

# **RURAL TOURISM ASSOCIATED WITH AGRICULTURE AS AN ECONOMIC ALTERNATIVE FOR THE FARMERS**

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**ABSTRACT:** This paper aims at presenting a possible approach to identify the best sites for rural tourism and also to analyze the synergies between agriculture and cultural heritage in Azores, in order to be incorporated in the full range of management concerns into private and public decision-making. The following territorial aptitudes for alternative were used to simulate this exercise: urban, touristic, horticulture, agricultural, cattle and forestry. Soil potential was defined in a number of classes from I to VII. The best hypothetical sites for rural tourism were defined using Geographical Information Systems (GIS). **Keywords:** rural tourism, familiar farming, non farming activities, multifunctionality, GIS.

**RESUMEN:** Este trabajo busca presentar una posible posición para identificar los mejores locales para el turismo rural y también para examinar las sinergias entre la agricultura y el patrimonio cultural de los Azores con el fin de ser incorporado en la gama de problemas de gestión en las decisiones públicas y privadas. Competencias territoriales para alternativa fueron utilizadas para simular este ejercicio: urbano, turístico, la horticultura, la agricultura y la silvicultura. El potencial de los suelos se determinó en un número de clases I a VII. Los mejores lugares hipotéticos para el turismo rural fueron definidos mediante Sistemas de Información Geográfica (SIG). **Palabras clave:** turismo rural, agricultura familiar; actividades no agrícolas, multifuncionalidad, GIS/SIG

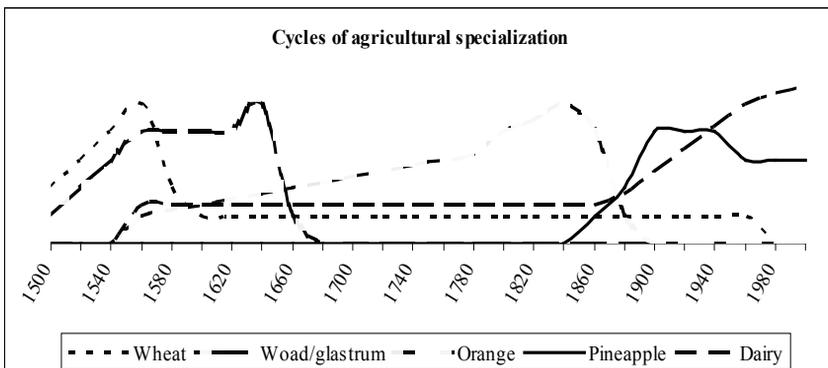
**RESUMO:** Este artigo apresenta uma abordagem conducente à identificação dos melhores locais para o turismo e das sinergias entre a agricultura e o património cultural dos Açores. Pretende-se que os seus resultados sejam incorporados na tomada de decisão, ao nível da gestão pública e privada. No exercício de simulação foram consideradas vocações territoriais alternativas: uso urbano, uso turístico, horticultura, agricultura e silvicultura. O potencial dos solos foi estruturado em classes, de I a VII. Os melhores lugares hipotéticos para o turismo rural foram definidos através do Sistema de Informação Geográfica (SIG). **Palavras-chave:** turismo rural, agricultura familiar; actividades não agrícolas, multifuncionalidade, GIS/SIG.

## INTRODUCTION

The objective of this work is to present a possible approach to determine the optimum sites for rural tourism in Terceira, São Miguel and Faial Islands. Besides, this work aims at demonstrate, that tourism associated with agriculture can be a way to maintain constructed and cultural heritage, which is considered redundant when other hegemonic economic cycles prevail.

The economic history of the Azores is characterized by the phenomenon called “colonial monoculture for export”. Since the beginning of settlement, the cycles of agricultural specialization, (cereals, woad/glastrum, orange; see figure 1), ensued between the crisis and socio-economic disturbances that marked the interim periods, resulting from the depletion of arable land and the emergence of pests, among other causes of a commercial nature.

After the Second World War livestock production for industrial purposes developed and today it is the dominant support of the regional economy. The increase in artificial pasture areas at the expense of agricultural crops, the rampant growth of the herd and the growth of industrial milk processing, led to a monoculture, with all its consequences, such as the dependence of the productive sector. Nevertheless, as stated by Joaquim (2004), nowadays, generally, this sector is decreasing, due to restrictions in climatic and orographic factors as well as surface dimension with aptitude to cultivation. The same author also mentions factors as high slopes or erosion as conditionings to the reduced farm sizes, bringing difficulties to access and mechanization and refers to transformation of primary products as demanding proximity to the source materials and to consumers’ market, which among other factors may be responsible for this decrease.



