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Sustainability dimensions of agricultural development in Almería (Spain): The experience of 50 years

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Sustainability dimensions of agricultural development in Almería (Spain)

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Abstract

Sustainable management not only constitutes the main challenge for agricultural systems, it is also becoming a driver of development in many regions of the world. As well as guaranteeing the production of food and other basic products, agriculture can foment social progress and economic growth while maintaining environmental quality. On a global scale, sustainable development can currently be said to be one of the main objectives of communities and societies. However, it is subject to different connotations due to the heterogeneous nature of productive systems and of the natural environment. In addition, it becomes difficult to achieve a balance between the three dimensions of sustainability due to a series of problems, including periods of recession, turbulent markets and changes in management policies on both a general and a sectorial level. Analyses of this issue must therefore strive to establish their results in practice and on holistic approaches. Particular emphasis should be placed on the generation of synergies and on the appropriate balance of the essential components that make up sustainable development. Along these lines, different practical experiences on an international level have illustrated the potential of agriculture to fulfil the above-mentioned aims. At the same time this sector currently encounters a series of challenges, among which we should mention growing internationalisation of the agrifood trade, increasing control of the distribution chains and varying strategies of agrarian policy. Indeed, in the context of European rural policy there has been considerable debate in recent years concerning the role of the agricultural sector and how it should face up to the following challenges: productivity-competitiveness, environmental protection and socio-economic development. This paper analyses how this sector in the province of Almería (Spain), based on small-scale horticultural farms, has risen to the above issues over recent decades. This case study provides some insights into the different synergies between sustainability dimensions. It is particularly interesting to observe how a highly social agrarian system has evolved thanks to the combination of certain factors: the basic structure of family-run concerns, the creation of commercial and financial entities and the generation of endogenous auxiliary industries. An additional point of interest resides in the system's manifest capacity to adapt and innovate in practices and technologies that are environmentally respectful. Finally, the fact that this sector, essentially without outside support, provides the basis for economic sustainability of the whole province makes it a paradigm of competitiveness in the European context. The integration of sustainability components observed in the development of Almería's horticultural sector may prove useful in helping other regions to adapt and improve their agricultural systems, especially in cases where small-scale farming predominates.

Keywords: Sustainability, horticultural family farms, development, environmentally respectful methods, socio-economic factors, Almería.

JEL: Q01, Q12, Q13

1. Introduction.

Over recent decades, the issues of “sustainability” and “sustainable development” have been widely adopted as part of the fundamental aims of numerous international organisms, national institutions, businesses, research entities, social groups, communities, etc. Based on the classic definition of sustainable development by the Brundtland Commission (World Commission on Environment and Development, 1987), a multitude of different definitions and indicators have been put forward (for a review see e.g. Thompson, 2007; Quental *et al.*, 2011). As Kates *et al.* (2005, p. 20) point out “the concrete challenges of sustainable development are at least as heterogeneous and complex as the diversity of human societies and natural ecosystems around the world”. Nonetheless, it is commonly accepted that sustainable development is based on three fundamental aspects: economic, social and environmental development (World Summit of Sustainable Development, 2002; DFID, 2004; OECD, 2008).

The multi-dimensional nature of sustainability is recognised in the agricultural sector just as it is in other productive activities (Ikerd 1993; Rigby and Cáceres, 2001; DFID, 2004; Dillon *et al.*, 2007, 2010)¹. Ikerd (1993, p. 30) considers that a sustainable agrarian system must be “resource conserving, socially supportive, commercially competitive and environmentally sound”. The trade-offs between the three dimensions is evident, since environmental and social sustainability depend on economic profitability that must provide for reinvestment in the maintenance of resources and on a satisfactory standard of living of people involved in the production process (DFID, 2004).

Along these lines, in its Communication “A framework for indicators for the economic and social dimensions of sustainable agriculture and rural development” the European Commission (2001, p. 3) indicates the relevance of synergies among these components and the need to balance them appropriately: “Economic, social and environmental objectives can to a certain degree develop synergies. However, they are not always mutually supportive; they even can compete with each other. Where this is the case, the concept of sustainability refers to the need to strike the right balance between its three elements”. Generally speaking, it is accepted that one of

¹ Nevertheless, the concept of sustainability related to agriculture continues to be a topic of debate (e.g. Thompson, 2007).

the greatest challenges of current agricultural systems is to balance these three components (DFID, 2004; Dillon *et al.*, 2010).

