



Research article

Agriculture and tourism: economic evaluation of sustainable land management

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Abstract: The ways in which the agricultural landscape has been used and managed by man has resulted in substantial changes over time in relation to the economic changes and social needs of local communities. In recent times, thanks to the multifunctional vision of agriculture, growing interest has focused on the recreational aspects of the landscape as a function of its usability. This interest derives both from its importance, highlighted by numerous studies on this aspect, and from its link with rural tourism. The latter phenomenon is growing rapidly and is capable of triggering important processes of development and local growth. In this context, the present study highlights some preliminary considerations on the relationships that, from the point of view of sustainable local development, exist between possible types of tourism and methods of landscape management. To this end, first explore some features of the agricultural landscape and their possible economic evaluations. The study shows that an agricultural landscape in which man is present with agricultural activity, and where the service sector offers adequate opportunities for receptivity, it is possible to create growth and development paths for the local economy. The empirical analysis carried out in the Madonie shows that the resilience of the agricultural landscape is strictly connected to the presence of man in the territory.

Keywords: internal areas; landscape; tourism; systemic development

1. Introduction

Over time, the ways of using campaigns have changed considerably in relation to the evolution of the socio-economic needs of man and various communities [1], as well as in relation to the world views that influence those communities [2,3]. In particular, after a period of time when the countryside was a source of food and work for local populations [4], they have now become the source of agri-food products for the global market. This situation has occurred since the fifties of the last century, with the increase in per capita income and with the transfer of man from the countryside to the cities. This aspect becomes more evident with the globalization of international trade. In fact, the availability of food is now guaranteed not only by local agriculture but also by companies that produce in other parts of the world. The consequences of this phenomenon, which is still present today both in rural and mountain areas, is represented by the economic marginalization of many territories, especially those in the mountains and far from large urban centers. However, a demand for the use of the rural landscape has progressively developed recently, which includes new aspects, for example, carbon fixing, giving different importance to functions once taken for granted. Furthermore, it is increasingly convinced that the presence of man in the territory favors ecosystems. As a result of this evolution, the basic concepts of campaign management have also changed. This is because they can be considered nothing but the scientific formulation of social issues that have emerged over time [5]. As a result, those interested in campaign management are required to have a broader view of the earth so that many different social needs that were previously taken for granted can be met. The emphasis on various economic, social and environmental functions are increasing to the point where agricultural products are the basis for fostering an offer of services for the area. Consequently, the abandonment of agricultural crops has negative social and income consequences, as well as negative consequences on collective well-being. The latter due to externalities that derive directly or indirectly from the positive externalities of the presence of man in the countryside. By revenue we mean the public incentives that are obtained through the Common Agricultural Policy (CAP) and the revenues from the sale of agri-food products. Although in the economic literature there are some studies [6] that show that these aid and agricultural activity develops sustainable growth, we must highlight that the management methods of many territories of the internal areas (especially in the mountains) are not yet able to be autonomous and competitive. Many factors hinder the development of internal areas: for example, the viability, the variability of agricultural and forest ecosystems, changes (in many cases very rapid) in public policies, the continuous aging process of the local population, etc. All these aspects contribute to the maintenance or otherwise of agricultural activity and therefore to the presence of landscapes. At the same time, other difficulties arise from the fact that, in economic terms, the products obtained in these environments are with characteristics (higher production costs). The landscape Among the flows of utility that of agricultural landscape, a key role is played by the landscape-recreational aspect. In fact, in the literature this aspect, which is also linked to tourism, and this, as we know, is a growing phenomenon that can trigger important local development processes [7]. This document discusses the relationship between countryside and tourism within the framework of sustainable development.

