

# Ethics, sustainability and logistics in agricultural and agri-food economics research

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## Abstract

This study analyzes the changes observed in the agri-food system with the advent of logistical management of the flow of goods and information along the food supply chain. Agri-food functions and responsibilities towards society are also analyzed. This field of research has been widely explored in recent years following the development of the Corporate Social Responsibility (CSR) certification in agri-business. The analysis starts by examining the coherence of the ethical basis of human choices in a *homo oeconomicus* framework in which social relationships are merely exploitable activities. CSR development is then studied in the light of the new stakeholder theory for firms. The main fields of economic research into sustainable development and the most important goals achieved are examined and the methodological perspectives of agricultural economics research will also be discussed.

## Introduction

In developed countries, growth of *per capita* income, together with

other important factors such as technological innovations, differentiation and segmentation of the economical activities, expansion of the tertiary industry, *etc.*, have modified the demand for agri-food products. This means that consumers continue to ask for ever more differentiated products which, in terms of quality, certifications, safety and information, added value and off-season availability, satisfy economical, ethical and social concerns. All this has increased the gap between primary agricultural production and the final link in the food production chain. This gap has been in part closed by the supply of new and more efficient services which respond to customers needs and demand. These services include the reduction of transfer costs through improved production and distribution systems, and a more socially sensitive, efficient and ethical attitude on the part of the buyer (Carrà, 2003). In such a context, because of its importance, territorial diffusion, and the quantity and quality of goods, food distribution is the privileged point of contact with the final consumers and their complex demands (Pulina, 2010). This research was carried out to support the new function, role and responsibility of modern food distribution towards the agri-food system and consumers. It contributes to economic-agrarian and food research, both for the logistics and the management of the entire production and supply chain, including ethical issues and questions of social responsibility, in order to diversify from competitors and improve communication. In fact, according to today's business management, it is in the area of communication that the interests of the different stakeholders are mediated.

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Key words: supply chain management, efficient consumer response, logistics, ethics, corporate social responsibility, sustainable development.

Acknowledgements: this research was carried out thanks to the financial support of the University of Catania, in the year 2009 (Giuseppe Timpanaro, scientific expert).

Received for publication: 30 December 2011.

Accepted for publication: 31 March 2012.

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Licensee PAGEPress, Italy  
Italian Journal of Agronomy 2012; 7:e33  
doi:10.4081/ija.2012.e33

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## Evolution of the agri-food system and the role and importance of logistics

Today, the issue of logistics is the subject of great interest because it is considered strategic for the development of the country. It is also closely connected to issues of territorial development (especially in southern Italy), of public and private interventions on infrastructures, processes of internationalization of production systems, the impact on employment, and on the possible transport links between different areas of the country.

In fact, it is not by chance that this interest in politics has been formalized through the preparation of a comprehensive framework of measures included in the recent National Plan of Logistics (consisting of 7 platforms located around the country, 3 of which are in the south) developed by the Advisory Council for Road Transport and Logistics of the Ministry of Infrastructure and Transport (2010) and, more generally, in the Planning Policy for Community Interventions. New Italian legislation was passed in 2001 with the adoption of the *General Plan for Transport and Logistics*, followed by the 2007/2008 law and the guidelines of the *General Mobility Plan*. On a European level, we should also remember: the *European Logistics Plan*, the specific lines of action included in the Cohesion Policies and the National Organic

Program (NOP) for Research and Competitiveness 2007/2013, the Regions of the Convergence Objective for the construction of primary logistical infrastructures (reduction of congestion, safety, environment, quality for consumers, integration of ICTs, and modern information and communication technologies, etc.), and the recent *Regional Transport Action Plan* for Mediterranean countries, in which important connections with other channels of production, supply and distribution are established.

It is well known that modern logistics is no longer confined to the mere management of transport and storage of physical goods, but it has been extended to the coordination of all phases identified in the course of supply, production and sale of a company and its relations with the rest of the environment in which it operates. In this context, therefore, it constitutes a true *management policy of production and marketing processes* or even of integrated logistics. Not only that, but it significantly affects the national GDP (about 14%), as recently confirmed by the Italian General Confederation of Transport and Logistics (CONFETRA, 2011). The aim of this policy is to coordinate the different operations in order to start the entire process at the right time according to demand. This should be neither too early (to avoid wasting expensive stock and the additional costs related to the risk of obsolescence) nor too late (to avoid broken supply lines and shortage at points of sale). These considerations confirm the importance of efficient coordination from the beginning to the end of the flow of goods and information. In the long term, this has remodeled the very function of the logistical process and brought information systems to center stage (Paché and Sauvage, 1999). Furthermore, it is not a concept that can be generalized; it needs to be linked to the territory and the development of production sectors. These can be divided into public-private, districts, chains, products, supply, and distribution sectors.