Source: DROTRH (2003)

**Figure 1. Agricultural cycles**

With time, rural territory has adapted to the changes imposed by economic pressures, namely financial, social and environmental, with an economic transition in the rural territory in course. In the countryside, as a complement to agricultural activities, many urban activities have developed. This way, the countryside is no longer exclusively agricultural, incorporating nowadays activities such as provision of services, processing industry, trade in goods, social services, construction industry, among other activities. These non-agricultural activities represent a supplementary way of getting income in rural areas. Besides, leisure activities and rural tourism may promote the development of specific regions and locations, with improvement in the welfare of the local population. This engages in the multifunctionality of the rural territory.

## LITERATURE RESEARCH

### *Multifunctional and Agriculture*

Multifunctionality refers to the fact that an economic activity may have multiple outputs and, by virtue of this, may contribute to several societal objectives at once. Multifunctionality is thus an activity-oriented concept that refers to specific properties of the production process and its multiple outputs (OCDE, 2001).

The analysis of multifunctionality favours a perspective that recognises the integrated nature of the outputs (although it should be recognised that the degree of integration differs significantly among them). For this reason, the term multiple outputs is generally preferred, as it allows the inclusion of intended outputs and not merely unintended side-effects. However, the term multiple outputs has a slightly positive connotation and may be considered less appropriate when negative effects of agriculture, such as water pollution, are examined. To circumvent this problem, the term multiple outputs are replaced by *multiple effects* when negative impacts are discussed (OCDE, 2001).

Multifunctional agriculture (MFA), which congregates several activities besides agriculture in the same space, can have several advantages, while integrating production, consumption and protection in the same space. Rural tourism could engage in this concept. Renting et al., (2009), critically discuss various existing research approaches to MFA, both from natural and social sciences, namely governance mechanisms as market regulation, land-use approaches, actor-oriented and public regulation approaches. The same authors also state that in the last decade “agricultural activity beyond its role of producing food and fibre may also have several other functions such as renewable natural resources management, landscape and biodiversity conservation and contribution to the socio-economic viability of rural areas”.

According to the existing literature, there is a great diversity of concepts about rural tourism. Phillip et al., (2009), presented a framework to identify the key characteristics currently used and organised them into a transparent and structured framework, which can be used as a basis for more informed debate and discussion and for future empirical research. Nevertheless, in order to congregate existing concepts, it was decided that the term “rural tourism” be used in the present work, thus representing the activities undertaken in farm holdings, which may include, for example, participation in agricultural work, visits to landscapes and natural environments, regional gastronomy and overnight staying. As a matter of fact, agriculture can benefit from tourism occurring in the same space in a larger or smaller scale, depending on economic features, but also on the management and manpower employed, which shall take into account that tourism management requires different skills from agricultural management. Rural tourism encompasses a trade off between the labour employed in the agriculture and the one employed in tourism, where, generally women dedicate themselves mostly to the tourism management, as an extension of domestic work and men dedicate themselves mostly to agricultural management. Sometimes, the visible benefits of supporting agriculture activities with tourism are not always as large as expected. Busby and Rendle (2000) stated that “For most farms, tourism does not bring a large revenue stream; rather it is about providing income which can make the difference between viability or not.” Tourism typically fails to stimulate local agriculture, and in some cases it is associated with a relative decline in production. Nevertheless potential for tourism to promote local agricultural development is widely recognized (Torres, 2003).

It seems that not only agriculture benefits from rural tourism. This seems indeed a symbiotic relation. Fleischer and Tchetchik (2005) performed a study which derived important conclusions, regarding benefits from agriculture to rural tourism, namely that:

- Working farms’ impact is embodied in the visitors’ valuation of the accommodations and in the enterprises’ production efficiency;
- A farmer can have potential benefits if running a tourism business, when visitors’ willingness to pay is higher for accommodations on working farms and from more efficient use of labour and capital;
- The working farm does not have any value for the visitors;
- On the production side, farmers benefit from the existence of a working farm;
- A firm producing agricultural goods and tourism services uses its production factors more efficiently in producing tourism than firms managed by nonfarmers;

- Visitors are willing to pay more for firms nearby tourist attractions, constituting a justification for public spending on tourism attractions & infrastructure, which impact is amplified to closer touristic firms.
- Socio-cultural development, including the re-population of rural areas; the maintenance and improvement of public services; the revitalisation of local crafts, customs and cultural identities; and, increased opportunities for social contact and exchange (Sharpley, 2002).

