: ordinal data, CUB model, consumer perception, authenticity, olive oil.

# SUBSTITUTING CEREAL-BASED PIG FEED WITH GRASS PROTEIN FROM GREEN BIOREFINERY: IS IT A ECONOMIC AND ENVIRONMENTAL SUSTAINABLE WAY FOR AGRICULTURE?

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Traditional pig production often highly relies on the cereal-based feed, which has adverse effects on the environment, e.g. unsustainable carbon and nutrient flux with cereals production. A promising alternative is to use proteinaceous feed from grass, which is produced at the green bio-refinery (GBR), to substitute part of the cereals. Cultivation of grass on arable land can reduce nitrogen leaching and pesticide application. The GBR using grass as feedstock also produces valuable byproducts, e.g. fiber and biogas. The residues from production at green bio-refinery can also be fed back to the land as fertilizer with reduced environmental effects. In this study we will use the life cycle analysis (LCA) to analyze the economic and environmental effects of pig feed for producing one ton pork with two feeding systems. The results show that compared with traditional cereal-based feeding system, for producing one ton pork (1) the average feed cost will decrease by 5.01%; (2) the GBR will produce a profit of 96 € before tax; (3) the nitrate leakage (NO<sub>3</sub>-N) will decrease by 26.8%. However, in most of the scenarios, the nitrogen emissions into the air will also increase because of the increased N fertilizer applied to the grass production, e.g. N<sub>2</sub>O-N and NO<sub>x</sub>-N will increase by 8.84% and 8.72%, respectively. In most of the scenarios, the energy and land use will also be saved. However, some important factors, e.g. the soil condition and pressed juice fraction in fresh biomass, could subvert the conclusion about energy and land use saving due to GBR. Because crop growing practice and pig feed composition are similar in Northern Europe, we suggest the method and results of this study can be applied for the Nordic countries in most of the cases.

# FULL COST RECOVERY OF IRRIGATION WATER SUPPLY, AND WATER PRICING SYSTEMS UNDER CLIMATE VARIABILITY CONDITIONS IN A MEDITERRANEAN AGRICULTURAL AREA.

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This study assesses the effects of various water pricing systems in a Mediterranean territory (56,000 ha in Sardinia, Italy) where an Irrigation Consortium operates. The analysis builds on one of the basic addresses of the European Water Framework Directive to coverage of water costs with tariffs to encouraging efficient use of resource. In this regard, several scenarios are examined with different pricing systems and degrees of cost recovery of agricultural water distribution. The study is based on two components. A translog function of cost of water distribution estimated for the irrigation Consortium, which provides the distribution costs on the basis of the use of water, in particular based on the extension of the irrigated area and the watering amount per hectare. The estimated coefficients of this function take account of the cost differences between the various used water distribution technologies. In particular, specific cost values are estimated for the Consortium districts where the water is supplied through pipelines in high pressure, for the districts where the water is supplied at low pressure, and for the districts in which the water reaches the farms in the channels, by gravity. These different modes of supply have also effects on the costs of water usage on farms. The second component of the study is a territorial model of discrete stochastic programming (DSP) for that same area. This model divides the Consortium territory in its various districts, with the different water distribution technologies and, within those, in the areas managed by the main farming types. In this context, the DSP modelling allows to representing the role of many uncertainties in the decision-making process of farms. In particular, our study considers the effects of climatic variability on the water requirements of crops and, consequently, on the use of irrigation water. The analysis develops on two scenarios: the current level of partial coverage of the water delivery costs, and a full cost coverage scenario. In these conditions different charging systems are simulated. The baseline is the current system of per hectare/crop payment. Also, a per hectare/crop scheme is simulated, which eliminates the current disparities in cost coverage between the Consortium districts. A third system, reflects the characteristics of the cost function of this study, and bases the payments on the extension of the irrigated area, and on intensity of watering per hectare. Finally, a volumetric system links payments to the use of the water supplied by the Consortium. The impacts of the various pricing and cost coverage scenarios are assessed with respect to agricultural income of the entire zone, and its main types of farms; use of water, provided by the Consortium and withdrawn from aquifers; use of other key agricultural inputs, as labor and chemicals; use of agricultural land. The significant differences are highlighted and discussed, between the different water payment systems, as well as the effects of the switching to a full cost recovery pricing.

# CONSUMERS' ATTITUDES TOWARDS HUNTING ACTIVITY AND STATED PREFERENCE FOR RED DEER MEAT: EVIDENCES FROM A NORTHERN ITALIAN SURVEY

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The meat of large wild ungulates can be considered a traditional meal in Italy and many European countries. Indeed, regional dishes containing red deer (*Cervus elaphus*), roe deer (*Capreolus capreolus*), chamois (*Rupicapra rupicapra*) and wild boar (*Sus scrofa*) can be found in most of the restaurants and local fairs in the Alps, Apennines, Central Europe and Mediterranean areas. Nonetheless, just few studies treat this topic in relation to consumers' attitudes towards hunting activity and no relevant research have been presented related to any European countries. We are of the opinion that there are at least four reasons why analyzing consumers' preferences for wild ungulates meat is interesting: 1) the purchasing of hunted games represents a source of supplementary income for people living in mountainous territories; 2) the large wild ungulates' meat presents excellent nutritional characteristics; 3) in the last two decades, the growth of populations of large wild ungulates generates a certain supply and some conflict with human activities; and, 4) hunting activity helps to manage wild animals population, nonetheless may be not socially accepted. Due to its representativeness among European large wild ungulates, the research focuses on consumers' preferences towards red deer meat. Authors present the evidences from a Northern Italian study that covers 361 respondents from the flat area of Lombardy Region. The survey is based on a questionnaire exploring for demographic characteristics, meat consumption habits and respondents' attitudes towards large wild ungulates meat and hunting activity. Preferences are evaluated using two hypothetical choice experiments aimed at simulate purchasing at the restaurant and at the supermarket respectively. The choice experiments aim at estimate the trade-offs between attributes and levels of the different products and exploring differences between consumers' evaluation towards red deer meat in the typical Italian consumption scenario or in a weekly family purchase situation. In the "Restaurant" scenario, respondents state their preference between two alternatives described by price, type of cooking (thinly sliced raw beef; stew), origin (Austria; Italy; Alpine valley) and type of meat (beef; red deer). In the "Supermarket" scenario, respondents state their preference between three alternatives of a 500gr pack of red deer chopped meat described by price, type of production (extensive breeding; selective hunting) and origin (New Zealand; Austria; Italy; Alpine valley). Descriptive results show that Italian respondents appreciate large wild ungulates meat, while state bad attitudes towards hunters' behaviors. First econometric estimations on the two choice experiments show that consumers' preferences are strongly driven by origin in both the scenarios. At the restaurant, the stew is highly preferred, while the difference between deer and beef is not significative. Results from supermarket model show that almost a quarter of the respondents chose the no-buy option in the choice tasks and that price attribute is significative and positive in the quadratic form, suggesting that high prices are used by consumers as a proxy for more utility, ie. higher quality of the product.

# THE FUTURE OF ALFALFA AFTER THE CAP REFORM: AN INSTITUTIONAL INTERPRETATION MATTER

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The new Common Agricultural Policy (CAP) reform, entered into force in 2015, introduces new rules related to the implementation of the First Pillar for European farms until 2020. One important novelty of the reform consists in setting new agricultural practices beneficial for the environment (greening) that involve all European farms under the umbrella of public good provision objective. A new controversial question concerns the formal interpretation of the alfalfa inside the crop diversification rules. The article 44 of the Regulation (EU) 1307/2013 establishes that farms with more than 10 ha of arable crops have to cultivate at least two crops (three for farms with more than 30 ha), exempting all those farms where more than 75% of the land is used for the production of grasses or other herbaceous forage, provided that the remaining arable area does not exceed 30 ha. In a recent guidance document, the European Commission has clarified that species belonging to the botanical family of leguminosae, as alfalfa, cultivated as monoculture should be classified as a crop and cannot be considered in determining the exemption threshold for crop diversification. This implies that farms over 10 hectares of arable area specialised in alfalfa production are not excluded from diversification constraint, as it was previously supposed, having to reallocate up to 25% of this area to other crops. This paper aims to compare the effects of the two opposed interpretation of leguminosae in the crop diversification measure through a positive mathematical programming (PMP) model applied to a sample of FADN farms of Emilia Romagna, the most important EU region for alfalfa production. The preliminary results show that in the scenario where alfalfa cannot be considered as fodder crop, the area reduces at regional level of 2.5%. Farms specialized in alfalfa production (dairy farms) are affected by the great impact, substituting the alfalfa area with other fodder crops and cereals. The new interpretation has also effects in the mountain territory, where in the original, but wrong, interpretation farms were substantially excluded from the crop diversification. Several mountain farms, specialised in alfalfa production, are interested by the diversification measure. Therefore, the Commission Interpretation risks to affect the stability of farms in marginal areas where the production alternatives are very limited. Alfalfa is also the basic feed for livestock producing milk for important PDO cheeses (e.g. Parmigiano-Reggiano). The displacement of alfalfa might engender high costs of adaptation for farms and risk of change in the intrinsic characteristic of the final product. Furthermore, alfalfa is an environmentally friendly crop, because it can remain in a same parcel without tilling even more than four years, contributing to increase the carbon stock in the soil, biodiversity and landscape value. Alfalfa is also a nitrogen-fixing crop qualified in Italy as ecological focus area for the third greening requirement. The role of alfalfa within the greening measures is a controversial issue to be assessed against the objectives of the CAP and the possible effects on specific agricultural systems.

# IMPACTS OF THE 2013 CAP REFORM ON THE EU FARMING SECTOR: SIMULATION RESULTS WITH IFM-CAP FARM LEVEL MODEL

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This paper presents a comprehensive analysis of the impacts of the 2013 Common Agricultural Policy (CAP) reform on the EU farming sector. We focus on two key elements of the reform: direct payments redistribution and CAP greening by applying the first EU-wide individual farm-based model for CAP analysis (IFM-CAP). IFM-CAP is a static positive mathematical programming model based on the EU-FADN (Farm Accountancy Data Network) data. The main contribution of the paper to the literature is the modelling the farm specific implementation and impacts of the CAP reform. IFM-CAP improves the quality of policy assessment upon the existing regional and aggregated farm-group models and allows assessing the distributional effects of policies over the EU farm population. To guarantee the highest representativeness of the EU agricultural sector, the model is applied to every EU-FADN (Farm Accountancy Data Network) individual farm (around 83292 farms) available in 2012, used a base year. Given that the adoption of different reform elements may vary across MS and their implications are dependent on farms characteristics, we account for the CAP reform implementation heterogeneity across Member States (MS) and farms. Simulation results show that the reform will lead to substantial direct payments redistribution effects (e.g. due to the external and internal convergence) among EU MS (most notably between new and old MS) and across farms within MS. The estimates suggest that up to 8 billion Euro will be redistributed between farms in EU. However, in comparison to the pre-reform CAP, the reform will result in a more equitable allocation of payments among farms, sectors and regions. Further, the simulation results show that the impact of CAP greening on farm income and production are minor at aggregate EU or MS level (less than 3%). There is more substantial heterogeneity of the effects at farm level where farms may lose up to 20% in income from the reform. More affected farms appear to be middle sized farms and those specialised in horticulture or livestock farming.

# THE ECONOMIC RESPONSE OF RURAL AREAS TO LOCAL SUPPLY SHOCK: EVIDENCE FROM PALESTINE

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Most of the literature on rural return migration examines the economic performance and occupational choices of returned migrants up on arrival. Still, little research addresses the effect of return migration on local labor market outcomes for the rural. Utilizing data on returned Palestinian commuters from the Israeli labor market, this paper provides a simulation of how an exogenous influx of returned migrants affects rural local market. Specifically, this paper utilizes the commuting restrictions that Israel imposed on Rural Palestinian workers, during the Second Intifada, to examine the effect on wages and unemployment for non-commuters. The analysis of this paper provides robust evidence of the short run negative effects on labor market outcomes for rural non-commuters. In specific, the findings show that returned commuters are perfect substitute to less skilled non-commuters (similar skill type), leading to a wage decrease for the latter. Consistently, the results favor the crowd effect hypothesis; returned commuters compete for same jobs with rural individuals and increase their probability of being unemployed. Most of this effect is limited to those seeking jobs. In addition, the results also show that unemployment duration increases the less skilled individuals. Overall, this paper provides a vital to evaluate export based policies that countries often utilize to eliminate excess labor supply. The results suggest that this policy might be back firing, at least for rural areas, when risks of forced returned migration or commuting are high. In this vein, the results are also vital in the context the Israeli-Palestinian conflict. Specifically, excessive reliance on the Israeli labor market to reduce unemployment in the oPt may not be the right policy to sustain economic development. The demand for the Palestinian workers continues to be governed by the prerequisite of Israel's security conditions.

# ASSESSMENT OF WATER DISTRIBUTION UNDER PIVOT IRRIGATION SYSTEMS USING REMOTE SENSING IMAGERY IN EASTERN NILE DELTA

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Abstract Traditional methods for center pivot evaluation are depending on the water depth distribution along the pivot arm. Estimation and mapping the water depth under pivot irrigation systems using remote sensing data is essential for calculating the coefficient uniformity (CU) of water distribution. This study focuses on estimating and mapping water depth using Landsat OLI 8 satellite data integrated with Heermann and Hein (1968) modified equation for center pivot evaluation. Landsat OLI 8 image was geometrically and radiometrically corrected to calculate the vegetation and water indices (NDVI and NDWI) in addition to land surface temperature. Results of statistical analysis showed that the collected water depth in catchment cans is also highly correlated negatively with NDVI. On the other hand water depth was positively correlated with NDWI and LST. Multi linear regression analysis using stepwise selection method was applied to estimate and map the water depth distribution .The results showed R<sup>2</sup> and adjusted R<sup>2</sup> 0.93 and 0.88 respectively. Study area or field level verification was applied for estimation equation with correlation 0.93 between the collected water depth and estimated values. Keywords— Center Pivot, Coefficient uniformity (CU), remote sensing, NDVI, NDWI, LST.

# UNDERSTANDING THE ROLE OF AGRICULTURE KNOWLEDGE AND INNOVATION SYSTEM IN THE AGROENERGY SECTOR: THE CASE OF BIOGAS DIFFUSION IN TUSCANY

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The European energy strategy towards 2020 involves increasing the production of renewable energy by agriculture (agroenergy) for moving towards a bio-based economy. The climate deal reached at the COP 21 conference in Paris (2015) supports the position of the EU concerning the sustainable promotion of agroenergy, as it allows save greenhouse gas emissions compared to fossil-based energy. However, the diffusion of agroenergy in the Mediterranean area is modest and uneven, compared to northern European countries, may be due to the low endowment of productive factors. Besides policy, the debate around the diffusion of agroenergy is particularly lively within the academy. To date, agricultural economists have mainly approached the process of agroenergy adoption on farm through econometric or mathematical programming models. The former aim at explaining the underlying determinants of farmers' investment choices (revealed or stated). The latter simulate the choices of profit-maximising farmers under different policy or market conditions. Beside rational behaviour, both methodologies assume that farmers can access perfect information, thus missing to investigate knowledge transfer and the role of research and extension services in technology adoption and diffusion. Against this background, this paper deals with knowledge transfer in the agroenergy sector and focuses on the role of networks in that transfer. We also consider the impact of those networks on the transaction costs associated with agroenergy adoption. The aim of this study is understanding the process of biogas diffusion in a region of the Mediterranean area. The paper would add to the literature on innovation in agriculture by depicting the Agricultural Knowledge and Innovation System behind the diffusion of agroenergy and by identifying the structural components of that system. With this objective in mind, we consider the diffusion of biogas in Tuscany, a NUTS3 region in Italy. We selected Tuscany because prospective biogas adopters should radically change the structure of their farms and because geography and farming systems of Tuscany allow use that region as a proxy for northern areas of the Mediterranean basin. The methodology involves social network analysis, which allows pinpoint the role of the different interest groups in knowledge transfer and the extent to which knowledge management has shaped the biogas sector in Tuscany. Preliminary results highlight the central position of few major knowledge producers from the research sector, which, however, poorly interact among them and with intermediary organisations. In turn, knowledge transfer downstream seems a weakness of the network. Apparently, adopters are self-sufficient in terms of knowledge gathering during the innovation-decision phase. Missing significant intermediaries, adopters may become reliant on technical support and face high transaction costs. Given the irreversibility of biogas adoption, disconnection could significantly affect the costs for daily management. When evenly distributed, small biogas-to-electricity plants may help the distributed generation, while allowing comply with EU's Renewables Directive. However, the lack of coordination among the components of the Agricultural Knowledge and Innovation System may hinder the sustainable diffusion of biogas, with the rise of intensive entrepreneurial agro energy farming.

