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CASE REPORT

The social dimension as a driver of sustainable development: the case of family farms in southeast Spain

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Abstract The social pillar has often been treated as an 'add on' in sustainable development studies, and analyses of its 'proactivity' in economic, environmental, and social transformations to sustainability outcomes are scant. The present paper looks at the social dimension as a key driver of sustainable development. Social factors in the farming system in southeast Spain are analyzed to show how family farms and their networks can integrate socio-economic and eco-social goals, promoting the generation of synergies and trade-offs between the dimensions of sustainability. This study contributes to existing debate on the role of family farms in the framework of European rural development.

Keywords Sustainable development · Social dimension · Family farms · Socio-economic factors · Eco-social goals · Southeast Spain

Introduction

In recent decades, particularly since the Brundtland report in 1987 (World Commission on Environment and Development 1987), numerous definitions and concepts of sustainable development have been suggested (for a review, see e.g., Thompson 2007; Quental et al. 2011). This is due to the heterogeneity and complexity of societies and ecosystems, all of which have to face different specific challenges in terms of sustainability, implying that issues related to social sustainability must in practice be handled at the local level (Kates et al. 2005; McLarty et al. 2014). Nevertheless, it is widely accepted that the multidimensional nature of sustainable development means that it should be based on the correct balance of several elements that can be grouped in the economic, social, and environmental dimensions. This approach is often oversimplified in that it fails to consider, for example, the different subdimensions and interrelated elements that exist a priori among them. This model has, in fact, resulted in these three components being considered separate sets, the so-called 'triple bottom line', which may result in conflicts among them (Lehtonen 2004; Boström 2012).

Moreover, from the viewpoint of the sustainable development policy, particularly as observed in first-world economies, theoretical and empirical analyses show that a considerable proportion of sustainability plans are aimed at limiting conflicts between economic development on the one hand, and social and environmental components on the other (Hull 2008). Environmental goals have attracted more concern, and therefore attention has focused on the dominating dyad of ecological and economic factors (Quental et al. 2011; Boström 2012), while social issues have been neglected (Commission for Social Development 2013). Indeed, many actions are primarily intended to protect or compensate individuals or groups from the negative consequences of other economic and/or environmental policies, and the social dimension is considered more as an 'add-on' to sustainable development policy (United Nations Research Institute for Social Development, UNRISD 2011). The preponderance of ecological and economic questions has also been criticized on the grounds that the plans and goals regarding these issues tend to be controlled by specific power groups, e.g., business

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groups or governments. Consequently, social organizations are less involved in decisions that are aimed to solve society's problems and foment sustainability (Bridger and Luloff 2001; Baker 2007; Tokar 2008).

Those groups with more decision-making power tend to assume that an approximation to sustainability objectives can be the result of an adjustment process of certain productive sectors built into the development programs and policies.[1] Although certain recent studies have stressed the potential influence and 'proactivity' of social factors on sustainability (UNRISD 2014), they have done so focusing more on environmental goals (Lehtonen 2004; Murphy 2012). Few studies have considered that the process of sustainable development in a given region or productive system might be determined largely by social components. A case in point would be an economic scenario that is closely linked to the social structure, such as family-run firms, and to the management and organization of local communities (Bacon et al. 2012; Ikerd 2013). This perspective contemplates not only the interrelationships or 'entanglement' of the three pillars (Psarikidou and Szerszynski 2012) but also the participation and integration of the economic and environmental aims to the benefit of society as a whole. In other words, there should be a dual focus: (i) developing productive activities that are better adapted to social requirements, i.e., the socio-economic perspective; and (ii) ecological actions that are better suited to the physical environment of the community, i.e., the eco-social view (Bridger and Luloff 2001; Gismondi and Cannon 2012).

This aspect may arise from, for instance, the bioeconomy model (Passet 1996; Maréchal 2000). This model features a set of concentric circles, in which the central one is occupied by the social dimension. This central position highlights the importance of economic activities for the benefit of all human beings, while simultaneously safeguarding biophysical systems (Lehtonen 2004). However, from this viewpoint, the environmental dimension still prevails over the other two; in contrast, few practical studies have identified the actors within an 'imprecise' social component or the role that they play in sustainable development (Lehtonen 2004; Boström 2012).

The present study contributes to the existing debate on how certain elements of the social dimension have constituted the driving force to sustainability. Based on the development of the agrarian system in southeast Spain, this analysis takes a holistic approach to show how many of the trade-offs among sustainability dimensions have arisen because of the social components. These components have become ever more relevant in a scenario of economic growth and environmental protection, i.e., socio-economic and eco-social factors that are related to family farms and their organizations and networks, which determine a proactive social capital. The combination of these elements, moreover, has proven essential in guaranteeing the durability and resilience of this development model, which has prospered for over 50 years (Galdeano-Gómez et al. 2011).

The present work, therefore, aims to contribute to the literature on sustainable development in two ways: (a) by providing an overview of the social dimension in the specific context of rural-farming areas in Europe, and (b) by considering the role of social components in sustainability from a new angle, particularly with regard to socio-economic and eco-social perspectives.

Conceptual framework and approach

The social dimension of sustainability and a review in the rural-farming context

In recent years, there has been more debate in the literature on the principles and factors that determine social sustainability, but there is still little consensus on this matter (e.g., Litting and Griessler 2005; Dillar et al. 2009; Cuthill 2010; Dempsey et al. 2011; Missimer 2013). Sachs (1999) points to a fair degree of social homogeneity and equity in income, resources, and services to construct decent livelihoods. Along the same lines, in its "Social Analysis Sourcebook", the World Bank (2003) refers to the social dimension of sustainable development as equitable economic opportunity and widely shared benefits. McKenzie (2004) considers similar principles, also stressing the importance of community responsibility and the transmission of awareness across generations. Cuthill (2010) constructs a framework, focusing on the goals of public policies, based on social justice and equity, social infrastructure, engaged governance, and social capital. Recently, Murphy (2012) has presented a conceptual framework of the social pillar on four policy concepts, i.e., equity, awareness for sustainability, participation, and social cohesion, highlighting the relevant connection with the environmental pillar. Another concept in Europe, specifically oriented to the 'community,' is that of "places where people want to live and work, now and in the future" (ODPM 2006, p. 12; also cited by Dempsey et al. 2011, p. 290). Along these lines, Dempsey et al. (2011) identify this dimension primarily with concepts such as