Logistics play an important role in the agriculture/food sector. This is due to the system *specifications*, i.e. perishability of products, long and tortuous supply chains marked by the presence of several operators, the need to maintain a cold chain to guarantee the quality of the final product, consumption behavior and habits, and the reason why health aspects and organoleptic quality play such an important role in purchasing decisions. It is also equally important that the agri-food system plays the same role at a national level. According to data from the National Institute of Agricultural Economics (INEA, 2010), in 2010 the agri-food system accounted for approximately 16% of GDP (246 billion euros). According to various estimates and evaluations, the cost of *agri-food logistics* vary between 20-30%. This can be even higher depending on the type of chain involved, e.g. the distance from origin (off-season) and the type of transportation considered (apart from problems related to different processing methods). The development of logistics management also offers important opportunities through the integration of initiatives which had for years been managed separately. In fact, the combination of these initiatives enhances the value of the supply chain in its strategic value and competitive leverage (Luceri, 2001).

In general, the importance gained by the logistics management is linked to the evolution of the national agri-food system. Agriculture has become less important compared to both the food industry and to food distribution (i.e. distribution and trade, including commercial food services) (Figure 1).

This development is due to various factors. The first is the pressure from and evolution of the demand for food (Belletti and Marescotti, 1996). In fact, there have been changes in tastes and eating habits with greater attention paid to quality, food safety, information about cultivation and production, certification, and information on labels, etc.). There has been an increase in expenditure directed towards food consumption outside the home and to food services (e.g. hotel suppliers, Ho.Re.Ca.), new legislation that is more sensitive to the need to protect the interests of consumers through specific regulations related to and involving environmental problems. Rapidly changing technology has

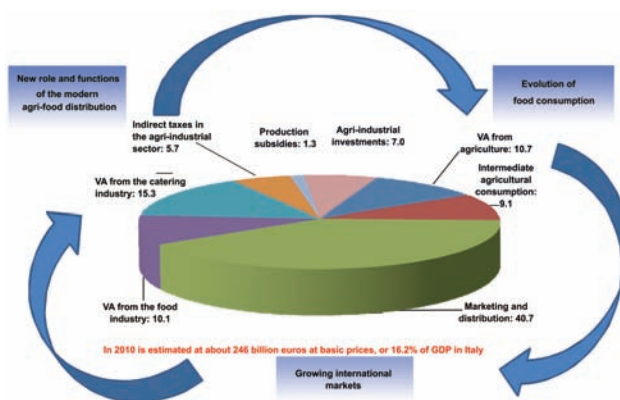


Figure 1. Main components of the agri-industrial system and evolutionary factors.

also been an influencing factor, as has the gradual growth of international markets. In this case, it refers to the cut-off time and space limits that regulate the competition among different economic role players, revisiting the role and importance of the functions and services required from the market; growing globalization and a growing consumption of off-season products. All this has led to the growing importance and dominant role assumed by the retail trade. In this context, of particular interest are the structural changes of Food Distribution by centralization of purchases, the reorganization of logistics activities, and the introduction of progressive technologies of information and communication technologies (ICT), etc. Results are relevant because these changes have led to a reduction in distribution costs and consequently in consumer prices. This is essential to stimulate demand since current life cycles of products are becoming shorter and an ever wider range of products are customized. This also means that logistics are being used more to manage the agri-food system. In practical terms, the transfer of goods from production areas to points of sale, delivering a range of services such as preservation, creation of product ranges, payment conditions and delivery actually deals with much that falls within the scope of logistics. Research and several studies have shown that logistics is a core business for the distribution company. This is in spite of the fact that today the logistical process is an integral part of the company's strategic planning, since it is considered a *competition lever* that helps increase incomes thanks to the commercial activities it promotes. In such a context, it is clear that logistics is a strategic ground both for industrial and commercial business, two realities which often find themselves in conflict.

## The role of modern distribution processes in managing the agri-food system

So let us examine how distribution uses logistics as a competitive lever, and innovations at a business and system level. In the past, the company was isolated from the context in which it operated. It was limited to production and to using its commercial function to get its products onto the market. Its only concern was to establish contact with the companies at other phases of the chain, contacts which were denied to the consumer. Today, the scenario has clearly evolved enormously, putting consumers and consume satisfaction at the center of the system. This is why agricultural and food companies have changed their organization and management. These changes have been supported by strategy, management and marketing. There has been a search for innovation in order to respond to the environment, use of information tech-

nology, flexible production processes, the creation of a system of vertical relations with customers and suppliers. To survive the unsettled conditions of the context in which it operates and improve efficiency of the entire management process, company management has reviewed its core business. All this has taken place regardless of the size of the company since it can only become competitive if it adopts a rational approach to management of the market, stock, food processing, commercialization and distribution up to the final consumer. Such processes have radically transformed the relations between sectors and companies, as well as giving a boost to interaction resulting in an epochal transition from *agriculture sector to agriculture system* (Boccaletti, 2010; Bacarella, 2010). This has been driven by the new logistical requirements dictated by the distribution process (Hobbs and Young, 2000). In fact, in order to meet consumer demand, products must be packaged and labeled according to legislation, with adequate ranges, quality, warranty and rapid delivery. New relations are, therefore, established between production and market, and both farms and food industries have to come into line. This all takes place under the perennial control of the Large-Scale Retail Trade, which for its part has become an increasingly multinational body due to globalization. Thus, reference is no longer limited to the simple production chain, but is extended to the entire *value chain or value system or agri-food supply chain*, which now becomes the *supply chain management*.