# BETTER VALUE OLIVE PRODUCTION TO IMPROVE DRYLAND FAMILY FARM HOUSEHOLD'S INCOME AND NUTRIENT AVAILABILITY: BIO ECONOMIC MODELLING APPROACH

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The majority of agricultural policies aiming to develop rural drylands were based on agricultural intensification. Rural populations in such areas are confronted with demographic and climatic pressures. These pressures impact their food security, real income, and drive them to deteriorate their own productive natural resources. Nowadays; the challenge for policy makers is to adopt an integrative and multidisciplinary approach for design policies aiming to improve the agricultural households' livelihoods simultaneously. To illustrate threats incurred in drylands, we have chosen Sidi-Bouزيد, a Tunisian rural arid zone. It has undergone considerable agricultural development since the late 80's through intensification, using irrigation and the privatization of land ownership. Currently, this area must face up to a crisis caused by the overexploitation of hydro-agricultural resources and rangelands, which shows the limits of Sidi-Bouزيد's rural development. It has been made worse by climatic uncertainties that indicate a probable 7mm decrease in annual rainfall and a 1° C temperature rise by 2020. These productivist measures have nonetheless made it possible for the whole country to establish a good position in terms of food security, less than 5% of its population being underfed. However, health studies have showed the importance of chronic food-related diseases, suggesting the non-sustainability of the Tunisian diet. To identify and study the different components of the production system in Sidi Bouزيد, an integrated assessment must be realised by analysing the behaviour of farming households at the level of the three significant issues at stake and design non intensification-based policy levers. This paper presents a way to assess the impact of agricultural policies on the productivity of the family farm's households, food consumption, and environmental impact of their activities by using a tool designed for researchers and policy makers and tested on peasant farmers from Sidi-Bouزيد. Such as olive growing represents the main agricultural activity in Sidi Bouزيد (60% of agricultural land); the simulated scenario is in the line for a better valuation of household production of olives at a higher price. The model allows us to determine the level of transaction costs related to transformation, labour and storage; that the household can support by improving his income and without deteriorate his food consumption quality. We have collected detailed data from seven farm households and twelve experts in different fields and then built a household non-separable household model based off of a mathematical program which serves to simulate production and consumption decisions both simultaneously. It is a static annual model with a utility based on the full income approach. The model incorporates several conditions: agronomic (rotation, seasonality, fodder self-production), resources (water and land), labour (gender), food consumption (nutritional recommendations for 13 nutrients, food demand system, budget constraint) and equilibrium conditions. The output variables are related to the household production (crop decision, global and monetary income), the environmental impact of agricultural activities (chemical inputs, water use and rangeland overexploitation) and to household's food consumption (self-consumed quantities, food purchased, nutrients available for the household). We calibrated the model with the risk calibrating approach.

# LESSON FROM THE NORTH AFRICA AND MIDDLE EAST CRISIS: AN AGRICULTURAL ECONOMICS APPROACH TO PREDICT RIOTS?

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Many factors, essentially related to economic, social and political constraints, originated North Africa and Middle East crisis. A deeper analysis of the social unrest and the violent protests beginning in 2011 brought to considering the agricultural and food crisis in these countries as possible driving forces of these riots. In particular, scientific literature underline the key role of food prices in social unrest, identifying a specific food price threshold above which protests become likely. Historically, there are numerous examples of food crisis with consequent social instability, challenges to authority and political change, for example in France before 1789 and in Europe in 1848. While many other causes of social unrest have been identified, food scarcity or high prices often underlie riots, unrest and revolutions. Nevertheless, food prices represent the final output of market dynamics. In this context, taking the cue from previous studies, this work aims to investigate the agricultural market dynamics at a more global level. Indeed the analysis of market disequilibrium at demand-supply level can highlight this aspects as a potential element contributing to promote social unrest. Data sources includes Fao, World Bank and IMF database, for the period 2005-2015. The variables considered include food supply, income, demographic variables, agricultural commodities prices and agricultural production variables. Preliminary results reveal strong variability among countries whit regard to the variables considered. Nevertheless, data underline connection between markets instability and social unrest. In conclusion, the situation in North Africa and Middle East reveal that the driving forces influencing the demand are slowed by high level of food prices. On the supply side, high prices cannot stimulate production as would be expected, due to political and social factors.

# APPLICATIONS OF HIDDEN MARKOV MODELS FOR PRODUCTION RISK ASSESSMENT IN CROP FARMS

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Farmers invest large amounts of money in high performance agricultural technologies, expecting good harvests and high returns, but these expectancies are dramatically influenced by weather conditions, agricultural market volatility and inconsistent agricultural policies at local, regional or global level. Many times, the associated risk to these situations can't be mitigated because the farmers do not use adequate financial products for risk coverage, adapted to the technical and economic processes in agriculture. In many other industries, companies using BI (Business Intelligence) tools can forecast outputs levels; but in agriculture the production is influenced by a large number of high complexity events difficult to predict, which can have adverse effects at farm level and result in significant financial losses. Various measures for risk mitigation (such as yields insurance, financial products as "futures" and "options" contracts, sales contracts etc.) involve the use of decision support technology platforms that sustain a good quality of business management processes in the farm. The aim of implementing such technology platforms is to support farmers to achieve a better quality production risk management based on data and computing services delivered as ITaaS (IT as a Service). Cloud computing providers as Amazon, Microsoft, Google, IBM or Oracle are offering services from Big Data-as-a-Service to machine learning services for predictive analytics which are used by specialized companies (such as Climate Corporation (offering the product Climate Field View) to provide complex information which help farmers to mitigate farm production risk. In this context, predictive models are used to identify patterns in historical data of the farm crop production in order to identify risks of potential losses (capital, crop yield, etc.) in agribusiness. Modeling the hidden "regimes" of farm risks (production risks, weather risks, market risks, etc.) – switches between good & bad periods for farming. In the present paper, we built a 4-states Hidden Markov Model to model the favorability of farming processes. The clustering of historical data regarding favorability index is used to obtain the state probability. Zero probability is associated with the state one - which corresponds with extreme condition for farming. The analysis of probabilities associated to the states family and the Markov transition matrix establish the topology of the model. The algorithm implementation was achieved in R language. We have used the package seqHMM, from R-CRAN language. We used the analysis of sequence categorical time series processing. All these data are multiple independent topics with one or multiple interdependent sequences (channels). The analysis of sequence is used for computing the dissimilarities of sequences, and often the goal is to find patterns in data using cluster analysis. Since Romania is facing a severe drought every four or five years, which is reducing the cereals output by 25-50% as compared to the multiannual average, the model was applied in two of the main cultivation regions for wheat and maize.

# HOW TO CONCEPTUALIZE A FOOD SUPPLY CHAIN: AN ANALYTICAL FRAMEWORK FOR SUSTAINABILITY

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Consumer's attachments to origin of foods regarding the way they are produced in addition to traceability has increased with rapid urbanization and there is now price premium for geographically differentiated products. The labelling and quality regulations on local, traditional/regional, direct sale, short food supply chain, geographical indications foods are now part of the food policy. These policies, at the same time, appears to be important tools for governments to challenge the deindustrialization and depopulation trends in rural areas, while firm level strategies (globalization, localization, glocalization) also influence upon these changes and affected by. This situation, also affects the analysis approaches of the agricultural and food studies; chains with the same terms of name could have different problem objectives and diverse analysis approaches. This study discusses the conceptual and analytical framework with main drivers undertake to get an assessment basis for further discussion. At the end, it discusses the sustainability dynamics of interaction of food supply chains and markets and lays down policy recommendations. Keywords: Food Policy, Geographical Indications, Safe Food, Food Supply Chain, Quality Choice, Rural Development

# THE IMPACT OF TURKISH AGRICULTURAL POLICY ON COMPETITIVENESS OF COTTON PRODUCTION

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The specific circumstances of agriculture necessitate this sector to be protected and supported either directly or through institutions authorized by the state in of each country. Therefore, in our country agricultural sector without any supports is inconceivable. Nowadays as a result of the internal as well as external developments agricultural support tools have changed. These changes of policy tools have made macro and micro level analysis of agricultural policies more important. Turkey is one of the countries which have a very suitable ecologic conditions and land resources for cotton production. Turkey' cotton and textile sector has the potential to create a worldwide economic value. Despite the advantage of yield and quality, the problems affecting the sector as a whole and ultimately reflecting to export competitiveness continues to increase. As a result, Turkey, an important cotton producer and exporter, has become a major cotton consuming and importing country in recent years. In addition to these developments, there is also a remarkable change in the geographical distribution of cotton production. As traditional cotton producing regions Çukurova and Aegean regions' competitiveness has decreased relative to alternative products. On the other hand in Southeast Anatolian Region cotton acreage is increasing. Therefore, to reveal the competitiveness based on the effective use of state resources with the economic and social costs of existing applications is extremely important in the formulation of appropriate policies in order to ensure economic development and food security. With this study, it is aimed to determine the competitiveness of cotton production in terms of profitability and to measure the effects of agricultural policies at national level. Firstly, agricultural policies applied for cotton production in Turkey will be examined. Policy transfers, resource utilization, costs, private and social profits resulting from these applications will also be presented with Policy Analysis Matrix (PAM). Also some important indicators such as Domestic Resource Cost (DRC), Effective Protection Coefficient (EPC), and Nominal Protection Coefficient (NPC) will be calculated from PAM framework to measure competitiveness. This method is widely used in the world in the analysis of the impact of policies on production economics and it is a very effective method. PAM is mainly based on benefit-cost analysis. PAM also may be used to generate scenarios for comparison of alternative policies. Besides the secondary data analysis of the effects of policy, the data obtained through face to face interviews with producers selected through stratified sampling method in the 3 regions and 4 provinces with high productions is used. Keywords: Agricultural Policies, Policy Analysis Matrix, Competitiveness, Social Profits, Cotton.

## TOURISTS' BEHAVIOUR TOWARDS CRETAN LOCAL FOOD

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**Abstract:** Gastronomic tourism is growing into the tourism industry. But studies on food tourists' behaviour are very few compared with those about tourists' behaviour in general. The current study provides an analysis of tourists' behaviour based on the perceived value (PV) and the satisfaction (ST) to predict the intention to revisit (IN) using the Modified Theory of Reasoned Action (TRA). The purpose of this study is to unveil the relation between perceived value and intention to revisit (H1), Perceived Value and satisfaction (H2) and satisfaction and intention to revisit (H3) using confirmatory factor analysis as a statistical tool. Results showed that the hypotheses H1, H2 and H3 were significant ( $p < 0.01$ ) and supported. H3 ( $\beta = 0.35$ ) shows that satisfaction is an antecedent to the intention to revisit. The same is true for H1 ( $\beta = 0.19$ ) and H2 ( $\beta = 0.45$ ) which is proof that perceived value can predict intention to revisit and satisfaction respectively. The contribution of this study is intended to make sense of empirical results using the modified theory of reasoned action to predict tourists' behaviour toward Cretan local food which proved that local food can influence the intention to revisit. The implications will be useful for tourism managers, decision makers and destination marketing organizations in Crete and Greece. **Keywords:** Gastronomic tourism, tourists' behaviour, perceived value, satisfaction, intention to revisit, confirmatory factor analysis (CFA), modified theory of reasoned action (TRA), Cretan local food, Greece.

# ACHIEVING SUSTAINABLE CAPACITY: INCORPORATING QUALITY ATTRIBUTES TO THE PRODUCTION EFFICIENCY ANALYSIS

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This research aims to set an analysis framework on measuring the farm specific feasible sustainable capacity in terms of their environmental impact mitigation practices and their contribution to human welfare. Technical efficiency analysis captures the effects of factors on agricultural productivity, however, with limited consideration of farm heterogeneity and its qualitative attributes. Commonly adopted utilitarian or productivist views on sustainability overlook the provisional services offered by the farms, thus, providing misleading performance measurements that render policies ineffective in the long-run. Data of cereal and general cropping-farms participating in the Farm Business Survey in England were derived for the period 2005-2014. The model is incorporating quality attributes that relate to the production inputs and outputs, technology adoption and sustainability of the farms. Analysis involved a parametric stochastic approach of sustainable efficiency measurements. The lack of data on environmental quality indicators such as biodiversity was overcome by the use of proxy indicators for ecosystem services flows and human welfare to account for the desirable and undesirable outputs of the farms. This empirical analysis contributes to the sustainable production efficiency literature by approaching the effects of farmers' endowments on input usage such as management practices, and the significance of capturing farm heterogeneity by qualitative measurements on a human welfare basis. Furthermore, it provides insights on the effectiveness of agri-environmental schemes and diversification practices on the sustainable development of agricultural production. Results contribute to suggestions on farm structural changes towards the goal of achieving higher levels of sustainable capacity. In addition, outcomes of the model provide a framework of analysis on the impacts of policy interventions and agri-environmental schemes.

# COMMODITY RISK MANAGEMENT EXPERTISE CENTER: A MULTIDISCIPLINARY PERSPECTIVE TO COOPERATIVE EDUCATION & TRAINING

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Recent research in cooperative economics, education and extension argues that training for stakeholders in the value chains require a multi-disciplinary approach. We apply a multi-disciplinary approach (i.e., marketing-finance) to organize and deliver high quality educational and training classes for managers, employees and board members of agribusiness and services cooperatives within the newly-established Commodity Risk Management Expertise Centre (CORMEC). Synergies with international cooperative leadership programmes and governmental and non-governmental agencies and organizations (e.g., University of Missouri; University of Illinois at Urbana-Champaign, United States Agency of International Development/USAID, International Centre for Advanced Mediterranean Agronomic Studies/CIHEAM) enhance the unique dimensions of our educational/training programmes in the areas of : a) commodity risk management; b) cooperative life-cycle and market behaviour; c) member relationships and heterogeneity and c) cooperative organizational restructuring and innovation. The fusion of the state-of-the art academic knowledge, strong engagement in action research initiatives, and experience in implementing solutions within coop organizations in developed and developing countries of CORMEC's scholars and educators in combination with the application of innovative educational and teaching techniques (e.g., problem-based and project-based learning approaches), provide the sufficient and necessary conditions for successful enhancement of course-participants' knowledge curve on crucial managerial issues that their cooperative organizations face. Keywords: cooperative education; training; multidisciplinary, risk management.

## POVERTY AND OLIVE OIL: OPTIONS FOR INCLUSIVE DEVELOPMENT IN SOUTHERN TUNISIA

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Tunisia is the third largest exporter of olive oil globally, with export earnings accounting for approximately half of the value of all agricultural exports for the republic. Predominantly mixed and marketed under Spanish and Italian brands, most European and international consumers are not familiar with Tunisian olive oil in its original state. Challenges to product differentiation and branding are largely related to low and erratic productivity on fragmented land holdings, coupled with a lack of economic incentives for maintaining consistency in quality. This is particularly characteristic of production unit in southern Tunisia where olives are the only feasible crop supporting livelihoods in the face of drought and climate change. Technocratic and apolitical business model approaches aimed at improving income security are available, but questionable within a contemporary environment of economic uncertainty and ongoing regional conflict. Olive oil plays an important role in the provision of insurance for rural households in Tunisia, where opportunity for engaging in formal markets for underwriting risk is not readily accessible. The vagaries of weather, within an environment of climate change, constrain stability in the production and marketing of (quality) olive oil. Land fragmentation, stemming from inheritance and land ownership norms, leads to a lack of bargaining power and when coupled with instability in output, relatively lower farm gate prices. In addition to outdated pressing equipment and issues of efficacy in service from local millers in ensuring quality, it is generally well known that household stocks of olive oil are liquidated in times of need but with deterioration in quality over time. Conventional wisdom within developmental circles would suggest the need for collective action, in order to enhance bargaining power for small and marginalized farmers, and thereby stabilization in collective quantity and quality shipped to market. Historical experiences with agricultural cooperatives in Tunisia, and generally within the Middle East and North Africa (MENA) region have however been bitter given heavy state involvement and influence. More contemporarily, policies for supporting the olive oil sector have largely been driven by opportunities within more favourable production areas where intensification presents opportunities for growth and options for enhancing returns from quality. In drier areas, lack of access to irrigation poses significant constraints to stability in supply to olive oil; and therefore, given limited other options for agricultural production, storage of olive oil as a measure of insurance potentially undermines collective efforts for marketing with quality assurance. We unpack the notion of “equity” in access to markets and services by distinguishing between horizontal and vertical measures of equity, together with an argument for why in Tunisia there is a contemporary need for avenues which support public-private-civil society partnerships in the delivery of rural advisory services. Within the spirit of a contemporary movement for uncovering more effective processes for innovation, we outline options for developing pro-poor olive oil value chains in Tunisia, which are sensitive to historically bitter experiences with cooperative movements, and timely given the EU’s recent offer to increase market access quotas for Tunisian olive oil.