However, current agriculture-based development, particularly for small farms, is also affected by a series of market variables and by international policies that also have a bearing on sustainability: internationalisation, changes in demand, the power of the distribution chain and the progressive phasing out of several policies of subsidies or support for the sector. Over recent decades, and especially in the case of Europe, several development strategies in rural areas have pointed to the difficult “economic sustainability” of agriculture, at least as the sole basis for providing wider socio-economic development (Terluin, 2003; Ward *et al.*, 2005). The framework of commercial liberalisation has made it more difficult to be competitive while at the same time providing quality products, especially using environment-friendly practices (Galdeano-Gómez *et al.*, 2008).

It is however clear that the challenge of achieving sustainable development and the strategies to be adopted must be based on practice (Kates *et al.*, 2005), given the heterogeneous and complex nature of the productive activities, the environmental components and the socio-economic implications.

This paper aims to provide arguments for multi-dimensional sustainability in agricultural-based development, particularly related to the challenges in the context of European strategies for the sustainability of rural areas: competitiveness, respect for the environment and socio-economic development.

To this end, it analyses the specific case of the agriculture-based development of Almería province in Spain, which has experienced an unprecedented transformation in terms of Spain’s recent economic history. Up to the mid-1960’s, all of the social and economic indicators characterised Almería as an underdeveloped province in a state of decline. However, from that point on this province underwent a period of growth far greater than that experienced by the rest of the region or by the nation as a whole. This success story has been driven by the intensive agriculture of horticultural products and the local structure of commercialisation, as well as related auxiliary industries, which have benefited not only the growers themselves, but also multiple sectors of the economy and society. As Tout (1990, p. 304) states: “A horticultural revolution has occurred in parts of the province of Almería in the last 20 years, as formerly barren lands have been turned into extremely productive family farms”. Recently Downward and Taylor (2007, p. 281) quote the following description made by Almería’s Director of Agriculture: “This is the most social level of agriculture in the world, not even the best communist system would have achieved what has been achieved in Almería... and by people

who maybe 50 years ago would have only had a herd of goats”. Likewise, environmental components have played an important role, particularly from the perspective of efficient use of natural resources, overcoming externalities and the tending towards a production system that is ever more environmentally respectful (Galdeano-Gómez *et al.*, 2008).

2. The agrifood market context and the challenge of sustainable development.

When referring to agriculture, the idea of sustainability is often more rigorous than when applied to other sectors of production, since this activity involves several connotations of a social nature (e.g. development in rural areas and provision of food products) and environmental implications (e.g. the use of basic natural resources: land, water, etc.) which are not so explicit in other economic activities. These traditional components of agriculture are currently affected by another series of factors related to economic growth and internationalisation. The current structure of the agri-food market therefore imposes additional challenges on the different agricultural sub-sectors which are inevitably linked to the perception of sustainability.

Indeed, the agri-food system has undergone major changes over recent decades on an international scale. Among the factors that have influenced these changes we should highlight the following (Galdeano, 2003; Weis, 2007): new demand requirements and changes in the international distribution of agricultural products.

As regards the former, we should mention increased demand for product quality and added values (packaging, presentation, speed and guarantee of supply, etc.), which tend to increase in both quantity and diversity at higher levels of income. As far as quality is concerned, consumers place ever greater importance on health issues and environment-friendly production methods, particularly in developed economies (Carpentier and Ervin, 2002). Clearly, these demand characteristics are an incentive for increasingly green production, but they must also be complemented by the possibility of incorporating other added values to the product in order to compete in markets that are more and more demanding support (Galdeano-Gómez *et al.*, 2012).

Regarding distribution, on-going internationalisation has also affected the agri-food sector due to processes of commercial liberalisation which have been propitious for the development of large distribution chains (supermarkets, hypermarkets, etc.) on an international scale (Weis, 2007; McMichel, 2009). This has meant that many agricultural productive sectors, particularly those based on small-scale farming, have had to rethink their activity, as they now have to compete in a wider market. Furthermore, within the European Union they have had to face the dilemma of whether or not to continue with the traditional pillar of support, the Common Agricultural Policy, as well as rethinking rural development policies, in which the agricultural

sector has tended to lose importance despite the agri-food crisis of recent years (Ward *et al.*, 2005).