The concept of the agri-food supply chain is based on the evolution of the traditional notion of the *chain* (Malassis and Padilla, 1986). This concept was developed by considering the ways in which operators in the chain respond quickly and appropriately to the ever-changing environmental conditions in which they work. According to this approach, therefore, we can expand the theory of the supply chain. This involves the flow of goods, the links in the sequence of economic agents, the impact they have on each other (*circularity*) and, ultimately, maximizing consumer demand and supply. Economic agents try, according to production processes, to anticipate and satisfy their clients needs early in the chain. In other words, the value chain of a business takes into account that of other businesses in which the company is also involved (Fontana and Caroli, 2009). In the agri-food sector, the value chain of a company is part of a chain that includes upstream the chains of suppliers of production inputs and downstream the users of the outputs up to the final consumers. The value is therefore, the result not only of the amount created by the value of the activities carried out by the various role players in the supply chain, but also by the interactions and relations that are established between these role players and the entities they refer to. Thus, competition in final food markets on an international level has increasingly focused on integrated business systems (vertically and/or horizontally) with different tools (*e.g.* chain contracts) aimed at limiting transaction costs between customers and suppliers, and the creation of the conditions of competitive advantage (Coase, 1937). The problem of the agri-food system is to create systems for effective and efficient vertical relations to respond adequately and appropriately to the market. According to recent assessments, the traditional agricultural systems in Sicily are not sufficiently integrated into the modern food system, representing 85-90% of the quantity produced on the island and 70-75% of the value of the local agricultural production base. This production structure is formed by the individual company. The average age of its entrepreneurs is high, they do not adopt quality and marketing strategies and, therefore, find themselves working in highly competitive markets. Furthermore, many of their competitors are much more efficient. Another consequence is that this production structure is unable to enhance either the particular genetic makeup of local traditional and historical products or the historical and cultural environment of Sicily itself (Bacarella, 2010).

The approach followed is that of the *supply chain management*. In such a context, logistics is seen as a real organizational innovation leading to better control over production and a greater reduction in

costs (Oliver and Webber, 1982). In particular, *food distribution* considers the application of an efficient logistics system to minimize the impact of *stock* by replacing the traditional function of warehouses with that of logistics platforms. These may have different origins, from producers located in the areas of production, distributors (located near the consumer markets and operating in heterogeneous products), and logistics providers (managed by the transport companies that offer timely delivery, reliability, food preservation and other services); these are centers that receive orders, and process and sort products (Cesaretti and Green, 2006). It is, therefore, the *distribution* to supply points of sale that deals directly with the purchasing or distribution center, a specialized structure that evaluates and selects the most convenient suppliers according to price, after-sale services and logistics. *Distribution* mediates in drawing up supply contracts replacing the wholesale fruit and vegetable markets. It operates on large volumes, a tight time flow and simultaneous cross-docking, *i.e.* without stock.

Running a complex logistics system based on distribution centers, platforms, warehouses and intermediate points of sale with a large amount of physical and information flow requires a strong and constant collaborative network upstream. One example of such an operation is the Efficient Consumer Response (ECR, 2005) that allows the application of SCM logic and tools in the distribution of foodstuffs (Covino, 2002). ECR was founded in 1991 in America and came to Italy two years later with a project which involves big brand companies on the one hand (Ferrero, Nestlé, Barilla, *etc.*) and the Large Scale Retail Trade on the other (GS, Rinascente, COOP, CONAD, *etc.*). The coordinated management of the whole supply chain, supported by marketing and EDI (electronic data interchange) technology, leads to a reduction in stock levels, warehouse maintenance, fewer inventories, lower broken stock, quicker refueling, *etc.* There are many benefits in terms of time, place and quantity, which allow consumers to have what they want, when they want, with the right information (Hardgrave *et al.*, 2009) (Figure 2). At the base of the conceptualization of the electronic data interchange (EDI) is the possibility of adopting a one-dimensional language, agreed on by all partners, that facilitates communication (INDICOD

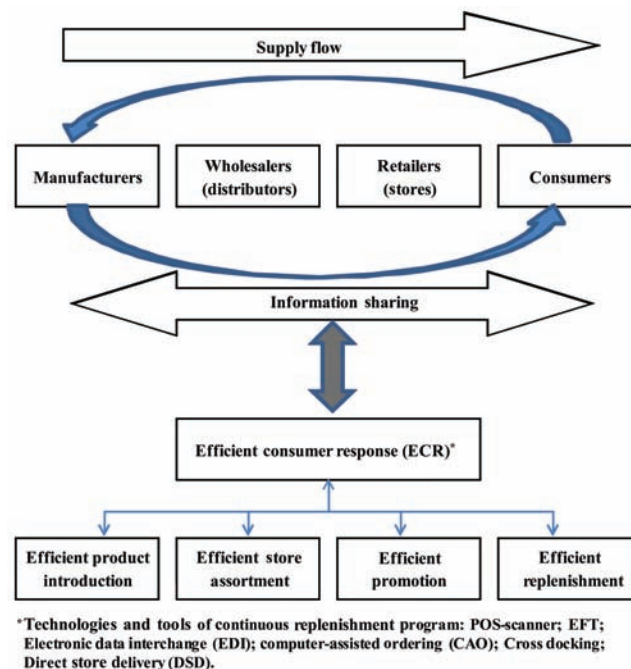


Figure 2. Logistic integration in the distribution channel: Tool of Supply Chain management.

ECR, 2010).