# LES VARIATIONS SPATIALES DES SUBVENTIONS DANS LA FILIÈRE LAIT EN ALGÉRIE. QUELLE EFFICACITÉ AUX AIDES DE L'ETAT ?

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Au lendemain de l'indépendance, l'Algérie a mené plusieurs politiques pour développer la filière lait et améliorer sa consommation. Cette filière est considérée comme la principale source de protéines animales accessible notamment aux couches les plus vulnérables de la population. Deux instruments ont été mis en place, notamment, (1) la subvention des prix à la consommation et (2) l'importation de la poudre de lait afin d'arrêter l'importation des produits finis. Ce deuxième outil est suivi de la mise en place d'unités de transformation de lait, et fonctionnant avec une importation massive de la poudre de lait. A partir des années 1990, le programme de réhabilitation de la filière lait, a porté un regard particulier à la filière locale. Cette dernière a bénéficié de soutien à travers deux fonds, à savoir : le Fond National de Développement de l'Investissement Agricole (FNDIA) et le Fond National de Régulation et de Développement Agricole (FNRDA). Ce programme est suivi du Plan National du Développement Agricole (PNDA) en 2001, puis du Renouveau Agricole depuis 2009. Ces derniers ont connu un confort budgétaire important. Le présent article vise à analyser l'impact de la concentration géographique des subventions accordées dans le cadre de la politique du Renouveau Rural en Algérie sur la période 2009-2014 à l'ensemble des 48 wilayas du pays sur la relance de la production et collecte de lait. Il essaye d'examiner les possibles externalités liées à la proximité géographique ou non des Wilayas. Ces externalités peuvent être de plusieurs ordres. La forte concentration de subvention au sein d'une Wilaya peut engendrer, en plus d'un effet positif sur la production et la collecte de lait, peut entraîner une réduction de la production et de la collecte de lait dans les Wilayas voisines (interaction exogène). Les comportements de production et de collecte de lait dans une Wilaya peuvent être similaires ou dissemblables aux comportements de production et de collecte dans les Wilayas voisines (interaction endogène). Il convient de capter également les effets liés à la variabilité temporaire des subventions au sein de chaque Wilaya. Le modèle de donnée de panel spatial emboîté généralisé spécifié ci-dessous permet d'exprimer en plus des effets des interactions exogènes et des interactions endogènes spatialement décalés, les effets liés à l'autocorrélation des erreurs. Le Modèle Spatial Durbin en Panel (SDPM) permet d'identifier en plus des deux effets présentés ci-dessus, les effets liés à la variation du volume de subvention dans le temps au sein des Wilayas. Au terme de cet article, l'impact des subventions sur le développement de la filière laitière en Algérie est déterminé, l'efficacité et d'efficience des aides de l'Etat sont évaluées, les effets de la concentration des subventions sont évalués à l'échelle des différentes Wilayas ainsi que les effets de spillovers sur les Wilayas voisines. Ces résultats vont déboucher sur les recommandations en vue de réorienter la politique de subvention compte tenu de la clustérisation des zones de production et du résultat de la subvention.

# THE ECONOMIC DETERMINANTS OF FOOD SECURITY IN THE MENA REGION

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Non-oil exporting eastern and southern countries in MENA region have been struggled with meeting the increasing food demand derived by primarily population growth, which is double of world average, and per capita income rises as well. Limited natural resource bases (per capita arable land, meadow and pasture land, fresh water resources) accompanied with lack of efficient use and management of the natural endowments make the food security is a particular concern in the region. FAO World Food Summit in 1996 defined food security as the status when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life where it is understood that the concept of food security includes physical and economic access to food as well as people's food preferences. As it is well known, recent food price spike have had severe effects in the region such as triggered so called the Arab Spring/Awaking and also exacerbated macroeconomic problems such as inflation, trade deficits, increasing poverty rate and fiscal pressure. Volatile food prices in international markets combined with degradation and inefficient usage of natural base, and water stress issues have led the food security become the primary concern through the South-Mediterranean region. Previous studies including empirical works had focused on exploring the current situations of food security dimensions in the region, but only a few studies had examined food security status interaction with limited macro/micro economic determinants. This paper aims to analyse the interactions between food security indicators (or overall food insecurity index) and macroeconomic/microeconomic variables such as per capita GDP, per capita arable land, per capita fresh water resources, unemployment ratios, women participation to labour markets, net food trade/GDP, net merchandise trade/GDP, net remittances, educational variables and so on using unbalanced panel data estimation method.

## COOPERATIVE MEMBERS' SATISFACTION: A REVIEW OF METRICS

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Farmer-members derive utility from the organizational and strategic attributes of their cooperative. The extent to which members perceive that their cooperative satisfies their own economic and social goals may reflect their overall utility (i.e., overall satisfaction). Farmer-members' satisfaction is defined as "a positive affective state resulting from the appraisal of all aspects of the farmer's working relationship with the cooperative" (Hansen et al, 2002). The level of members' satisfaction within a cooperative may be positively associated with several member attitudes and perceptions such as the level of commitment, the loyalty and trust that the membership has, the motivation of members to participate in democratic processes, as well as their intention to continue as members of the cooperative. Moreover, members' satisfaction has been increasingly used as a measure of a cooperative's sustainability in economic and social terms. Members' economic goals may include better prices and quality of products, cheaper inputs, and reliable services, among others. Members' social goals may include the (active) participation in cooperatives activities and decision-making boards, the sense of belonging to a group, feelings of fairness and altruism, and attitudes towards social engagement. Several theoretical angles (e.g., agency theory, neoclassical and transaction cost economics, theory of planned behavior) offer explicit and/or implicit notions of how members' satisfaction can be measured. Yet, there is a plethora of objective and subjective metrics that have been used empirically to assess members' satisfaction. In this study, we review all these metrics and we discuss their advantages and disadvantages. Using several criteria, we further classify these metrics into basic and complex. Finally, we attempt to advance our understanding of how a metric may capture all attitudes and perceptions about risk-taking behaviour, loyalty, trust, commitment, and active participation, and how these attitudes and drive cooperative's performance.

# MARKETING PROSPECTS FOR MEDITERRANEAN PRODUCTS IN DOMESTIC MARKETS: THE CASE OF MOROCCAN MAJHOUL DATES

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Rural development in the countries at the southern shores of the Mediterranean Sea requires the creation of sustainable income opportunities for the rural population which is often poor and lives under harsh living conditions. This points to the importance of developing and extending value chains for food commodities being produced in such often remote areas so that increasingly more value added is shifted to these areas. One important aspect of this challenge is the upgrading of marketing options Mediterranean products both in domestic as well as international markets. We focus in this paper on consumer perceptions of domestically produced food commodities in the Moroccan context. In order to boost the above-described goals, the Moroccan government established recently a origin labeling policy strategy. This so-called “Plan Maroc Vert” policy aims at fostering marketing perspectives of various domestically produced food commodities. Dates especially of the brand of Majhoul play a crucial role in the traditional Moroccan diet. Therefore, we analyze in this study preferences and attitudes of Moroccan consumers towards this product by focusing in the extrinsic attributes especially the influence of origin in the consumer choice. To achieve this objective, a survey of 303 consumers was conducted. A factorial and a cluster analysis followed by AHP and cost-benefit analysis were used. Results indicate two consumers types. The first one expects a very high level of product quality including origin labeling and attractive packaging. The second type of consumers is less demanding in product quality and gives less importance to the packing. The AHP and cost-benefit results reveal that label of origin in general and Tafilalet origin in particular are the most important attributes affecting choices and purchasing decisions of Moroccan consumers.

## TRADE EFFECT ON PRODUCER AND CONSUMER PRICE DEVELOPMENT

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The concerns of sustainability and efficiency and in the food sector have brought competition issues in the EU food value chain under scrutiny by antitrust authorities. Concentration of retailers in the food sector has been on the upward trend since the latter part of the last century due to mergers and acquisition at the retail level. Subsequent to that is the persistent speculation over market power exerted by retail firms in the food sectors over other actors. One indicator that has been used to infer market power is market definition and openness to international trade. Thus, depending on how relevant markets are defined both geographically and in terms of commodity baskets, market power could be over or under estimated. The presence of market power has been cited as reason behind the wedge between producer and consumer prices at the food sector. This study examines the trade effects on the wedge between producer and consumer prices. We analyze the extent to which the wedge is explained by trade using a non-traded commodity as counterfactual to a traded one in the EU. We showed that trade has significant effect on the wedge between producer and consumer prices of traded commodities. The results show the importance of trade on market power considerations. It is important for pro-competition authorities to consider trade as a tool for neutralizing market power and ensuring efficiency along the food value chain. Encouraging trade cooperation among EU-Mediterranean countries would not only improve their food sector but also help in elimination of some form of retail power in the food value chain.

## IDENTIFICATION / MAPPING OF THE DISTRIBUTION CHANNELS AND SUPPLY CHAINS OF CRETAN AROMATIC PLANTS

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The Cretan flora consists of a variety of plants with special characteristics that have been recognized since the ancient times. In particular, the Cretan aromatic plants (also called herbs) possess unique flavor and medicinal properties that distinguish them from herbs that grow in other areas of Greece or other parts of the world. These facts explain the strong demand for Cretan herbs in the local, national and international markets. Recently and following EU and OECD Guidelines and Best Practices, the processing and marketing of aromatic plant products is being standardized, certified and marketed under brand names that contain the geographic identification “Crete”. The purpose of this study is to identify the extent, the influence and the share of the market that the “Crete” branding is having on the aromatic plant products, as well as their distribution channels and supply chains, especially for the aromatic plants: *Origanum vulgare* subsp. *hirtum* (Oregano), *Salvia fruticosa* (sage), *Sideritis syriaca* subsp. *syriaca* (malotira) and *Origanum microphyllum* (Cretan marjoram).

# GENERATION Z PERCEPTIONS OF QUALITY CERTIFICATION: A CROSS CULTURAL STUDY

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In recent years due to various food crises, globally, there has been an increasing concern about food quality and food safety. In order to protect consumers' health, governments and non-governmental organizations have developed quality standards based on quality control outcomes. Food and agricultural products having quality certification labels are generally considered as of "better quality" products. Based on this concept, this study explores generation Z consumers perceptions of quality certification. Specifically, this study explores the perceptions of 270 university students studying in three different European Union Countries, on how they perceive quality certification on fruits, assessing 9 statements on a Likert scale. The study was conducted with an online questionnaire. Participants were generation Z university students from Greece (n=87), Romania (n=86), and Czech Republic (n=97). Statistical analysis included descriptive statistics (frequencies, percentages, and means) and One –Way ANOVA, in order to explore how the country of residence impacts on students perceptions of fruit quality certification. Analysis revealed that consumers perceived the fruits with quality certification as having better taste (MS=4.22); are of superior quality (MS=4.20) and are free of pesticides (MS=3.84). The results of the ANOVA analysis indicated that there are significant differences among the three countries'. Moreover, outcomes also indicated that the Greek university students do not trust at all the quality labeling and certifications, since in almost all cases (excluding one case) had the lowest mean scores in comparison with the other two countries. Additionally, post- hoc tests revealed that in almost in all cases all groups were statistically different. The results of the research could be a useful input for fruit production operation and fruit marketing strategy planning and implementation.

## THE EFFECTS OF THE REFORMED CAP TO CEREAL CROPS

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This paper studies the effects of the CAP Reform which introduced the decoupling of subsidies (2003) in the agricultural production, focusing on the cultivation of cereals, in the region of Eastern Macedonia and Thrace. The data for this research was gathered by agronomists, who are the scientists responsible at the stores selling pesticides, fertilizers and other supplies to farmers and not by the farmers. In order to succeed this scientific attempt a qualitative research was conducted, ultimately leading to the generation of a valid questionnaire that was used for the quantitative research, through face-to-face interviews. The valid responses reached a 67% percentage out of the total scientists who are responsible at the Stores selling pesticides and other supplies to farmers in the region. A Factor Analysis led to a Structural Equations Model (SEM) which was considered as the appropriate statistical tool and it was selected for further analysis. Based on the results, the significant impacts as well as the relationship between Cultivation, Production and Marketing of cereals with Local Economy was formed after the effects of the application of the revised CAP, successfully. Out of the three (3) hypotheses recorded, based on the pronouncements of the EU over the announcement of the specific revision, two (2) were accepted, while one (1) was rejected.

# ALBANIAN SMALLHOLDERS PERCEPTIONS OF CLIMATE CHANGE IMPACTS: A "WILLINGNESS TO PAY" ASSESSMENT

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Climate change is becoming a crucial subject for farmers in decision-making. Shifting seasons is influencing in the time of planting and crop harvesting period. In addition, extreme events are occurring more often and are having unpredicted impacts, which are threatening food security. As a result, it is important to invest in farm system in adapting to such changes, but it depends on willingness to pay or to accept the damage from climate change. This paper presents a problematic situation of smallholders in Albania in particular Shkodra region regarding to climate change. For many smallholders the willingness to pay is limited, because of low incomes, poor technology, as well as lack of information and awareness. The purpose of this paper was to analyze the main factors of smallholders in Shkodra, which determine willingness to pay or to accept the damage from climate change. For this research we conducted a questionnaire by interviewing 185 farmers in 14 municipalities in Shkodra region. They were asked if they are willing to pay or to accept the impacts of climate change. The questionnaire was designed to get general information regarding to farm types, gender, education, as well smallholder's perceptions on extreme events risk and impacts on their farm. A number of methods are used, including ML Binary Logit models, and comparative qualitative analysis. The findings show that, climate risk perceptions and climate impacts were some of significant variables in determining willingness to pay. Key words: Climate Change, Willingness to pay, Smallholders

# PHOSPHORUS POLLUTION OF IRISH HIGH STATUS RIVER BODIES: A SCENARIO APPROACH FOR EVALUATION OF MITIGATION OPTIONS

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P run-off from agricultural sources into rivers has a great environmental significance as it contributes to reduction of water quality. The EU Nitrates and Water framework directives mandate that EU rivers maintain a High or Good Status, meaning that P transfer losses have to be kept to a minimum. This highlights the need for effective policies towards the reduction of P transfer from agricultural land. Up to date most related regional policies focus on the adoption of measures to minimize P inputs. However, depending on specific location characteristics certain options for control of P run-off maybe more efficient that (Kronvang et al., 2005). This study focused on phosphorus losses from agriculture, in selected representative river catchments in the Republic of Ireland. The main aim of this research is to evaluate the effectiveness of a range of P-run off mitigation measures, which address multiple management practices promoting P transfer. Information on farm nutrient management was collected across three high-status river catchments, chosen through GIS mapping. The farm surveys identified a range of management practices that promote P transfer and list of mitigation options that could potentially reduce the impact of those practices was developed. Because of differences in characteristics and farm management practices, the effectiveness of measures was evaluated based on three different scenarios corresponding to the case study catchments. Evaluation was performed through the assignment of expert based P run-off reduction coefficient to each option and for each scenario. The Annual Phosphorus Loss Estimator (APLE) Model (Vadas et al., 2007) was used to estimate the potential P run-off before and after adoption of each option. Results indicated differences in effectiveness of measures per scenario, with P inputs reduction having the lowest impact while controlling transport through controlling erosion and maintaining well-constructed drainage systems proved to effective for different scenarios. In conclusion, the scenario approach highlights the usefulness of targeted measures based on the catchments' needs.

# INVESTIGATING THE IMPACTS OF EU CAP REFORM 2014-2020 AND DEVELOPMENTS IN SUSTAINABLE OLIVE FARMING SYSTEMS

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This contribution investigates the adoption of sustainable olive growing in connection with the likely impacts of the recent EU CAP reform 2014-20 on diverse olive farming systems, taking Southern Spain as representative study area. The basic motivation is the need to better understanding the policy measures implemented in the heavily supported olive sector in the EU where 40% to 50% of gross producer receipts derive from policy transfers. It also has to be noted that this support generates controversies in non-EU competing countries, particularly in Southern and Eastern Mediterranean where olive industry barely receives public support payments. Thus the effects of these policy measures on production, farming systems and farm margins are an important issue from policymaking viewpoint and therefore a relevant research question. The analysis uses statistical methods and a Positive Mathematical Programming model calibrated with the neutral procedure. The PMP model compares the situation of the average olive farm in base year with its position in a simulated year using two policy scenarios: 1) all production systems are under CAP green payments, 2) only organic and integrated systems are under CAP green payments. The base year is 2011 which is the most recent year for which all the data needed to define base situation are available. Simulations show that for scenario 1 there is no variation in the area of different farming systems with respect to the base year, nor in the gross-margin-before-aids. Subsidies increase slightly due to the fact that agricultural policy does not consider the reduction for modulation included in the base year. In contrast, in scenario 2 there are increases of integrated and organic farming areas in detriment of the conventional farming. This variation in the distribution of area on the farm is associated with a decrease of total support by approximately 20% as consequence of the 30% loss of decoupled aids in conventional farming (because in scenario 2 it is hypothesized that this system does not benefit from greening aids). The consequence of this fact is a decrease in gross margin plus aids by nearly 10%. It can be concluded that the distribution rules of the green payment established in the new CAP do not incentivise the adoption of integrated and organic farming systems. Moreover, an alternative policy allowing the implementation in the olive sector of a green payment scheme equivalent to the implemented in annual crops, could have further positive effect in terms of redistribution of aids from less (conventional) to more environmentally friendly farming practices (integrated, organic), which contributes to better rewarding the public goods generated through such public aids (better environment and product quality), and boosting in the meantime the legitimacy of the CAP financial aids. This could be a realistic option for future revisions of CAP measures tending to extend totally or partially the greening obligations to permanent crops including olive farming. For future research, further comparative analysis following this approach would be needed by farm size strata as well as in other Mediterranean countries using suitably adapted policy scenarios.