Thus, over recent decades the guidelines of socio-economic policies and regional development, in the rural areas of Europe, have implied a reduction of the surface area cultivated and the workforce employed, and the redimensioning of farming activity and the multifunctionality of rural activities support (Galdeano-Gómez *et al.*, 2012). Economic growth has been associated with phenomena of productive diversification and consumption (tourism, leisure, typical local products, nature conservation, etc.), in which agriculture is no longer the driving force behind the economy (Van der Ploeg *et al.*, 2000; Brouwer, 2004). The overall trend is to identify the minor role of the agrarian sector in stimulating socio-economic development in rural regions (Terluin, 2003; Bryden and Hart, 2004) and to question the sector's capacity to be a competitive productive activity while at the same time being environmentally sustainable (Losch, 2004; Weis, 2007).

In this context, we consider that competitiveness should not depend on subsidies, since these have a bearing on the concept of "fair trade" as a fundamental component of sustainable development (World Bank, 2003; OECD, 2006). Furthermore, over recent decades many agricultural subsidies in developed countries (prices, production, inputs, etc.) have had a negative effect on the environmental sustainability of this sector (DFID, 2004). It follows, therefore, that a farming activity should be considered as sustainable competitive when it proves capable of sustaining itself over time without external support.

All these factors lead us to consider that in general terms the challenges of sustainability for any agricultural productive sector depend on a series of demands among which the following can be highlighted from the productive, environmental and socio-economic points of view (Galdeano-Gómez *et al.*, 2012):

a) Productive perspective. This includes: competitiveness (on a national and/or international scale) allowing the sector to be self-sustaining; products suited to meeting greater food demand (added value, quality, etc.); technological efficiency and innovative capacity (e.g. eco-innovation and eco-efficiency).

b) Environmental perspective. This comprises: appropriate and efficient use of natural resources (water, soil, etc.); environmentally respectful production (reduction of the environmental impact of the activity); tendency to greener produce.

c) Socio-economic perspective. This includes: a wide basis of development on local, regional levels, etc.; the capacity to distribute fairly the economic and welfare effects; maintenance of productive structures of a social nature (family farms, cooperatives, etc.).

Without doubt, it is difficult to integrate the different perspectives in the current agri-food market. For instance, although the slogan “green and competitive” has figured in many development strategies over recent decades (European Commission, 2001, 2007), in many cases the third component (i.e. the socio-economic aspect) remains the main challenge that has been neglected (Kates *et al.*, 2005; Cuthill, 2010), mainly as a result of the influence of multinationals in agri-food commerce (Weis, 2007).

The following section analyses how these challenges have been approached from the three perspectives described above in the specific case of the agricultural development of Almería.

3. The horticultural specialisation of Almería and its productive indicators.

The remarkable degree of agricultural specialisation has been the main feature of the development in the province of Almería over the last five decades. The importance of the agricultural sector in the productive structure of Almería province in the 1960s has practically been maintained to the present day. Approximately 24% of the province’s GDP depends directly on agriculture, particularly intensive horticulture, and agricultural employment represents 28% of the total; in both cases these figures are much higher than the national and European averages. The general downward trend in the importance of the agricultural sector has been less marked in Almería, which has intensified its specialisation. Indeed, the index of agricultural specialisation grew considerably from 1969 to 1979, maintaining very high levels thereafter (Aznar-Sánchez *et al.*, 2011).

The annual horticultural production reaches around 3 million tonnes, making Almería the top vegetable growing province in Spain (which is the 5th producer in the world), representing about 25% of the national total. Nonetheless, this is a case of specialisation in certain produce (tomato, pepper, cucumber, green bean, zucchini, eggplant, water melon and melon) which have figured over the whole period of development and which taken individually represent percentages of production between 25% and 62% of the national totals (Galdeano-Gómez and Godoy-Durán, 2010).

