

## LAND POLICY & SOCIO-SPATIAL IMPACTS IN A BURNED FOREST: THE CASE OF CHALKIDIKI, GREECE (2006)

*N.D. HASANAGAS, Assist. Prof., Kavala Institute of Technology, Department of Landscape Architecture, City of Drama, Greece, GR 66100, nikolaos.hasanagas@gmail.com,  
A.D. STYLIADIS, Prof., Kavala Institute of Technology, Department of Landscape Architecture, City of Drama, Greece, GR 66100, styliadis@ath.forthnet.gr  
E.I. PAPAPOULOU, Assist. Prof., Aristotle University of Thessaloniki, Faculty of Agricultural Science, Department of Agricultural Economics, City of Thessaloniki, GR 54124  
P.K. BIRTSAS, Assist. Prof., Larissa Institute of Technology, Department of Forestry and Management of Natural Environment, Laboratory Wildlife, End of Mavromichali Str., City of Karditsa, GR 43100*

**Abstract:** *The results have been based on statistical analysis of 110 questionnaires in collected in the peninsula of Kassandra, Chalkidiki, in 2008, about the fire which took place in 2006. Almost all socio-spatial functions of the burned forest area are restored in relatively short time after the fire (about 2 years), contrary to the expected long-term catastrophe that is believed to be caused by an extensive forest fire. Only the sport has been affected in the burned area. Female visitors and students or pupils seem to appreciate the natural values after the fire. These who desire the reforestation of the local area do not necessarily regard the reforestation as an ultimate scenario which should be implemented in every burned area in the country (“local environmentalism”). Urbanized free time behavior is rather addictive than saturating, as people with urbanized free time behavior do not need a reforested area as an alternative.*

**Keywords:** *socio-spatial impacts, forest fire, restoration, environment, forest and rural policy*

### 1. Introduction

Although an extensive forest fire is considered to be a tragic incident, in this paper it is argued that the land use is almost restored latest two years after the fire. This paper aims at showing a comparison of land use behavior before and after the fire, and to examine the determinants of these socio-spatial impacts. The attitudes of the local population toward land and environmental policy issues will be critically examined and issues of dogmatism toward land policy issues will be discussed.

#### 1.1 Literature review

Gill (2005) has extensively described the complexity of the forest fire issue, emphasizing its multidimensionality (socio-economic, politico-administrative and ecological). Although the landscape policy and planning has been presented a central point related to the forest fire issue, no analysis of socio-spatial behavior has been conducted.

Iliadis et al. (2002) have presented an interesting computer-system for classifying the areas according to the fire risk level, emphasizing that the fire in forest is mostly arson. However, this risk assessment system can possibly be supported by socio-spatial empirical models so as to be developed into an expert system for landscape policy after the fire.

Shin and Lee (2004) recognized the importance of integrating social, economic and ecological factors in the landscape restoration after a forest. However, they decided to focus mainly on the ecological dimension and not so strongly on the socio-economic one. Ubysz and Szczygieł (2006) tried to make an illuminative analysis of both social and ecological causes of forest fire causes but they did not deal with the socio-spatial impacts of the fire.

Shinneman et al. (2010) have proposed an accurate simulation of restoration scenarios of forest areas, taking into account fire suppression. They focused on the range of natural sustainability of landscapes, disregarding the socio-spatial impacts and behavior.

Sisk et al. (2006) recognized the importance of a collaborative process of landscape analysis as a tool of making acceptable restoration scenarios. Such a process can be more accurate, if it is based on detailed and comparative socio-spatial data collected from different places.

Various models of forest change have been proposed for designing restoration scenarios (Xi et al. 2009, Klenner et al. 2008). However, these consider natural determinants or human-technical interventions such as thinning or fire suppression, and not free time behavior and social values. Orsi and Geneletti (2010), Selman (1993), Klenner and Walton (2009) have tried an integrated approach, discussing ecological and socio-economic criteria. They mostly pay attention to the identification of priority reforestation sites and zoning or to general landscape principles. Despite their willingness to offer an integrated analysis, they do not identify land user groups or socio-spatial relations through a detailed quantitative analysis.

Extensive analyses of socio-historical determinants and implications of forest fires have been provided (Taylor and Skinner 1998, Foster and Motzkin 2003, Fry and Stephens 2006), but the socio-spatial aftermaths on a group-specific basis have not been analyzed through a quantitative approach.

Prather et al. (2008) have analyzed conflict scenarios concerning reduction of wildfire and native fire regimes and wildlife management. However, this does not concern socio-spatial behavior of people after forest fire, but only general forest management strategies. Tyler and Peterson (2004) tried to connect forest policy with landscape impacts but they have not seriously considered the impacts of a possible fire.

Styliadis (1998) and Geri et al. (2010) have examined the role of topographical determinants in landscape change patterns, by analyzing digitized historical forest maps and vegetation synthesis. This is useful for ecological decision-making, but it could constitute a more acceptable decision support system, if it included socio-spatial behavior patterns, after fire impacts.

Conflicts and compatibility between aspects of natural protection, architectural design, wildlife habitat, recreation and history have been thoroughly explored (Gobster 2001). The symbolic and iconic nature of landscape perceptions are discussed through a constructionist approach. The consideration of these aspects could be further completed through a statistical analysis, with an additional examination of attitudes toward commercial and urbanized values and their changeability after extensive fire destruction.