[1] Furthermore, many decisions and policies are frequently formulated in distant centers with little regard for local social, economic, or environmental consequences (Tokar 2008). From the local point of view, bottom-up participation in decision-making will permit a swifter and more specific response to problems of sustainability (Bridger and Luloff 2001).

social networks, sense of place, stability, and safety to achieve sustainable communities particularly in the urban context.[2]

Further, we have a view that stresses the influence and proactivity of social factors in promoting sustainable development. For instance, Chambers and Conway (1991) refer to this dimension in relation to the ability of any social unit—individual, family, or community—not only to earn a decent livelihood, but also to maintain it. These authors consider both the social capacity to react to shocks and adapt to circumstances, i.e., resilience, and the ability to be proactive in creating change and development (Adger 2000). In addition, Bridger and Luloff (2001) note how, at local level, the social capital can generate sustainable development when communities participate in the decision-making of both economic self-reliance and the correct management of local ecosystems. Along rather similar lines, Lehtonen (2004) starts with a non-hierarchical bioeconomy model and describes the social dimension with two basic elements, one referring to individual capabilities (Sen 1999) and the other to the social capital of networks and social relations; these elements are shown to play an important role in welfare economics and in the ecological dimension. This proactivity in development outcomes has recently been highlighted by the UNRISD (2014) by emphasizing that 'social drivers' in the very social structures, principles, and norms can have a profound influence on heading in a more sustainable direction, e.g., supporting economic productivity, raising human capital, or reducing inequalities.

In the context of rural development, mainly related to farming systems, concern for the social dimension influencing its outcome is paramount. This concern has arisen mainly from developed economies' view of countries or regions that are less developed and more dependent on the rural economy and farming, and it focuses on the need for equity and improving the quality of life. Kassie and Zikhali (2009), for instance, outline how social sustainability associated with farming systems in developing countries involves ensuring equitable revenue for as many members of the community as possible, from farmers to different stakeholders in the agricultural production chain, thus contributing to a better quality of life and greater social cohesion. In addition, concern for environmental sustainability has led some analysts to consider social issues as a secondary goal (Bebbington and Dillard 2009), or to analyze how social improvement can, in part, be promoted via the adoption of more ecological farming techniques (Pretty et al. 2011). A further line of study in recent years has shown the importance of the link between the social and environmental dimensions of sustainable development, i.e., the eco-social dimension (Peeters 2011), particularly regarding communities' awareness of the need to maintain biodiversity (Boström 2012) or environmental protection in general (Bacon et al. 2012). Nevertheless, this proactivity in the farming system should not be considered purely in ecological terms, but also in economic ones. Psarikidou and Szerszynski (2012), for instance, consider a 'sociomaterial' perspective, in which social sustainability is not a separate pillar: the economic pillar is embedded in social relations[3] and the social one includes the relationship between humans and the material world in agrifood processes.

As far Europe is concerned, the multifunctionality of the farming systems continues to be the predominant by considering the farmers as both producers and environmental protectionists (Brouwer 2004; Lowe and Ward 2007). Additionally, certain recent programs with a wide perspective in rural areas have focused on the balance between the economic, environmental, and social dimensions (European Commission 2001, 2007). However, the different strategies of development tend toward deagrarianization, considering that farming alone is not sufficient to guarantee sustainability (Terluin 2003), and these strategies uphold the idea that economic aid must go hand in hand with environmental support programs (Galdeano-Gómez et al. 2013), since social improvements can be a direct consequence of both policies.

It has seldom been considered that social components such as the family structure of businesses and organizational capabilities, such as community management and social networks, can lead to economic and environmental improvements, particularly when they do not form part of a defined strategy or program, e.g., Common Agricultural Policy (CAP), LEADER programs, etc.

Nevertheless, we believe that this scenario may arise when the governance of rural development is based on structures that are linked to society and it can be stronger when these structures are of an endogenous nature, without dependence on exogenous development programs or top-down strategies (Bridger and Luloff 2001; Galdeano-Gómez et al. 2013). This context implies a considerable degree of interaction of social components with the economic dimension (Roome (2008); Psarikidou and Szerszynski 2012), i.e., socio-economic factors, as well as a close link to the ecological dimension, i.e., eco-social factors (Peeters 2011).[4] From this perspective, the social

[2] In addition, the social dimension should be considered a dynamic process with its own well-defined goals, rather than a side effect of economic or environmental goals.

[3] Similar to the bioeconomy model, this implies overcoming the traditional separation between the economic and social pillars, thus avoiding the overly economic and productive view of modern societies (Lehtonen 2004; Psarikidou and Szerszynski 2012).

[4] See Appendix (Fig. 5) for a simplified representation of this framework related to family farms.

components, e.g., social capital or corporate social responsibility, act as drivers and controllers of economic activity; simultaneously, these components promote eco-social objectives, such as ecological production, eco-efficiency in the use of agrarian resources, protection of the environment, etc.

The role of family farms in the interrelationships between sustainability dimensions

The family structure of farming systems is increasingly recognized as one of the elements that can foment interrelationships among economic, social, and environmental goals (Calus and Lauwers 2009; HLPE 2013; Ikerd 2013). Family farms play a key role in the long-term maintenance of the economy in rural areas that specialize in agricultural activities; because of their knowledge of local production, their ability to adapt and the fact that their know-how is handed down over the generations. In addition, the motivations of family farmers often go far beyond profit maximization, and encompass social and ecological aspects that will benefit their community.