For the modern agri-food system involved in the reorganization of relations, competition, and creation of horizontal and vertical networks, such technologies provide the means to implement an adequate system of traceability at all levels of the supply chain. This is essential to manage the storage chain, risk and quality, besides helping optimize stock (particularly important for short-shelf life products whose profit margin is too low to cover high storage and transportation costs).

## Contribution of the agri-economic and food research for markets and logistics

Traditionally, agricultural economy and politics form part of a large number of studies and research on related markets, carried out on both a macro and microeconomic level, such as those concerning the role of agriculture in the agri-food system, the contractual power of the primary sector, and integration with the food industry and its dynamic evolution in each sector (Bellia, 1963; Alvisi and Regazzi, 1986; Idda *et al.*, 2003) (Figure 3). It is important to remember that these are traditional and consolidated research topics not only in the field of transportation economics (especially when goods and services are involved) but also in industrial logistics, economic politics, public economy and territorial issues (particularly on a regional level) that are currently included in a transversal study that is recognized as *Economic Logistics*.

In particular, this latest analysis clearly shows the relative value of the different sectors, the structural changes that have taken place and that have stimulated the gradual process of downsizing the industry to the advantage of *food distribution*. From this point of view, there is no shortage of analyses about the different positioning strategies adopted by *food distribution* based mainly on the diversification of the products offered (Walters and Laffy, 1996). These have shown how logistics have become increasing importance both in national and international literature. Studies on the various components of the *supply chain* and their relationship to each other are of particular interest and especially, in an

international context, those belonging to the final stage of the process. In fact, it is here that the ever expanding retail chains are of growing importance. The conclusion to be drawn is that the need for market competition requires *logistics* to adapt to the demands of large scale retail trade. This requires more efficient suppliers to develop and provide product innovation and logistical support (Lanini, 2010; Lanini and Zampagna, 2002; Giacomini *et al.*, 2006). Quality and safety, continuity of product availability, the reduction of lead times and the increase in delivery frequency all also need to be maintained (Fearne and Hughes, 1999). Since logistics physically links production areas with points of sale located at different distances, economical, organizational and geographical issues are critical. In fact, some applications have focused on the *localization theories* that help explain the concentration of production activities in some territories rather than others. Among these, some studies have focused on *minimal cost* by indentifying the best location of businesses in order to reduce transportation costs through the production and distribution processes. Others developed the theories of *market areas* to identify the best location for a business with respect to that of the market in order to maximize profits. In these cases, since transportation costs in relation to distance have been reduced (thanks to technological innovations and intermodalities) and since information technology has changed production processes, companies have been able to detach production cycles from their location, offering so called *logistics products*. Here, it is the very logistics itself that establishes the value.

Another line of studies regards the structure of the logistics network, the encoding of interrelations, warehouse organization, use of IT solutions to trace the flow of goods, to assure quality at all levels of the supply chain and to protect trademarks, rationalize transport and intermodality, strengthen logistics platforms, promote investments in the cold chain, ICT and the electronic exchange of information to optimize acquisition and fulfillment, satisfaction or traceability (tracking and tracing) and security (ISMEA, 2006). In short, in the case of large scale goods, distribution companies have been defined as the *strategic center of gravity in the value system of consumer markets* (Ottimo, 2001; Penco, 2007). This role has clearly been achieved over time but also *defended* by the *attacks* of the industry (or more generally of production). Industry has always been a competitor in *distribution* activities,

	Evolution approach to historical and interpretative	Technical-efficiency approach	Relational-systemic approach
Field of analysis	Agri-food system; Phases of the distribution; Logistics systems	Logistics activities of enterprises; Food Marketing	Food Supply Chain / Supply Chain Management
Main Themes	Logistical problems and development of the agro-food industry; Distribution systems and relationships between agriculture, industry and food distribution; Chain relations and complexity of the relationships between the actors; etc.	Validation of technology and management solutions adopted by the enterprise; Organization of the stores; Food law Restrictions (security), etc.	Structure of the logistics network; Contractual forms and relations; etc.
Specific Insights	Consumption and trends in modern food markets; Development, role and authority of the DA; Study distribution inefficiencies; Transformations competitive environment (cost vs. customer service); Distribution strategies logistics company; Relationship supply/demand in the production and commercial relations; Food Marketing Strategies; Outsourcing, ICT application; etc.	Analysis of different logistics management systems; Impacts of the application of information technology and ICT; Process optimization of acquisition and order processing; Creation and Value Chain; Logistics and Supply Chain Management (SCM); Out-sourcing logistics; etc.	Analysis of the relationship and level of integration/coordination of logistics in terms of contractual, competitive and collaborative; Optimization of logistics costs, to increase the value created by the channel to the consumer; etc.

Figure 3. The various areas of agriculture and agri-food economic research.

attempting to acquire a higher share of the added value generated by the channel (vertical distribution of logistics and marketing functions) (Musso, 2010).