## **1.2 Paper's contribution and innovation**

Until now, issues of land and environmental management, especially related to fire, have been examined mostly from the ecological and technical aspect. The social aspect has been disregarded or only mainly examined through a qualitative, constructionist approach. A critic could regard this approach which is quite often in academic journals as a kind of subjective journalism, which is not based on any positivist method and has nothing to do with "science" and "prognosis" of phenomena.

In this paper, the detection of socio-spatial impacts and free time behavior patterns as well as of environmental attitudes will take place through a systematic and objective quantitative approach. Latent tendencies of environmental dogmatism and local environmentalism will also be examined, by using quantitative results.

### **1.3 Paper's Organization**

This paper is further going to present: a) the methodology (section 2), b) the selected case study (beginning of section 3), c) the critical results on the socio-spatial impacts of the fire (3.1), d) the analysis of the socio-spatial behavior determinants (3.2), e) the analysis of attitudes toward policy and restoration issues (3.3), and f) conclusions (section 4), including suggestions and questions for future research.

## **2. The Proposed Methodology**

A standardized questionnaire has been formulated on the basis of explorative interviews with the population of several villages of the area. This questionnaire focused on their beliefs and attitudes toward the possible cause of the fire, land use before and after the fire, land use scenarios after the fire, politico-administrative issues and general free-time behavior. Personal and socio-economic features such as gender, income, profession, have also been measured. A pilot questionnaire has been tested to the local population. After improvements, a standardized questionnaire was formulated in order to make attitudes and socio-spatial behavior patterns measurable.

As the purpose of this research was not to generalize descriptive statistics for a whole population, no random sample was necessary. The purpose was to produce correlations. Thus, a kind of judgment sampling was implemented so as to include people of a large variety of education level, jobs, genders, places, attitudes etc. Thereby, the influence of the "independent" variables to the "dependent" ones could be detected. The judgment sample is more appropriate for extracting clear correlation, when it is characterized by a balanced pluralism of attitudes and other personal or social characteristics of the sample. Contrary to the descriptive statistics which requires an adequate random sample in order to detect the "representative" average or frequencies within a variable, the analytical statistics aims at examining possible dependencies between variables. Particularly, the bivariate analysis enables a holistic overview of interdependencies. This is a comparative advantage to multivariate analysis, which is more useful for focused typology rather than for extensive exploration of interdependencies. The results of the bivariate analysis can be used for a more multivariate analysis in a future research. Purpose of this paper is the extensive analysis of correlations.

It becomes evident that as the sample is a non random one and statistics not a descriptive one, there is no point in determining a sample size by a formula based on confidence interval and variance. Additionally, as the research focuses on bivariate and not on multivariate analysis, there is also no point in determining an acceptable sample size depending on the number of variables. At any rate, the crucial thing in social statistics is not the sample size but the sampling method (cf. Bryman 2001).

As 110 standardized questionnaires were collected in 2008 (two years after the fire). The socio-spatial behavior patterns and attitudes were digitalized and its statistical processing with SPSS 15 was able. After Kolmogorov-Smirnov and Shapiro-Wilk normality test, bivariate analysis with Pearson test has been conducted.

In-depth interviews with the local population have been conducted after the statistical process, for the interpretation of the results. This was necessary in order to understand the

reasons of the attitudes and socio-spatial behavior, as the quantitative correlations alone are not enough to reveal causalities.

The proposed method is displayed in Figure 1:

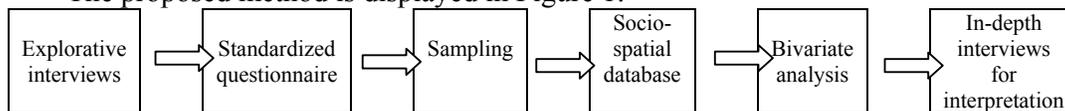


Figure 1. Method for analyzing socio-spatial scenarios

In general, a classical GIS method is a more reliable measuring instrument than the standardized questionnaire, but it is weaker in theorizing and cannot be used for scenario and attitude analysis.

### 3. An Application Case Study: Burned Forest in Kassandra peninsula

The forest fire at Kassandra peninsula, which took place at 21<sup>st</sup> August 2006 has been selected as a case study. This case study can give insights into the socio-spatial impacts of a forest fire and into the attitudes of the population of rural areas toward a wide variety of land and environmental policy issues and restoration alternatives. Also, it is selected as it is a hilly rural area and thereby the impacts of a fire are supposed to be more intensive (e.g. erosion) than in a plain area.

The area is characterized by multifunctional rural activity: agri- and eco-tourism, agricultural production (e.g. olives). Cultural tourism is also usual because of the ancient monuments. Most tourists visit the area for the nice beaches, the sea and the entertainment facilities. The geo-morphological heterogeneity (sea, beach, hills, forest and agricultural land) allows developing a wide variety of land use scenarios (Figure 2).