From a socio-economic perspective, in a productive sector with a broad base made up principally of family farms and involving a large segment of the population, these farmers are indispensable for maintaining employment and economic viability within local communities in rural areas (Calus 2009; Psarikidou and Szerszynski 2012). They are also the main stakeholders in the countryside, producing commodity and non-commodity outputs, and interacting dynamically with different stakeholders in the farming and economic systems (Calus and Lauwers 2009). These farmers can play an important role in management and entrepreneurship in this economic context, for instance as members of farming–marketing cooperatives, inter-professional associations, etc., and at the same time they develop social capital and promote welfare equity, participation, and social cohesion (Ikerd 2013; Galdeano-Gómez et al. 2013).

From the eco-social perspective, as farmers are in direct contact with the natural landscape and rely on basic natural resources, they, more than anyone else, are aware of the limitations of land and water (Bacon et al. 2012; HLPE 2013). These families have their roots in the land, usually transmitted from one generation to the next, which increases awareness and a sense of responsibility for maintaining that system (Murphy 2012). Moreover, for these families, the goal of improving their quality of life is more associated with the sense of belonging to a place and to the natural environment than it is for those in other productive sectors (Ikerd 2013). As a result, the sustainable management of resources and the environment tend to be intrinsic components of family farms and their communities, who in turn transmit this awareness to other farming organizations (e.g., cooperatives) and other rural

Table 1 Dimensions of sustainable development and social components of farming system

Economic dimension	Social dimension	Environmental dimension
Socio-economic goals[a]	Eco-social goals[b]	
✓ Economic structure linked to society, e.g. family firms and the development of social capital ✓ Participation of social organizations in economic objectives: employment, management and entrepreneurship ✓ A balanced distribution of economic goods and welfare, i.e. equity	✓ A locally-based sense of responsibility, at both family and community levels, for the use of resources ✓ Management of natural resources to ensure that their use does not exceed their natural supply ✓ A system for transmitting socio-environmental awareness from one generation to the next	
Factors that can determine the trade-offs between the socio-economic and eco-social goals in farming systems[c]		
Family farms, farming networks and organizations (cooperatives, associations, etc.) and the extension of social capital structures to other productive activities		

[a] Based on Sachs (1999), Bridger and Luloff (2001), World Bank (2003), Litting and Griessler (2005), Cuthill (2010), Dempsey et al. (2011), Gismondi and Cannon (2012), UNRISD (2014)

[b] Based on Adger (2000), Lehtonen (2004), McKenzie (2004), Peeters (2011), Murphy (2012), Boström (2012), UNRISD (2014)

[c] Based on Calus and Lauwers (2009), Pretty et al. (2011), Bacon et al. (2012), Psarikidou and Szerszynski (2012), Galdeano-Gómez et al. (2013), Ikerd (2013), HLPE (2013)

economic activities (Pretty et al. 2011; Munasib and Jordan 2011).

Based on the reviewed literature, the following table provides a schematic overview of the various aspects of sustainable development (Table 1). Although this table is not an exhaustive list of goals, it sums up the sustainability issues in the development processes in which social factors can play a more integrating and proactive role.

Method

Following the case study method (Yin 2013), an in-depth analysis was performed on a particular development process, preserving a global vision of the phenomenon while striving to avoid generalization. However, this analysis contributes to the debate on sustainability and the role of the social component by presenting a practical case. In this context, the research design consists of linking the data to be compiled with the main issues that were discussed in the previous sections on the theoretical framework. The initial premise of the present work is that the social dimension, in which family farms constitute the basic element in the intensive agrarian model in southeast Spain, plays a fundamental and characteristic role in fomenting sustainable development. To this end, this analysis identifies the socio-economic and eco-social components based on several studies focusing on this farming system. These studies are of an inter-disciplinary nature, because many aspects have been analyzed from the perspective of development and agricultural economics (e.g., Galdeano-Gómez et al. 2011), agronomy (e.g., Medina 2009), sociology (e.g., García Lorca 2010), geography (e.g., Tout 1990), ecology (e.g., Downward and Taylor 2007), or history (García-Latorre et al. 2001). The data and information that are drawn from these studies outline several indicators that demonstrate the role of the different factors in achieving the goals of sustainability in an integrated way.

Following the elements of interrelationships and trade-offs among the sustainability dimensions described above (Table 1), we have included the following indicators in our analysis:

(a) Socio-economic indicators: economic structure linked to society and social capital, the participation of social organizations in the management of economic development, and equity outcomes.
(b) Eco-social indicators: responsible use and management of natural resources, on the scale of individual farms and of the community as a whole, and the intergenerational transmission of environmental concerns.

Case study

Development features of the agrarian system in southeast Spain

The farming system in southeast Spain, in which the agrarian development of Almería is the main exponent, has been the subject of several recent studies. Among others, Aznar-Sánchez et al. (2011) focused on the socio-economic and technological changes of an endogenous nature (without institutional programs or support), and Galdeano-Gómez et al. (2013) centered on the multidimensional sustainability of agrarian development over recent decades.

This agrarian system is located in one of Europe's peripheral areas, southeast Spain, in the coastal zones of Almería and Granada provinces to be precise. This area is semi-arid with scant precipitation, but with subterranean water resources and a mild climate due to the proximity of the sea and the nearby mountain ranges that afford it protection. This area is particularly noted for the high total sunlight per year (more than 3000 h). The current agricultural model commenced some five decades ago, cultivating fresh vegetables at first in the open and later in greenhouses. This sector has become highly productive because of the technologies that have been adapted to local requirements (for further details see Aznar-Sánchez et al. 2011) and natural climatological conditions.

With some 30,000 hectares of crops at present, this system accounts for approximately 30 % of all vegetables grown in Spain and the produce is destined for both the domestic and foreign markets, the latter accounting for some 60 % of total marketed produce in recent decades. The graph below outlines the evolution of this farming system in terms of production and the increase in the surface area that is dedicated to horticultural crops (Fig. 1).