## EXPLORING ALTERNATIVE DISTRIBUTION CHANNELS OF AGRICULTURAL PRODUCTS

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**Introduction (objectives and research questions)** Fresh fruits and vegetables constitute the basis of many people's daily nutrition habits and different distribution systems have been developed to cover daily supply needs. Important components of alternative distribution channels among others are high quality, high standards and consumer-producer trust. Although numerous studies have been conducted on alternative types of distribution channels, there is a lack of research on consumer behaviour towards these ways of distribution. The aim of this study is to identify consumer attitudes and preferences towards alternative agricultural distribution channels regarding fresh fruits and vegetables. In addition, this study contributes to the understanding of consumer behaviour, by pointing out the factors that affect the final purchase of agricultural products. **Methodology** The research took place in Thessaloniki during January to March 2016 using a random sampling approach and collecting 420 valid questionnaires. Descriptive statistics, cross-tabulation and Qualitative-Research (Q-R) hybrid methodology were applied in order to measure consumer behaviour towards alternative distribution channels of agricultural products. The present study illustrates that consumers are interested in alternative distribution channels and the supply of fresh fruits and vegetables. The results of the survey may offer constructive conclusions for policy makers, entrepreneurs, consumers and the academic sector. In particular, the present study concluded, that consumers trust alternative distribution channels for purchases of fresh fruit and vegetables, since they believe that these channels increase employability. The study concludes that there is space for further development and promotion of alternative distribution channels in the agricultural and food sector. **Keywords:** Consumer behavior, alternative distribution channels, sustainability fruits and vegetables

# VALUING ALTERNATIVE DISTRIBUTION CHANNELS: A SYSTEMATIC LITERATURE REVIEW OF THE AGRIFOOD SECTOR

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Introduction (objectives and research questions) Globalization and recent economic trends have created highly complex supply chains and as a result their design, organization, interactions, competencies, capabilities and management have become key issues. Important components of alternative distribution channels among others are high quality, high standards and consumer-producer trust. A key priority of agriculture and rural development is to strengthen both the means of distribution and the processes and functions of the short supply chain. Methodology and potential results In the present paper, an extensive literature review was conducted in the attempt to provide a comprehensive definition as to what constitutes alternative distribution means and channels in general, and alternative agricultural distribution channels, in particular. Although numerous studies have been conducted on alternative types of distribution channels, there is no established definition of the term 'alternative'. Through the description, analysis and comparison of the articles under review it became evident that not only is this a broad field of study but also a general one in that it entails information and parameters that fit an array of cases each with its particular characteristics. The paper comprises of four main sections. More specifically, the first part is the introduction, which presents the study objectives, including a review of the literature, followed by the second section which includes the field of study on alternative agrifood sector distribution channels in relation to relevant research and the methodology. Next is the results and discussion, which examines the study findings, and finally the conclusion, giving some concluding remarks. The reason why agricultural products were focused on is because it is both a timely topic and an area open to further study. Finally, the contribution of the present study is to shed light on the constituents of alternative agricultural distribution channels, whose constructive information can be applied effectively each for their own purpose by producers, entrepreneurs, scientists, policy makers, as well as consumers. Keywords: Systematic literature review, alternative distribution channels, agriculture development.

# GREEK AGRO –FOOD FIRMS DURING ECONOMIC CRISIS: FIRM'S STRATEGIC,MARKETING AND FINANCIAL CHOICES

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Although there is a large literature concerning general company measures taken in an economic crisis, there are very limited works dealing with the effects of economic crisis, on firm performance. It is difficult for firms to recognize and adapt to changes when it is drastic, sudden, and externally forced. Some are forced to close down and others to drop their production capacity because of insufficient consumer demand for their products. At the same time, however, certain firms do sustain competitive advantage even during such major environmental changes. The objective of this study is to draw conclusions about changes over the crisis period in firm performance and especially to compare effects from changes in external financial conditions, using firm specific variables prior and during the crisis. The real impact of 2009 crisis in Greece on firm-level performance is investigated using accounting data for 350 food and beverage manufacturing firms in the period from 2005 until 2012. Within this framework, a review of the literature and a statement of the research questions, followed by the methodology and the findings are evaluated. In order to identify and quantify the factors that explain profitability of firms we formulated a model with market share, capital intensity, liquidity, leverage, along with age, differentiation, and innovation. To test whether significant profitability differences between pre-crisis and during crisis exists in the case of Greek food firms we estimated the same model for pre-crisis group and during crisis separately. According to the results of the analysis, there are significant performance changes over the crisis period.

## EXPLORING THE ANTECEDENTS OF EXPORT COMPETITIVE ADVANTAGE OF GREEK YOGURT

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Although a vast number of studies in the international literature have sought to identify the factors that determine the export performance of firms, less attention has been given to the antecedents of competitive advantage and the firms' capabilities and resources necessary for developing competitive advantage in export markets. This advantage actually replicates how firms pursue their competitive strategy that can be translated at either aiming at lower cost and/or differentiation through creating superior value for the product. The present study utilizes a resource-based view to yogurt firms engaged in exporting activities, aiming to determine their export competitive advantage. Specifically, the study analyzes the firms' export resources, export skills, and export competitive advantages to identify the determinant effect of each factor. A structured questionnaire was mailed to 137 Greek yogurt firms and 104 completed surveys were received, providing an overall response rate of 75.91 percent. The data were analyzed through of a series of multivariate methods, namely exploratory factor analysis, confirmatory factor analysis and structural equation modeling. The results indicate that the availability of financial and organizational resources, along with experience and production process capabilities are key antecedents of competitive advantage leading to success in export markets.

## 2030 CAP AND FOOD SECURITY NEXUS: A FOCUS ON THE EURO-MEDITERRANEAN AREA

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Since its inception, the common agricultural policy (CAP) remains one of the central tenets of the European Union (EU). Over the past 50 years, the *raison d'être* of the CAP has evolved radically, together with its main instruments from compensatory coupled subsidies – based on income losses induced by price support decreases – to decoupled payments – conditioned to European and national statutory requirements. Despite the current social, economic and financial climate, the agreed CAP budget over the period 2014-2020 strengthens the strong public support to European agriculture with approximately 38% of the EU budget (i.e., about 400 billion euros) devoted to the CAP; a policy which will be pivotal in facing several EU and Global challenges in the near future such as the provision of a sustainable system of food production which can efficiently tackle the issues of food and nutrition security. Furthermore, the European neighbourhood policy (ENP) toward Southern Mediterranean countries is moving forward. Establishing a common area of peace, stability, and shared prosperity remains a key objective of European integration. To reach this objective, expanding the common market to the EU neighbourhood countries is a required catalyst. Therefore for policy coherence purpose, it is critical to assess the direct (and indirect) effects of current and possible CAP changes on the South Mediterranean region, where many countries are currently engaged in an ardent process of political and economic reform. While talks on the post-2020 CAP will soon be launched, the last reform of the CAP is still undergoing a progressive implementation. The 2013 reform introduced new instruments (e.g., 30% of the direct payments envelope by Member States have to be related to greening practices such as crop diversification or maintaining permanent pasture; voluntary re-coupling of former decoupled payments; etc.) and provided much more flexibility to Member States in national implementation strategies. The aim of this paper is to use a sophisticated computable general equilibrium (CGE) model to build a comprehensive representation of the CAP up to 2030, and quantify two different options for the post-2020 CAP. The 'Greener CAP' pathway postulates greater emphasis on the provision of sustainable resource management measures through the substitution of traditional market support and direct payments (Pillar 1) in favour of rural development initiatives (Pillar 2). The 'market-orientated CAP' adopts a more liberal view with a drastic cut to the CAP budget. The study incorporates state-of-the-art modelling of the CAP, as well as other key EU policies such as trade, bioenergy or environmental using the MAGNET model. Key findings of the paper are the relatively limited impacts of any CAP changes on both EU and South Mediterranean agricultural output. To a large extent, this is to be expected given the assumption of production neutral behaviour with respect to decoupled payments. However beyond traditional macro-effects, impacts on key food security indicators provide interesting evidence of changes in food prices, calorie intake improvement or self-sufficiency deterioration, advocating for a deeper Euro-Med market integration.

# THE STOCHASTIC EFFECTS OF THE END OF CHINESE CORN STOCKPILING POLICY ON EUROPEAN COUNTRIES

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Since the end of 2015, China has been implementing structural supply-side reforms to sustain a medium-high GDP growth rate in the country. One reform is the reduction of corn inventories. Before the corn stockpiling policy was put in place in 2008, China had been a net exporter of corn. This market intervention policy had been put in place in 2008 as a means of supporting farmers and is similar to the ones for other products (e.g. cotton). The main direct effects of this policy have been higher domestic prices and substantially guaranteed farm sales. Moreover, the Chinese Government justified this policy in terms of self-sufficiency and rural development (i.e. basically slowing down the exodus of rural population to cities). As a direct consequence, higher corn stocks increased domestic prices and sparked the opportunity for cheaper import substitutes to enter the Chinese domestic market, especially from the U.S. or EU. With weak barriers to trade to isolate the domestic market, China became a net importer of corn. While food processors and households would buy corn at (lower) international prices, corn producers would sell their product to (higher) domestic prices to the Government. Indeed, China has been importing not only corn but also other coarse grains, such as barley and sorghum, which are competing grains in feed markets. Corn feed consumption decreased in 2014/2015 in concurrence with a surge in imports of sorghum and wheat. This is due to the absence of a tariff rate quota on these maize feed substitutes. In fact, for other coarse grains net trade has been negative since the beginning of the 1990s. The end of the corn stockpiling policy will take place starting from October 2016. This decision effectively means a large need for adjustment of international markets to large extra quantities of corn from China in the years to come. Uncertainties on the effective impact of this policy reform remain for global agricultural trade. One of the main drivers of uncertainty is the direction of extra corn supplies. This is fundamental because it can either directly affect only the Chinese domestic market or both the domestic and the foreign market. A second big driver of uncertainty is the amount of the extra corn supply. The actual stock numbers are unknown and go between 100 and 300 MMT. Finally, there is uncertainty about the quality of Chinese corn stocks. This would affect both the direction and the amount of corn that can be sold domestically or traded externally for food (industrial or nutritional), feed, or fuel use. In this paper the potential effects of these three drivers of uncertainty on global markets are assessed stochastically by means of the Aglink-Cosimo model ([www.agri-outlook.org](http://www.agri-outlook.org)). We analyse the European (Western and Eastern) trade balances with China to consider whether a drastic reduction of corn stocks would harm European commercial trade flows. It is critical to our analysis the multiplier effect that these drivers have on world agricultural markets.

## TWO PILLARS A UNIQUE STRATEGY? THE CAP 2014-2020 IN THE EU MEMBER STATES

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The recent approval of the latter RDPs in UE28 completes the process of the reformed CAP post 2013. It marks the end of the implementation process under the rural development and follows the choices taken and notified by Member States on the direct payments already in 2014. Member States and regions draw up their strategies benefiting of an increased flexibility in the implementation of the CAP. While for the second pillar the subsidiarity principle is a key element in all the programming stages of the rural development since decades, the flexibility granted to Member States under the first pillar is an unprecedented innovation, by number and relevance of options (Swinnen, 2015; Matthews, 2015). Did Member States and regions elaborate a whole strategy exploiting the complementarities and synergies of the two pillars of the CAP support? Notwithstanding the trend to provide the CAP with a more holistic approach and the last reform itself aims to strengthen the link between the two existing pillars, which should be more targeted, integrated and complementary, there are few analysis in literature taking into account the agricultural policy as a whole. The paper contributes to fill this gap and aims to assess the programming approach adopted by the 28 Member States (MSs). To this end, it combines and analyses the decisions taken by MSs on direct payments and choices settled in the 118 RDPs. The exercise focuses on the main political decisions and financial allocations both under the first pillar components (i.e. financial allocation for voluntary couple support, redistributive payment, decision on regionalization or convergence of entitlements value) and under each of the 6 priorities and 18 focus areas of the second pillar. In this way, combining Member States and regions decisions with a holistic view of the CAP the paper wants to contribute to the current debate on the new programming period 2014-2020 as the paper. Having this in mind, the paper exploits a cluster analysis technique in order to provide a classification of the MSs, on the basis of qualitative and quantitative information of the two pillars. It comes out a highly heterogeneous picture of the Member States choices under the whole CAP. Preliminary results highlights that new Member States seem more oriented to combine the voluntary couple support of the first pillar with the focus areas under the priority 3 “Promoting food chain organization and risk management in agriculture”, while old Member States look more concerned with decoupled direct payments in association with the focus areas of the priority 4 “Restoring, preserving and enhancing ecosystems dependent on agriculture and forestry”. A breakdown of the analysis and the results of the cluster analysis allow to shed light on needs to improving the two pillars complementarity and coherence and/or the necessity to further clarify the scope of action of each pillar minimizing the use of demarcation specifications in next CAP reform.

# THE REDISTRIBUTIVE POLICY OF DIRECT PAYMENTS IN ITALY TOWARDS THE NEXT CAP REFORM

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Through successive reforms, the CAP has increased market orientation for agriculture, while providing income support to producers, integration of environmental requirements and support for rural development. However, the same reform process has raised demands for a better allocation of support. The achievement of a more balanced distribution of direct payments was stressed also in the latter CAP reform post 2013. For this purpose, the Commission proposed to carry out a convergence of direct payments at national (or regional) level towards a uniform value. However, two years of negotiations among Member States and European Institutions brought to the introduction of softer mechanisms of convergence. Indeed, for the implementation of direct payments over the period 2015-2019, Member States had the possibility to choose between three main different options: a full convergence in 2015, with the same unit value per hectare as from 2015 (chosen by 3 Member States); a full convergence in 2019 (chosen by 7 Member States); a partial convergence, with a progressive and limited reduction of unit values over the period (chosen by 11 countries, Italy included). However, the 2019 could be the last year before the transition from historic based model to a flat payment. An even distribution of direct payments among farmers might continue to be a relevant political scenario also for next debates on the future of the CAP post 2020 which will likely take place in a couple years. The objective of this paper is to evaluate the effects of the convergence of direct support distribution at farm and territorial level in Italy, moving across three different architectures of direct payments. The scenarios analysed take into account the Single Payment Scheme, applied since 2014, the partial convergence mechanism for the Basic Payment, as implemented in Italy since 2019, and a possible development of the CAP post 2020, with uniform unit value per hectare. To deal with this objective, the paper proposes a simulation tool (CAP2020-Simulation tool) able to estimate the redistributive effect of the reforms, comparing the changes of allocation at farm level. The tool implements in detail the complex mechanism of internal convergence of direct payments according to current Italian decisions, for the period 2015-2019, and the flat payment as from 2020. The CAP2020-Simulation tool is based on data at farm level from the Integrated Administration and Control System (IACS) and the National Farm Register, gathering information on about 2 millions of farms in the whole Italy. The use of farm level data on the universe of Italian farms, allows to assess the redistributive impact of direct payments by farm types (e.g. size classes) and territorial level (regions, altitude, rural areas). The results allow to assess the effectiveness, in Italy, of the current and the possible future redistributive policy of direct payments, giving relevant indication in view of the next negotiations and political debates for the CAP post 2020.

# THE IMPACT OF SUSTAINABLE ASPECTS IN THE MEAT SECTOR – A CLUSTER ANALYSIS BASED ON CONSUMER ATTITUDES TOWARDS SUSTAINABILITY ASPECTS AND STORE FORMAT CHOICE

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In recent years' the sustainable aspects of food production have gained significantly in importance in the global food market. There are various approaches for the food industry to respond to consumer demand for more sustainable food products. In particular, products labelled as 'organic', 'fair trade', 'carbon footprint' and 'GMO free' are in the consumers' focus as they indicate to fulfil higher sustainable production standards. With regard to the meat sector mainly 'organic', 'animal welfare' and 'local' products offer a sustainable alternative to conventional meat products. Organic labels are already established in the meat market for many years, even if they appeal to a small target group only. While the market for organic foods in general is currently significantly increasing, this trend cannot be seen for organic meat products so far. In contrast, due to the rising consumer claims for higher standards in livestock production, animal welfare labels have gained remarkably in importance recently. In the market these products can be assigned to a segment between conventional and organic meat products. Likewise, 'local' products obtain more and more relevance in the market. Even if they do not fulfil standardized production guidelines, they suggest consumers to be more transparent and reliable. Although, all these three sustainable product categories are still niche products, they offer the various stakeholders in the meat chain a crucial opportunity for differentiation in the market because of increasing consumer demand. In the field of meat marketing various consumer studies have broached the issue of sustainability. However, most of these studies have focused on the impact of only one or two of the sustainable meat categories mentioned above. So far, there is no study analyzing and comparing the significance of the aspects 'organic', 'animal welfare' and 'local' simultaneously. Consequently, the main objective of this study is to close the existing gap in research by carrying out a detailed target group analyze. Therefore, the study analyzes how consumer attitudes towards sustainable aspects of meat production influence their store format choice. Thus, unlike previous studies, the resulting target groups differ furthermore on the store formats 'self-service counter/supermarket', 'service counter/supermarket' and 'service counter/specialist store. For this purpose, an online survey among 667 German consumers was conducted using quantitative empirical methods. The data was analysed by applying bivariate and multivariate analysis methods. After reducing complexity of the data by a factor analysis, two analogous cluster analyses were carried out: one for 'attitudes towards sustainability aspects' and one for 'store format choice'. One way ANOVA was used for comparison of means. Finally, the results of the cluster analyses were combined by using the cross tabulation analysis. By this means, it can be seen which store format is preferred by the different target groups. The study provides important new results for the meat industry as well as for retailers and butchers. These stakeholders can use the findings of this study to develop suitable sustainable meat products and to implement appropriate marketing and positioning strategies for their products.