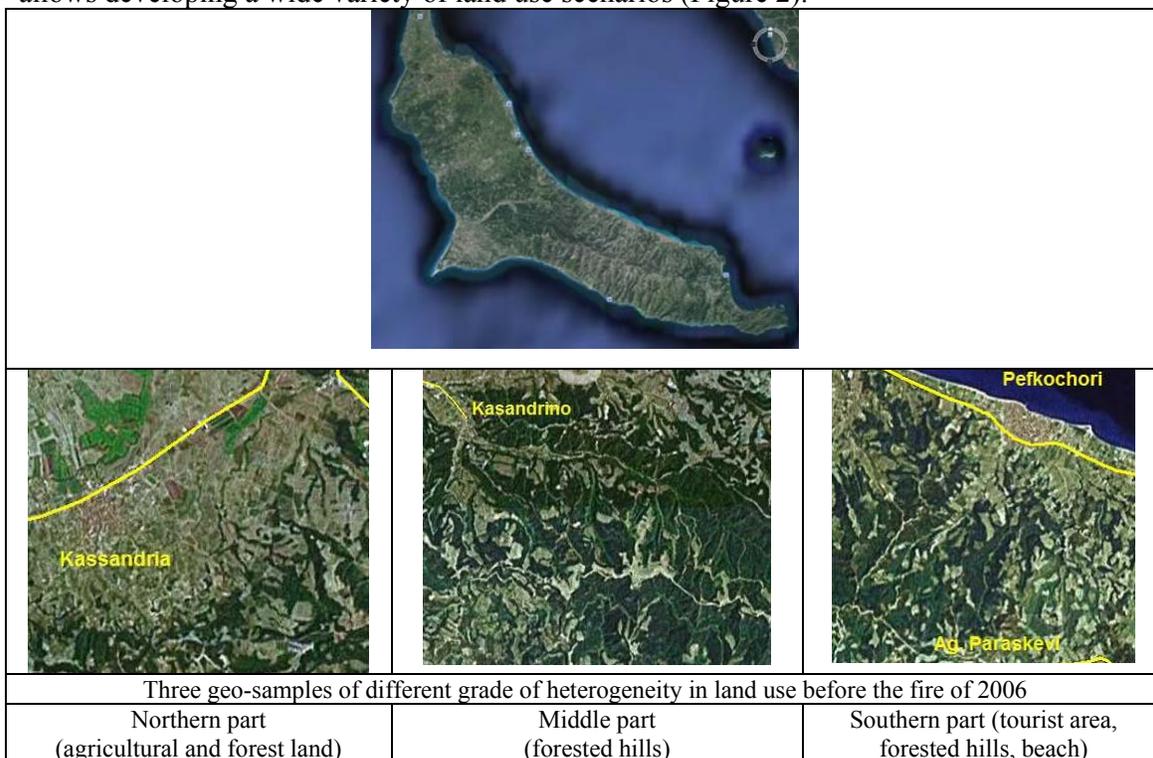


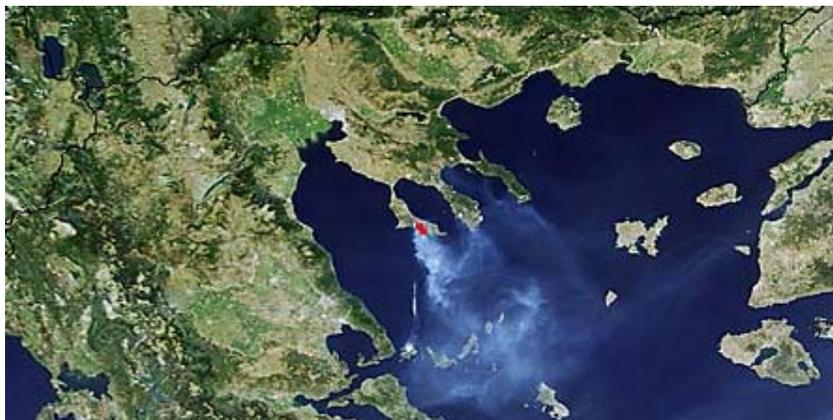
Figure 2. Kassandra satellite picture (Source: Chalkidiki.com)

As presented in Figure 3, numerous villages or small towns are depicted which were threatened by the fire (a). There is also complex network of 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> class roads (b) around the peninsula and through the hilly, forested area, which triggers a debate about its adequacy and appropriateness in case of forest fire. Apart from that, Kassandra (western peninsula) is much more densely populated than Sithonia (middle peninsula) and Athos (eastern peninsula) (Figure 3). Additionally, Kassandra is less mountainous than Sithonia and Athos. Thereby, Kassandra is more appropriate for developing a wider variety of activities and land use scenarios (Athos is in any case incomparable as it is a monastery area).



Figure 3. Visual documentation (Source: Chalkidiki.com)

An example of the extensive and socio-economic impacts is also presented in the Figure 4. The extensiveness of the burned area often makes the impression of an “irreparable” catastrophe, especially, when this impression is constructed by the media.