The success of this agricultural model has been further driven by the small-scale farms that specialize in vegetable produce and that have proved to be highly efficient (Tout 1990), as well as by their related local structure of commercialization, farming organizations, and auxiliary industries. All these elements have benefited the farmers themselves as well as multiple sectors of the economy and society. Another singular characteristic is the endogenous nature of this development, which has not been aided by outside planning or support from national and European policies (Galdeano-Gómez et al. 2011). Indeed, subsidies from the CAP, which started in 1997, only account for approximately 1.5 % of the income that is generated by the farming activity in this area. However, the importance of the agricultural sector in this productive structure in the 1960s has practically been maintained to the present day. Approximately, 24 % of the province's GDP (Gross

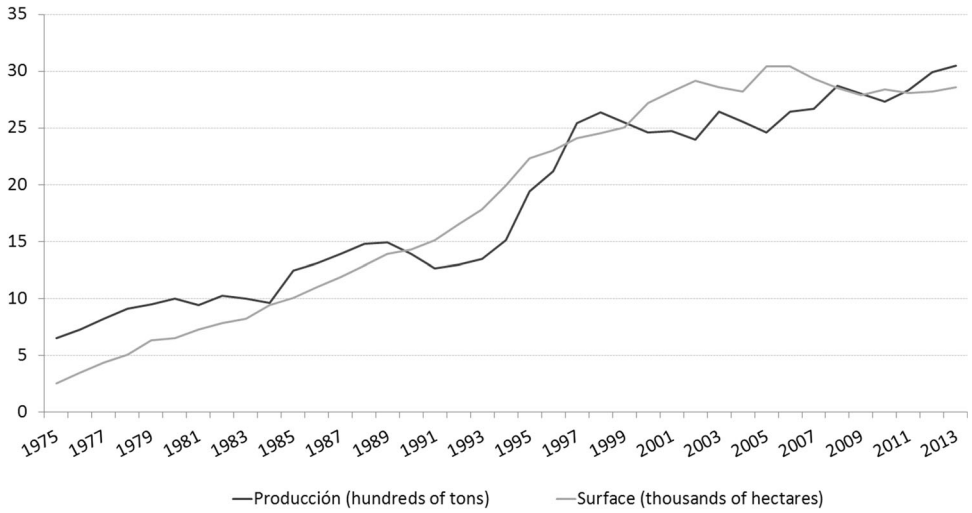

Fig. 1 Evolution of the farming system in surface and in production. Source: Cajamar (2014)

Domestic Product) depends directly on farming, and the employment in this activity represents 28 % of the total. Further, the agrarian system as a whole accounts for more than 60 % of both the GDP and employment in the area (Galdeano-Gómez et al. 2013).

Family farms play a pivotal role in the development of this region, because they interact with all of the major players (see Fig. 2). Authors such as Tout (1990) and García-Latorre et al. (2001) relate the role of family farms in this productive activity, explaining how they have created their own organizations and built up a close relationship with other stakeholders in the sector, to whom the farmers transmit not only their economic concerns but also those regarding the management of resources. For instance, Downward and Taylor (2007) highlight the social nature of this agrarian system and its effects on efficient water usage. Galdeano-Gómez et al. (2013) outline the role of family farms and their own cooperatives in the management of natural resources and the promotion of a production system that is ever more environmentally respectful.

We now analyze these features from the socio-economic and eco-social perspectives.

Socio-economic components

A relevant trait of the development of the farming system in southeast Spain is its social nature and the fact that it represents widespread development throughout the regional economy, generating few disparities in terms of income and welfare.

Economic structure linked to society and social capital

The basic socio-economic element in an agrarian system is the family farm. On an individual level, the farming system not only helps the farm family to survive, but it also improves the quality of life for the family, which enables them to spend more quality time together, both at work and at home. It also affords the family a sense of belonging and caring that comes with being part of the rural community (Ikerd 2013).

In the agrarian system of southeast Spain, the family nature of the farms is a feature that has endured to the present day (García-Latorre et al. 2001; Downward and Taylor 2007). The farmland is widely divided among 15,000 small-scale farmers, each with an average of approximately 2 hectares with the family members providing 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 point of view of gender, as many of the owners of these farms are women (about 15 %) and joint ownership between men and women is common (about 30 %) (Céspedes López et al. 2009). In other words, an ample segment of the families and of the population as a whole is involved in the local agrifood system.

Other organizations that come within the framework of the so-called 'social economy', cooperatives in particular, have evolved locally, generating networks among the farms and a greater degree of interrelationship with the other stakeholders in the sector. Generally speaking, cooperative entities are considered the most appropriate type of mechanism to guarantee the stability of the farming sector by pooling resources to improve the position in the agrifood chain, and providing access to finance and technology (Cook and Plunkett 2006). Moreover, cooperatives play a major role in promoting democracy and constitute fundamental drivers for social networks and social cohesion, i.e., social capital (Pretty 2008; Gismondi and Cannon 2012), because they tend to be associated with a wide section of