# THE COMPETITIVENESS OF FRENCH WINE PRODUCERS WITH DECREASING USE OF PESTICIDES

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Wine production and trade is the second-largest export sector in France and therefore the country is one of the world's leading wine producers and exporters. French wine is famous for its excellent quality and serves mostly the high price segment. Beyond the economic importance, viticulture affects the environment. In many vineyards a variety of different herbicides and fungicides are used to achieve high quality grapes. The use of pesticides in producing grapes is widely discussed and peaks in the latest debate about glyphosate. Is it possible in this context to reduce pesticide use without decreasing the competitiveness of French wine on the world market? This research question will be adapted with the Policy Analysis Matrix (PAM). We take into account private and social revenues and costs to compare the competitiveness of grape production in France, in Loire Valley region, with other producing countries. At first sight, our results show that viticulture in Loire Valley is not competitive despite implemented tools to protect the wine production in French wine-regions. Only the regional value creation in producing high quality wine enables the vintners to earn profits.

# WHICH STRATEGIES FOR SUSTAINABLE FISHERIES AND AQUACULTURE? INSIGHTS FROM A PRELIMINARY CONTEXT-SPECIFIC ANALYSIS.

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Fisheries and coastal aquaculture in Tuscany (west-central Italy) are both concerned by the critical conditions affecting the Mediterranean Sea. Since they are strongly interconnected resource systems and economic activities, capture fisheries and aquaculture present evolving and complex dynamics, constrained by several socio-economic, policy and biophysical factors that intervene and alter behavioural dynamics within the production system. There is evidence that commercially important stocks are exploited close to the rate that will deliver Maximum Sustainable Yield, and economic performance of the fleets shows highly variable trends leading to uncertain outcomes. Moreover, overfishing and climate change are modifying the distribution and productivity of marine and freshwater species, and altering food webs. Fishers and fish farmers, as primary producers and economic agents, are also profoundly affected by a worsening of the general economic situation - influencing markets, costs and purchase power and changes in consumption patterns - and by the impact of climate change on aquatic ecosystems, through rising sea levels, acidification, droughts and floods. This paper aims to present some preliminary analysis of the multidimensional causal dynamics of key regional context-specific drivers, market and regulatory conditions, influencing the decision-making process of fishers and fish farmers vis-à-vis several factors that are characterising the structural and dynamic context - from both socioeconomic and ecological perspectives - in which primary producers operate. Derived from industrial organization and agrofood value-chain management approaches - combined with an extended literature review (integrating principles from rural studies, rural sociology and agricultural economics) - a multidisciplinary research process is proposed for analysing factors influencing strategic decision-making and the related outcomes of primary producers of fisheries and aquaculture in a specific geographical area of the Mediterranean Basin. The analysis in this paper is situated in the specific geographical context of coastal fisheries and aquaculture production in Tuscany, in west-central Italy. Sustainability of fisheries and aquaculture is generally jeopardised by a set of factors shaping conditions such as habitat degradation, over-exploitation of resources, biodiversity loss and transformation, changing consumption patterns, complex and restrictive regulatory frameworks, increasing illegal competition, reduced catches, rising costs, inefficiencies in terms of supply chain organisation, seasonal bans, export and spill-over, market concentration and excessive fragmentation of holdings, illegal, unreported and unregulated fishing. Response strategies can be found - among several others - in investing for technological innovation, reduction of catches for targeting high-value species, regulating fishing capacity of fleets, training of operators, reorganising and shortening the supply chain, generation renewal, pluriactivity, multifunctionality and income diversification, transforming and processing products for creating added value, participating in labelling programmes, implementing cooperative programmes and supporting sustainable development. Engaging with stakeholders and experts and accessing qualitative and quantitative information is key to comprehensively analyse how primary producers develop decision-making process when they are exposed - and thus potentially vulnerable - to specific stressors and changing conditions, calling for transformation strategies towards sustainable solutions and performances for fisheries and aquaculture.

## METRICS AND MODELS FOR SUSTAINABLE FOOD SYSTEMS

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Recurrent food crises and global change, along with habitat loss and micronutrient deficiencies, placed food security and environmental sustainability at the top of the political agenda. Analyses of the dynamic interlinkages between food consumption patterns and environmental concerns recently received considerable attention from the international community. Socioeconomic and biophysical changes affect the food system functions including food and nutrition security. The sustainability of food system is at risk. Building sustainable food systems has become a key effort to redirect our food systems and policies towards better-adjusted goals and improved societal welfare. Food systems involve multiple interactions between human and natural components. The systemic nature of these interactions calls for systems approaches and integrated assessment tools. Identifying and modeling the intrinsic properties of the food system can help tracking progress towards sustainability and setting policies towards positive transformations. The general objective of this research is to analyze and explore the sustainability of the food system through identifying a set of metrics at the Mediterranean region level. The specific aims consist of developing a multidimensional framework to evaluate the sustainability of food systems and diets, identifying the main variables to formalize and operationalize the abstract and multidimensional concept of sustainable food systems, and defining metrics for assessing the sustainability of food systems and diets, at a subregional level. Through a broad understanding of sustainability, the methodological approach builds on the theories of vulnerability and resilience. Following the steps of the global change vulnerability assessment a causal factor analysis is presented concerning three Mediterranean countries: Spain, France and Italy. Formulating "what is vulnerable to what" hypotheses, we identified eight causal models of vulnerability. A Delphi survey was then applied to select indicators on the basis of the vulnerability/resilience framework. A conceptual hierarchical framework was identified for modeling the complex relationships between food and nutrition security and sustainability for developing potential indicators of sustainable diets and food systems. A feedback-structured framework of the food system formalized eight selected causal models of vulnerability and resilience and identified intrinsic properties of the food system, shaping the interactions where a set of drivers of change directly affect food and nutrition security outcomes at a subregional level. Each interaction was disentangled in exposure, sensitivity and resilience. This theoretical framework was operationalized through the identification of a set of 136 indicators. The Delphi study revealed low, medium, and high consensus and majority level on indicators in 75% of the interactions out of the 24 initial ones. Experts confirmed with positive feedback the appraisal of the components of the framework. This theoretical modeling exercise and the Delphi survey allowed the identification of a first suite of indicators, moving beyond single and subjective evaluation, and reaching consensus on metrics of sustainable diets and food systems for supporting decision-making. The operationalization of the theories of vulnerability and resilience, through an indicator-based approach, can contribute to further analyses on the socioeconomic and biophysical aspects and interlinkages concerning the sustainability of diets and food systems.

# AN ANALYSIS OF THE PREFERENCES FOR FRUITS FROM THE MEDITERRANEAN AREAS IN SCOTLAND

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The need to improve the quality of the diet of Scottish consumers has increased the interest and efforts to understand determinants of the quality of consumers' diets, particularly in deprived neighbourhoods (e.g., Cummins et al. 2009, Durham and Eales 2010, Weatherspoon et al. 2013), as consumption of a diet rich in fruit and vegetables may help prevent a range of diet-related health problems including cardio vascular diseases, cancer and stroke (Cummins et al. 2009). Although outside of the economic recession and the period of increasing food prices, consumers are still cautious in terms of their expenditures, therefore an important point of study has been to analyse the sensitivity of fruit purchases to prices, particularly with the purpose figuring out the effect that changes prices may have on the purchases of fruits. The purpose of this study is to analyse the demand for fresh fruits in Scotland and in particular considering, where possible, the substitution of fruits from different origin, in order to provide evidence not only about the importance of fruits coming from the Mediterranean region in the Scottish diet but also their contribution to food availability and accessibility, i.e., to the food security of the Scotland. Six fresh fruit categories were studied using time series for the period 2006 to 2014: citrus, apples and pears, bananas, grapes, soft fruits and tropical fruits, together with their origins (e.g., Mediterranean, Rest of UK, Scottish). The series were constructed from a consumer panel that reports weekly purchases by approximately 1,300 households per week and which allowed constructing thirteen periods of four weeks per year each year. Since the information has relatively short frequency (about monthly), the demand for fruits was modelled using a dynamic version of the Almost Ideal Demand System. Short term and long term conditional elasticities (Marshallian, Hicksian and expenditure) were estimated. The results from the long term elasticities indicated the demand for all the categories were sensitive to changes in prices. Grapes and soft fruits were most price elastic fruits. In addition, whilst all the expenditure elasticities were positive, the elasticity of citrus was greater than one, apple and pears, bananas and grapes were approximately one and soft fruit and other fresh fruits were less than one. Furthermore, the results indicate that Mediterranean fruits are a key component of the Scottish consumption of fruits and vegetables and they offset the seasonality observed in the UK.

# PRICE RELATIONS ALONG THE EU FOOD SUPPLY CHAINS: A PANEL COINTEGRATION ANALYSIS

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The present study investigates the price relations as well as the direction of causality between the actors in selected European food supply chains, based on the methods of Panel Cointegration and Panel Vector Error Correction. In this framework, the “cost-push” and “demand-pull” theories are considered together with Granger causality tests, to further confirm the direction of causality. The panel data used comprise monthly price observations between January 2005 and September 2012 in nineteen European Member States. The empirical findings indicate the existence of a long-run equilibrium relationship between producer price (PP), agricultural commodity price (ACP) and consumer price (CP). Furthermore, “demand-pull” factors are found to be of greater impact on the supply chains than “cost-push” factors. Regarding the short-run dynamics, panel VECM results reveal positive and statistically significant interaction between ACP and PP as well as positive and statistically significant impact of both PP and ACP on CP. Concerning the long-run dynamics, PP, ACP and CP respond to deviations from the long-run equilibrium, even though the respective speed of adjustment is found to be relatively slow, in all cases. Bidirectional causality is shown between PP, ACP and CP both in the short- and in the long-run, thus supporting the feedback hypothesis of interdependency between the variable prices. Finally, the panel multivariate impulse response functions highlight that fluctuations around the long-run equilibrium decay within twelve months from the initial shock in every variable price, with the most intense of them being observed in the ACP.

# ASSESSING THE VALUE OF PRODUCT ATTRIBUTES IN THE EVOO HIGH QUALITY MARKET SEGMENT

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Differences among olive oils have been traditionally conceived and perceived by consumers as forming vertical differentiation. Recently the product is becoming more complex with a number of quality features that starts playing a major role in competition (Cacchiarelli et al. 2016; Delgado and Guinard, 2011). Most of them are experience or credence attributes. Sensorial characteristics are often evaluated by experts in different ways such as journals, olive oil guidebooks, testing events and prizes. In these occasions also other features related to the product, the place the producer etc. are released. The paper seeks at assessing the role and effectiveness of different quality clues in the creation of value in high segment of the Italian olive oil market. We estimate a hedonic price model where the price is explained with different quality clues (Rosen, 1974; Thrane, 2004):  $\text{Log } P = \alpha_0 + \alpha_1 \text{Pro} + \alpha_2 \text{Ar} + \alpha_3 \text{M}$  where P is the price and the different quality clues are grouped in three categories: i) Pro groups the variables that denote the nature of the production process and the intrinsic characteristics of the product; ii) Ar includes the production area and the certification of origin, if any; iii) M denotes quality assessments such as the Eco-sustainability Award, Farm ranking given by the experts plus bottle size. The analysis covers olive oils from all Italian Regions. Data comes from one of the major Italian olive oil guides: FLOS OLEI. Ramsey RESET test indicates that the log-linear specification performs better than other functional forms. Log-linear specification presents two advantages with respect to other ones: it allows obtaining residuals that are approximately normally distributed as required by selected regressions; the interpretation of regression coefficients is more immediate: the dependent variable changes by  $100 \times (\text{coef} - 1)$  percent for a one-unit increase of one of the regressors, holding all other variables fixed. Since in this study data covers olive oils produced in three years (2011-1; 2012-13 and 2013-14, a panel data analysis was also conducted (Hsiao, 2007). Preliminary results indicate that: i) the area of origin worth a price premium. With olive oils from northern and central regions that worth more; ii) the Geographical Indications do not show significant impact on price; iii) organic EVOOs are associated with a negative price premium; iv) Local varieties are associated with a negative price premium while mono-varietal olive oils gain higher prices; v) the intense flavor of olive oil is associated to higher price premium compared to the medium and the light ones; vi) the bottle size is inversely related with olive oil price indicating that it represents a relevant marketing strategy for producers. vii) a positive price premium is associated to the farm ranking given by the experts.

# A VISION AND A FRAMEWORK OF GOVERNANCE FOR SUSTAINABILITY: ASSURING FOOD SECURITY WITHIN NATURAL SYSTEMS

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Global food production capacity for a growing population is considered as a challenge. However, the current production exceeds current needs, and food insecurity is a combination of poverty, inequality and other socioeconomic and political factors. The FAO defines food security as physical, social and economic access to sufficient, safe and nutritious food for meeting dietary needs and food preferences for an active and healthy life of all people, at all times. This includes food distribution and stability of supply. For Malthus, the poor are responsible for overpopulation and thereby for the deprivation of other people, and famines are 'natural defences': this pessimism, even while demonstrated as faulty, has been used to justify the use of GMOs. Even if Malthus was right, limiting overpopulation requires reducing poverty and assuring human rights, as the high birth rate in developing countries is a consequence of social insecurity for households. The notion of "food desert" describes low-income locations with limited access to healthy, safe and nutritious food. Famines occurred not because of lack of food but of political will to distribute it to starving people. Food distribution, rather than higher total food production, is the problem. The FAO considers food justice as a human right, and food sovereignty as the right to decide on food and agriculture policies, protect and regulate domestic production and trade, and build independence from foreign imports. However, current liberistic food system governance has put 70% of the world's food under the control of just ten producers. As capital concentration increases profits, it may continue, eventually leading to the worrying scenario of a sole food system lord. The 70s' Green Revolution and the recent GMOs have increased global yields but also food insecurity and per-capita hunger, as importing cheap, subsidised food or patented seeds into food-insecure countries undermines the independence of subsistence agriculture farmers, often obliged to move into urban slums. 900 million people suffer from hunger—80% of which are food producers—women workers' rights are denied and land grabbing spreads. Simultaneously, 1.4 billion are obese owing to extensive consumption of high-calorie foods, easier to access than healthy high nutritional food. Additionally, monocrops increase vulnerability to pests and disease, requiring more chemical fertilizers and pesticides. Pope Francis denounced pesticides and GMOs not to be the solution for hunger, as human intervention creates a vicious circle, destroying the complex web of biodiverse ecosystems and local development. For Saint Francis, contesting Aristotelians that considered resources and nature to serve humankind, nature and all creatures have value and meaning in-themselves. This ancient philosophy of creation diversity and human-nonhuman dependence remains central in modern ecological and environmental thought. The paper argues that central to food security and sustainable production are issues of governance. It considers governance for sustainability as a multidisciplinary and participatory social learning process about human-nature interrelations, aiming at accountable and transparent decision-making. The paper presents a decision-support framework—'GAME' (Governance Assessment Matrix Exercise)—to identify context-based practices and general sustainability criteria.