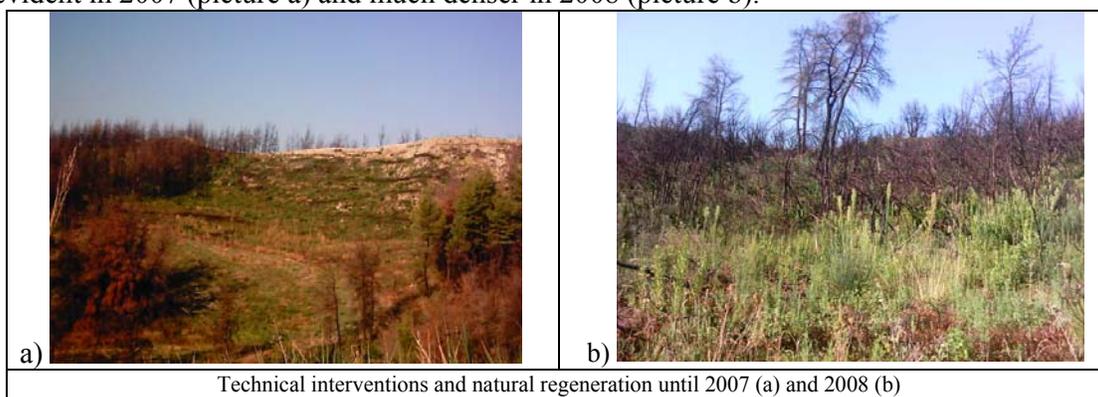
Smoke of Chalkidiki fire in August 2006 (Source: NASA database)



Picture of the Kassandra fire at 21<sup>st</sup> August 2006

Figure 4. Fire impacts

As shown in Figure 5, immediately after the fire, only slight technical interventions were made. In picture (a), burned trunks were placed parallel to the contour lines of the hills in order to avoid erosion. The natural regeneration of the forest vegetation was already evident in 2007 (picture a) and much denser in 2008 (picture b).



Technical interventions and natural regeneration until 2007 (a) and 2008 (b)

Figure 5. Technical works and natural regeneration

Although, as stated, the purpose of the research was not the descriptive statistics, the following basic characteristics are presented in order to provide an overview of the sample: The average age was 32, the maximal age was 67 and the minimal 14. The average education level was high school graduate, the lowest no primary school graduate and the highest PhD holder. There were 51 female and 58 male interviewees.

### 3.1 The role of the fire in socio-spatial behavior

In the Table 1, the relation between visit frequency before the fire (until 2006) and after the fire (in 2008 when the research was conducted), is positive and statistically significant (0,591). This means that the burned forest area has not dramatically lost in social functionality.

Table 1. Visit frequency depending on land use

	Visit frequency after the fire	Mainly I was hunting in the area before the fire	Mainly I was going to the area for recreation before the fire	Mainly I was going to the area for sport before the fire	Mainly I was going to the area for picnic before the fire
Visit frequency before the fire	<b>,591(**)</b>	,059	-,076	<b>,287(**)</b>	-,068
	<b>,000</b>	,571	,462	<b>,005</b>	,510
Visit frequency after the fire		-,123	-,049	,043	,041
		,239	,640	,685	,694

Pearson correlation. “\*\*”: significance 5%, “\*\*\*”: significance 1%

In any case, the visit frequency before the fire was statistically significant only for sport exercising (0,287), while the places for other forest functions (hunting, general recreation and picnic) were neither especially attractive before nor after the fire, as the statistical coefficients are not significantly strong at all. The only difference lies in the sport exercising, which is not so intensively implemented after the fire (0,043 insignificant), as there is not enough shadow and refreshing micro-climate yet, which is created only by the high vegetation (trees). In general, the natural regeneration of the forest area is effective enough.

### 3.2 Determinants of land use behavior

In the Table 2, we see that the place was mostly attractive before the fire for the male visitors (-0,274), while after the fire it seems to be equally attractive also for female ones (-0,094 insignificant). The same applies also to the students/ pupils, though they normally prefer more urbanized free time behavior (e.g. cafeterias), as this satisfies the socio-psychological needs of the age class. These social groups (female visitors and student/pupils) seem to appreciate the natural values after the fire (Thomson et al. 2005), while before the fire they were taking them for granted, as they were satisfied just by distant view of the forest. After the disappearance of the extensive green area, they need to visit the area in order to feel the low vegetation which has remained or has been regenerated after two years. Besides, the women are more willing to visit the place alone, as they feel safer in open light areas.

Table 2. Personal and social determinants of land use

	Visit frequency before the fire	Visit frequency after the fire
Gender (male=0, female=1)	<b>-,274(**)</b>	-,094
	<b>,004</b>	,345
Birth year	-,113	-,007
	,246	,942
Education level	-,101	-,058
	,302	,558
Unemployed	-,059	,038
	,547	,706
Student/ pupil	<b>-,248(*)</b>	-,132
	<b>,010</b>	,185
Private employee	,153	,102

	Visit frequency before the fire	Visit frequency after the fire
	,118	,304
Civil servant	,065	-,111
	,508	,265
Freelancer	-,016	,015
	,870	,879
Employer	-,094	-,101
	,340	,312

Pearson correlation. “\*”: significance 5%, “\*\*\*”: significance 1%

The rest social and personal characteristics proved to be rather unimportant for the visit frequency. Particularly, the insignificance of the age, the education level and the professional status shows that the appreciation of the natural values is not a free time behavior of elder or retired people, nor depends on the mentally or intellectually developed social groups, nor attract especially professional groups which are characterized by anxiety and uncertainty (e.g. employers) or professional groups who have enough free time, such as civil servants.