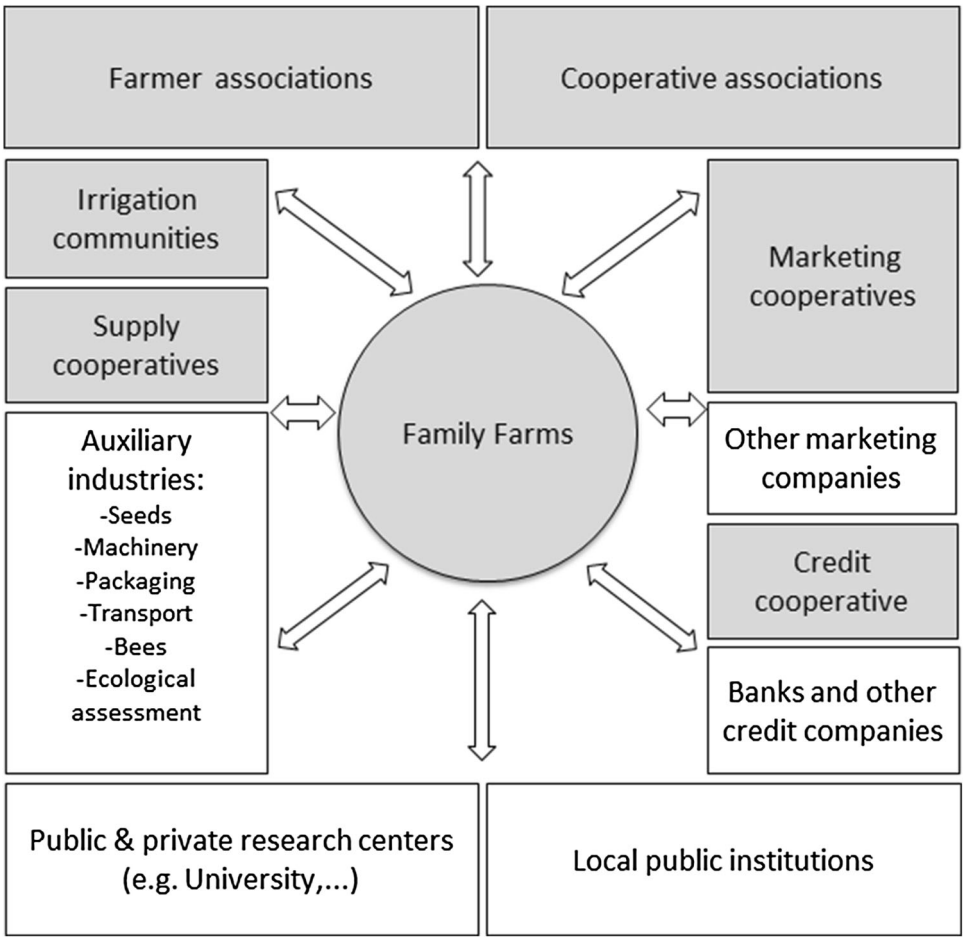

Fig. 2 Interrelationships between family farms and other actors in the agrarian system of southeast Spain (in *gray* the organizations in which they are owners). Source: The authors

the community. In sustainable development, the social capital can be considered a process of generating networks and collective actions not only in social terms, but also in economic ones (Bridger and Luloff 2001).

As explained above, the family farms in the sector under study have given rise to the parallel development of cooperative entities that specialize in different services: the marketing of produce, financing, the supply of resources, and services of agronomic assessment (Aznar-Sánchez et al. 2011). More than 90 farmer-owned cooperatives are currently operating in the area providing either specialist or general services. Most of the farmers are members of one or more cooperatives (marketing, supply, or financing cooperatives). However, other types of organization in this system are also worthy of note, namely the 16 irrigation communities, which include all of the growers, the farmers' associations (e.g., Association of Producers of Fruit and Vegetables in Andalusia, APROA) and the cooperative's associations (e.g., the Association of Growers and Exporters of Fruit and Vegetables of Almería, COEXPHAL, and the Federation of Agrarian Cooperative Entities of Andalusia, FAECA), who have represented their members in dealing with local institutions and have played an important role in coordinating collective objectives.

Participation of social organizations in economic objectives

As implied above, the involvement of a broad segment of the population in the productive organizations of the local farming system means that there is more personal commitment to the economic goals of the rural community (Calus and Lauwers 2009), which leads to the creation of other complementary economic activities on a local level.

Thus, in the sector under analysis family farms participate directly in employment and the generation of income, as mentioned above (28 and 25 %, respectively) and indirectly via cooperative organizations. For instance, the cooperative entities in this horticultural sector commercialize most of the produce (62 %), while also supplying a great proportion of input (45 %) and financing services (76 %) (Pérez-Mesa and Galdeano-Gómez 2010; Cajamar 2014). Figure 3 shows the figures of several cooperatives in this sector.

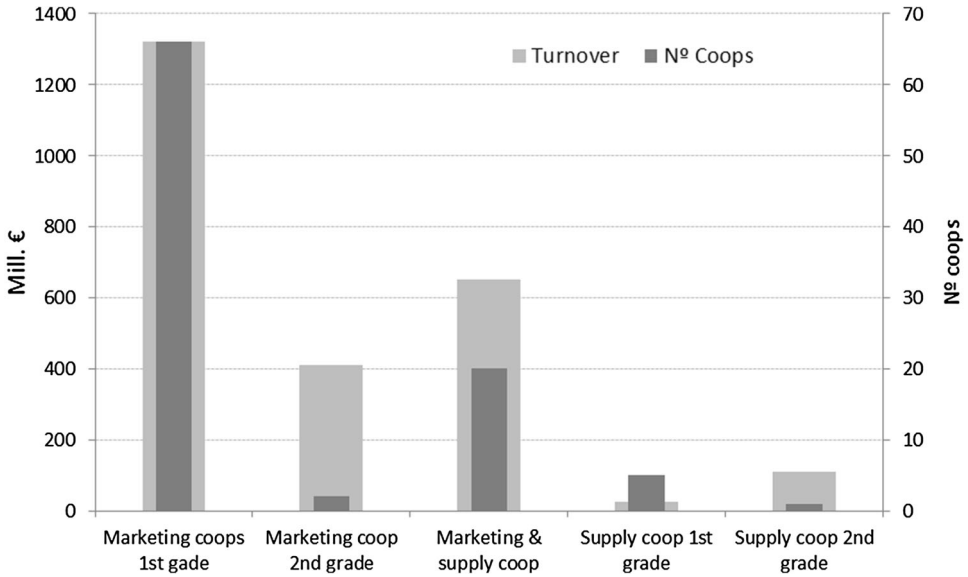

Fig. 3 Number and turnover of marketing and supply cooperatives. Source: Pérez-Mesa and Galdeano-Gómez (2010), Cajamar (2014)

It may well be said that the family farms and the cooperatives in this farming system represent the leadership of economic development, which to a great extent has been oriented toward achieving 'collective objectives.' For example, training for farmers and families, R&D activities and financing adapted to smallholders are all provided in great part because of these farming organizations (Giagnocavo et al. 2010).