It is important to mention that this kind of studies (Choice experiments) can not entirely be extrapolated for other regions, since it is affected by the inquired person's culture, which is different from region to region, but can serve as a reference, if carefully analysed.

### *Rural Tourism and Local Development*

Agriculture can no longer constitute the sole economic basis for the development of rural areas. The possibility to incorporate new economic alternatives to the countryside has been the strategy adopted by many countries to limit migration from rural areas to towns, with improvement of their quality of life by increasing income, achieved through greater diversity of activities and functions. One of those activities could be rural tourism. Tourism has long been considered as a potential means for socio-economic development and regeneration of rural areas, in particular those affected by the decline of traditional agrarian activities (Iorio, 2010).

A number of studies on farm tourism consider it as an economic alternative for farmers who are facing decreased profits and difficulties generated by the agricultural crisis and restructuring. The opportunity to engage in activities that are negatively correlated with farming and the prospect of increasing farm income by spreading costs is probably the greatest advantage of incorporating tourism into the farm business. Because of the problems in agriculture, diversification has been viewed as a means of survival for farm business, with tourism thought to be an attractive and feasible option open to farmers (Cavaco, 1995; Sharpley, 2002; Cánoves, 2004; Oredgebe, 2009; Duarte, 2010).

To understand this phenomenon, Silva (2006) identified the owners of this "new business" in Portugal. He points to the existence of three different groups of owners. A first group is linked to traditional and noble families who join the activity mainly to keep and recover old family properties, especially palaces and manor houses. A second group consists of farmers that seek to make some money from agricultural facilities, such as barns and small farmhouses. Finally, individuals who buy and restore old houses in traditional villages to use in touristic ac-

tivities compose the third group. Many people saw rural tourism as an opportunity to restore family houses with government support and at the same time create an alternative way to earn some extra income.

Farm tourism is an area where farmers are in direct competition with non-farm commercial enterprises. An attractive landscape is only one element of the package of leisure goods sought for by tourists. In most cases, farmers who expand into farm tourism have to upgrade existing accommodation or build new living quarters, and expand the range of services they can offer. They also need to commit labour resources to the tourist activity. Whether farmers are able to compete with non-agricultural suppliers of tourist services depends on cost-factors (the size of the investment required to adapt existing facilities to tourist standards; spare capacity in terms of lodging and family labour), the quality of farm-specific services (access to landscape and nature; existence of high-value landscape and ecosystem features; availability of home-made food; access to farm animals; proximity to services that can not be supplied on the farm), and the preferences of vacationers for farm-specific rural amenities. Farm tourism is one way of internalising the social benefits associated with agricultural landscape provision, but not the only one.

Hjalager (1996) mentions in its study that “tourism by its very nature draws outside capital into the local community which can lead to positive economic benefits that may be the essential attributes for the survival of a rural community undergoing economic transition”.

Nevertheless, as mentioned by the same author, which discusses the impact of rural tourism on agricultural holdings, “financial returns most often do not measure up either to the expectations of the politicians or to that of the farmers.” This issue deserves clearly a board approach in order to frame economic issues within financial, social and environmental aspects, based in land use potentials, in such a way to site these activities in the best possible way.

Holland et al., (2003) mention a study by Slee, Farr and Snowdon (1997) that analysed the impacts of soft tourism (tourism accommodation provided by locals in farms, for example) and hard tourism (accommodation provided by externals such as time-share companies) on the local rural economy in Scotland. They found that a much higher proportion of expenditure remains locally or in surrounding areas when soft tourism providers are used (68.5% of expenditure), compared to hard tourism providers (only 25.3% of expenditure remains in the local or extended area).

Rural tourism can therefore constitute an alternative to keep young population in rural areas, if they achieve comparable welfare conditions, i.e. if they were to migrate. Nevertheless, rural tourism generates low income for local rural population, when constituting visits organized

by urban tourism agencies, which also use urban tour guides. This often constitutes short visits, being that both meals and overnight staying are made in the city nearest to the place visited. This type of tourism uses the rural space and its basic infrastructures, with most of the value generated remaining in urban enterprises and employees. Therefore, the multiplying factor will not have the significance mentioned by Joaquim (2004) on other economic sectors at the regional scale. However, the rural community can benefit from it, since ultimately it shares the benefits generated indirectly, such as the improvement of infrastructure and public services.