### 3.3 Analysis of attitudes

In the Table 3, it is shown that people who visit the burned area more frequently after the fire, are satisfied with the infrastructure (0,230), because they are familiar with this, while previously they had not seen it (insignificant coefficients). The same applies to their attitude toward the adequacy of the forest road network (0,206). In the last case, it is evident that these people have adopted a positive attitude toward the forest road network after the fire, as before the fire they had not visited the area even for recreation (-0,208).

Table 3. Land use and politico-administrative attitudes

	Visit frequency before the fire	Visit frequency after the fire	Mainly I was hunting in the area before the fire	Mainly I was going to the area for recreation before the fire	Mainly I was going to the area for sport before the fire	Mainly I was going to the area for picnic before the fire
Satisfied with the infrastructure	,066	<b>,230(*)</b>	,090	-,102	-,012	-,012
	,526	<b>,028</b>	,397	,336	,909	,909
The forest road network was adequate for the fire corps	,118	<b>,206(*)</b>	-,127	<b>-,208(*)</b>	,079	,137
	,233	<b>,039</b>	,226	<b>,045</b>	,454	,192
The fire was arson (and not an accident)	-,160	<b>-,252(*)</b>	,097	-,009	,169	-,091
	,107	<b>,012</b>	,358	,931	,108	,390
Just in time protection provided to the dwellers	,192	<b>,240(*)</b>	-,038	,048	,050	-,115
	,055	<b>,018</b>	,722	,655	,642	,285
Just in time protection provided to the tourists	,117	<b>,294(**)</b>	-,079	-,022	-,019	,086
	,239	<b>,003</b>	,453	,836	,860	,418

Pearson correlation. “\*”: significance 5%, “\*\*\*”: significance 1%

People, who believe that the fire was arson and not an accident, avoid visiting the burned area (-0,252), as they are feared of any further criminal actions. In the contrary, those

who believe that adequate protection was offered to the dwellers and tourists, feel safe enough to visit the place more frequently after the fire (0,240 and 0,294), while they were not so systemic visitors before the fire (insignificant coefficients).

In the Table 4, it becomes evident that these who desire the reforestation of the local area do not necessarily regard the reforestation as an ultimate scenario which should be implemented in every burned area in the country. Mainly the female population regards the reforestation of Kassandra as necessary solution (0,248), though it does not maintain the same strong attitude (0,038 insignificant) toward the burned forest areas in general. Thereby, this population group shows a local environmentalism (cf. Taff 2005). However, this group seems to be indifferent to volunteer working time (-0,097 insignificant) for the restoration and rather unwilling to pay for it (-0,224). Those who prefer the cafeteria for recreation are negative to the compulsory reforestation of Kassandra (-0,290), while those who prefer the beach as recreation place desire the reforestation of Kassandra, as they consider the shadow and the view of green areas as an integral part of the beach recreation.

The hunters and the sport people are rather indifferent (insignificant coefficients) toward the reforestation in general, while those who used the forest are for picnic or general recreation are rather negative (-0,347 and -0,530). This shows that they are satisfied also with the natural regeneration which took place within two years and the high vegetation (trees) is not of crucial importance for their quality of recreation.

Those who attribute the fire to arson desire the reforestation of the local area (0,283), while those who believe that the fire was an accident are rather open to other land use policy alternatives and not to reforestation (-0,315). Thus, the local people seem to strictly desire the restoration of the socio-legal order rather than the restoration of the very nature. Those who believe, however, that this fire was favorable for land property interests, desire the compulsory reforestation of burned areas in general (0,254) but not necessarily in Kassandra (0,171 insignificant). In other words, they are rather driven by the general normative dogma that “the forest is threatened and should be protected against economic interests” but they did not really feel that such a danger exists for their area. Under these conditions, this dogma appears to be an ideology well-disseminated by journalists, politicians and other protest business actors (e.g. environmental groups) rather, than a specific fear really internalized by the public in relation to their local area.

Table 4. Determinants of attitudes toward restoration strategies

	The burned forest area of Kassandra should be reforested	Every burned forest area in the country should be reforested	How many unpaid hours would you volunteer for the restoration of the area	Willingness to pay in fund-raiser for reforestation
Gender (male=0, female=1)	<b>,248(*)</b>	,038	-,097	<b>-,224(*)</b>
	<b>,011</b>	,704	,325	<b>,022</b>
Birth year	,065	-,080	<b>-,296(**)</b>	-,029
	,511	,423	<b>,002</b>	,768
Preferring to spend free time in cafeteria	<b>-,290(**)</b>	-,183	<b>-,243(*)</b>	-,059
	<b>,003</b>	,064	<b>,013</b>	,549
Preferring to spend free time at the beach	<b>,220(*)</b>	,108	-,137	<b>-,247(*)</b>
	<b>,023</b>	,279	,162	<b>,011</b>
Mainly I was hunting in the area before the fire	,116	,022	<b>,235(*)</b>	-,045
	,262	,838	<b>,022</b>	,664
Mainly I was going to the area for sport before the fire	,116	,150	,110	<b>,299(**)</b>