These socio-economic structures have also allowed a certain degree of employment stability and social stability and have permitted the swift integration of new family farms, as has occurred for foreign workers and families since the mid-1990s (Aznar-Sánchez et al. 2011). Though the family workforce still provides the basis for the farming activity, there has been a considerable influx of immigrant workers, which has led to a high degree of stable employment and specialization in agrarian activity. Even in times of economic recession, this sector has proven to be capable of maintaining the employment levels. The following graph shows the number of national and foreign workers who are affiliated with the agricultural division of the Social Security in the area, which guarantees all employees the same work conditions and social rights (Fig. 4). Farmers' associations have also been proactive in initiatives that integrate the foreign workforce. Indeed, a growing number of foreigners have become owners of farms and members of cooperatives (García Lorca 2010).

In addition, many auxiliary companies have sprung up around these socio-economic organizations. Although they are not actually owned by the family farms, in many cases, these firms have been set up by farmers who have opted to specialize in a certain aspect of the agrarian system (e.g., building greenhouses); these firms include new generations of family members with training in agronomy, information technologies (IT) and administration. Consequently, these firms are in the main small family-run enterprises and social economy entities in sectors such as transport, IT services, and industrial activities: plastics, irrigation, biological production, containers, and greenhouses (Sánchez-Picón et al. 2011). The endogenous character of these auxiliary firms implies a strong commitment to the socio-economic objectives of this rural community.

Equity outcomes

Equity is a key social concept that is linked to the distribution of welfare, goods, and life chances. As such, equity is a broad concept that includes the equitable redistribution of wealth among citizens, covering gender issues, democracy, and an equal opportunity to both survive and fulfill development potentials (Murphy 2012).

In the sector under study, the fact that family farms are smallholdings implies the broad distribution of one of the main resources, land, as well as entrepreneurship and employment among family members. Although Spanish legislation guarantees universal Access to basic services (health and education), in this case, organizations such as cooperatives and family businesses have allowed redistribution in other activities of the farming system and have also favored the incorporation of new families and workers in this development process (García Lorca 2010; Galdeano-Gómez et al. 2013).

As mentioned above, this system constitutes a major source of income and employment to this rural area (60 % in terms of GDP and labor). As a result, family farms and their organizations, together with the complex system of diverse industrial activities and services that has grown around them, have fomented the creation and widespread

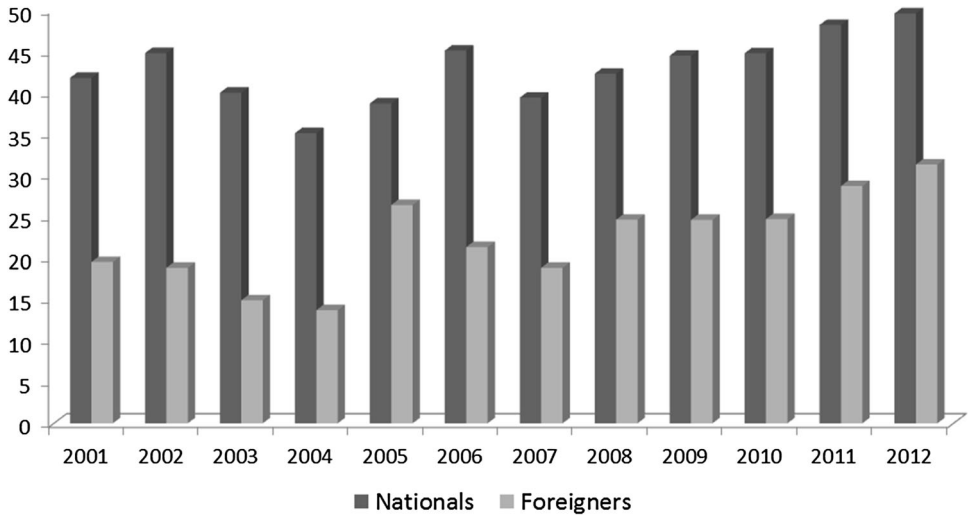

Fig. 4 National and foreign labor, including both farmers and employees, in thousands. Source: Cajamar (2014)

Table 2 Gini coefficient of income in Spain and southeast Spain

Years	Spain (national average)	Municipalities in southeast Spain
2000	0.342	0.328
2001	0.338	0.321
2002	0.333	0.326
2003	0.330	0.320
2004	0.328	0.316
2005	0.326	0.321
2006	0.324	0.306
2007	0.323	0.298
2008	0.321	0.292

The Gini Coefficient indicates a more equitable wealth distribution when figures are closer to 0

Source: Galdeano-Gómez and Godoy-Durán (2010)

distribution of wealth. For instance, income equity is reflected in the Gini Coefficient as estimated for municipalities that specialize in agriculture in southeast Spain and the Spanish economy over the period 2000–2008, which represents the period of the most equitable wealth distribution in Spain in recent decades (Galdeano-Gómez and Godoy-Durán 2010) as is shown in Table 2.

Eco-social components

Agrarian activity can be considered as a nexus of integration between society and ecology over time (Bacon et al. 2012). And, when the agrarian system is based on a configuration of family-owned smallholdings, this nexus becomes even more apparent (HLPE 2013). Moreover, children who are raised on farms tend to participate in the family work, which makes them a key element in a culture of sustainability, as the importance of preserving the natural environment as part of their heritage is passed down over generations (Ikerd 2013). Social economy entities in farming also tend to transmit concern for the environment to the community (Gismondi and Cannon 2012).

Responsible use and management of natural resources[5]

In the farming system of southeast Spain, an area that has an arid environment, family farms have traditionally shown concern for the shortage of basic resources such as land and water, and have been instrumental in encouraging efficient usage of these resources. Indeed, Medina (2009) highlights the greater awareness of farmers in this region compared to those from other areas of Spain. This understanding of the limited available resources has led to a degree of stability in the size of the holdings and in the surface area that has been cultivated (between 26,000 and 30,000 hectares) in the last two decades (see Fig. 1). However, this stability is also due to factors of economic management and productivity, particularly the reluctance to employ paid workers from outside the family for tasks that require considerable specialized manual labor. In addition, rather than on expanding the crop area, investment efforts have focused on technologies and ecologically sound agricultural practices (dealt with in greater detail below) in order to improve efficiency in the use of resources (Aznar-Sánchez et al. 2011). Another noteworthy characteristic is the manner in which the production system has been adapted (crop species and cycles) to take full advantage of the natural climate conditions without having to expend extra energy.