2. The agricultural landscape in economic literature

It is known that the various utilities that land produce show different characteristics in relation to the attributes of rivalry and excludability, which, if considered jointly, produce important aspects for understanding the nature of the landscape and the impact on the community. If we look at these two attributes and examine their most recent evolution, we can understand how a substantial change has come about at a general level within the campaign world. In the Western world, the consideration of the countryside as a source of private goods, such as timber, has gradually given way to its growing importance in the procurement of public goods, also in consideration of the guidelines of the community legislator. This aspect is highlighted by looking at the multifunctional aspects of agricultural activity. Indeed, until the fifties of the last century, the role given by the community to the countryside was precisely this. The countryside was seen as an asset for the production of food and social welfare for the community (work, income, employment). The focus on production specialization has resulted in a shift from this vision; in fact, the production specialization has determined the birth of specialized companies where economies of scale have become the main objective. This change led to the removal of the entrepreneur from the company at least as it was in past years. From this moment on today, this changed vision of food production has led to a productivist vision that looks only at profit. In particular, from natural resources, food for mass production is started looking for the least expensive production method. Even with this new vision, agriculture plays a crucial role in the formation of the agricultural landscape. Even the public operator looks with interest at the role that agriculture plays in the formation of landscapes, however over time the economic policy measures have not always been adequate. But we ask ourselves what is the landscape? Can a unique definition be given? In fact, in literature, we have different definitions of landscape depending on the fields of human knowledge [8] and is susceptible to a variety of meanings. Tabet (1963) [9] defines the rural landscape as a permanent creative process and therefore his analysis must take into account the factors of transformation and therefore the evaluation must be dynamic and not static according to the current beauty. Furthermore, Vos & Meekes (1999), [10], speaking of rural landscape, affirm that people buy landscapes. In this vision it can be said that when the consumer buys a food product or when he wants to spend some time in the countryside, he does so according to his objectives which depend on the known places. Therefore, we can say that if the landscape gives a utility to those who enjoy it, the demand for landscape becomes rather complex as it depends on several variables. From the demand point of view, the value of the rural landscape can be considered as the sum of three main components: scenic value (or landscape), recreational value and nostalgic (or evocative) value and a component linked to the direct use of the asset [11]. The scenographic value is composed of the aesthetic aspect and the perceived quality. Some authors [12–14] refer to the peculiarities, diversity, stability of the landscape over time (resilience), coherence and complexity when they talk about the scenographic aspect. Other authors [15] emphasize the specific role that the elements that make up the landscape can have in modifying the level of appreciation that a certain landscape can arouse. Therefore, the complexity of the mosaic that makes up the landscape is such that even in economic terms it can be considered as a group of goods rather than an identifiable product. This situation applies to other utility streams produced by campaigns as well. Considering the case of biodiversity, the result is that, also in relation to the attributes of excludability and rivalry, the different “products” of the campaign can be classified into different clusters. In almost all cases, the interaction between tourist activity and the

agricultural landscape operates through the consideration of the latter as a tourist support. Consequently, it is necessary to classify the roles that an agrarian landscape can play within different types of tourism activities in rural areas. To this end, we will only use the recreational value and therefore the scenic components of the landscape. Depending on the perspective, campaigns can be fully or partially user-oriented or resource-based recreational areas, or they can also take on the function of background. In the first case, the campaign becomes a specific resource with which to attract the attention of tourists. In the second case, the countryside constitutes a generic resource for tourism, even if it is not always replaceable.

3. Materials and methods

In order to analyze the recreational-landscape function of the landscape, we have departed from the neoclassical perspective where the fundamental object of study of the economy is the economic system and the conditions of its efficiency. The meaning we propose is that of ecological economics which was born as an attempt to overturn the neoclassical approach through an integrated and systematic study of the links between ecological and economic systems. The basic idea is that the environment and the economy are complex systems that must be studied in an integrated way. In fact, over time, human activities have caused an imbalance in the Earth's carbon cycle. It is known that humanity emits more CO₂ (carbon dioxide or carbon dioxide) into the atmosphere than can be accumulated by plants and the sea. In this way the atmosphere is enriched with greenhouse gases causing a warming of the Earth. Ecosystems that absorb more CO₂ than they release they can stop this process. When any forest absorbs CO₂ and accumulates carbon permanently in its biomass, the concentration of carbon dioxide in the atmosphere decreases. The forest therefore assumes the function of a carbon reservoir. Of all terrestrial ecosystems, forests have the greatest storage potential. Furthermore, it is good to remember that global warming, for which man is mainly responsible, is influencing and modifying the hydrological cycle, that is the chain of events that guarantee the circulation of water between the atmosphere and the mainland and whose balance guarantees the survival of man and other living species. The hydrological cycle consists of the alternation of processes that transfer water from the surface to the Earth's atmosphere and, following the reverse path, from the atmosphere to the surface. During these movements, the water changes state, transforming from solid to liquid, from liquid to gaseous or vice versa. The water present in the atmosphere in the form of vapor can condense and form clouds. Subsequently it can precipitate on the surface in liquid (rain) or solid (snow/ice) form, spilling into rivers, lakes, seas, oceans and onto the ground. The water of the seas and oceans can evaporate, while that on the continental surface can in turn spill over into rivers, seas and lakes and then evaporate or creep into the subsoil. The plants that absorb it release it into the atmosphere through evapotranspiration and the cycle closes. Any alteration of the hydrological cycle is important as it affects the availability of water. From a physical point of view, the first obvious consequence of global warming is the melting of ice, both marine and terrestrial. Any alteration of these systems causes negative consequences that also have an economic impact both in the short term and in the long term. In this scenario, the forest plays a very important social function. In fact, in many areas of the planet the main social function of the forest is the religious one. In fact, going beyond the borders of Europe and considering other continents such as Asia, Oceania, Africa, the main role assigned to the forest by many peoples, regardless of the level of progress achieved, is that of the