With regards to final consumption, this process was applied more to information than to physical flows. In fact, it is easier for the manufacturer to adopt organizational innovations such as those related to cross-docking and reduction of lead time. This is due to the higher demand for services in terms of delivery frequency, mode, types of packaging to reduce time/cost of picking the goods. On the other hand, the *Large Scale Retail Trade* manufacturing companies can use logistics as a way to differentiate themselves from competitors and as a trade marketing factor. This is in contrast to the information flow that remains the prerogative of *distribution*, also thanks to the organizational and technological systems used in retail logistics. All this aims to resolve the traditional information asymmetry of the trade system. It is for this reason that e-procurement and marketplace were developed (Galizzi, 2002; Green *et al.*, 2009). Some structural *problems*, therefore, need to be overcome, such as the lack of attention to flows and to the support offered by logistical services, weaknesses in transport networks and logistics hubs, *etc.* *Behavioral and cultural problems* also need to be solved. Innovation is, therefore, very important. However, gaps still exist in ICT and in the adoption of information technology solutions to optimize the acquisition and tracking of orders, and to assure safety and security through traceability. This is especially true where the complexity of the relations within the supply chain and its high fragmentation makes the creation of a logistics network difficult (*e.g.* fruit and vegetables). It is also absolutely essential to intensify training, make more information available, create new skills, improve information management and promote outsourcing of *logistics*.

To this end, the new challenges and future trends involve evaluation and reconstruction of procedures, investing in logistics system infrastructures, focusing on security issues, the role of emerging markets, and sustainability and environmental security (CONFETRA, 2009).

## Ethics and social responsibility

An analysis of the best of economic research on logistics has allowed us to recognize the extremely important role played by technological and organizational developments in shifting power towards the marketing stage of the agri-business system. The relationships between the different types of operators along the *food supply chain* are currently characterized by an asymmetric distribution of negotiating power in favor of the modern distribution firms. This is partly due to several recent acquisitions and mergers that have led to the current concentrated structure of the food distribution sector. But this is only a part of the story; the power of modern distribution has more complex roots and implications. When the community assigns specific functions to supermarkets with regard to inflation, environmental protection, animal welfare, employment, urban planning or food safety, then power becomes authority (Dixon, 2003). In other words, because of the institutional responsibilities entrusted to it, the modern distribution system is asked to take responsibility for monitoring compliance with ethical behavior in the food chain. In this way, the reference point for the food business is no longer the consumer but the citizen, with whom relations are extended from the purely transactional sphere to ethical concerns.

There has always been a difficult relationship between economics and ethics, despite the fact that economic science has its origins in philosophy. From Aristotle until the advent of classical thought in the late eighteenth century political economics was considered to be one of the moral sciences in its own right. Adam Smith started the long process of separating the interests of the two disciplines, and this cul-

minated in the exclusion of principles such as reciprocity and solidarity from the economic interpretation of human choices. Adam Smith taught moral sciences at Glasgow University. His *Theory of Moral Sentiments* (Smith, 1759) introduced the *principle of sympathy* as the basis of the moral system, going well beyond the teachings of his master Hutcheson and the vision of his friend Hume. Like Hume and Hutcheson, for Smith, *sympathy* means identification with other people. However, he conceives this sentiment as the fundamental criterion for moral judgment. For Smith, to *empathize* is to morally approve or disapprove of the emotional state or passions of those who take actions that affect other people. This moral basis inspires the behavior of all of us; more precisely, people act in a certain way in order to be appreciated by others. This sentiment differs somewhat from altruism and kindness and, most importantly, does not replace selfishness in any way. This is the ethical basis of classical economic thought which can be said to have begun in 1776 with the publication of Smith's masterpiece *An Inquiry into the Nature and Causes of the Wealth of Nations*. Here he describes the nature of human action as it has long been conceived by economic science: ... *It is not from the benevolence of the butcher, the brewer, or the baker, that we can expect our dinner, but from their regard to their own interest... and by directing that industry in such a manner as its produce may be of the greatest value, he intends only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention* (Smith, 1776). In other words, people follow their own interests, and the appreciation of others is a fundamental part of this because without it they cannot sell their products.

This selfish conception has been strengthened in economic thought in the two centuries since Smith. During this period, the utility-based approach to human behavior became the *rational* framework of mainstream economic modeling. To give one example, the original definition of *economic man* declares that it is ... *an arbitrary definition of man, as a being who inevitably does that by which he may obtain the greatest amount of necessities, conveniences, and luxuries, with the smallest quantity of labour and physical self-denial with which they can be obtained* (Mill, 1844). Neo-classical economics dominated the field in the twentieth century. The influence of positivism over the discipline marginalized ethical concerns that were reduced to an equity-efficiency trade off in the Paretian welfare framework: the optimal allocation of resources does not mean that they are distributed under socially acceptable conditions. ... *In short, a society or an economy can be Pareto-optimal and still be perfectly disgusting* (Sen, 1970). The intervention of the State is then required and this can distort efficiency. This approach made a profound distinction between positive and normative economics which often take opposing positions (van Staveren and Peil, 2009).