In some regions, with similar characteristics to the Azores, the tourism sector revealed itself as an important motor for economical and social transformations and development, namely in Ultraperipheric regions from the UE, such as Canaries Islands and Madeira Islands, which specialized in the tourism sector and presented high development rates, while regions as the Azores, which developed mainly based on the primary sector did not follow these development speeds (Joaquim, 2004).

When considering local development, specificities of each locality or territory must be explored in a different way in rural tourism from mass tourism, which tends to mix products and concentrate on certain locations. Rural tourism must be a diffuse activity directly related to environmental aspects and specificities of each location.

Any regional or local initiative for development of rural tourism must start by performing an economic and ecological zoning of the rural space, followed by the description of the main tourist products and analysis of its current and potential demand, the spatial planning of productive activities and of the cadastre of farmers that would benefit due to its potential to explore this type of tourism. This means that after siting the location or region in a agro-ecological way, an integrated development plan would be outlined, where the rural tourism could be one of the activities contemplated. This information also allows performing management plans for environmental and socio-economic impacts of rural tourism. Finally, local communities should become active players in touristic plans and projects for the countryside.

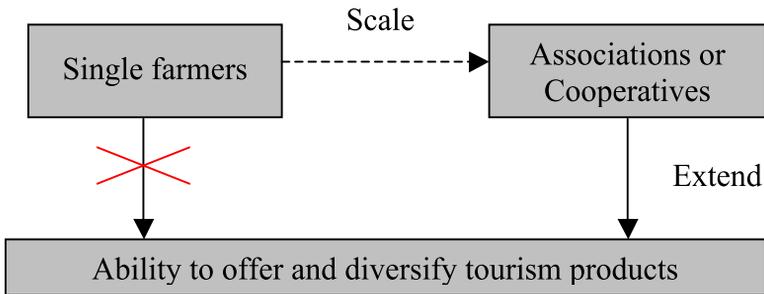
As with any other type of economic activity, several problems can arise from rural tourism, such as: (a) environmental degradation caused by garbage, noise, depletion of the natural heritage, its fauna and flora; b) degeneration of local culture, due to the interaction of the local community with tourists from different sources; (c) increase in the transit of persons and population mobility; d) increase in the demand for public services; (e) inclusion and exclusion of areas and regions, which may lead to the rural exodus in excluded areas; f) abandonment of farming activities, with rural tourism constituting the main source of family income; g) increase in the cost of life in communities due

to the increase of prices of products of land resulting from real estate speculation.

Rural tourism requires a lot of professionalism and good training for all stakeholders. It is an activity that depends heavily on the owner's profile, its vision for the business and, in particular, his venture character. *Rural Tourism and Economies of Scale*

Rural areas used to be dependent on farming and income from agricultural production was the base of maintenance for large part of rural population for many centuries (Przezborska, 2005; Sharpley, 2002; Perales, 2002).

The scale under which the activities are developed is an important factor to address. Even though economies of scale tend to favour the success of activities; rural tourism generally tends to present a small scale structure. Regarding this issue, Hjalager (1996) mentions that "In some respects rural tourism contributes positively to the innovation of the tourist product since its small scale, 'green' issues and special facilities differentiate the product from others. But the unleashing of real potential is hampered by the fact that farmers tend to give priority to traditional agriculture and by the fact that industrialized agriculture is not easily combined with the commodifying of agricultural traditions for tourism". By reasons of scale, a single farmer is unable to deliver an agro-tourist product that satisfies the generality of demand. The most viable alternative would be the Organization of associations or cooperatives, to extend the ability to offer and to diversify tourism products placed at the disposal of tourists (Figure 2).



**Figure 2. Economies of scale in rural tourism**

Hjalager (1996) also refers that "The community level interorganizational innovations which are designed to ensure the marketing and quality control of rural tourism are taking place too slowly", which nowadays still constitutes a reality in Azores. The same author also mentions that "cooperative efforts in the field of tourism are hampered by the fact that the organizations have not been logically placed in the value chain". The same author introduces measures to improve

the interorganizational set-up, suggesting that this is essential if rural tourism is to be launched on any large scale.