One of the most representative indicators of competitiveness is the sector’s exports capacity. Sales to international markets did not begin until the late 1970s, and in 1980 they only accounted for 9% of production. From the second half of the nineties, sales in foreign markets continued to rise to the point where they currently account for over 60% of Almería’s horticultural production. During this time this province became the largest Spanish exporter of fresh vegetables, representing about 30% of the national total in recent years. Indeed, over recent years Spain has become the world’s leading exporter of vegetables and the majority of Almería’s

most representative crops each account for over 50% of total national exports of that crop (Pérez-Mesa and Galdeano-Gómez, 2010).

However, this indicator and those mentioned above would not be so relevant if they did not imply that the horticultural sector were capable of sustaining itself without outside support. Along these lines, unlike other European agricultural sectors in which the support of the Common Agricultural Policy has played an extremely relevant role (cereals, dairy produce, beef, sugar, etc.), Almería's intensive horticulture has been developed thanks to family investment and capital, with few or no subsidies (Galdeano-Gómez *et al.*, 2011). Despite Spain's eventual incorporation into the European Economic Community (EEC) in 1986 (when the sector was already well developed), many restrictions were imposed on the sector over a ten-year transition period. It was not until the end of this period and the advent of the Common Market Organization of Fruit and Vegetables in 1996 that the first subsidies began to be granted, and even then they were relatively small and directed essentially at improving quality and developing environment-friendly practices. Thus, while for some crops and for some Spanish regions Community aid represents over 35% of the value of the produce and of the farmers' income, in the fruit and vegetables sector they account for no more than 2%; and in the specific case of Almería's agriculture subsidies only account for 1.6% of agricultural income (Consejería de Agricultura y Pesca, 2010).

4. Environmental challenges and tendency to greener produce in the horticultural sector of Almería.

Intensive farming in Almería represents the largest agrarian transformation that Spain has experienced in recent decades and the impact on the environment and the use of resources are directly related to the technology used in this type of horticulture. First of all, it should be understood that these crops were established in semi-arid terrain thanks to the exploitation of underground aquifers that were abundant enough to withstand the initial development. The first step forward took place with the introduction of the farming technique called "enarenado" (sand covered crops), which completely transformed unproductive lands into prosperous farms with higher yields and a greater degree of precocity (Tout, 1990). Later, people began to construct the first plastic greenhouses intended to provide effective protection against winds and low winter temperatures. This further contributed to increased yields, precocity, quality and water conservation. In addition, the favourable climate allows crops to be grown in greenhouses whose structure is extremely simple and which do not require additional energy input for climate

control (e.g. heating systems) (Galdeano-Gómez *et al.*, 2012).

In its initial stage, however, intensive horticulture was developed without any type of territorial planning and organisation, and the rapid growth generated some negative externalities (Ferraro, 2000). Among these we should highlight the over-exploitation and contamination of aquifers, the extraction of sand, and uncontrolled dumping of waste (organic, plastic, packaging, etc.) (Gómez, 2003).

As regards the hydrological factor, the expansion of the surface area dedicated to greenhouses exerted great pressure on hydric supply, which became manifest as unmistakable symptoms of degradation appeared in the aquifers, such as the progressive salinisation in the areas closest to the shore (Tout, 1990). The solution to this problem began to be introduced in the late 1980s in the form of generalised systems of water economy (drip irrigation, hydroponics, etc.) and increased supply (desalinisation plants, reservoirs, reusage), together with innovations in studies of the capacity and evolution of the aquifers with the aim of establishing a suitable framework to regulate demand (Ferraro, 2000; Downward and Taylor, 2007; Galdeano-Gómez *et al.*, 2008). Nowadays, Almería is Spain's most technified and efficient irrigation area, with widespread use of drip irrigation systems and increasing application of water treatment and reusage techniques (Fernández *et al.*, 2007).²

It should also be mentioned that since the early 2000s the surface area dedicated to greenhouse production has hardly increased. This has been due to several factors, such as the increase in the cost of inputs (labour, seeds...) and a trend towards stabilisation of vegetable sale prices. This has led to a tendency towards greater investment in technology, with a view to increasing crop productivity and improving resource efficiency.