Regarding the judicious usage of water, significant statistical evidence is available. The farmers are organized

[5] These components, i.e., use and management, are presented together because we consider that the indicators that are associated with them in the sector under study to be strongly interrelated.

into irrigation communities, which have given rise to what might be termed a culture of correct water usage (Downward and Taylor 2007; Fernández et al. 2007). More recently, analyses of the water footprint in Spain (Sotelo Navalpotro 2011; Tolón Becerra et al. 2013) have revealed that the use of water by the farming system in southeast Spain has had little impact on the environment.

As Table 3 shows, the water footprint of the horticulture in this region is a mere fraction of that of Spanish agriculture taken as a whole, namely 44.14 m^3 compared with 844.69 m^3 per capita. This result is due to two basic factors: (a) efficient water usage because the per capita usage of this resource is less than half that of the average usage in the Spanish agricultural sector (453.60 m^3 compared with 937.34 m^3); and (b) the high volume of produce with a high yield per surface unit, as consumed by a huge segment of the population; estimates calculate that the fruit and vegetables that are produced by this farming system are consumed by some 53 million people, most of whom live outside the area, thus implying 'virtual' water exports (Tolón Becerra et al. 2013).

Evidence of the sector's decreasing ecological footprint is also found in the Rural Hygiene Plans for the treatment of residues as implanted by the family farms and cooperatives with the support of local institutions. Growers deposit different types of residues in containers that are placed conveniently close to their greenhouses for subsequent collection and treatment. Certain auxiliary enterprises have also been established to manage and reutilize the waste that is generated by horticultural activity (e.g., Albaida, Sigfito, etc., in some cases with public participation and private participation from cooperative associations). Currently, more than 80 % of the sector's waste is recycled, that mainly includes plastics, vegetable residues, and packaging (Céspedes López et al. 2009; Callejón-Ferre et al. 2011).

Intergenerational transmission of environmental concerns

Concern within the family for the need to maintain the environment and adopt ecological crop practices has been handed down over generations in this agrarian system.

A salient feature of this development over several decades is the way in which it has specialized in a few crops: pepper, tomato, cucumber, green bean, zucchini, eggplant, water melon, and melon. Farmers tend to rotate the production of these different crops (two to three crops a year) and apply appropriate technologies. Three to four generations of family members have passed on their know-how and adopted ongoing technological innovations, particularly with regard to the economy of natural resources and the application of environmentally respectful practices (Galdeano-Gómez et al. 2008).

While the surface area of crops and greenhouses per farm has not varied considerably, the technologies have. A case in point is water economy, with more than 50 % of farms now applying systems for rainwater collection for example, or more recently hydroponic irrigation with systems for water recycling, allowing growers to use 25 % less water and 30 % less fertilizer (Céspedes López et al. 2009).

The trend toward more ecological production is another major feature of the changes that have been adopted by the different generations of growers. For instance, 95 % of pepper, 85 % of eggplant, melon and watermelon crops, and 84 % of tomato crops are produced using Integrated Pest Management (IPM), i.e., the control of pests by biological means rather than using chemicals. Indeed, this area is the world's leading exponent of IPM, ahead of countries such as the Netherlands and Israel (Pérez-Mesa and Galdeano-Gómez 2010). This fact provides additional added value to the quality and salubrity to the produce: hygiene and health have been improved in the family workplace, and biodiversity is protected and maintained because pest control is managed using bees and other insects that are autochthonous to this agricultural area.

One of the major concerns of the current generation of growers resides in improving the use of resources and infrastructures, and in particular exploiting renewable energy. Several R&D projects are being carried out in collaboration with local research centers along these lines, including the cogeneration of CO_2 and solar energy in greenhouses (Pérez-Alonso et al. 2012).[6]

Cooperatives and farmers' associations also play a fundamental role in environmental management, channeling some recent public programs that are aimed at this issue; their systems of evaluation and control allow the better application of recommended measures to achieve environmental aims (Galdeano-Gómez et al. 2008). At the same time, these programs promote the corporate social responsibility of other businesses in the sector and encourage research, education, and awareness of environmental issues via seminars and scientific meetings that are aimed at a wide segment of the region's society.

[6] Moreover, it should be noted that the high concentration of greenhouses in this area seems to have had a positive impact on the struggle to combat climate change. This concentration implies a CO_2 reduction (as it is absorbed by crops) while simultaneously acting as a brake on atmospheric warming. According to Campra et al. (2008), the 'albedo' (whiteness) effect that is generated by the plastic greenhouse covering reduced temperatures in the Almería 'Poniente' region by 0.75 degrees from 1983 to 2006. According to the surface shortwave radiative forcing (SWRF) data and local temperature trends, the recent development of greenhouse horticulture may have masked the local warming signals that were associated with the increase of greenhouse gases.

Table 3 Hydric efficiency and water footprint: Spanish agriculture versus the farming system of southeast Spain

Comparative variables	Mean data for Spanish agriculture	Horticultural crops in southeast Spain
Agricultural water usage	937.34 m^3 per capita	453.60 m^3 per capita
Agricultural water footprint	844.69 m^3 per capita	44.14 m^3 per capita

Source: Sotelo Navalpotro (2011) and Tolón Becerra et al. (2013)

Interplay between socio-economic and eco-social goals

The social dimension can generate trade-offs and synergies to sustainable development from a holistic perspective, which occurs because the ideal of social sustainability is linked to the economic and environmental dimensions. For instance, 'economic self-reliance,' 'the use of energy and materials in balance with the local ecosystem' or 'appropriate safety conditions,' among others, are concepts that are widely identified with the ideal of social outcomes (Bridger and Luloff 2001; Lehtonen 2004; Dempsey et al. 2011). The first of these concepts concerns not only local economic development but also equity and the involvement of a broad segment of the community in the development process via cooperation and networks among the productive structures to achieve socio-economic objectives (UNRISD 2014); the second concept is more related to the environmentalist viewpoint in today's society, implying widespread awareness in all social units and economic activity organizations of the need for the responsible management of natural resources (Peeters 2011); and the third concept is related to both neighbor relations and the local natural environment (Dempsey et al. 2011), which are necessarily mutually dependent as eco-social objectives to achieve a place in which to live with a degree of well-being (Murphy 2012).