The extreme position of the selfish conception of human action along the ethical dimension of economic science is encapsulated in Friedman's arguments when he says that ... *there is one and only one social responsibility of business – to use its resources and engage in activities designed to increase its profits so long as it stays within the rule of the game, which is to say, engages in open and free competition without deception or fraud* (Friedman, 1962). In other words, ethical concerns are defined as the *rules of the game* designed by policy makers, and the only role that corporations can play is to maximize profits while abiding by these rules. Friedman was ahead of his time; his arguments became practical in the 1980s, the era of managerial shareholder capitalism when the reaction to the crisis in corporate profits in the preceding decade signaled the end of the truce in the conflict between capital and work. Until then, this truce had been the essence of the Keynesian-Fordist model that had been followed through management submission to the directives of the property owners and the *financialization* of the economy. In the real world, this new enterprise culture was expressed through important managerial innovations: from 3-10 to

no more than 1-2 year planning (short-termism); from firm growth strategies based on employment and one's own production to growth based on mergers and acquisitions; from enterprise governance models characterized by retaining and reinvesting human as well as economic resources to the *cut jobs and distribute* (to shareholders and management) framework; from Schumpeterian to coercive competition, *i.e.* from a mix of competition and cooperation to more aggressive strategies (low prices, excess capacity, oligopolistic rent destruction, *etc.*) and from re-investment to reacquisition of one's own shares. Such management and governance models were the conditions for the emergence of *irresponsible firms* (Gallino, 2005).

In response to this underlying trend, a growing cohort of economic researchers focused their efforts on Corporate Social Responsibility (CSR). The original inspiration for this field was Howard R. Bowen's seminal work *Social Responsibilities of the Businessman*, in which he argued that this concept *... refers to the obligations of businessmen to pursue those policies, to make those decisions, or to follow those lines of action which are desirable in terms of the objectives and values of our society* (Bowen, 1953). This gave birth to an abundant stream of economic studies on this argument and to different fields of research, as well as to original and heterodox definitions of basic concepts. Among these, the stakeholder theory shed a new light on the real nature of the firm: *a... stakeholder in an organization is (by definition) any group or individual who can affect or is affected by the achievement of the activities of an organization* (Freeman, 1984). From this it logically followed that *... The corporation is an organization engaged in mobilizing resources for productive uses in order to create wealth and other benefits (and not to intentionally destroy wealth, increase risk, or cause harm) for its multiple constituents, or stakeholders* (Post *et al.*, 2002). From this new point of view, the firm cannot afford to ignore the interests of commitments other than those to shareholders for a long period. If they do, they risk facing significant reactions from these non-shareholding stakeholders. These may take the form of boycotts of its products, non-renewal of contracts, labor disputes or unavailability of financial resources (Dematté, 2002). CSR can also produce positive economic results directly when it persuades consumers to pay more for products or employees to accept lower wages. On the other hand, in the short term, the ethical firm can suffer from higher costs than its less ethical competitors. This means that a significant number of firms need to share the basic rules of competition if ethical behavior is not to be penalized. In other words, a widespread enterprise culture of social responsibility is essential, given that it has been shown that if a *critical mass* of firms does not adhere to CSR projects, speculative competition strategies prevail over those desired by the collectivity (Beltratti, 2003).

## Corporate Social Responsibility in the agri-food system

It is now clear that, contrary to Friedman's vision, CSR finds its place in the space where behavior is not a response to rules, but rather comes from individual voluntary choices. This means that the boundary of ethics depends on the specific institutional environment in which the firm operates. Where a Civil Law culture prevails, the space for social responsibility is more restricted than in Common Law countries (Hinna, 2009). In other words, a company being given an area of freedom to operate also means that it must take an equal amount of ethical responsibility (Enderle, 2004). Furthermore, the growth of CSR in the last decade can be seen as *... a response to perceived failures or limitations of governmental regulation following privatisation, globalisation and reforms of welfare state* (Hartmann, 2011).

Agri-food companies can use different tools when adopting socially

responsible policies. First of all, they can write a Social Report, in which the relationships with representative groups of community are included. With reference to sustainable behavior, an environmental balance sheet can be prepared. Several corporations and organizations adopt an Ethical Code which defines the moral responsibilities of each figure who contributes to the firm's action. CSR certifications of compliance with international standards are widespread all over the world. Except for ISO 26000, which was only approved in 2010, each standard refers to a specific aspect of social responsibility: ISO 14001 focuses on the environmental impact of the firm's activities; BS OHSAS 18001 concerns workers' safety conditions; SA 8000 supports CSR policies based on compliance with the main international conventions on human rights and freedom. Italy is the country in which SA 8000 certification is used most frequently, especially in the cleaning, agri-food and trade sectors (Social Accountability Accreditation Services).

Agri-food firms are subject to different types of pressure to adopt responsible behavior. Big corporations, such as modern distribution chains or large food industries, are those mainly called upon by public opinion to follow ethical principles (Hartmann, 2011). Rather than improving their competitiveness, the main problem that these firms face is preventing any occurrence which may give rise to a food scandal that could destroy their painstakingly built reputation. As the *prospect theory* shows, when at risk, people overvalue losses and give less value to welfare improvements (Kahneman and Tversky, 1979). This is particularly true for transactions where information asymmetry between seller and buyer of its different quality characteristics makes food an *experience or trust good* (Nelson, 1970; Darby and Karni, 1973). Trust and reputation are key elements for determining responsible behavior by big food corporations. This means that it is essential for them to obtain full control of the wide and complex network of suppliers. Therefore, we can agree with Hartmann (2011) when she argues that while large enterprises are mainly subject to external CSR pressure on the chain, which results in the adoption of a certified international standard along the whole supply chain, for Small and Medium Enterprises (SMEs) this kind of pressure comes from within the food chain itself.