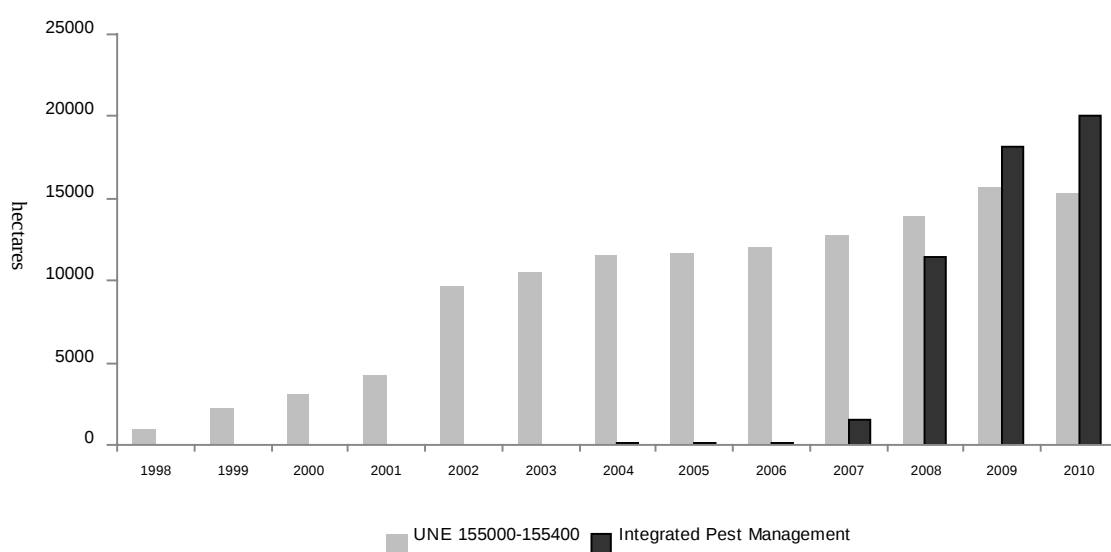
The use of sand and its negative externalities (deterioration of the coastal area) also began to be corrected from the late 1980s. This was due to a system of restrictions and the progressive substitution of "enarenado" with soilless or hydroponic systems, which have also complemented the techniques of water usage efficiency (Galdeano-Gómez *et al.*, 2012).

In addition, some corrective measures have been applied in order to reduce waste, residues and the use of pesticides. For example, different Rural Hygiene Plans have been implemented to improve the collection of many types of waste materials and their treatment, which has helped to reduce this problem (Gómez, 2003). We should also highlight the growing awareness of the farmers regarding the necessity to maintain a clean environment, particularly as a result of the

² The income generated per m³ of water in the greenhouses of Almería is almost twelve-fold that obtained in horticultural crops in the open field and six-fold that generated on average by irrigation nationwide (Fernández *et al.*, 2007).

incorporation of biological control techniques and the treatment of pests in crops. One example that highlights the adoption of environment-friendly production techniques is that in only three years (2006-2009) integrated pest management, IPM, was widely adopted for the main crops. Almería has become the world's leading area using this system, ahead of countries such as Holland and Israel (Pérez-Mesa and Galdeano-Gómez, 2010). The most spectacular result of the implementation of IPM has been the drastic reduction in the use of phytosanitary products and the almost total elimination of chemical residues (Van der Bloom, 2010). All of these changes would have been impossible without a change in attitude on the part of the farmers. Indeed, Medina (2009) highlights the greater awareness of Almería's farmers compared to those from other areas of Spain. Figure 1 shows the evolution in hectares over recent years of IPM and the certificates UNE-155000 and 155400, which includes environmental control (Galdeano-Gómez *et al.*, 2008; Pérez-Mesa and Galdeano-Gómez, 2010).

Figure 1. Adoption of environmental control certificates (hectares).



Source: Pérez-Mesa and Galdeano-Gómez (2010).

Also, the changing landscape as a result of the extension of the greenhouse is another environmental effect that usually concerns analysts. Indeed, the provincial land area dedicated to horticultural greenhouse farming has undergone spectacular growth over the last forty years, increasing from barely 3,000 hectares in 1970 to a round 27,000 hectares in 2010. This figure makes Almería the Spanish province with the largest area of greenhouse crops. Nevertheless, this considerable transformation of landscape has taken place in a semi-arid area, practically a desert landscape that was home to the odd herd of goats (Downward and Taylor, 2007), and so the so-

called degradation of the landscape is seen from a different perspective by local farmers and inhabitants.