	,262	,155	,288	<b>,003</b>
Mainly I was going to the area for picnic before the fire	<b>-,347(**)</b>	-,106	<b>-,214(*)</b>	-,022
	<b>,001</b>	,313	<b>,037</b>	,831
Mainly I was going to the area for recreation before the fire	<b>-,530(**)</b>	<b>-,277(**)</b>	-,173	-,037
	<b>,000</b>	<b>,005</b>	,084	,711
The fire was arson	<b>,283(**)</b>	,072	,118	,191
	<b>,004</b>	,475	,239	,053
The fire was an accident	<b>-,315(**)</b>	-,045	-,053	-,112
	<b>,001</b>	,658	,596	,260
The fire has mainly favored the interests related to land property	,171	<b>,254(*)</b>	,010	,037
	,083	<b>,010</b>	,923	,710
Income	-,115	<b>-,289(**)</b>	,058	,065
	,251	<b>,003</b>	,563	,513

Pearson correlation. “\*”: significance 5%, “\*\*”: significance 1%

Those who would volunteer unpaid working time for the restoration of the area are mainly the older people (-0,296), as the younger ones are oriented to more urbanized lifestyle, such as cafeterias (-0,243). The hunters, though they have been appeared to be open to alternatives different from reforestation as discussed above, would be more willing to volunteer time, as they are used to spending quite a lot of time at outdoor activities. On the contrary, the picnic group seems to be used to spending only a few time for relaxing in nature. Thus, it appears to be unwilling to volunteer time for the landscape restoration.

Those who prefer to spend their free time at the beach, present attitudes similar to these of the women: they believe that the burned area should be restored but they would not contribute to the restoration with money (-0,247). They expect, thus, a restoration financed by the taxes which are already paid. Only the sport people seem to be willing to pay (0,299), while the income does not play any role in the willingness to pay (0,065 insignificant).

In the Table 5, the marital status appears to be rather significant in landscape preferences. The married people desire reforestation/ regeneration (0,243) and not an organized recreation area (-0,329), while those who only live with a life partner together would like to have an access to a new organized recreation (0,381) area than merely a forest (-0,292). This inverted profile in free time behavior between someone who is married and someone who just has a life partner can be attributed to the fact of their different everyday program. The former has adopted a routine of everyday duties and he/she does not want to have one more factor, like an organized recreation area, which is going to disturb his/her program and life order. A new organized recreation area is a new stimulus for the children or for the marriage partner, while a forest is a “quiet” free time solution. Inversely, someone who has a life partner would like to have access to an organized recreation area in order to enrich his/her program and to avoid a monotonous routine.

Table 5. Determinants of attitudes toward restoration alternatives

	Reforestation- regeneration	Organized recreation area	Commercial centre
Married	<b>,243(*)</b>	<b>-,329(**)</b>	,024
	<b>,014</b>	<b>,001</b>	,811
Living with life-partner	<b>-,292(**)</b>	<b>,381(**)</b>	,002
	<b>,003</b>	<b>,000</b>	,982
Preferring to spend free time at the cafeterias	<b>-,216(*)</b>	,159	<b>,226(*)</b>

	,029	,112	,023
Preferring to spend free time at a stream (water element)	-,184	,231(*)	-,020
	,064	,020	,841
Mainly I was going to the area for recreation before the fire	,212(*)	-,256(*)	,046
	,044	,014	,667
Mainly I was going to the area for picnic before the fire	-,282(**)	,364(**)	,010
	,007	,000	,927
Income	-,160	-,091	,479(**)
	,111	,363	,000

Pearson correlation. “\*”: significance 5%, “\*\*”: significance 1%

Those who spend their free time at the cafeterias would rather go to new commercial centre (0,226) than to a forest (-0,216). Those who would spend free time along a stream, desire an organized recreation area (0,231). This shows that the water element would be a quite desirable landscape component in an organized recreation area for certain visitors. Those who were going for recreation to the forest before the fire prefer once again a forest (0,212) and not an organized recreation area (-0,256). Thus, with “recreation” they do not mean “organized” free time behavior in a natural area. Those who were going to the area for picnic before the fire, would rather like an organized recreation area (0,364), in order to make their picnic again more comfortably, and not a forest (-0,282). People with high income would like to have a commercial centre at in the burned area (0,479).

#### 4. Conclusions

Contrary to the expected long-term socio-spatial catastrophe that is believed to be caused by an extensive forest fire in a populated rural area, almost all socio-spatial functions of the burned area are restored in relatively short time after the fire (about 2 years). The burned forest area has not dramatically lost in social functionality. The effect of the fire on hunting, general recreation and picnic two years after the fire was not detectable any more. Only the sport has been affected in the burned area. A gender-specific behavior is connected with the spatial impacts. After the fire, the place seems to be equally attractive for both males and females, while before the fire it mainly was attracting the male population. Specific social groups, such as female visitors and students or pupils seem to appreciate the natural values after the fire. The women also feel safer in open light areas created after the fire. The appreciation of the natural values does not depend on the age, the education level or the job status.

Certain people get familiar with the infrastructure in the forest only after the fire. Those who believe that the fire was arson and not an accident, avoid visiting the burned area. These who desire the reforestation of the local area do not necessarily regard the reforestation as an ultimate scenario which should be implemented in every burned area in the country. Thus, there is an attitude which could be characterized as “local environmentalism”. People with urbanized free time behavior do not need a reforested area as an alternative. Thus, urbanized free time behavior is rather addictive than saturating. Between beach- and forest-related recreation there seems to be a complementary relation.