Agri-food economics research has analyzed these fields in detail in order to provide support to decision makers by supplying them with knowledge. It is well accepted that firms benefit from CSR mainly through improved reputation, moral satisfaction and, most of all, for the widespread environment of trust in the exchange between retailer and consumers. This climate makes transaction costs lower and allows firms to improve their competitive position. On the other hand, responsible behavior can objectively displace resources and, when certified, requires considerable additional bureaucratic-administrative costs. The linkage between acquiring CSR credentials and economies of scale can have adverse effects on SMEs in food supply chains (European Commission, 2002; Ciliberti *et al.*, 2009). Nevertheless, the growing attention that consumers and citizens are paying to the ethical aspects of firms' strategies will inevitably persuade agri-food SMEs to orient their choices towards CSR communication, re-organizing their internal and relationship structures in such a way as to make the related costs sustainable.

Agri-food economics research has to study these specific fields in more depth in order to give useful support to SMEs when they evaluate the economic convenience of CSR. Specific attention also has to be paid to the management and multifunctional role of farms. Economic research must also make more intense efforts to analyze the impact of CSR on specific stakeholders. To be more precise, their willingness to pay for responsible behavior has to be studied in order to determine the flow of benefits produced and to identify the main variables conditioning this behavior. Efficiency and effectiveness analysis of different pressure tools that stakeholders use in favor of CSR are also useful, since we need to make a more careful assessment of the efficiency and

effectiveness of media tools used by companies to communicate their socially responsible behavior.

## Multifunctionality and sustainable development

In agriculture, CSR means multifunctionality. In other words, agriculture is asked not only to supply food and fiber, but also to shape the landscape and to support rural development, as well as guaranteeing food safety and security and managing the rural environment. The *working definition* of multifunctionality underlines two key elements: ... i) *the existence of multiple commodity and non-commodity outputs that are jointly produced by agriculture; ii) the fact that some of the non-commodity outputs exhibit the characteristics of externalities or public goods, with the results that markets for these goods do not exist or function poorly* (OECD, 2001).

This concept has important economic and policy implications. First, the community must trust in the ability of agriculture to achieve collective goals, such as food safety and security, economic development and environmental protection. These functions are jointly produced by agriculture, together with food and fiber. This makes agriculture the one and only economic activity able to satisfy such collective needs. Second, these functions are related to public goods which have a value but not a price, because of the non-existence (or the inefficiency) of a market for them. Without public intervention or an efficient incentives-sanctions scheme, the optimal allocation of resources designed to produce the volume of such non-commodity outputs as would satisfy the demands of society is, therefore, compromised.

The several non-commodity outputs jointly produced by agriculture can be grouped in four main areas of multifunctionality: i) environmental protection; ii) food security/safety; iii) rural development; and iv) animal welfare. Multifunctionality is a central issue in World Trade Organization (WTO) negotiations on food trade. Several countries, such as Japan, Norway and those in the European Union, justify strong support to and protection for domestic agriculture on the basis of its multifunctional nature and the consequent national interests. The Common Agricultural Policy itself defines a multifunctional European Agricultural Model (European Commission, 2003) in which several measures (agro-environmental and single farm payments among the others) are perfectly coherent with this approach.

Economic research has made an in-depth study of multifunctionality, including both the positive and normative aspects (OECD, 2001, 2005, 2008; Anderson, 2002; Vatn, 2002; Lankoski and Ollikainen, 2003; van Huylenbroeck and Durand, 2003). On one hand, the value of public goods (landscape, land conservation, food safety, rural well being, *etc.*) produced are determined; the degree of its conjunction with food and fiber production is analyzed; the economic convenience for farms of adhering to environmental conservation programs or certifying some socially responsible behavior is evaluated. On the other hand, the most effective policy arrangements for supporting multifunctionality are studied. Such efforts have not yet had a significant impact on policy. The international negotiations on food trade are still searching for common ground on the basic concepts that have been put on the table. The Common Agricultural Policy is not always able to identify the optimal incentive tools for supporting some of the functions of agriculture. As a result, even today several observers and decision makers consider multifunctionality no more than a veil which governments use to hide their real policy goals. Today, it is still not clear what the link between instruments such as single farm payments and multifunctionality is. To be more precise, the amounts paid do not have any connection with the flow of social benefits produced by the farms who receive them.

Sustainability is the element of multifunctionality which has attracted the most attention from researchers and policy makers. Agricultural

and agri-food economics need to carry out further research in three main fields of study. The first is methods of evaluating environmental resources. New knowledge is needed if evaluation is to be improved. Diagnostic parameters and protocols are arranged with the aim of avoiding the most frequent problems linked to bad statistical designs (poor sampling, sloppy framing, selection of attributes and levels, *etc.*). But there is growing dissatisfaction with the neoclassical theoretical base of several assessment methods: non-market evaluation is consistent with the rational actor model, where preferences are exogenous, *i.e.* not conditioned by other individuals or social institutions (Gowdy, 2004). Social psychology and behavioral economics argue that human preferences are the product of people's attitudes, behavior and beliefs, and that consequently these have to be considered endogenous to the specific evaluation situation (Spash and Carter, 2001). In other words, ... *in many circumstances economic agents respond to what they think is right or wrong, and not necessarily to their inner preferences. In terms of behavioral economics, this can even be taken so far as to argue that agents derive utility from acting righteously* (Carias Vega and Alpizar, 2011).