Moreover, we should mention that this high concentration of greenhouses seems to have had a positive impact on the struggle to combat climate change. The existence of greenhouses in the province of Almería has had a positive effect on both CO₂ reduction (as it is absorbed by crops) and in decreasing local temperature, acting as a brake on atmospheric warming. According to Campa *et al.* (2008), the “albedo” (whiteness) effect generated by the plastic greenhouse covering reduced temperatures in the Almería “Poniente” region by 0.75 degrees from 1983 to 2006. According to their data of SWRF (surface shortwave radiative forcing) and local temperatures trends, the recent development of greenhouse horticulture in this area may have masked local warming signals associated with the increase of greenhouse gases.³

The result of all the above is a constant improvement in the efficient use of natural resources and a gradual internalisation of environmental costs (Sánchez-Picón *et al.*, 2011).

5. The development of social and economic structures related to horticulture.

A relevant feature of the development of Almería’s intensive farming is its social nature and the fact that it represents widespread development in the whole of the provincial economy, generating few disparities in terms of income and welfare. It is important to highlight three indicative elements that have given rise to this characteristic (Galdeano-Gómez *et al.*, 2011, 2012): a) production based on many small family-run firms; b) the role of cooperative entities; and c) the development of a services sector and of auxiliary industries.

a) The family nature of the farms and their reduced size were characteristics that appeared at the beginning of the sector’s development but have endured until the present day, making them the most characteristic and unique traits (García-Latorre *et al.*, 2001; Downward and Taylor, 2007). The farmland is widely divided among 13,500 small-scale farmers in which the family represents the basis of the workforce that the horticultural growers require due to the manual nature of many of the activities. This structure is also interesting from the mainstreaming gender, as many of the owners of these farms are women (15%) and is also widely shared ownership extended (about 30%) between men and women (Céspedes *et al.*, 2009).

During the first decades most of the profit from the farming activity has gone towards

³ This factor has given rise to the paradigm: “Almería’s greenhouses contribute to reducing the greenhouse effect” (Galdeano-Gómez and Godoy-Durán, 2010).

paying this family-based workforce, allowing the income generated to be distributed homogeneously. Nevertheless, the workforce has undergone certain changes from the 90's to the present day. Employment opportunities in auxiliary industries and the greater surface area of crops have led to the increasing employment of paid workers. As in other agricultural areas in Spain, the lack of workforce, especially for occasional work, has been solved by employing foreign workers since the mid-1990s (Galdeano-Gómez *et al.*, 2012).

Immigration occurred on a massive scale, and in the early years it was uncontrolled, which led to several problems. There was an excessive turnover of workers and widespread presence of illegal immigrants. Consequently, suitable management of this immigration has become one of the major social challenges facing the intensive agriculture sector in recent years. Different Government regulations regarding the immigrant population and stricter frontier controls have helped to reduce the problem of undocumented immigrants and the excessive arrival of foreign workers to the province. Within the private sector a series of measures were also taken to improve this situation. These have included making greenhouse work more attractive (fixing salaries as a function of productivity, mechanisation of the hardest tasks, etc.) and adopting formulas which provide work stability and allow specialisation. In addition, several producer associations and cooperatives have put into practice campaigns to contract immigrant workers in their country of origin in order to guarantee the availability of a legal workforce (Aznar-Sánchez, 2011). All of this is providing greater stability and social integration of immigrant workers, who now often come with their families and enjoy the same services and social guarantees as Spanish nationals.

b) On the other hand, it would have been difficult to sustain this extensive structure of small family-run firms had there not been a parallel **development of cooperative entities**. Cooperative entities are deemed to be the most appropriate type of mechanism to guarantee the stability of the farming sector by pooling resources in order to improve the position in the agri-food chain, access to finance and technology and so on (Arcas-Lario and Hernández-Espallardo, 2003). In addition, cooperatives constitute fundamental drivers for social networks and social cohesion, i.e. social capital ⁴(Sporleder and Wu, 2006; Pretty, 2008), as they tend to be associated with a wide sector of the community. In this sense, the cooperatives in Almería represent the leadership of economic development, but also of the social networks to achieve “collective objectives”, e.g. equity, services to society, social infrastructure, and so on (Sporleder and Wu,

⁴ Social capital is considered to be one of the fundamental pillars of the social dimension of agricultural sustainability (Pretty, 2008).