The local people seem to be satisfied also with the natural regeneration which took place within two years. High vegetation is not of crucial importance for their quality of recreation. They also seem to strictly desire the restoration of the socio-legal order rather than the restoration of the very nature. Those who believe that the fire was related to land property

interests seem to be driven by the general normative dogma that "the forest should be protected against economic interests" but they did not really feel that such a danger exists for their area.

Volunteers would mainly be the older people and not the young ones because they are strongly engaged to the urban lifestyle. The hunters are also willing to volunteer time as they are engaged to outdoor activities. Acceptance of the necessity of reforestation does not necessarily mean volunteerism or willingness to pay. The income does also not influence the willingness to pay.

The life order induced by the marriage and the need for breaking which characterizes the life-partnership differentiate the free time behavior and thereby the landscape preferences of people who are married from those who just live with life-partners (the former desire "quite" forest and the latter a new organized recreation area). Characteristic elements of an organized recreation area are considered to be the picnic places and the water (e.g. a stream).

Thus, the only measures that can be regarded as necessary in a burned hilly area are those that can prevent erosion or flood. An artificial reforestation which may prove to be successful after many years or may even be unsuccessful is not necessary in order to attract land user groups. The natural regeneration is adequate for this purpose.

The land user groups do not massively avoid the burned area. Most of them visit it quite frequently two years after the fire. The high vegetation does not change the socio-spatial behavior strongly. The creation of an organized recreation area or of a commercial centre in certain places of the burned forest area would also attract more visitor groups and they would not prevent other types of land use, as it does not occupy the whole forest area. These architectural interventions could also include centers for environmental education or rural museums, organized eco-tourism or agri-tourist units.

In this case, they could favor a multifunctional rural development which is supported by the Rural Development Program of the EU 2007-13, particularly by Axis 2: Conserving landscape and environment, and Axis 3: Improving quality of life and encouraging diversification rural economy (Papadopoulou et al. 2008a). However, a decision support system with detailed criteria and a flexible, politico-administrative system is demanded for such a development (Papadopoulou et al. 2008b and 2009). The role of Local Action Groups (LAG) in the framework of LEADER can be of crucial importance for the development of the area. However, the influence and effectiveness of a LAG depend on the cliental milieu of the specific area and the local dynamics is more crucial for the success of a LAG (Papadopoulou et al. 2010a). The role of information which is considered to be "scientific" in issues of local rural development is also crucial (Papadopoulou et al. 2010b). This means that a simple politico-administrative procedure would be not plausible enough in the design and evaluation of local developmental scenarios. Thus, a region-focused socio-economic study by a decentralized authority such as a prefecture is purposeful.

The appropriateness of the current legal, socio-economic and politico-administrative system as well as the need of decentralized or centralized rural and forest policy making in such a restoration and development issue can be a question for further research. The repetitive implementation of such a quantitative research by using similar questionnaire in cases of forest fire in other regions and countries with different socio-economic and geomorphological structure, in order to produce comparative results and safer generalizations, is also an important research issue. A typology of restoration scenarios by multivariate analysis is also a point for further research. Finally, finding out variables with stronger correlations with each other is always a challenge in social statistics.

## 5. Acknowledgments

The research initiative proposed by this paper has been supported by the EU-funded “Archimedes” Research Project (Department of Landscape Architecture, Kavala Institute of Technology, Drama, Greece), by the EU-funded research project “RUDI: Rural Development Impacts- Assessing the impact of Rural Development policies, incl. LEADER” (Department of Agricultural Economics, Faculty of Agricultural Science, Aristotle University of Thessaloniki, Greece), and by the Institute of Forest Policy and Nature Conservation of Goettingen University (Germany).

## 6. References

1. Bryman A. 2001. *Social Research Methods*. Oxford University Press
2. Foster D.R. and Motzkin G. 2003. *Interpreting and conserving the openland habitats of coastal New England: insights from landscape history*. *Forest Ecology and Management*, Volume 185, Issues 1-2, 127-150
3. Fry D.L. and Stephens S.L. 2006. *Influence of humans and climate on the fire history of a ponderosa pine-mixed conifer forest in the southeastern Klamath Mountains, California*. *Forest Ecology and Management*, Volume 223, Issues 1-3, 428-438
4. Geri F., Rocchini D. and Chiarucci A. 2010. *Landscape metrics and topographical determinants of large-scale forest dynamics in a Mediterranean landscape*. *Landscape and Urban Planning*, Article in Press, Corrected Proof
5. Gill A.M. 2005. *Landscape fires as social disasters: An overview of ‘the bushfire problem’*. *Global Environmental Change Part B: Environmental Hazards*, Volume 6, Issue 2, 65-80
6. Gobster P.H. 2001. *Visions of nature: conflict and compatibility in urban park restoration*. *Landscape and Urban Planning*, Volume 56, Issues 1-2, 35-51
7. Iliadis L.S. Papastavrou A.K. and Lefakis P.D. 2002. *A computer-system that classifies the prefectures of Greece in forest fire risk zones using fuzzy sets*. *Forest Policy and Economics*, Volume 4, Issue 1, 43-54
8. Klenner W. and Walton R. 2009. *Landscape-level habitat supply modelling to develop and evaluate management practices that maintain diverse forest values in a dry forest ecosystem in southern British Columbia*. *Forest Ecology and Management*, Volume 258, Supplement 1, S146-S157
9. Klenner W., Walton R., Arsenault A. and Kremsater L. 2008. *Dry forests in the Southern Interior of British Columbia: Historic disturbances and implications for restoration and management*. *Forest Ecology and Management*, Volume 256, Issue 10, 1711-1722
11. Orsi F. and Geneletti D. 2010. *Identifying priority areas for Forest Landscape Restoration in Chiapas (Mexico): An operational approach combining ecological and socioeconomic criteria*. *Landscape and Urban Planning*, Volume 94, Issue 1, 20-30
12. Papadopoulou E., Hasanagas N., Papalexidou C., Kanaki E., Georgiadou E. (2008a). *Rural Development Policy Design, Work Package 2 Report for Greece, EU-funded 7th framework research project: Assessing the Impacts of Rural Development Policies (RuDI)*. Aristotle University of Thessaloniki. Greece
13. Papadopoulou E., Papalexidou C., Hasanagas N. (2008b). *Rural Development Policy Delivery and Governance, Work Package 3 Report for Greece, EU-funded 7th framework research project: Assessing the Impacts of Rural Development Policies (RuDI)*. Aristotle University of Thessaloniki. Greece