meeting place between man and the divine and, therefore, a privileged area for establishing the rules of coexistence in communities, be they small remote villages or megalopolises with millions of inhabitants. For example, in Japan, 120 million inhabitants who have the most modern production systems in the world, keep alive a bond of particular respect for the forests, which occupy 25 million ha, that is 67% of the territory, for the meaning represented by the "bosco" as an expression of the divine and of the sacredness of nature, from which the balance of life derives [16]. This also existed in Europe. In fact, particularly in our country, the abandonment of many inland areas, especially in the mountain territories, characterized by the presence of famous abbeys, votive churches, chapels, surrounded by centuries-old woods, witnesses of the spirituality of exceptionally devoted men, who they are still today points of reference for millions of faithful, they risk disappearing due to the lack of cultural care and poor maintenance of the territories. The problem therefore arises of how to preserve these forests for future generations, which perform an important social function, not only from a religious point of view, but also as a defense of the territory in its historical, cultural and naturalistic complexity. It is therefore necessary to promote environmental conservation such as sustainable forest management, defense of biodiversity and maintenance of multifunctionality. All this can happen through a balance and actions aimed at the permanence of man in the territory, to avoid the inevitable degradation of the environment. There are no miraculous solutions, but taking advantage of the exodus from high-risk areas with the reduction of the pressure of the populations on the territory, it is necessary to re-propose the protection of the plains starting from the mountains and hills, integrating forest accommodation with agricultural ones. Therefore, the existing forests should be ensured the appropriately certified cultivation interventions, to guarantee their sustainability, starting from the numerous networks of National, Regional, Provincial, Municipal Parks, which now occupy extensive areas and which are custodians of biodiversity conservation. Producing more, keeping better, means creating the appropriate conditions to allow access to the public, which is the most innovative aspect that is being manifesting in an increasing way, especially among young people. It is a social service of the forest that should be specifically organized, taking into account that the youth group who loves the forest, goes in search of sensations and adventures concerning multiple sports activities from mountain biking to trekking, which cannot be practiced in the city, but which must be planned and regulated. In summary, the social function represents a higher value than that of the wood mass available in the forest, which is destined to grow, over time, due to the interest of the various tertiary activities that it is able to arouse for the benefit of local communities. Several studies have been carried out to provide value to the landscape-recreational function of the agricultural landscape. Some of them focus their analyzes trying to obtain the values to be attributed to the agricultural landscape according to the attributes of the visitors. Regarding local management and development issues, it is advisable to keep in mind an aspect of landscape recreational values related to capital intensity. The landscape-recreational values appear high if we compare them with those linked to the production of agricultural products, but they are very low if we compare them with those guaranteed by alternative forms of land use (utilization for the production of alternative energy). For extensive crops, in order to produce an adequate income for today's needs, therefore, large areas are required for production. These surfaces are not always available, either because the farms are too small or because they are not compatible with adequate local development, and because it requires a sufficient population density. Finally, alternative uses, also for the tools to internalize the positive externalities of the landscape, are given by the economic weight of the landscape in landscape-recreational terms which is accompanied on the