*Rural Tourism: Qualified and non Qualified Manpower*

Joaquim (2004) mentions that tourism generates, in a general way, more job opportunities than any other sector of the national economic system, having an impact on other economic sectors at the regional scale, rising expenses in the accommodation sector, rising the rents and the jobs of the related sectors, rising employees' consumption and therefore inducing a rise in production in other economic sectors.

As stated by Hjalager (1996) and Iorio (2010) rural tourism creates hardly any extra jobs in the primary sector, but reallocates family work. As a matter of fact, only in large scale projects is rural tourism able to create new jobs, through the development of new products. Generally, rural tourism is not considered as a "real" job, for various reasons. Firstly, because its contribution to the total income is limited—about a third of the household income—and because women do not receive a salary, but rather an unreliable income, that helps the family budget. Second, it is always a part-time job. Thus, looking after tourists at home is still a complementary job to agriculture. A different situation occurs when the agricultural activity becomes secondary or residual and the main income comes from the tourist activity and both the man and the woman in the household work at it Cánoves et al. (2004). As stated by Hjalager (1996) only the most competent farmers, with high incomes, are able to launch professional and larger-scale tourism projects with greater probabilities of success. It seems therefore extremely important that the tourist manager and employees have sufficient knowledge to support the tourist, namely regarding communication skills, and the capacity to supply a service adapted to the particular needs of the tourist. This way, many farmers are not capable of supplying this service, since they are not trained for such activities. Training as well as use of qualified manpower seems to be an important tool to promote adaptation of farmers to be able to implement rural tourism projects.

This drives the attention to the fact that small scale projects need also to adapt to these particularities, and pursue with specialized job creation. But, as stated by Hjalager (1996) very small-scale projects, with substantial manpower resources have not prospectation to pursue with the projects in a long term run. The same author also mentions that very small islands are less able to take up the opportunities for rural tourism, since they lack sufficient facilities to accommodate tourists to stay for more than one day. This indicates that it is also important to have a minimum scale to implement rural tourism at the local level, namely in islands.

Hjalager (1996) found that the rural tourism services offered are nearly always based on typically female work operations existing on a farm, as an extension of ordinary household-type activities ‘upgraded’, to provide accommodation and catering services to ‘strangers’ without introducing particular innovative elements. The same author mentions that “Things take place on a larger scale, but are still performed as they used to be”. So, this shows the need to pursue a change of management concepts, as for instance to improve the image of the tourist product. *Support Tourism or Agriculture?*

With the implementation of a policy of support to rural tourism, it is intended to stimulate many farmers to join the activity and to abandon production, which may compromise the supply of products in the local economy. The process of development of rural tourism must occur at the local level, with the involvement and participation of all social actors duly represented and with a careful assessment of tourist potential, having as reference the local culture. Local limits for this kind of ventures should be established, in order to avoid social and environmental imbalances, similarly encouraging other activities which may enable alternative or complementary sources of income from farming activities.

Nevertheless, as Fleischer and Tchetchik (2005) mentioned, “The support funds for agriculture indirectly help tourism production: reducing them, on the one hand, and increasing direct support for tourism, on the other, might actually counteract each other.” and “In some cases, agriculture production benefits tourism production. Thus, it can be that support for agricultural production is indirectly channelled into support for tourist activities. In this case, reducing support for agriculture while increasing support for non-agricultural activities, such as tourism, might not have the desired impact on firms with these two activities”. So, it seems necessary to understand in a better way whether support shall be directed to agriculture or tourism, in order to maintain sustainability of both.

#### *Rural Tourism as a Way to Maintain Constructed and Cultural Heritage*

With the change in the Azores economic cycles along the time, many predominant activities have been abandoned, leaving behind constructed Heritage. One example is the Orange Cycle, which lost its economic viability in the Azores, leading farmers to adapt and change the products offer, thus becoming small agricultural owners, engaging, among others, in the dairy farming sector, which is nowadays the predominant one.

These and other changes left many rural buildings and infrastructures abandoned, without practical utility. It is within this context that

some of these facilities are being recovered for rural tourism. Joaquim (2004) refers that for the Azores, the recovery of rural spaces for rural tourism is taking place, in order to raise the offer in this sector, while maintaining its ecological value and using the potential value of these areas.