14. Papadopoulou E., Papalexidou C., Ventouri E., Hasanagas N. (2009). *Reviewing the CMEF Indicators, Work Package 6 Report for Greece, EU-funded 7th framework research project: Assessing the Impacts of Rural Development Policies (RuDI)*. Aristotle University of Thessaloniki. Greece
15. Papadopoulou E., Pappas A., Hasanagas N., Papalexidou C., Ventouri E. (2010a). *Applying Shift – Share Analysis (SSA) on LEADER+ Initiative Local Action Groups in Greece, Work Package 8 Case Study Report, EU-funded 7th framework research project: Assessing the Impacts of Rural Development Policies (RuDI)*. Aristotle University of Thessaloniki. Greece
16. Papadopoulou E., Ventouri E., Hasanagas N., Papalexidou C., Giannelos I. Pappas A. (2010b). *Measure 121: Modernisation of the agricultural holdings: Applying Quantitative Network Analysis, Work Package 8 Case Study Report, EU-funded 7th framework research project: Assessing the Impacts of Rural Development Policies (RuDI)*. Aristotle University of Thessaloniki. Greece
17. Prather J.W., Noss R.F. and Sisk T.D. 2008. *Real versus perceived conflicts between restoration of ponderosa pine forests and conservation of the Mexican spotted owl. Forest Policy and Economics, Volume 10, Issue 3, 140-150*
18. Selman P. 1993. *Landscape ecology and countryside planning: Vision, theory and practice. Journal of Rural Studies, Volume 9, Issue 1, 1-21*
19. Shin J.H. and Lee D.K. 2004. *Strategies for restoration of forest ecosystems degraded by forest fire in Kangwon Ecoregion of Korea. Forest Ecology and Management, Volume 201, Issue 1, 43-56*
20. Shinneman D.J., Cornett M.W. and Palik B.J. 2010. *Simulating restoration strategies for a southern boreal forest landscape with complex land ownership patterns. Forest Ecology and Management, Volume 259, Issue 3, 446-458*
21. Sisk T.D., Prather J.W., Hampton H.M., Aumack E.N., Xu Y. and Dickson B.G. 2006. *Participatory landscape analysis to guide restoration of ponderosa pine ecosystems in the American Southwest. Landscape and Urban Planning, Volume 78, Issue 4, 300-310*
23. Styliadis A.D. 1998. *Design, Implementation and Evaluation of a System for Forest-Fire Modeling based on Australian Experience. Cartography and maps in the promotion and protection of the environment. 4<sup>th</sup> Conference of the Hellenic Cartographic Society. City of Kastoria, October 1997 (orig. in Greek)*
24. Taff G. 2005. *Conflict between Global and Local Land-Use Values in Latvia's Gauja National Park. Landscape Research, Volume 30, Issue 3, 415 - 430*
25. Taylor A.H. and Skinner C.N. 1998. *Fire history and landscape dynamics in a late-successional reserve, Klamath Mountains, California, USA. Forest Ecology and Management, Volume 111, Issues 2-3, 285-301*
26. Thompson C.W., Aspinall P., Bell S. and Findlay C. 2005. *"It Gets You Away From Everyday Life": Local Woodlands and Community Use—What Makes a Difference? Landscape Research, Volume 30, Issue 1, 109 - 146*
27. Tyler M.W. and Peterson D.L. 2004. *Effects of forest policy on landscape pattern of late-seral forest of the Western Olympic Peninsula, Washington. Agriculture, Ecosystems & Environment, Volume 101, Issues 2-3, 289-306*
28. Ubysz B. and Szczygiel R. 2006. *A study on the natural and social causes of forest fires in Poland. Forest Ecology and Management, Volume 234, Supplement 1, S13*
29. Xi W., Coulson R.N., Birt A.G., Shang Z.-B., Waldron J.D., Lafon C.W., Cairns D.M.,
30. Tchakerian M.D. and Klepzig K.D. 2009. *Review of forest landscape models: Types, methods, development and applications. Acta Ecologica Sinica, Volume 29, Issue 1, 69-78*