one hand by the growing importance of rural tourism in Europe. This evolution has created numerous problems mainly due to the simultaneous reduction of the profitability of the land as for the production of commodities. This phenomenon has stimulated the search for alternative sources of income in order to prevent land abandonment that causes numerous environmental, economic and social problems in large areas, especially in the mountains. At the same time, this evolution obviously requires management methods and tools that are different from those of the past and which can generate conflicts between different uses and between potential beneficiaries. The landscape can therefore become controversial and raise numerous issues, such as the methods used to allocate the resources necessary for its production, the definition of those entitled to decide these issues and how their conservation should be paid for should be compensated. A pleasant landscape is a positive externality of human activity. How the land is managed greatly influences the degree of appreciation of the landscape. At the same time, the production of agricultural products and the landscape represent a union of production. In general, the improvement of the landscape function increases the costs and / or reduces the production of agricultural products, with a consequent decrease in the income of the owners with impoverishment of local populations. In order to identify suitable measures with which to quantify together the positive landscape externalities produced by cultivated agricultural land, we can proceed from two different starting points. The first requires that there be a reward at least equal to or greater than the costs (or lower profits) that the entrepreneur receives from the conservation of a pleasant landscape. The second requires that "production" landscape to be paid for in an amount equal to that of the benefits produced. In the light of the foregoing, it is clear that the available economic policy instruments must take these aspects into consideration. In particular, try to internalize the positive externalities produced by forcing those who use them to pay them. To this end, we present some brief considerations on tourism within the local development process, as well as on the possible link between landscape and recreational activities as regards tourism. In order to analyze the importance of the landscape for man, we examined the area of the Madonie Park in Sicily, at the heart of the Mediterranean. It is a protected natural area established in 1981 [17] and established on November 9, 1989; includes fifteen municipalities (Caltavuturo, Castelbuono, Castellana Sicula, Cefalù, Collesano, Gratteri, Isnello, Petralia Soprana, Petralia Sottana, Polizzi Generosa, Pollina, San Mauro Castelverde, Scillato and Sclafani Bagni). Furthermore, it includes the Madonie mountain massif, located on the northern Sicilian coast, between the course of the Imera and Pollina rivers. The park is home to over half of the Sicilian plant species, and in particular most of those present only in Sicily (such as the endangered *Abies nebrodensis*, in the Vallone Madonna degli Angeli). For the fauna there are more than half of the bird species, all the mammal species and more than half of the Sicilian invertebrate species. There are three main areas of agricultural landscape: the hilly area between Scillato, Lascari and Cefalù, with citrus crops, that of vines and ash (*Fraxinus oxycarpa*) between Pollina and Castelbuono, and finally the mountain area where the olive cultivation and where cattle breeding and discrete extensions of forage meadows are concentrated, on the edge of chestnut woods (*Castanea sativa*), oaks and beeches Collesano, Gratteri, Isnello and San Mauro Castelverde. In some areas there are still wheat crops (*Triticum monococcum*). Legacy of the Sicilian latifundium, these cover the southern slope of the Park in the Petralie, in Gangi, Caltavuturo and Sclafani. Although the traditional agricultural system of the Madonita plateau has for some time been experiencing a profound structural and economic crisis, like all mountain farming, the production of olive, vine, almond (*Prunus dulcis*) and hazel (*Coryllus avellana*) life of man and his subsistence before the advent of the era of