In rural areas, in particular, there is a constant need to seek a balance between human needs and those of other life forms, i.e., biodiversity. Economic activities, such as tourism, agriculture, agrotourism, and cottage industries based on goods and materials from the local ecosystem, are closely linked to the natural environment (Bacon et al. 2012); but at the same time well-being, including safety and life-style, is associated with the maintenance of the landscape and natural local features (Pretty et al. 2011). The sense of belonging, heritage, and strong roots of rural families are transmitted through generations also in terms of education and the cultural awareness of economic and environmental issues (Ikerd 2013), thus rendering the development process more resilient (Adger 2000). Moreover, rural populations tend to foster a stronger sense of belonging, not only to the community, but also to organizations that are intended for group actions, such as cooperatives and social economy entities (Gismondi and Cannon 2012).

As a result, a series of actors and relationships can be identified as promoters of this situation in agrarian systems. The family farms, as individual entities, and the social capital that is associated with them, in a collective way, are considered the components that best integrate the social, economic, and environmental aims (Gismondi and Cannon 2012, Ikerd 2013). These farms embody the socio-economic and eco-social aims, which theoretical discussion suggests should not be considered separate sets but rather integral elements of sustainable development.

The present case study provides evidence of this need for interrelationships. For instance, little awareness of environmental sustainability not only has ecological consequences, it also affects the economic sustainability of small family enterprises, with very limited resources within the agrarian system. A lack of equity has not only social and economic consequences, but also environmental ones if the actors do not feel involved and may incur disparities in the management of the natural surroundings. If these concerns are not correctly transmitted through generations, there will be negative ecological and economic consequences, e.g., lack of specialization. These consequences would have a negative bearing on the system's resilience and capacity to adapt and develop.

Conclusions

Although the sustainability of a development process is widely associated with the trade-offs among the three basic dimensions (OECD 2008), environmental concerns regarding the growth of certain productive activities have received greater attention. This fact often gives rise to a traditional dominating dyad of ecology and economy. Indeed, in policy programs, many initiatives are aimed at protecting or compensating individuals or groups that suffer the negative consequences of other economic and/or environmental policies, whereas the social dimension is considered an 'add-on' to development policy. Despite the growing interest in defining the principles and factors that determine social sustainability, many analyses on this topic barely consider their 'proactivity' and the relevant role that they may play.

This social influence may be relevant in both environmental (Lehtonen 2004; Murphy 2012) and economic terms (Gismondi and Cannon 2012; UNRISD 2014).

However, the diversity of ecosystems and societies makes sweeping generalizations unadvisable, rather this topic should be analyzed in a practical and preferably local context. Therefore, bottom-up strategies and the broad-based participation of local communities in development issues can have more effective results than decisions taken at the national or regional level (Bridger and Luloff 2001).

In rural-agrarian systems in particular, the interplay between human needs/activities and landscape becomes more apparent (Psarikidou and Szerszynski 2012). Even more so when these systems are based on productive structures that are directly linked to society, e.g., family farms and their organizations. In these cases, social goals are linked more closely to economic (socio-economic) and ecological (eco-social) ones.

This case study of the agrifood sector in southeast Spain, whose development has been of an endogenous nature and without significant policy support, reveals that the local socio-economic components of sustainability are drivers of welfare equity. Family farms provide the basis for management and entrepreneurship in this economic context by participating directly or influencing other activities and stakeholders within the agrarian system.

Similarly, the efficient use of limited basic resources in this region indicates the important role of the family structure and the social capital that is generated in this eco-social objective. Family tradition and culture have made the environment a multi-generational issue, while at the same time transferring this awareness to other sectors that are related to agricultural activity and involving a broad spectrum of society.

Although this case study has dealt separately with socio-economic and eco-social factors in a rather simplified manner, it also considers the combination and interaction of the two. These factors are mutually dependent because social aspirations to well-being and safety cannot be understood without the direct involvement of families in maintaining their income and the natural environment on which their earnings depend.

Though this study is limited to a specific case with certain unique characteristics that are difficult to extrapolate to other contexts, it highlights the family aspects and the social capital that can be applied to other agrarian systems. Ikerd (2013) has recently outlined the potential of family farming compared with industrial farming regarding the great transformations that are still necessary to solve sustainability issues: "… the sense of community and sense of place that characterize local food systems are essential aspects of the new ecological and social worldview of sustainability" (Ikerd 2013, p. 5).

We believe that it is not so much a case of returning to more traditional or artisan production systems, but rather requires taking as reference certain values and practices that family farms and their organizations can instill in order that social, environmental, and economic decision-making is more in line with sustainable development processes.

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Appendix

See Fig. 5.

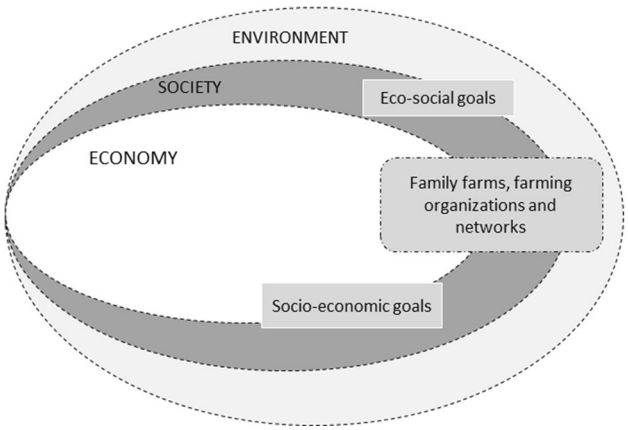

Fig. 5 Family farms and related factors in an agrarian system following a bioeconomy model (without strict division of sustainability dimensions). Source: The authors based on Lehtonen (2004), Roome (2008) and Peeters (2011)

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