The second field that needs further investigation is directly linked to the first. This is the methodologies and protocols used for normative prescriptions of the use and management of environmental resources. Cost-benefit and cost-effectiveness analysis, and multi-criteria and multi-objective analysis are the main procedures used in this field. The focus of the debate is the welfare matrix of cost-benefit analysis and its typical attempts to give monetary value to some intangible assets, such as landscape, environmental resources, biodiversity, and so on. Other problems of cost-benefit analysis are shadow prices and discount rate choice, and the determination and choice of the probability of events occurring in conditions of risk. Cost-effectiveness analysis is that preferred by non-economists because it is simple and uses heterogeneous units of measurement. The two methods have different theoretical and ethical roots. While cost-benefit analysis refers to individual preferences and is aimed at maximizing the value created by the project, cost-effectiveness tries to minimize the cost of some pre-determined result. This means that the focus of cost-effectiveness analysis is objective needs, somewhat similar to what Sen (1980) called *basic capabilities*, rather than subjective demands (Dolan and Edlin, 2002). When the project produces simultaneous effects on different goods, the evaluation must adopt a multi-dimensional approach, which is typical of multi-criteria analysis.

The third, but not least important, field of research where further efforts are needed is measurement of the performance of sustainability. The scientific community has set up and empirically tested several performance indicators for sustainability, such as the Ecological Footprint (Wackernagel and Rees, 1996) or the FEEM (Fondazione Eni Enrico Mattei) index (Cruciani and Lanzi, 2010). For agri-food economics the most promising perspectives come from the Life Cycle Assessment (LCA). This is a procedure which analyzes the interactions of goods or services with the environment during its whole lifespan, *i.e.* from the preliminary phases of its production to the post-consumption stages (delivery and recycling). A specific and fashionable use of LCA is determining the Carbon Footprint. The general public has recently become more aware of its importance as part of the general concern about and awareness of climate change and global warming. *The carbon footprint is a measure of the exclusive total amount of carbon dioxide emissions that is directly and indirectly caused by an activity or is accumulated over the life stages of a product* (Wiedmann and Minx, 2008). The present research in this field is aimed at trying to find a compromise between the bottom-up method, namely Process Analysis (PA), which assesses the environmental impact of individual products from the cradle to the grave, and the top-down method, where input-output tables are used to analyze the effects of all the economic activities of a whole sector or of an economic system. PA produces more pre-

cise and detailed results for defined goods, but it needs a great deal of data and information that is very expensive to collect, and it also suffers from the limitation that the boundaries of the system must be defined, and so there are truncation errors. Environmental input-output analysis adopts a sector- or economy-wide approach, which is cheaper but has only limited value when analyzing the environmental impact of single products (Wiedmann, 2009). Today the scientific community is involved in creating a hybrid life cycle assessment approach, which emphasizes the strong elements of the two above mentioned methodologies and minimizes the weak aspects (Minx *et al.*, 2008).

All these efforts of the scientific community in the field of sustainability can be interpreted as signs of an underlying trend towards a progressive shift in economic thought from the neo-classical view of environmental economics to the new ecological economics approach. Both neo-classical and ecological models are basically utilitarian and anthropocentric. Nevertheless, ecological economics considers individual preferences, as neo-classical economists do, but it does not conceive them as either sources of sovereignty or the only normative criteria. Furthermore, neo-classical environmental economics does not ignore equity issues, but the focus is on efficiency, in perfect coherence with Pareto's optimality framework. Ecological economics, on the other hand, makes sustainability rather than efficiency the central concern of the analysis. This leads to a substantial difference to neo-classical economics. While the latter trusts in markets and the capacity of technology to support a truly sustainable growth process, ecological economists are persuaded that income and wealth redistribution policies are needed if long-term development goals are to be achieved (Common and Stagl, 2005).

## Conclusions

This survey has tried to describe the present state of development of agri-food economics science on important issues such as logistics, ethics and sustainability. The general feeling created by the analysis is that there has been a great deal of research and that significant goals have been achieved. However, there is widespread dissatisfaction in the scientific community about to what extent the knowledge obtained can be applied in the real world, especially with reference to ethical and environmental concerns.

This brings to mind the message of Leonardo da Vinci's *Vitruvian Man* in which the human species is conceived as the unit of measurement of all things. The *Vitruvian Man* is an icon of Western thought and civilization. It has inspired, among other things, the anthropocentric approach which has characterized ethics and environmental economic analysis so far. The belief that mankind is at the center of the universe has been responsible for significant progress throughout history. Furthermore, the same *divine proportion* that characterizes the relationship between the circle and the square in which are inscribed the two figures of the *Vitruvian Man* seems to reveal some kind of divine sanction for such a role. This may be true, but at the same time it also means that it is impossible for mankind to square the circle. This reading of Leonardo's message sheds light on the existential anguish of mankind's condition (Gramigna, 2000). Our ability to measure has helped us to achieve significant results, but at the same time has forced us into the restricted area within the square, the top of which rests on the head of the *Vitruvian Man* like a lid. Perhaps this deeply unsatisfactory situation is in itself the necessary agent to generate scientific research and progress.

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