The inclusion of local architecture, gastronomy, traditional music, games and costumes in the touristic products, can be part of this strategy, enriching the tourist experiences in these areas, while maintaining records of these traditions, not leaving them to “die” along with the older population. This extinction of Heritage records must be prevented in order to maintain the historical collective memories and the value that this poses for the rural territory identity. Consequently, this will pose a relevant advantage in the valuation of a determined place for the tourist and for the local people. The traditional way of life of the local communities does not seem to be altered by the tourists who share spaces, times and meals with their hosts. As mentioned by Iorio (2010) “The “old world” atmosphere of these settlements, the generally pristine environment, the search for “authentic rurality”, the interest in cultural and natural heritage and the wish to observe and get in touch with the local”.

Azorean landscapes are characterized by areas where landscapes maintain themselves almost in the “natural” state, but also by landscapes which reflect land based human activities, nowadays, mainly connected to farming and dairy farming. This seems to be an important symbol of Azorean landscapes, which attract tourists (as, for example, Terceira volcanic stone walls).

Giupponi (2006) referred to the increase in intensive farming as being responsible for the fragmentation and loss of natural habitats and their associated species, in various European farming regions. Nevertheless, the same author also referred to the development of widespread land abandonment because of the effects of the Common Agricultural Policy (CAP) reform, with the expansion of the European Union, globalisation, as well as changes in climate and technology.

Degradation of rural territory, driven by the abandonment of land based activities is an important issue to address, since this may lead to landscape changes, which can affect tourism demand for Azorean landscapes. This is particularly explained by the lack of maintenance of infrastructures and soil structure allowing invading species and the appearance of ruins, causing sometimes high changes in the landscapes patterns. So, in this way agriculture maintenance poses an important role in the landscape maintenance.

Besides, as mentioned by Giupponi (2006), “maintenance of the livestock production systems typical of mountain agriculture is shown

to be the key factor for contrasting land abandonment and the consequent expansion of woodlands, with negative effects in terms of simplification of landscape and impacts on species of naturalistic interest". This does not have necessarily to be the case in the Azores, but may as well play an important role.

So, in case agriculture outcome is not enough to financially support itself, rural tourism can act as a support in an integrated symbiotic based approach, deriving other economic advantages, namely in the social and environmental fields, while maintaining constructed and cultural heritage.

### *Rural Tourism Siting through GIS Land Use Suitability Assessment*

Joaquim (2004) refers to Plano de Ordenamento Turístico da Região Autónoma dos Açores (POTRAA) mentioning the objectives of redefining the positioning of the touristic destinies in the Azores, in compliance with sustainable development, while integrating touristic activities. The same author also mentions other objectives of POTRAA, such as improving quality of regional touristic product and preserving the natural and cultural heritage. This way, rural tourism can be seen as a form of territory valuation, since it contributes both to environmental protection and conservation of the natural, historical and cultural heritage of the countryside.

Referring to Plano de Ordenamento Turístico da Região Autónoma dos Açores (POTRAA), Joaquim (2004) also mentions other objectives, such as the identification in each Island of the tourism siting, and prevention of the destination degradation, through sustainable policies for tourism. Rural tourism can therefore benefit the local population involved in tourism activities directly and/or indirectly, in a higher or lower scale, depending on the policy and management decisions and specificities of rural tourism.

Beedasy et al. (1999) referred to the importance of GIS to provide holistic approaches towards problem solving, being this able to process qualitative and quantitative information and supply visual display of results, which can be used to promote participation at decision-making level.

Silberman et al. (2010) developed a GIS-based model and analytical procedure to identify settlements in the Rocky Mountain region that possess the attributes of existing ski areas and might be suitable candidates for reinvention as ski resort towns.

## METHODOLOGY

The potential aptitudes for the rural tourism, resulting from crossing other known aptitudes are defined in a spatial scale. Known apti-

tudes used to simulate this exercise are: urban, touristic, horticulture, agricultural (arable farming), dairy farming (pasture) and forestry (Silveira & Dentinho 2010).

According to the optimal characteristics for these activities, several determinant factors (Edafoclimatic variables) were assessed for each aptitude. These were the Annual average temperature (°C), Annual cumulative precipitation (mm), and Slope (%). From this, Soil use potential was defined in classes from I to VII.