2006; Pretty *et al.*, 2011). Among these services to society we should mention encouraging environment-friendly practices in different productive activities.

As regards financing services, the private credit facilities offered by marketing firms, and particularly the rising importance of local credit cooperatives, mainly the Caja Rural de Almería (now Caja Rural Intermediterránea, Cajamar), created in the 1960s as an agricultural credit cooperative (with a high degree of participation in the capital from local farmers), were fundamental for continued investment, given the lack of Spanish government support and foreign investment (Galdeano-Gómez *et al.*, 2012).

The cooperatives have also played a fundamental role in the development of a local marketing structure, which has been necessary to adapt to an agrifood system that is dominated by distribution firms whose operations are markedly international. These entities have allowed the concentration of considerable volumes of farming supply, enabling direct sales to consumer markets through distribution companies organized by the growers themselves. This implies a vertical integration and allows an ever greater part of the value added generated to be retained in the sector (Galdeano-Gómez *et al.*, 2011). As the large commercial chains continue to strengthen their position through processes of concentration and globalisation, Almería's farming-marketing cooperatives, have recently initiated their own process of concentration in order to improve the family farms' economic results (Pérez-Mesa and Galdeano-Gómez, 2010).

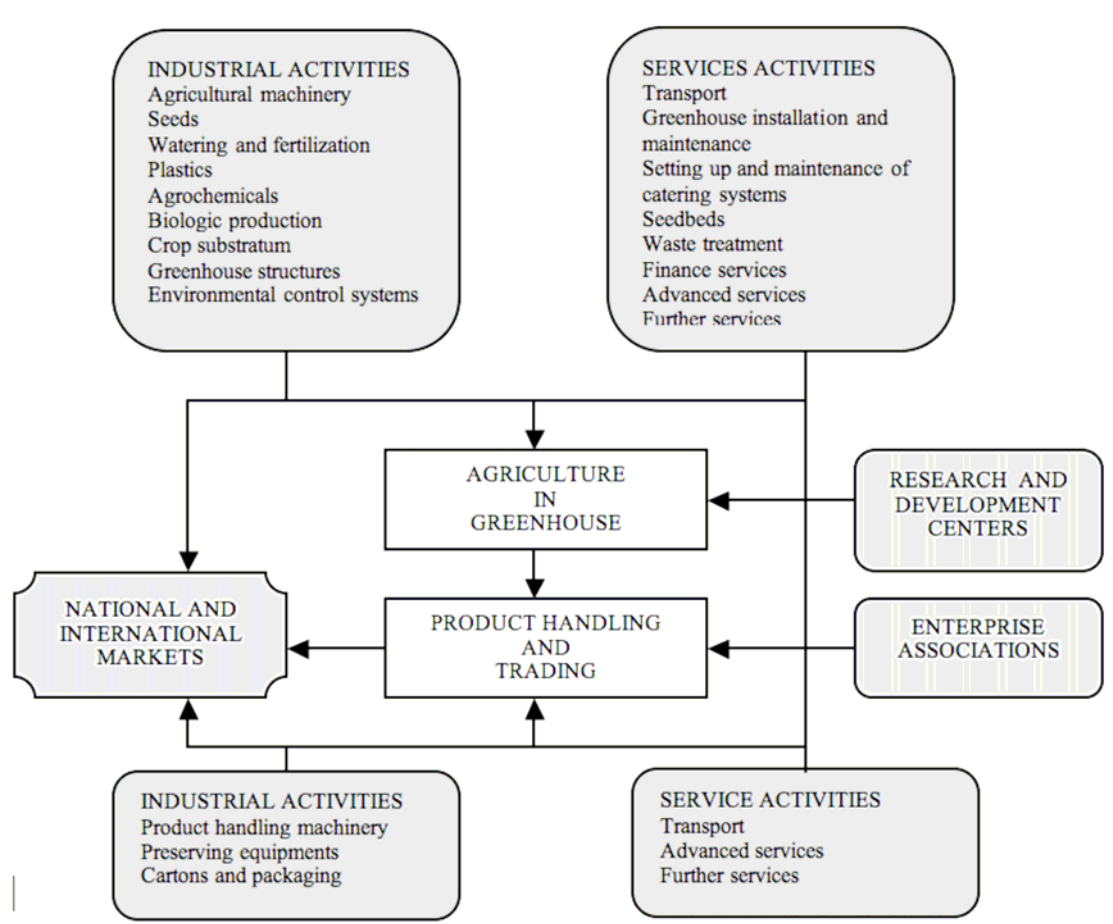
At present these farming organisations produce and market 65% of the horticultural produce of Almería, which is higher than the sales volume of agricultural cooperatives in any other Spanish province (CCAE, 2010).

