

LANDSCAPE PLANNING AND PUBLIC'S PREFERENCE SURVEY: A CASE STUDY IN GREECE

ATHANASSIOS KARAMERIS(*)

ABSTRACT

This paper, at first, touches upon the need of public's preference survey and the inclusion of their results in the landscape planning. Afterwards, it is focused on a research of public's preference carried out in two research areas in Greece, a big city and a mountainous county. Six landscape scenes were selected. From each scene were created two photorealistic simulations with different alteration degree of the attribute under consideration. Totally were created six sets of three images (the real scene and two simulations). These sets were given for evaluation to the respondents of a representative sample. The results showed significant differentiation in preferences between the study areas. General preference identification was observed in some cases. Preference identification on the real scenes was observed in 1/3 of the cases. The results have shown on the one hand that cannot be established general guidelines for landscape formation in regional or national level, on the other hand the real landscape scenes mostly don't respond to the public's preference and require improvement.

RÉSUMÉ

Ce travail porte tout d'abord sur la nécessité d'une prospection sur la préférence de la collectivité et l'inclusion de ses résultats dans la planification du paysage. Ensuite, il portera sur une recherche de préférence de la collectivité menée en deux zones de la Grèce, une grande ville et un comté montagneux. On a sélectionné six scènes de paysage. Pour chaque scène on a eu deux simulations photo-réalistes avec un différent degré d'altération de l'attribut considéré. Au total, on a créé six ensembles de trois images (la scène réelle et deux simulations). Ces ensembles ont été soumis à l'évaluation de la part des personnes interrogées faisant partie d'un échantillon représentatif. Les résultats ont montré une différenciation significative des préférences entre les deux zones d'étude. Dans certains cas on a observé une préférence générale. L'identification de la préférence sur des scènes réelles a été observée dans 1/3 des cas.

Les résultats ont montré, d'une part, qu'on ne peut pas établir des directives générales pour la formation du paysage au niveau régional ou national et, d'autre part, que la majorité des scènes de paysage ne correspondent pas à la préférence de la collectivité et qu'elles requièrent des améliorations.

The progressive deterioration of living and working conditions in Greek urban centers after the 2nd World War obliged the citizens to search for recreation areas and residence with better environmental conditions. This search was expressed by the emigration to suburbs where the living conditions were better, the acquisition of second residence at coastal or forests areas, the visit of natural areas for recreation and the development of interior tourism.

The visit of natural and especially forest areas for recreation emerged at the beginning of 70's decade and took explosive dimension during the 80's decade, especially in suburban forests (Karameris, 1989).

The public's pressure for forest recreation areas had as result the gradual revision of forestry aims and the upgrading of recreation function in one of the main targets of forest management, especially in suburban forests. In this framework recreation areas are opened and organized all over the country and primarily around the large urban centers. However, the determination of recreation areas, the landscape interventions and especially the recreational facilities are made mostly empirically due to lack of guidelines. This fact had also its positive side, because the interventions in recreation areas were limited made under the main perspective of forest protection, while the recreational facilities were restricted to absolutely

necessary without exaggeration elements, as happened in other countries (Zundel, 1987; AFL, 1991; Scherzinger, 1996).

The general landscape was not influenced and managed in the frame its conventional targets. The aesthetic parameter remained unknown or played a secondary role in the whole forest management.

In the frame of multiple-use forestry, however, the elevation and exploitation of all forest functions (wood production, protection, recreation, wildlife, landscape scenery (aesthetics), hydrological function etc.) constitute a basic presupposition to achieve the greatest possible benefit for the public and the forest.

For the forest visitors, recreation and landscape scenery are of great weight, because the forest is not only a place for recreation activities but also an object of observation, admiring and experiences, not only for them but also for those who

passes through the forest or in a relatively small distance from it, where the forest landscape is visible from. Consequently, the landscape as a natural resource has to offer, besides other aims, recreation and aesthetic services through its scenery, in order to increase the user's experiences. Under this point of view is arisen the dual relationship "object-subject" between landscape and user. The landscape, as object, with its natural equipment offers opportunities of aesthetic delight and from the other side receives the public's use and the management's care. On the other hand the visitor-user, as subject, becomes receiver of the referred services, increasing his experiences in such a level as the offering landscape scenery meets his demands. Parallel