# EXPLORING WATER-FOOD SECURITY NEXUS IN MIDDLE EAST AND NORTH AFRICA REGION: A MULTIDIMENSIONAL ASSESSMENT

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The complex and multifaceted relationships between water resources and food security are at the core of the challenge of a sustainable development in Middle East and North Africa (MENA) countries. To incorporate the operational implications of this nexus into effective response strategies integrated indicators can be useful though still limited. Indicators and indices can help to explicitly identify the nexus in decision making by understanding the trade-offs between the different resource allocation strategies. Therefore, we explore the informative potentialities of an integrated analysis of Water and Food Security Indexes. We propose to link a multidimensional evaluation of water resources that takes into consideration socio-economic, managerial, institutional and political factors to food security. The five components of the Water Poverty index (WPI) - Resources, Access, Use, Capacity and Environment – and the three components of the Global Food Security Index (GFSI) - Availability, Affordability and Food quality and safety - have been analysed and correlated. The ultimate goal of this paper is to provide a robust as well as an easy-to-use analytical tool to understand the role of water in achieving food security. In the first part, the paper provides an overview on water resources and food security in MENA region and critically looks at the existing water and food security indexes by assessing their ability to grasp the Water-Food nexus. Potential application and main shortcomings of the two selected indexes are considered. In the second part, an analysis of WPI and GFSI across MENA region is provided and a regression analysis was performed considering 15 MENA countries for which both data on WPI and GFSI are available namely Algeria, Egypt, Ethiopia, Israel, Jordan, Kuwait, Morocco, Pakistan, Saudi Arabia, Sudan, Syria, Tunisia, Turkey, United Arab Emirates (UAE) and Yemen. Results indicate a positive correlation between WPI and GFSI. However, correlation is higher when considering only Capacity and Access components of the WPI indicating that socio-economic development indicators and conditions of access to resource affect food security more than availability of water resources. The correlation between WPI with the different dimensions of the GFSI shows a higher correlation with food availability, which might be explained by the fact that water security has a lower effect on food affordability and food quality/safety components of GFSI with respect to food availability one. Integrating water security metrics into food security indices could be a useful step to operationalize water-food nexus and to design effective actions and strategies to achieve food security in the MENA region.

# SUPPLY CHAIN ORGANIZATION EFFECTS ON WINE QUALITY AND PRODUCER REPUTATION

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We analyze how differences in the organization of the grape supply chain affect individual wine quality and the reputation for quality of different types of wineries. We distinguish cooperative wineries that receive their entire grape supply from small grape growers, larger private wineries that buy in grapes from grape growers and smaller private wineries that only use own grown grapes. Differences in the grape supply chain are also observed due to organic production and specific quality denomination rules (e.g. DOC, IGT). Compared to private wineries who exclusively use their own grapes, cooperatives and larger private wineries buying in grapes face the challenge to raise wine quality through appropriate incentives that induce individual growers to supply high quality grapes (e.g. quality management schemes in the vineyard and/or grape prices rewarding for quality). Wine regions differ with respect to their climatic potential to grow wine and their rules of quality denomination. Incentive schemes to induce individual growers to supply high quality grapes, existing quality denomination rules and organic grape production will determine the organization of the supply chain and in turn wine quality, prices and the quality reputation of wineries with consumers. We analyze a data set for wineries from the Italian wine region South Tyrol (Alto Adige). The data allows to differentiate local cooperatives and (larger/smaller) private wineries that buy in grapes or not. We have information on retail prices and quality evaluations for wine as well as indicators of wine quality reputation, regional denomination rules and on how the supply chain is organized for different types of wineries. We employ a hedonic pricing model in order to test the following questions: Do cooperative wineries suffer a reputation and wine quality discount relative to wines from private producers that also buy in grapes? Do private wineries that buy in grapes suffer a significant reputation and wine quality discount relative to private wineries that only use own grown grapes? Do organic wines have to suffer a discount for wine quality as shown by other authors and is IGT wine really of lower quality as the denomination rule would suggest? Our results are mixed, but we can reject the hypothesis that cooperatives suffer a significant reputation and wine quality discount relative to wines from private producers that also buy in grapes. However, private wineries that buy in grapes do not suffer a significant reputation and wine quality discount relative to private wineries growing their own grapes. We analyze the effects of supply chain organization on wine quality and the quality reputation for different types of wineries. When cooperatives are able to implement incentive schemes to raise grape quality as it is typically done in South Tyrol, they may also gain a significant price premium for wine quality and cooperative reputation. Distinguishing private wineries that buy in grapes from grape growers and those that only use own grown grapes, highlights the significance of our result.

# ASSESSING THE ECONOMIC ROLE OF IRRIGATION AND THE PRODUCTIVITY OF IRRIGATION WATER IN MEDITERRANEAN COUNTRIES: THE CASE OF ITALY

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In Mediterranean countries water remains a major productive factor because summer precipitations are very limited. Increasing scarcity, droughts and attention to avoid environmental degradation, have forced governments to limit water availability for irrigation purposes and to increase water cost paid by farmers. This calls for a more efficient use of water resources but also a comprehensive understanding and accurate assessment of water Productivity in the sector. Unfortunately, assessment of how much irrigation water contribute to the farm output and of water productivity are often lacking especially at large geographical scale level (e.g. regional or national). This seems an important shortcoming because any attempt to reduce water use could have not negligible consequences on the competitiveness of the farm and agri-business sectors, trade flows as well as food security in Mediterranean countries. This paper presents a national-wide assessment of the relative economic importance of irrigated crops. Furthermore, combining the estimated figures regarding the value of the revenues obtained by irrigated crops with the estimates of the amount of irrigation water, the paper assesses the gross average productivity of irrigation water at national level as well as in 4 macro-regions. Finally, the paper explores some factors that can explain the obtained water productivity levels by decomposing water productivity indexes in terms of land productivity and volumes of irrigation. According to our estimates, irrigated crops provide around 2/3 of the value of the overall crop sector even if the relative importance of irrigation strongly differs among crop groups and macro-regions. The economic importance of irrigated crops is clearly due to the fact that revenues obtained by one hectare of irrigated land strongly exceeds that of one hectare of not-irrigated land. This is particularly the case of South and Islands of Italy where not-irrigated land generate revenues that are around 5% of that of irrigated land. According to our estimates, average national water productivity 1.27 Euro/m<sup>3</sup>. However, water productivity is way lower in the North-west of Italy than in all other macro-regions. In particular, water productivity is 3.19 Euro/m<sup>3</sup> in the South. This latter figure is due to the fact that very low unitary volumes of irrigation water and very high level of revenues per hectare. Exactly the opposite situation occurs in the North-west of Italy. Such results could be used to design national-wide policies and regulatory interventions. Obtained results suggests that any reduction of irrigation practices could generate a potentially high reduction of the revenues derived by the crop sector in Italy. Irrigation water productivity is not very low on average but the situation of the macro-regions strongly differ. In particular, in some areas of Italy it seems possible to pursue a reduction of the amount of water used in each hectare of land, while in other it seems more difficult to do so without generating relevant reductions in crop output value. Finally limitations of the analysis and directions for future research are also discussed.

# TRADE LIBERALIZATION AND FOOD SECURITY: A COMPUTABLE GENERAL EQUILIBRIUM ANALYSIS OF NON-TARIFF BARRIERS BETWEEN EUROPEAN UNION AND SOTHERN AND EASTER MEDITERRANEAN COUNTRIES

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The paper analyzes the effect of trade liberalization between the European Union (EU) and Southern and Eastern Mediterranean Countries (SEMCs). The EU absorbs the second largest share of exports from SEMC countries, 33% in 2013. The agricultural markets where the SEMCs have a comparative advantage are fruit and vegetables. Tomatoes, oranges, mandarins, and other products represent 44% of the SMECs exports. However, the main obstacles to export to the EU countries are non-tariff barriers (NTBs). In addition, the SEMC countries are net food importers. Due to population and income growth in these countries, the demand for food increased drastically during the last decade. The largest share of imports is still coming from the EU (29% in 2013) providing the main source of food energy such as cereals and tubers. Finally, political instability and limited resources have deteriorated the already unstable food security situtaion in the region (in the 2010-2013 period, Egypt and Libya have the largest percentage of undernourished children; in 2015 over 67% of the Syrian population is in need of some humanitarian assistance). Consequently, this paper uses a global computable general equilibrium framework to analyze the nexus between trade liberalization, namely relaxing of NTBs between the EU and SEMCs, and, food security. A flexible approach to measuring the food security impact is developed that focuses on capturing the potential mutual food security benefits. The approach is developed with a mind to handle cases of diverse trading partners, with very different problems related to food production and consumption such as undernourishment in food stressed regions compared to obesity in food abundant regions.

# CONSUMER PREFERENCES FOR WINE ATTRIBUTES IN ITALY: THE CASE OF SUSTAINABLE LABELLING

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In the recent years, there has been a growing interest in sustainable food production and consumption. Also in the wine sector, sustainability has become a key issue in the global wine business. In 2011 the Italian Ministry of the Environment, Land and Sea developed a sustainable winegrowing and winemaking programme called V.I.V.A. Sustainable Wine, which established a common methodology for environmental, social and economic sustainability assessment using four indicators (Air, Water, Vineyard and Territory). In summary, the objectives of this research are to determine the relative importance placed by consumers on specific key attributes (origin, region of production, sustainable logo) associated with wine; and estimate the consumer's willingness-to-pay for such attributes. Choice-Based Conjoint (CBC) analysis, in which consumers are asked to select a product from a given set of alternatives (choice set), simulating as much as possible the actual purchasing process, was carried out and 245 completed and valid responses were gathered to represent the Italian wine drinking population. The collected preference information is used as a basis to estimate for each level the part-worth utilities. Each part-worth coefficient expresses the contribution of a particular level of an attribute to the total utility of a product when that level is present. The relative importance of an attribute can be defined as the weight that the consumer places on each attribute when selecting a product during the buying process. Table 1 Importance of each attribute and utilities of their levels

No.	Attribute levels	Average importance	Utilities
1	Price (per bottle) Till 3,00€	47.2	-0.34
	From 3,10 to 5,00€	0.43	
	From 5,10 to 7,00€	0.31	
	More than 7,00€	-0.40	
2	Geographical Indication Denomination of origin	22.8	0.44
	absence	-0.44	
3	Origin of production Produced in your region	13.8	0.20
	Not produced in your region	-0.20	
4	Sustainable label Sustainable wine logo	16.2	0.29
	absence	-0.29	

The purpose is to use information gained from this study to give useful feedback for future sustainable labelling policy and to guide marketing strategies in the wine industry. These findings provide a basis for the actors involved in the promotion of ethical behavior and enables researchers to further investigate aspects of the ethics of consumer choice.

# ASSESSING ECONOMIC AND AGRICULTURAL ASPECTS OF FOOD SECURITY: TRENDS AND PROSPECTS IN THE EURO-MEDITERRANEAN REGION

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The measurement of the state of food security is essential for the design, monitoring and evaluation of related policy. However, this is a challenging task due to the multidimensional nature of the concept, encompassing four major dimensions: availability, access, utilization and stability (FAO, 1996). Moreover, specific criticalities relate to the scope and aim of the study and the subsequent information needs. From this point of view, we distinguish a “household” approach, from a “macro” approach. To date, the concept of food security has been used extensively at the household level. However, these studies are based on direct surveys and their results cannot be extended to a wider national context and can be hardly used in cross-country comparisons. As far as the “macro” approach (i.e. at country level) is concerned, there is a smaller number of contributions and their main limitations relate to the lack of consolidated and reliable data and the difficulties to include all the relevant information in a synthetic assessment. This study aims at proposing and implementing a conceptual and operational method for the assessment of food security conditions under a “macro” approach. We chose to focus on economic aspects of food security, highlighting the role played by economic growth as well as agri-food system development. A specific attention is devoted to countries in the Mediterranean Basin, as the whole region is facing complex economic and social changes. Actually, North and South Mediterranean Countries present many common features, but also significant disparities in either food demand, food supply and domestic policies. As a first step, a qualitative evaluation of the existing food security data and indicators (mostly from FAO and World Bank) is conducted. To do that, the so-called “SMART” criterion is adopted (i.e. each indicator has to be Specific, Measurable, Achievable, Relevant and Time-bound). As a result, a reference set of about 40 indicators is identified and calculated. The dataset obtained includes data for more than 90 countries worldwide, over a 25-year time frame. Then, as a second step of the study, we run a Principal Component Analysis in order to reduce the number of variables to be considered and to differentiate each country and region accordingly. This allows for comparative analyses among various countries and regions worldwide and to monitor the evolution of their food security conditions in the medium- and long-term. As far as the Euro-Mediterranean region is concerned, the results show moderate and gradually improving food security conditions. However, critical issues emerge from a closer examination of food security dimensions as well as country-specific issues. The main factors inducing vulnerability to food (in)security include food import dependency, lack of infrastructure and investments in the agricultural sector, climate conditions and political stability. Hence, we suggest that in order to improve these critical aspects there is need for domestic and international policy targeted at enhancing agricultural productivity and market efficiency, differentiating agricultural production, improving trade relationships and market integration in the region.

## FOOD SECURITY AND FOOD REGIMES.

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Nowadays, Food Security continues to be a huge problem. According to the latest FAO report, there are 795 million undernourished people in the world (FAO, 2015). This paper tries to analyse the problem of Food Security from the point of view of Food Regime analysis. Studies of Food Regime, initiated by McMichael and Friedman, emerge as a method of analysis of the role of agriculture and food in the configuration of the global capitalist economy. It has set up the existence of three agri-food regimes: the First Food Regime which would cover from 1870 to the Second World War, the Second one configured from World War II and ending with the crisis of the 70s, and the Third Food Regime that is currently in force. The methodology of the Food Regime is well suited to analyze the issue of Food Security. The Food Regime puts food in the processes of development of global capitalism and connects agricultural production with food consumption patterns. This integrated vision, enables us to understand the processes and economic and political structures that lead to hunger and inadequate food consumption. This analysis reveals that the conceptualization of food security, the causes of food insecurity and the coping strategies (including policies) have been changing over the different Food Regimes. The article concludes that the Third Food Regime is facing increasing difficulties to solve the problem of Food Security in the world.

# ROLE OF BUFFALO PRODUCTION IN SUSTAINABLE DEVELOPMENT OF RURAL REGIONS

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The objective is to estimate an econometric model for the feed response of using a ration composed of treated rice straw silage with the common concentrate feed mix for feedlot system of male buffalo feeder calves to reach the optimum marketing weight, which maximizes the gross margin above the least cost ration. Rice is cash exportable crop and a main source of income to the Egyptian farmers. The farmers used to burn the rice straw at the farm borders, even though it is forbidden, which causes socio-economic negative externalities from about 0.75 million ha of rice, due to the probability of premature-mortality and morbidity of rural and urban individuals. The estimated feed-response model showed that providing 40% of the starch equivalent (S.E.) of the daily ration as chopped rice straw-silage mixed with dissolved urea and molasses, at 2% and 3% of straw weight, respectively, would raise the marketing weight that maximizes the gross margin above the feed costs, from 384 to 518 Kg live weight. Such policy would provide additional 80,000 tons lean meat from fed buffalo calves, rather than slaughtering them as rearing veal calves. The estimated income generated from one buffalo fed calf reached 50% of the average annual per capita income in Egypt, providing feasible employment opportunities and prevents the probable negative externalities from burning rice straw. Accordingly, an extension program on making enriched rice straw silage is recommended for rice farmers in Egypt

# WILLINGNESS TO PAY FOR MALARIA PROPHYLAXIS IN ETHIOPIA

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Malaria is seen as one of the diseases that has prevented the African continent from achieving its main goal of food availability, security and sustainable development. One major problem policy makers seem to face all the time is the precise amount the households are willing to pay for a particular prophylactic measure. The epidemiology of the disease on the continent has made this measure difficult and adopting a stated preference approach has not been very helpful. Also, the link between malaria incidence and agricultural productivity has not been fully explored in the literature. Thus, the aims of these research are; to measure how much malaria impacts on farmers technical efficiency and the application of these values to present a reliable measure of the farmers' Willingness-To-Pay for malaria abatement in Ethiopia. We use data set from Ethiopia with the respective spatial malaria prevalence data set from the Malaria Atlas Project. We apply this data set to the envelope theorem to arrive at a reliable estimate of the Willingness-To-Pay and a measure of how much malaria affects farmers' technical efficiency. The merger of the household data set with the spatial malaria data set, and, the innovative use of the envelope theorem is one of the major high points of this research. We apply the Bayesian Econometrics to our empirical framework. The results shows that in Ethiopia, malaria affects efficiency and has the a priori sign. The result further states that for a 100 unit increase in malaria the household is willing to pay, on the average, US\$ 0.12 to purchase prophylactic measures. Policy makers can use these values to introduce minimum prices and gradual repayment schemes for prophylactic measures.