In addition, these entities play a fundamental role in environmental management, by channelling the public programmes aimed at this issue; their systems of evaluation and control allow better application of recommended measures to achieve environmental aims (Galdeano-Gómez *et al.*, 2008). At the same time, following the lead of Cajamar, they promote the corporate social responsibility of other businesses in the sector, also encouraging research, education and awareness of environmental issues via seminars and scientific meetings aimed at a wide segment of Almería's society.

c) It should also be taken into account that intensive horticulture has also brought about widespread local development of a multi-functional nature. Indeed, one of the novel components of the sector in Almería is the evolution of **a major agro-industrial cluster around the production and marketing of vegetables** (Aznar-Sánchez *et al.*, 2011). At the end of the 1980s most of the inputs used by this sector came from other Spanish provinces or countries with a stronger tradition of horticulture. From then on, centres of production and distribution were set

up in the province itself, as were local companies, often small family-run concerns and cooperatives, in the different sectors: services (handling, marketing, transport, financial systems, IT services, agronomic assessment, etc.); industrial activities (plastics, irrigation and fertigation, containers and greenhouses); and technological inputs (seeds, biological production, machinery and agro-chemical products) (Aznar-Sánchez and Sánchez-Picón, 2010). As a result, a complex system of diverse industrial activities and services has grown and prospered around the greenhouse farming sector (Figure 2).

Figure 2. Production links of the agro-industrial cluster of Almería



Source: Aznar-Sánchez *et al.* (2011).

6. Conclusions

Economic, environmental and social sustainability today constitutes one of the main concerns of analysts and policy makers involved in the development of any region. Like any other productive sector, agriculture has to face these challenges, but as the main supplier of food it is closely linked to both environmental sustainability and the development of many rural areas.

Nevertheless, given the current context of internationalisation of the agrifood system and the consideration of strategies of territorial rather than sectorial multifunctionality, as is the case in the rural areas of Europe, it is questionable whether the agricultural sector has the capacity to meet the above-mentioned demands in a competitive environment without government support. However, unlike most studies, which tend to identify the minor role of the agrarian sector in stimulating sustainable development in rural regions, this paper outlines the particular role of this sector in Almería in the face of these challenges.

In Almería, horticulture has been especially relevant due to the unique features of the sector from the economic, environmental and social points of view. The sector's capacity to generate economic growth and to sustain itself are signs of competitiveness, not only at national level, but also regarding exports. At the same time, the ability to use resources efficiently and to reduce externalities to the environment despite the intensive nature of the activity are indicative of its eco-efficiency and eco-innovation. Moreover, one of the most relevant characteristics is that the above-mentioned factors have been compatible with social, multi-functional development of the productive activity. The main reason for this is that this sector is based on small family-run firms to a great extent, and they have allowed the income generated in the sector to be redistributed quite equally among a wide segment of the population of Almería. At the same time, these firms tend to create associative and cooperative structures that are adapted to market needs.

Although this sector still has to face many challenges, such as the on-going processes of reducing some negative externalities to the environment and achieving closer cooperation among the family firms in the sector (e.g. grouping of cooperatives), there are indicators that point to the coexistence the different components of sustainability, without which this level of development could not have been sustained over the last five decades.

Furthermore, this farming experience provides evidence of the synergies among these components. Thus, for example, it would be hard to understand the efficiency in overcoming externalities without the structure based on small family-run firms and the development of cooperatives, which are considered appropriate for the challenges of environmental sustainability. It would have also proved difficult to attain competitiveness and socio-economic development without these financing and marketing cooperative entities or without the efficient use of natural resources and adaptation of products to meet the environmental quality requirements of end markets. Nor would this have been possible without the maintenance of productive structures which employ a large volume of specialised labour, while at the same time maintaining close links with society as a whole.

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