**Table 1. Edafoclimatic variables used for soil class suitability determination**

Factors	Urban	Tourism	Horticulture	Arable Farming	Dairy farming (Pasture)	Forestry
Average Annual Temperature (°C)	≥ 16	≥ 16	≥ 16	≥ 10	≥ 12.5	> 0
Cumulative Annual Precipitation	-	-	≥ 1000	750	≥ 1300	≥ 750
Slope (%)	0 - 25	0 - 25	0 - 25	0 - 15	0 - 25	0 - 50
Capacity of Soil Use (I - VII)	I - VII	I - VII	I-VI	I - IV	I - V	I - VI

*Source: Silveira & Dentinho, 2010*

As referred to by Silveira and Dentinho (2010) the definition of soil classes is crucial for establishing a workable model, considering in their study four levels of average annual temperature, three levels of annual cumulative precipitation, three classes of land slope and four types of soils. The same soil classes are used in this work.

Based on this, the same authors also defined 14 soil classes. Soil Class 1 allows all the considered land uses; Soil Class 2 is suitable for arable farm, pasture, and forest only; Soil Class 3 allows all uses except arable farming; Soil Class 4 can be used for pasture and forest; Soil Class 5 allows all uses except pasture; Soil Class 6 is good for horticulture, arable farming, and forestation; Soil Class 7 can contain urban uses, tourism, arable farming, and forest uses; Soil Class 8 can only sustain arable farming and forestation; Soil Class 9 is suitable for urban uses, tourism, horticulture, and forestation; Soil Class 10 can only sustain forest uses; Soil Class 11 can be used only for urban uses, tourism, and forest uses; Soil Class 12 is just for urban uses and tourism; Soil Class 13 does not allow any considered use and Class 14 is for marine uses.

**Table 2. Soil Class suitability for land uses**

Class	Urban	Touristic	Horticulture	Arable farming	Pasture	Forest
1	X	X	X	X	X	X
2	-	-	-	X	X	X
3	X	X	X	-	X	X
4	-	-	-	-	X	X
5	X	X	X	X	-	X
6	-	-	X	X	-	X
7	X	X	-	X	-	X
8	-	-	-	X	-	X
9	X	X	X	-	-	X
10	-	-	-	-	-	X
11	X	X	-	-	-	X
12	X	X	-	-	-	-
13	-	-	-	-	-	-
14	Sea	Sea	Sea	Sea	Sea	Sea

*Source: Silveira & Dentinho, 2010*

Pasture areas and agricultural lands occupied essentially by silage cultures in each island are excluded in this work, since they do not pose an important role for rural tourism, and since they could be used for cattle and agriculture, being those uses very competitive for dairy farming which is very specialized and do not easily employ part-time nor specialized personnel.

Besides, as referred to by Silveira and Dentinho (2010), different types of uses compete for each class of soil in each zone. This will be the case for tourism and dairy farming, within these pasture areas and silage cultures. In this study it is given preference for dairy farming in these competition areas since this is a sustainable sector which should be maintained, and not replaced by tourism. This way, the classes of interest for this study, to define the potential for rural tourism are: classes 1, 3, 5, 7 and 9.

Infrastructures connected to rural tourism in the Azores, particularly in Terceira, Faial and São Miguel Islands were identified and their location was assessed (Table 3) and referenced in Figures 3, 4 and 5.

**Table 3. Infrastructures connected to rural tourism  
Terceira, Faial and São Miguel**

Island	Location	Name
Terceira	São Mateus	Quinta do Martelo
	São Pedro	Casa do Pombal
	Cabo da Praia	Quinta dos Figos
Faial	Cedros	Casa do Capitão
	Capelo	Casa dos Capelinhos
	Feteiras	Casa da Japoneira
	Castelo Branco	Quinta da Meia Eira
	Fajã de Baixo	Quinta da Abelheira
	S. Vicente Ferreira	Ana Santos
São Miguel	São Roque	Quinta da Manguinha
	Nordeste	Casa do Monte
	Lomba da Maia	Herdade Nossa Sra. da Graça
	Ribeira Chã	Casa São José

GIS is then used to incorporate in maps the potential areas for rural tourism as well as the existing rural tourism infrastructures.

## RESULTS AND DISCUSSIONS

Potential aptitudes for the rural tourism, resulting from crossing the referred aptitudes and determinant factors were defined in a spatial scale, through the use of GIS. These are presented for Terceira Island in Figure 3, for São Miguel Island in Figure 4 and for Faial Island in Figure 5, as well as the existing rural tourism facilities. This output can be used to assess the best sites for rural tourism, serving as a tool for decision-making.