# FACTORS AFFECTING CONSUMERS' BUYING BEHAVIOUR UNDER ECONOMIC CRISIS

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The current global economic and financial crisis, which began at the end of 2007 in the U.S., poses a major threat to health. Recent research argued that consumers change dramatically their purchasing behaviour in times of economic crisis. Yet, limited, if any, marketing and consumer behaviour research has been devoted to the examination of consumers purchasing in turbulent economic times. Recognizing this need, the factors influencing consumers' purchasing behaviour for food in times of crisis were studied. As the global financial crisis deepens and the purchasing power of people diminishes, due to reduced incomes and higher unemployment, hunger is likely to increase. While economies are contract, incomes are falling and people laid off, families are cutting back, purchasing only the absolutely necessary goods and even could stop eating crucial nourishing food. Thus, substantial changes can be noticed on purchasing behavior of families, leading to changes in the quantity and type of food which is consumed. Consumer behavior in the crisis is characterized by consumption smoothing at various levels. People are not so willing to pay more for products that can substitute with cheaper ones. Using this unique decision context, the objective of this paper is to identify and examine empirically the factors influencing consumers purchasing behavior towards food. To address the research objective, a mix of qualitative and quantitative techniques was used. With data from two focus group sessions and a quantitative data gathering instrument (intercept survey that conducted in a random selected sample consisted of 553 consumers, between January 2016 and April 2016 at the region of Thessaloniki, Greece), the factors influencing consumer purchasing behaviour were explored. Further, Principal components analysis (PCA) was conducted in order to identify the factors that affect consumers' buying behaviour. The factors that influence people to purchase food are: (a) Product's Feature and Natural contents, (b) Economic issues, (c) Identity & Sensory Appeal, (d) Mood, (e) Weight Control & Health and (f) Convenience. Moreover, cluster analysis was employed to classify consumers with similar buying behaviour, identifying them to five groups (a) neutrals, (b) those who are influenced by psychological issues, (c) those who are influenced by economic issues, (d) low diet/healthy eaters and (e) those who are influenced by availability and easy access. Discriminant analysis was applied to assess how the identified factors derived from Principal Component Analysis could predict cluster membership. Non parametric tests (Friedman one way ANOVA and chi-square analysis) were conducted to profile each group of consumers regarding their buying behaviour, their demographic characteristics and other factors affecting their eating behaviour. Results strongly support the hypotheses that under the current economic crisis, most of the factors are almost the same with those that affect consumers' food purchases before the economic crisis. The big exceptions are that consumers want to purchase food that have clearly marked the country of origin, they look the prices of food and want it to be in offer and they do not pay any attention to the quality of food. Keywords: Consumer behaviour, Economic crisis, Food Purchasing attitudes.

# HOW WELL DO CONSUMERS UNDERSTAND FOOD WASTE LABELLING? A COMPARISON BETWEEN MEDITERRANEAN AND NON-MEDITERRANEAN EUROPE

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Currently 89 million tonnes of food (i.e. 179 kg per capita) per annum are wasted in the EU & this is projected to increase by 40% by 2020 if no action is taken. This research analyses the impact that the level of understanding of date marking has on the food waste behaviour of consumers in the European Union focusing on a comparison between Mediterranean and non-Mediterranean countries. The data used in this study were extracted from the Dataset Flash Eurobarometer 425: Food waste and date marking (European Commission, 2015). The Eurobarometer survey was carried out by TNS Opinion & Social through face-to-face interviews of citizens in the 28 Member States of the European Union, with an average sample size of 950 observations. The variables included in the analysis are: – socio-demographic variables (gender, age, education, occupation, place of living - rural or urban, number of people aged 15 or more in the household); – perceptions regarding the role consumers play in preventing food waste; perceptions regarding ways to waste less food at home (better and clearer information on the meaning of "best before" and "use by" dates indicated on food labels; better and clearer information on food product labels e.g. information on food storage and preparation; better shopping and meal planning by household; availability of smaller portion sizes in shops; using up leftovers instead of throwing them away; using the freezer to preserve food longer); – frequency of checking the "use by" or "best before" dates on food labels when shopping and preparing meals; – knowledge about the meaning of "best before" and "use by" labels on food products; – perceptions about the usefulness of "best before" dates on non-perishable foods, such as rice, pasta, coffee or tea; – food waste behaviour, i.e. use of senses instead of labels to decide whether to eat or throw away food (e.g. non-perishable foods from own kitchen cupboard with no "best before" date indicated on the label which were not bought recently, or food products which must be used within a certain number of days after opening). We use structural equation models to estimate the influence of these determinants on stated food waste behaviour in each of the 28 countries. SEM is a statistical technique used to test and estimate causal relationships amongst variables. We estimate the model using the Diagonally Weighted Least Squares (DWLS) method and the statistical package Lisrel 8.80 (Jöreskog and Sörbom 2007). The results suggest that food marking understanding has a significant effect on food waste behaviour. The research discusses the differences in effect magnitude between Mediterranean and non-Mediterranean countries in the context of food waste policies and public information campaigns in these countries. References European Commission, 2015. Flash Eurobarometer 425: Food waste and date marking. European Commission, September 2015. Jöreskog, K. G., & Sörbom, D. 2007. LISREL8.80: structural equation modeling with the SIMPLIS command language. Chicago, USA: IL Scientific Software International.

# CLUSTERS AS TOOLS OF SUSTAINABLE TERRITORIAL DEVELOPMENT : LACTIMED EXPERIENCE IN DAIRY VALUE CHAIN IN THE MEDITERRANEAN

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Great majority of countries in the world are currently building capacity to manufacture and produce the exportable goods, responding to an expanding market demand. Thus, national policies support export-oriented and standardised products as well as intensified agricultural production patterns aiming national food security. Yet, several studies claim that the institutional capacity of many of the countries for protecting sustainability is rather weak as they tend to prioritize the economic growth at national level, despite often limited local economic benefits. This situation is particularly observable in the Mediterranean region, threatening the shared and advocated vision of inclusive development. Typical local products, important key factors of sustainability and forming the essence of the cultural heritage in many countries, are thus confined to particular territories and stay at the hands of small landholders and SMEs that are threaten by the globalization process, agricultural intensification and industrial standardisation. This evolution intensifies competition and pulls the prices down, weakening small farmers and processors. The industrialization of production also leads to standardisation of tastes and to the predominance of marketing arguments rather than organoleptic characteristics in the development of products, to the detriment of unprocessed food products. One of the key solutions to this dilemma seems to be clustering activities that can give an impetus to local stakeholders to build capacity. As discussed by Michael Porter, clusters, which are “geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions in a particular field that compete but also cooperate” can be real levers for sustainable territorial development. They foster collective actions amid the stakeholders of local value chains and help to install participatory and vertically and horizontally effective governance structures in a bottom-up approach. Such organizational allows supporting a production quite more in line with the principles of sustainable development as it contributes to maintain ethno cultural shepherd groups linked to cultural heritage and traditions, to encourage the semi-extensive livestock breeding practices and to catch a greater added value of the milk and processed dairy products at local level.

# FACTORS LIMITING THE CONSUMPTION OF ORGANIC EXTRA VIRGIN OLIVE OIL IN SPAIN

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Spain is the European country with the largest area of organic farming, however shows very low levels of consumption, which makes most of the production is oriented to foreign markets. This strategy is not sustainable in the long term for several reasons: first, by the desire of local products in target markets; secondly, by questioning the "degree of organic" of a product which has been transported hundreds or thousands of kilometers, and, thirdly, by the decline in confidence of producers because of the difficulties in marketing their products in local markets. Therefore, increasing consumption of organic food in Spain, has become a priority for the Spanish government and, producer associations. In the context described above, and focusing on organic extra virgin olive oil, this paper identifies and analyzes the reasons that limit higher consumption of this food in Spain. To do this, first, a thorough review of the literature on the factors that hinder the development of demand for organic food in general, and organic extra virgin olive oil, in particular, was conducted. Secondly, the influence of these factors was tested from the results of a survey conducted to 800 people in Madrid, Seville, Barcelona, Oviedo, Salamanca and Valencia. The results, from the descriptive analysis, suggest that the good quality image of non-organic extra virgin olive oil, along with the overpricing of organic extra virgin olive oil and the difficulty of finding it in establishments where people regularly purchase, are the three most limiting factors to consume organic extra virgin olive oil in Spain, by nonusers of organic extra virgin olive oil. In this sense, the first factor mentioned is not a cause which has been mentioned in the literature to explain the low consumption of organic food in general, so we can assert that it is a factor associated with the olive oils market exclusively.

## CONSUMER WILLINGNESS TO PAY FOR IMPROVED ANIMAL WELFARE: THE CASE OF FRESH PORK MEAT IN ITALY

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In the EU, pig animal welfare is one of the areas of concern most closely monitored and regulated. Pig welfare regulation has evolved resulting also into a European Declaration promoting the end of (painful) surgical castration of piglets since January 1st 2018. Breeding practices currently complying with the EU regulation include raising full boars (with a high likelihood of the meat developing boar taint), physical castration with anaesthesia/analgesia or immunocastration. In case the European Declaration became legally binding or highly relevant for the consumer, the industry would be able to rely on raising full boars and/or immunocastration, only. Because immunocastration requires performing two/three injections of a vaccine, this innovative practice may be rejected by the final consumer because of perceived human health consequences or other concerns. In turn, this translates into immunocastrated pork meat/products commanding higher/lower prices and selling more or less, than their counterparts obtained via (painful) physical castration, according to consumer Willingness to Pay (WTP) for these innovative characteristics. The paper develops consumer behaviour research on the preferences of a random sample of 1,000 Italian pork meat consumers - representative of the national distribution of the gender, age classes and regional location of Italian consumers - for animal welfare enhancing practices in pig breeding. Ultimately, the average WTP for an improved animal welfare certification is computed, estimating a Random Parameter Logit (RPL) model, on hypothetical choice experiment (CE) data. The latter were collected employing a web-based questionnaire distributed by a professional agency at the beginning of December 2015, when the immunocastrated pork chops were not available yet. The attributes and levels for the hypothetical CE have been identified completing three focus groups with 10 meat consumers, fairly representative of the age and gender distribution of the Italian ones, in the cities of Parma, Siena and Milan to capture different degrees of acquaintance with, and characteristics of, local pork meat production (in the former two cities) and the preferences of particularly "modern" consumers (in Milan). While the focus groups have unveiled a general unfamiliarity with the reality of "intensive" farm breeding practices, they have identified Origin (with its National, EU and Extra EU levels), Meat Marbling (Low, Normal, High), improved Animal Welfare Certification (Yes, No) and Price as the relevant attributes in consumer purchasing decisions. The web-based CE required each participant to select the product they would purchase, out of a three items choice set, three times, generating a panel dataset. Because fresh pork meat is frequently purchased by Italian consumers, each choice set contained a "status-quo" option defined according to consumer demand data and the average of local prices. An average WTP for a kilo of improved animal welfare fresh pork meat is estimated at 10.77 €/Kg, translating into a 12.6% price premium over the 9.57 €/Kg average price in the experiment, suggests that expanding the market towards products showcasing improved animal welfare will be appreciated by the average Italian pork meat consumer.

# EFFECTS OF THE ARAB SPRING ON THE WHEAT TRADE OF EGYPT

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Wheat is the main ingredient in the Egyptian diet and heavily subsidised in Egypt. General availability of cheap wheat flour creates a very high wheat demand. Therefore, Egypt is highly dependent on wheat imports from mainly Ukraine, France and Romania for its food security. It makes the country vulnerable to increasing food prices on the world market. This paper investigates the effect of political instability on the domestic wheat trade in Egypt. For the empirical analysis, monthly wheat trade data from the Comtrade Database of the United Nations are used. In particular, we analyse imports and exports of wheat and wheat flour of Egypt from 2010 up to 2014. An analysis of seasonal patterns shows that in the years before 2011 wheat imports were strongly increasing in autumn, but in 2011 this was not the case. The analysis of variance shows that there was a significant difference in wheat imports between 2011 and the other years. The analysis confirms indeed a negative demand shock in the second half year of 2011 after substantial and enduring political instabilities, the so-called Arab Spring, had spilled over to Egypt from neighbouring Arab countries in the first half of this year. General chaos during the political instabilities caused suddenly high uncertainty for consumers and traders, which led to a fall in wheat demand and resulted in a negative shock to the market of this stable food. These results emphasize the need for economic cooperation across the Mediterranean Sea. They call for more engagement of the EU for improving and ensuring food security in its Arab neighbour countries.

# IDENTIFYING WINE PRODUCERS' MARKETING STRATEGIES: AN EMPIRICAL ANALYSIS IN TUSCANY

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In the field of global competition, the Mediterranean winegrowers and producers are exposed to several risks, such as fluctuations in consumption, competition from new producing countries and among traditional ones (Rocchi and Gabbai, 2013). Risk factors together with ecological, technological, market and regulatory conditions, drive local producers towards different strategies in order to maintain the competitive advantage. Through a Resource-Based perspective and Transaction Cost Economic approach (Traversac et al. 2011) supported by an empirical analysis at local level (Tuscany Region), the research aims to highlight the role and the effects of farmers' marketing strategies on the governance assets of the Tuscan wine sector. In this paper we identify determinants of both wine growers' marketing specialization and determinants of wine growers' decisions toward marketing strategies. The marketing specialization is calculated by measuring the Herfindahl-Hirschman Index (HHI) among alternative commercialisation strategies. The HHI is commonly used as measurement of the marketing specialisation but is also applied at farm level to measure the marketing specialisation (see for example Lobley et al., 2001; or Ilberly et al., 2010). Otherwise, the decision towards commercialisation is measured as percentage of farm's production sold through each specific marketing channel. The considered marking strategies rely on direct sell to consumers, vertical integration, forward contracts and cooperation. The determinants of marketing specialisation are quantified by applying censored regression model, while the sale towards alternative marketing strategies by hurdle models, with the aim to simulate the process as two-stage model. The data used relies on the microdata of 2010 Tuscany census merged with database of public payment received by the agricultural farms. The set of covariates belong to the farmers, farm, household, spatial/territorial and policy categories. The database contains more than 8000 farms, of which more 45% sell mainly wine grape while the remaining 55% sell wine. The preliminary results show a very concentrated commercialization strategy of grape wine producers (the average value of HHI 0.97), while wine producers shows more diversified marketing strategy (the average value of HHI 0.86). While the former confirm a strong vertical integration in grape wine production, the latter shows more diversification of sales, with a share of the production that is sold directly to the consumer outside the farm gate (45% of the volume) and another quota trough further intermediaries (32%). In addition, the wine producers show strong heterogeneous strategy between those producing PDO wine and those not. Being mainly involved in PDO certification positively affects the diversification of marketing channel (HHI equal to 0.8) while, at the opposite those not involved in PDO have concentrated marketing channels for those outside (HHI equal to 0.92). Moreover, farmers' location in urban areas negatively affects marketing specialization, while at opposite, location in marginal area returns higher value. The results, holding constant the producers' exposure to risk and uncertainty, depict an interaction of complex farmers strategies encompassing strategy aimed at pursuing vertical integration process with diversification strategy.

# ASSESSING THE INTERACTIONS BETWEEN AGRICULTURAL PRODUCTION AND THE DIMENSIONS OF SUSTAINABILITY: FINDINGS FROM FBS DATA

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Sustainability has become the leading edge of the strategic planning, policy making and scientific debate. A sustainable agricultural production system is one maintaining production while also being economic viable, minimising pressure on the environment and being socially robust. It is of vital importance in that sense to examine how the three pillars of sustainability have interacted so far with agriculture. The main objective of this research paper is to explore the impacts that variations in economic, environmental and social themes have on agricultural production within areas with similar natural conditions and constraints. In order to conduct such research, accounting and physical data from the Farm Business Survey are derived. In particular, data of economic, environmental and social indicators are projected with the use of Geographical Information Systems (GIS) on a national level (England). Such projections allow investigation of patterns of leading or lagging performances which will allow further research on the socio-economic and environmental characteristics that may trigger these disparities on productivity. Findings indicate that environmental constraints affect the allocation of the different types of production systems which in turn creates spatial variation in economic performances. Similar constraints are observed for the various characteristics of the social capital underpinning the farming systems. In that sense, the examination of tradeoffs between the pillars of sustainability emerges as essential. The study of these interactions indicates aspects that benefit or degrade production. Finally, the results of this analysis will enhance the knowledge of policy makers as well as farmers who aim to improve the sustainability of farming systems.

# USE OF RENEWABLE ENERGIES IN GREENHOUSES FOR THE IMPROVEMENT OF AGRICULTURAL CROPS

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Agricultural greenhouses utilize energy for heat , cooling , lighting and operation of various electric equipments. Renewable energies can be used in agricultural greenhouses in order to cover part or all of their energy needs. Solar energy , solid biomass and geothermal energy have been used so far for energy generation in them replacing the conventionally used fossil fuels. Their use results in the decrease of greenhouse gases emissions and in economic benefits of the farmer. A new methodology is proposed for the replacement of all the fossil fuels used in agricultural greenhouses with renewable energies including solar energy , solid biomass and low enthalpy geothermal energy. Those renewable energies are mature , reliable and cost effective. Since all the energy needs of the greenhouses are covered without fossil fuels use , their CO<sub>2</sub> emissions due to energy use in them is zero. A design of an energy intensive greenhouse in Crete-Greece is presented with zero CO<sub>2</sub> emissions due to energy use. Installation cost of renewable energies systems in the greenhouse are estimated together with their operation cost . It is proved that the replacement of fossil fuels with renewable energies in greenhouses according to the proposed methodology offers economic benefits to the farmer resulting in zero CO<sub>2</sub> emissions and in the improvement of the sustainability of the produced crops.