mass consumption. The cultivation of the hazelnut, in particular, is exclusively developed in the Polizzi Generosa area, with about 300 hectares of hazelnut groves, which often arise next to old country houses in the mystical valley crossed by the fresh water that in the past was used in the country mills to produce flour.: the rural landscape is very suggestive. The Polizzi hazelnuts, which are harvested between the end of August and the beginning of September, undergo a significant decrease in production from year to year. In the countryside and in the mountain "marked" (ancient sites of the pastoral route), it is the period of ricotta, sheep's and goat's milk, handmade according to ancient procedures. In the summer period (late July and August) the ash manna is harvested, which has disappeared in the rest of Europe and in the Mediterranean basin and is now exclusive to the Castelbuono and Pollina countryside, where a few hundred hectares of ash trees continue to be cultivated. For some years there has been a specific consortium for the protection of the product and for its marketing and the product has been included in the list of slow food principals. In autumn in the territories of Castelbuono, Collesano, Geraci Siculo, Gibilmanna (Cefalù), Isnello, Petralia Sottana and Polizzi Generosa with their large chestnut groves, excellent chestnuts are harvested, while mushroom picking begins at the first rains. In spring, on the other hand, you can collect the much sought-after basilisk mushroom (*Pleurotus nebrodensis*), typical of the Madonie. In the lower Madonie, oil and wine are produced, mostly for family consumption. An ancient "palmento" or "palmintello", where once the grapes were pressed with the feet, has been restored in Petralia Sottana. From November onwards it is time for the olive harvest, from oil and to be consumed in salt. Harvesting is still done manually, under centuries-old trees that are beaten with reeds to let the fruits fall into the nets [18]. A practice which, in the most advanced olive growing regions, has now been largely replaced by machines. In order to examine how the presence of man favors contributes to the enhancement of the territory, we carried out a cognitive survey in the Madonite territory through the selection of ten case studies that refer to ten farms. The interviews were done over the telephone. In particular, we interviewed the business owners we asked for general information about the company and the strategies adopted to be competitive.

4. Economic structure of the territory under study

The resident population in the area under study according to ISTAT data [19], the resident population in the municipalities of the Madonie Park is 50,644. If we compare the same figure with that of 2010, when the population was 53,894, there is a decrease of 3,250 units. This data appears very worrying as in ten years the resident population decreases, with negative effects on social and economic activities.

Table 1. Population data.

Municipalities	Resident population (2011)	Resident population (2019)	Demographic variation
Caltavuturo	4171	3867	-304
Castelbuono	9161	8619	-542
Castellana Sicula	3549	3256	-293
Cefal ù	14354	14035	-319
Collesano	4095	3953	-142
Gratteri	1019	910	-109
Isnello	1598	1.465	-133
Petralia Soprana	3443	3166	-277
Petralia Sottana	2975	2677	-298
Polizzi Generosa	3607	3196	-411
Pollina	2998	2928	-70
San Mauro Castelverde	1847	1542	-305
Scillato	627	612	-15
Sclafani Bagni	450	418	-32
Total	53894	50644	-3250

Source: ISTAT

With regard to agricultural activity, according to the data available from Istat (years 2000 and 2010) [20] there is a decrease in the number of agricultural production structures. In particular, it goes from 8,012 farms in 2000 to 6,666 agricultural production facilities in 2010 with a reduction of 17.61%.

Table 2. Evolution of the Farms.

Municipalities	Year 2000 farms	Year 2010 farms	variation
Caltavuturo	520	484	-6.92%
Castelbuono	778	841	8.10%
Castellana Sicula	548	375	-31.57%
Cefal ù	419	543	29.59%
Collesano	767	770	0.39%
Gratteri	243	177	-27.16%
Isnello	312	146	-53.21%
Petralia Soprana	625	468	-25.12%
Petralia Sottana	1035	778	-24.83%
Polizzi Generosa	666	505	-24.17%
Pollina	556	430	-22.66%
San Mauro Castelverde	803	498	-37.98%
Scillato	187	145	-22.46%
Sclafani Bagni	553	506	-8.50%
Total	8012	6666	-17.61%

Fonte: Istat.

The data on the resident population and on agricultural production structures highlight the strong exodus from the territory, due to lack of economic prospects and therefore in order to block this exodus, new strategies for relaunching and developing the territory should be implemented. In particular, since the demand for agri-food products is rigid with respect to price and income, living in an area that could be a source of attraction for tourists who seek "well-being" and have spending power (high incomes), we must think valorization strategies of the agroforestry territory and of the agricultural and gastronomic products that the territory produces [21,22]. Man's abandonment of the territory leads to phenomena of desertification and also of vast fires that have repercussions at both the microeconomic and macroeconomic levels [23].