**Figure 3: Potential rural tourism siting in Terceira island**

The results show that rural tourism aptitudes tend to be focused in coastal areas, which are in line with the existing facilities of rural tourism, with few exceptions. According to Figure 3, Figure 4 and Figure 5, there are many areas where new rural tourism installations could be implemented. Indeed, the identified areas are in line with the location of the best support infrastructures, since the core of the islands is in general free of construction, remaining almost in the natural state. It is therefore important to maintain the core areas as intact as possible and to develop rural tourism where some construction and agriculture already exists.

Fleischer and Felsenstein (2000) stated that “while tourism is heralded as job generating, it is also blamed for creating low wages and only seasonal employment”. This may be overcome if tourism is conciliated with agriculture, provided that technical conditions and skilled labour are granted, in order to supply good quality products (agricultural and touristic) in the same space.



**Figure 4: Potential rural tourism siting in São Miguel island**

Besides, an economic analysis shall be performed in order to define the best land uses within the ones presented here. Complementary approaches to analyse these issues can be rooted for example in Heidkamp (2006) with the aim of integrating GIS and environmental valuation methods in the structure of a cost–benefit analysis (CBA), in order to evaluate spatial concerns, as tools for policy decisions towards sustainable regional development, considering environmental issues in the economic analysis of land use. Liu et al., (2007) performed an integrated GIS-based analysis system for land-use management, and stated that in land-use management, different goals, stakeholders and criteria must be considered.



**Figure 5. Potential rural tourism siting in Faial island**

Another issue to address is the environmental pressure from tourism. Patterson et al., (2006) evaluate this issue and refer that “the complexity of the challenge at hand can no longer be understood in terms of a single management objective that can be attained. It is critical that environmental managers are assisted in setting an adaptive, rather than static carrying capacity, which responds to a framework of nature’s rules, that captures the adaptive and evolutionary nature of adaptive cycles that are nested one within the other across space and time scales”.

Patterson et al., (2006) concludes in his work that a greater understanding is needed in several dimensions, namely:

- Tourism structure;
- Temporal and spatial dynamics;
- Shift away from a static vision of carrying capacity in the tourism management;
- To seek for broader spatial or temporal information and collaboration in transforming the problem domain (social, political, or economic perspectives);
- Investigate how improved indicators can assist in the management of the complex processes that cause (or mediate) tourism impacts;
- Examine linkages through time and between hierarchical management levels (such as the spatial understanding of tourism dynamics from site, municipal, provincial, regional and national scales).

Besides the effects in the environment, it is also important to understand the effects on the cultural environment, in order to establish corrective and preventive measures, threats and opportunities to em-

power continuous improvements in the management solutions, and offer quality experiences for each touristic demand segment, maintaining the cultural identity of the destination community (Moniz, 2006). As a matter of fact, tourism can promote overcrowding, traffic and social change. This is a reason why rural tourism may be a better option in small communities than mass tourism, in order to maintain constructed and cultural heritage. To achieve this, Moniz (2006) suggests that touristic sustainable development demands for an informed participation of the relevant stakeholders (from public and private domain), with strong policy leadership and with a share of responsibilities, in order to consider different perspectives and priorities, to achieve agreements, being this of high relevance in small dimension islands.

Nevertheless, other tools should be considered, in order to lead tourists to choose these destinations. Moniz (2006) mentions the importance of marketing directed to the segments which would potentially be interested in this type of tourism. Besides, it is also extremely important to connect Islands to the mainland with good and low cost transportation networks, in order to prevent segregation of these islands from potential markets.

All these issues should be addressed as a complement to the present analysis.

## CONCLUSIONS

Rural tourism siting requires extreme care in order to achieve sustainable regional development, considering local environmental and cultural features, stakeholder's goals, demand opportunities and continuous management improvements, framed by cost benefit analysis, considering externalities. By considering the potential aptitudes for rural tourism and the determinant factors (Edafoclimatic factors) it is possible to define in a spatial scale, through the use of GIS, the best siting of rural tourism. This output can then serve as a tool for decision making, which shall frame these results within the previously mentioned features. Complementing this perspective, tourism in rural territory associated with farming, may also be considered as an alternative for the reduction of labour in traditional agricultural activities and a new outcome for the rural populations, due not only to the sector itself, but also to the tourism related activities, such as commerce, restaurants and other services. Indeed, all the rural community can benefit from the increasing demand of environmental goods and services, with leisure and associated tourism playing an important part in those activities. Rural tourism can then serve as a way to maintain constructed and cultural heritage in rural areas, with ample benefits for local communities.

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