# ENVIRONMENTAL PRESSURES OF DIFFERENT TYPES OF FADN FARMS IN POLAND

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This paper presents an attempt to measure environmental pressures resulting from agricultural production in different types of Polish FADN farms. The load on the natural environment was measured with the following parameters, estimated with the use of data from the FADN data-base: balance of nitrogen (N), balance of phosphorus (P), greenhouse gas (GHG) emissions. N and P balances have been calculated according to the methodology of the Gross Nitrogen Balance proposed by OECD [OECD Handbook, 2009]. GHG emissions were calculated as CO<sub>2</sub> equivalent resulting from application of fertilizers, use of fossil fuels, electricity and from livestock. Multiple regression models were estimated for farm types with a different production orientation and size. This paper examines the relations between variables characterizing environmental load and farm output (production value) as well as farm income. The results show that environmental pressures vary depending on farm type.

# WHEAT IN MOROCCO: ADOPTION AND IMPACTS OF IMPROVED VARIETIES AND SEED DEMAND ANALYSIS

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Using a nationally representative sample of 1,230 farm households from 21 provinces and a combination of the Heckman selection model, duration analysis, propensity score matching and endogenous switching regression, this study provides: 1) accurate estimates of current national and provincial adoption levels of improved varieties with special attention to their release date; 2) analysis of factors influencing the decision and speed of adoption of improved wheat varieties; and 3) estimates of impacts on livelihoods indicators. Survey results show that there are 40 wheat varieties in farmers' hands out of which 19 have been identified to be bread wheat and other 15 to be durum wheat while the remaining 6 were not identified. With average varietal replacement rate of 22 years, very old varieties still dominate the Moroccan farmers' portfolio. The top 10 varieties are being cultivated by more than 91% of wheat growers on 92% of total wheat area with 52% of the farmers cultivating varieties which are older than 20 years. Seventeen varieties which came out of the joint INRA/ICARDA/CIMMYT breeding programs are adopted by 81.8% of farmers – showing that though very old, the varieties are in high demand among Moroccan farmers. This raises important questions on whether: 1) there are new improved varieties which are superior to the old varieties; 2) there are indeed new and better varieties but farmers are not aware of them or don't have access to them; or 3) the old varieties are performing well or have traits more preferred by farmers than more recent varieties. Among many other factors, access to seed proves to be an important factor in determining farmers' adoption decisions. The combined effect of factors which affect access to seed (i.e., proximity to seed source, the ability to use certified seed and the ability to buy seed from seed companies in adequate quantity and in timely fashion) is an increase in the propensity to adopt improved varieties by 15%. While this figure is high in and of itself, it is not high enough to take the whole blame for poor adoption levels. Instead, farmer characteristics (including access to information) were found to be the most important explanatory variables accounting for 45% of the total variation followed by farm characteristics which explained 19% of the variation. The adoption of improved wheat varieties leads to 482kg/ha (49%) increase in yields, US\$165 /ha (48%) higher net income and 29.6 kg/capita/year (60%) increase in wheat consumption from own production. Given the 41% adoption levels, these gains clearly show that the improved varieties are contributing to livelihoods improvements at household and national levels.

# GREENHOUSE GAS EMISSIONS AND AGRICULTURAL INCOME FOR EUROPEAN COUNTRIES; A SURVEY WITH NON-LINEAR ARDL FRAMEWORK

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Within the last decade a coordinated effort was made in global terms for the improvement of agricultural income in line with environmental concerns. The concept of sustainable agriculture was introduced in agro - environmental schemes embodied in Common Agricultural Policy policy implemented to the economies in European Union. Implicitly, environmental performance and economic efficiency as well as competitiveness have become complementary objectives, not mutually exclusive. The environmental Kuznets curve hypothesis postulates an inverted U shaped relationship among indicators of environmental degradation and income per capita. The present study aims to provide an insight to the effectiveness of agro-environmental policy schemes within the CAP securing eco-efficiency, through a survey on the validity of the environmental Kuznets curve hypothesis for the European agriculture. This is achieved by employing a measure of environmental degradation (carbon emissions equivalent) and per capita agricultural income (as a proxy for income the net added value by agriculture is employed). The data that derived from FAOSTAT for the period of 1961-2010, involved the countries of Bulgaria, France, Spain and Greece, and were analyzed through the non-linear ARDL co-integration. The short run, as well as the long run non-linearities are introduced through positive and negative partial sum decompositions of the explanatory variables. The nonlinear co-integration extends the concept of the linear co-integration as it allows the adjustment to the steady state to occur only after the deviation exceeds some critical point; the particular model takes into account potential delays in adjustment of the variable under review. Furthermore, the model allows us to capture asymmetries in the speed adjustment, given that positive or negative deviations won't be corrected in the same manner. The results are conflicting regarding the validity of the environmental Kuznets curve hypothesis for the data employed, while the role of the CAP and specifically the agro-environmental policy tools implemented, seem to be vital for the relationship between carbon emissions and income per capita.

# THE CORRELATION BETWEEN MEDITERRANEAN FOOD SECURITY AND BLACK SEA AND EAST EUROPE AGRICULTURAL EXPANSION

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The group of Mediterranean Countries characterized by miscellaneous levels of incomes, agricultural development and, as a result, the national's food security levels. Using the closer inspection and following the information from The Mediterranean world Economic Foresight Institute we can define that trends in the eleven countries that make up the South and East Mediterranean Countries (SEMCs) indicate significant food insecurity, with deficits that could go as high as 50 billion dollars in 2030, endangering public health and social cohesion in these countries [Rastion J.-L., 2012] . Naturally, that significant influence to the regional food security influence the group of EU countries, which has the more developed agricultural production and processing, lead the EU agrifood foreign trade and, what is important, use the EU Common Agricultural Policy (EU CAP) instruments and funds. The main problems, faced by the Mediterranean agriculture are the fairly common also for other countries and regions, during last decades – land usage, employment, income support, farm prices, inputs and investment aid, quality and trace, supply chains and market access. Note, that the fast and dynamic development of the other agriculture oriented group of East European countries (mostly Ukraine, Belarus, Moldova, Kazakhstan) also influence to the World Food Market, price reduction and rising the food supply. As far as all mentioned countries belong to few regional trade and economic communities, it is important to determine the cross role and influence for their food security and outlines the directions of cooperation based on competitive advantages, trade priorities and consumer behavior. As far as almost all countries already have the Free Trade Agreements it is also important to measure the level of competitiveness and specialization between the groups. The level of Regional specialization can be generally defined in relation to production structures (Ricardo, 1817, Heckscher 1919; Ohlin 1933). Regional specialization refers to the distribution of the industry shares in total manufacturing in a specific region compared to a norm. A region is found to be specialized in a specific industry if this industry has a high share in the manufacturing of the region (Krugman, 1979, 1980, 1981; Helpman and Krugman, 1985; Krugman and Venables, 1990; Porter 2003). The primary purpose of our research is to identify newly emerging patterns of regional specialization within and across mentioned group of countries, and to examine their effects on agricultural productivity, regional competitive advantages and international trading patterns and as the result to determine the role of the regional (Black Sea, East Europe and Mediterranean) and cross impact on regional and national Food Security.

# Posters

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# P1 EFFECT OF SALINE WATER DRIP IRRIGATION ON TOMATO YIELD AND QUALITY CHARACTERISTICS UNDER MEDITERRANEAN GREENHOUSE CONDITIONS

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Soil salinity is a major soil degradation threat, especially for arid coastal environments where it hinders agricultural production and soil health. Protected horticultural crops in the Mediterranean region, typically under deficit irrigation and intensive cultivation practices, have to cope with increasing irrigation water and soil salinization. Measurements are performed on a small-scale *Solanum lycopersicum* L. cv Elpida greenhouse experiment that simulates semi-arid conditions in the RECARE Project Case Study in Greece (Timpaki basin in Crete). The use of local planting soil with initial Electrical Conductivity (ECe) 1.8 dS m<sup>-1</sup> and local cultivation practices aim to replicate prevailing conditions at the Case Study. Plants are drip irrigated with two NaCl treatments: slightly (S) saline (EC<sub>w</sub> = 1.1 dS m<sup>-1</sup>) and moderately (M) saline water (EC<sub>w</sub> = 3.5 dS m<sup>-1</sup>), resulting to very high and excessively high ECe, respectively. Preliminary results suggest that total and marketable yield for the M treatment is 15% and 40% less than in the S treatment respectively, by the end of the growing season. Besides yield, plants of the M treatment appear to mature slower for later harvests but may have taste advantages due to increased Total Soluble Solids.

## P2 EXPLORING THE PRIORITIES OF AGRICULTURAL RESEARCH IN THE EU

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Accurate ex-post evaluation of institutional investments in research moves from the underlying motives, the purpose, and the priorities of funding allocation, thereby allowing estimate the effectiveness and efficiency of financial management. Properly understanding policy targets is also key for evaluators to identify research objectives and therewith pinpoint the stakeholders and the socio-economic and environmental impacts of that research. In this sense, tracking the pathway(s) from stated objectives to impacts helps highlight the effects – direct/indirect, first/second order, intended/unintended – of such research. Domestic research expenditure data are available for most EU member states; however, sectorial information is not accurate, which hinders the identification of research objectives and priorities in agriculture. This study tries to overcome this obstacle by considering EU-funded research projects in agriculture that had concluded within the last twenty years, as those projects are coordinated and implemented at the member state level and benefit from the largest budget in the world (Acheson et al., 2012), with additional financial resources being available from member states to improve the compliance with EU's objectives. The methodology relies on computer assisted content analysis of abstracts of projects kicked-off and concluded under the fourth (1994-1998), fifth (1999-2002), and sixth (2002-2006) Framework Programmes for Research and Innovation, which are available from the Community Research and Development Information Service. Firstly, we created homogeneous groups of projects via textual clustering based on topic similarity; then, we drew on Gaunand et al. (2015) to classify the groups based on projects' expected outcome and impacts at different times and scales, thereby identifying seven expected outcomes and seven impacts of research. Preliminary results point out the evolution of research subjects over time and across member states, as well as the steady increase of EU expenditure in towards the promotion of the bio-based economy. Considering expected outcomes and research objectives, the share of budget allocated to social issues and to long-run goals had markedly raised over time. The research confirms the importance of ex-post evaluations of institutional investments, given the increased competition for research funds and the call for higher consistency between research projects' aims and socio-economic needs. References Acheson, M. H., Annerberg, M. R., Dammert, R., Klusacek, M. K., Kraus, W., & Lock, J. (2012). Review of the Joint Programming Process Final Report of the Expert Group.

## P3 BAYESIAN BELIEF NETWORK ANALYSIS OF SOIL SALINISATION MANAGEMENT STRATEGIES

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Soil salinity management can be complex and expensive, as well as a source of water management conflict among stakeholders, especially in arid and semi-arid regions. Besides taking no action, management strategies include mitigation, amelioration and adaptation measures and involve day-to-day operational decisions. Bayesian models of environmental resources management behaviour can provide insight into the likely criteria which stakeholder use to make such resources allocation decisions. This work develops a Bayesian Belief Network (BBN) to infer soil salinity management related decision-making behavior of farmers based on factor interaction and posterior probabilities. The BBN discussed here integrates the various system components - biophysical, social, ecological, and economic - and stakeholder perception of benefits - production/socio-economic, socio-cultural, ecological and off-site - associated with soil salinity management options. The method of integration of the system components is demonstrated in the RECARE Project Case Study of Timpaki, a semi-arid region in south-central Crete (Greece). Excessive groundwater abstractions have resulted in a drop of the groundwater level in the coastal part of the aquifer, thus leading to seawater intrusion and in turn to soil salinisation. Impacts of management scenarios are assessed using a probabilistic approach to evaluate criteria which are compared with those for the present situation. The study shows that BBNs can be a prospective tool to analyse likely decisions about irrigation in an on-demand system with good accuracy.

## P4 INNOVATION FOR TRADITION: CONSUMERS' ACCEPTANCE OF “DNA CONTROLLATO” TECHNOLOGY IN CARNAROLI RICE

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Agricultural innovation ensures the global food system to provide adequate and sustainable supplies of high quality food and non-food agricultural products. Academic interest toward food innovation has rapidly increased with specific attention to the analysis on consumers' acceptance of innovative food products, identifying some level of scepticism toward the use of new technologies. This work deals with the innovation in rice production in Italy, within a regional project aiming to help local rice farmers in developing an alternative supply chain, able to increase farmers bargaining power and promote new market strategies. The attention was focused on one of the most traditional Italian variety of rice, Carnaroli, by introducing the “DNA controllato” (DNA-tested) technology, a new method for variety certification through the DNA analysis of rice seeds. In this context, this work intends to evaluate the determinants of consumer's acceptance of this product and, more precisely, the role of the “DNA controllato” logo which consists in a stylized DNA double-helix. The significance of the case study lays in the fact that this product is simultaneously endowed with strong attributes of tradition and local origin together with information cues referring to new technologies for food production. Methods included customer satisfaction analysis on the commercial rice product and then a vis-à-vis survey on a sample of 400 consumers. More specifically, the questionnaire was structured in different section: the first one was meant to elicit the role of information provision about “DNA controllato” technology on consumers' attitude toward the product. The second section collected information on respondent's food values driving food purchase, containing questions adapted from Lusk and Briggermann (2009). The subsequent part of the questionnaire dealt with the explicit evaluation of the rice package layout, testing different version of the “DNA controllato” logo. Then, the last part of the survey focused on consumers' socio-demographic characteristics and rice consumption habits. Preliminary results revealed different attitudes toward the product depending on the dimension of the logo, suggesting that the presence of the DNA double helix impacts on consumers perception. More in general, this work contributes to evaluate the role of new technologies applications in the food system and offers new insights for the debate about the relationships between tradition and innovation.

## P5 THE COMPETITIVENESS OF POLISH APPLES ON INTERNATIONAL MARKETS.

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The article presents the problem of competitiveness of Polish apples. In the paper the quantity of production and international trade of apples was analyzed. Major importers and exporters were identified. In order to assess the international competitiveness ex post measure has been used. The study covered 2005-2014.

## P6 WHAT DOES YOUNG GENERATION WANT TO EAT AND DO FOR BEING HEALTHY FROM THE PERSPECTIVE OF TODAY AND FUTURE?

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What Does Young Generation want to eat and do for being healthy from the perspective of Today and Future? In order to physically and mentally healthy in each stage of life one needs have an adequate and balanced nutrition with activities such as sports, reading etc. The problems caused from nutritional preferences effect physical and mental development and in the educational process causes of failures. University students are located in the critical period of the eating habits for the future. Eating without skipping meals and balanced nutrition are extremely important in terms of wellness and education or in terms of achievements in their life. To examine all these issues, students of Ege University will be considered as a case study for nutrition preferences with special reference to current and future expectations. The aim of this study is to design an optimum healthy framework for future under the light of current preferences of young generation. In the study, AHP scores and likert based data will be used. Binary programming will generate optimal framework with scores obtained from AHP and other related variables. The data was collected from the students of schools in the faculties of Ege University campus. The study sample size was determined as 190 with proportional sampling with 90% confidence interval and 10% error margin. Key words: Young generation, AHP, Binary Programming

## P7 OPPORTUNITIES OF PRICE RISK LIMITATION IN HORTICULTURAL SECTOR IN POLAND

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This paper reviews the possibility of price risk limitation, what conduce to farmers' income stabilization. The attempts to control price risk in both agricultural and horticultural sectors have started long time ago. A few years after The World War II was over, all actions leading to agricultural market regulations, as well as fruit and vegs market, were a subject of inner regulations of countries. Due to the harsh situation in post war Europe, all initiatives directed to food security improvement were accepted with optimism. The situation in Poland since the accession to EU has radically changed, but there is still many problems which need to be solved. The WTO negotiation in Doha 2004 resulted in solutions which brought liberalization in agri-food products trade. What is key importance in this process it is gradual reduction of inner support, lowering of export support, as well as further opening to external partners. In the same direction lead Common Agriculture Policy reforms in EU. Against this background, the disparity between agri-food producers and receivers ratchets up. The price is the most important factor bounding supply and demand on the market. Prices of agri-food products are volatile and derives from many factors, which are unable to be known in the practice. The influence of many factors is, furthermore, also volatile and emerges in various intensity. The price risk of farmer results from the fact, that the production decisions are made mostly under the influence of current prices, but products are sell in future prices. It means, that the risk in agriculture is multiplied, due to impossibility of correction of ongoing production. Effects of all risk factors, as well as their correlations, are focused in a price. Price volatility and negative effects it causes is able to destabilize farmers' incomes, and keep them off investments or optimal use of resources, what in consequences may lead to retreat from the sector. It is crucial to provide in agriculture sector the solutions supporting farmers in taking their own economic risk. Current regulations included in II pillar of CAP 2014-2020, try to urge producers to take economical responsibility. From among many possibilities to protect farmers against price risk, there are advanced financial tools, like futures contracts or options. On the other hand, there are other solutions like income stabilizing accounts used in different variants in some countries.