5. Results and discussions

As we have seen, the woods play a strategic role for man. Their protection and defense is crucial for the economic activities and not only that take place in the territory. Protecting the woods and the economic activities that take place in these territories is important for the community. From the interviews we have done, we have highlighted that these are people who, despite having had the opportunity to leave the mountain, have remained. They carry out agro-forestry activities. These are entrepreneurs who are between the ages of 45 and 50 in total have university degrees. To be competitive, they have activated agritourism and soil protection activities through the payment of ecosystem services. In particular, they carry out direct sales activities in the company and for the excess they supply commercial activities that are in the territory. This aspect is very relevant if we consider that the ecological economy is zero-kilometer. The direct sale in the company takes place above all on weekends when the flow of tourists from the neighboring cities of the plain moves towards the Madonie mountains. This represents rural tourism which is a well-defined productive activity but rather an aggregate of services offered to users who depend on the systemic interaction between agricultural activity and services. Indeed, rural tourism depends on a multitude of variables. Among these variables we can highlight the natural landscape beauty but also that created by man through the constitution of agricultural landscapes. This is configured as a tourism product. According to what has been said, the nature of the tourist product is extremely composite and complex [24,25]. The relationship aspect is very important when considering systemic and endogenous development. In fact, this is characterized by a type of use in relation to the characteristics of the environment and by the fact that the activities of different actors form a system [26]. At the same time, the impact that tourism itself produces is also systemic, given that the tourism industry tends to involve the entire economy of the territory it operates, with social, cultural and environmental effects [27]. Like many other sectors, tourism has undergone radical changes over time which vary according to the social contexts and economic variables of the population (income, employment). Indeed, the greater the wealth in the territory, the better the agrarian landscape should be [28]. This aspect, however, may also not be applied according to the entrepreneur's objectives. In developed economies, changes that have occurred over time, such as the increase in per capita income, have produced an increase in tourist interest in nature. It is evident that tourism can be an important factor in local development and very often represents the variable success strategy for the revitalization of many rural territories of inland areas. To consider a specific territory as a tourist destination, the place must have the presence of factors of attractiveness, or resources of various kinds capable of facilitating a tourist demand. Among

these in the agricultural landscape we include crops and landscape arrangements, but also the receptivity of the territory (roads and infrastructures in general). Furthermore, there must be a uniform vision of the area with a geographically identified territory accompanied by cooperation between the actors involved in an integrated supply perspective (primary, secondary and tertiary). Very often, the tourist offer is not structured in the best possible way. In fact, the configurations of the tourism offer are often sectorial (not systemic), when the relationships between the subjects involved are random and unplanned. On this aspect we very often observe that even if we are in the presence of beauties of rural landscapes, there are no itineraries or hotel accommodation. Moreover, even if there is this relationship, it is very often systematically weak as the actors of the tourism offer are part of a uniform structured body. It is clear that in order to have a planned tourism system, relations between the actors of the territory are needed. Without relationships we can have a tourism product offer but not a tourism system.

6. Conclusions

As we have seen, the agricultural landscape is an engine for promoting endogenous development. However, it is very difficult to assess the positive externalities produced and above all to foresee a payment. It should not be overlooked here that an agricultural landscape also produces positive externalities for local populations in general and even in this it is difficult to internalize the benefits produced. In this regard, the possibility of introducing policies for the use of the landscape seems limiting and relatively small effective. In our opinion, the policies should be chosen on a territory by territory and a specific window for planning and management of the landscape should be created which represents the reservoir for promoting the development of rural tourism. The remuneration of the landscape externality (for example of vineyards, arable land, orchards) must be at the basis of the planning of local development policies. It is necessary to ensure coherence between land management methods, type of tourism and the characteristics of the local development model to be pursued. This goal is not easy to achieve, given that it is pursued within a complex situation in which, in addition to the importance of individual factors, the relationships between them must be taken into account. It is also necessary to keep in mind this is a dynamic context in which the speed with which it is necessary to operate is not the same for the various systems considered. Finally, it must be emphasized this coherence between territorial management, tourism and local development requires adequate policies which, among other things, imply income redistribution by the actors who benefit from those who bear the costs of creating pleasant and appreciated landscapes. Let's not forget that the strength of a territory lies in its endogenous resources. The endogenous development of rural areas through rural tourism can represent the key to sustainable development over time. The empirical analysis carried out on the Madonie highlights that the development and resilience of the landscape passes from an action of systemic territorial growth. It is important to maintain economic activities, agricultural and forestry businesses in the mountains as, in addition to providing positive externalities in terms of ecosystem services to the community, they prevent forest fires. The farmer is the custodian of knowledge and of the agroforestry landscape and therefore it is necessary that the community reward him for what he does.

Conflict of interest

The author declares no conflict of interest.

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