(*) Prof. Dr. Athanassios Karameris. Institute of Forest Policy. University of Thessaloniki, Greece

contributes positively to the landscape with his environmentally acceptable behaviour and the improvement of landscape scenery through public preference surveys. The harmony in the relationship "landscape-user" is a basic presupposition for optimising the use's result. For example, if the landscape aesthetic quality is equal or greater than the user's expectation, then is achieved the greatest experience and user's complete satisfaction. On the contrary, if the aesthetic quality is inferior to expectation, then the experience is lower than the optimum and there is a deficit on user's satisfaction. The greater the disparity between landscape aesthetic quality and expectation is, the lower the user's experience and his satisfaction. Consequently, the efforts of landscape managers to improve the aesthetic quality, in fact, aim to decrease the divergence between landscape aesthetic quality and user expectation, in order to be achieved a greater level of user's experience and satisfaction.

THE NEED FOR LANDSCAPE PLANNING AND RESEARCH OF PUBLIC'S PREFERENCES

The decrease of divergence between "landscape aesthetic quality" and "user's expectation" presupposes either the improvement of aesthetic quality (positive change), or the reduction of users' expectation (negative change), or both of them. The expectation, however, is bound close together by psychic and spiritual human parameters that determine the user's aesthetic standards. For this reason it is difficult and also risky to think about such emotional changes, without risking to pass the limits of human rights. Consequently, the only remaining possibility to decrease the divergence between "landscape aesthetic quality" and "user's expectation" is the improvement of aesthetic quality.

In this case arise following questions:

- Who defines the aspiring landscape scene?
- Which is and how is determined the landscape scene, which the aesthetic quality is closer to the visitors experience of, and finally
- In what level the public preference must be considered?

1. The first question arose a series of important discussions. Must the aspiring landscape scene be determined exclusively and only by specialists or the public's preference is of greater importance, as it is recorded by preference surveys (Schauman, 1986)? Can the public, without a special landscape aesthetic knowledge, be juxtaposed with the skilled opinions and thoughts of specialists? If yes, in what extent the public's preferences can affect the final decisions for the improvement of landscape aesthetic quality?

These problems were caused during the decades of 70's and 80's from the results of planning, based only on designers' choices-decisions, which were not satisfactory for the public, and moreover created problems of ob-

scurity and communication with action scientists (Schwann, 1995). Consequently, the selection of the aspiring landscape exclusively from the planners does not foresee the effort's success, because their experiences and choices are not obligatorily identified with the experiences and expectations of landscape visitor-users. To be achieved a compromise, it is needed the investigation of public's preferences concerning landscape aesthetic and their inclusion in the design proposals, because the public is ultimately the final receiver of landscape designs. On this Arthur *et al.* (1977) will support that the "uninitiated" public may be less knowledgeable than specialist as it concerns some of the criteria used for landscape aesthetic assessment, but also the "uninitiated" public is this who observes and uses the landscape and its arising scenic beauty. This view has weighted importance if it is taken into consideration that forest landscapes do not cover a small area, which a designer could even experiment with, but extensive areas.

2. The second question considers the wished landscape image. The public is the final user of landscape and visits it having in mind specific expectations, which wants to verify or to cover during his visit and to transform them in experiences. Visitor's expectations are the perfect picture (for the visitor himself) of the landscape in a spiritual level, which the user, during his visit, would like to see, to meet, to live and gain experiences inside it. The aspiring picture of landscape aesthetic quality is not in every case the same for each visitor, whilst it is consisted by a group of factors, as previous visitor's experiences, his aesthetic standards, his educational level, his psycho-spiritual parameters etc. (Daniel *et al.*, 1984). The goal of planning, offering of the best possible services to the visitor, is achieved by the reflection of user's expected images into landscape aesthetic designs. This fact dictates the identification of the relative images.

The aspiring pictures and generally the public's views about landscape are investigated by preference surveys. The investigation of public's preferences for determination of the wished landscape scenic is based upon identification of preference for alternative scenes which differ with respect to a specific attribute, such as presence/absence of broadleaf's species, dwellings, recreation facilities, different mixture of conifers and broadleaves, etc.

For the production of alternative scenes are followed different techniques:

a) The forest landscape scene is photographed before and after on-site physical alteration of the attribute under consideration. It concerns the depiction of physical situations. The choice is easier and done between real scenes with visual similarity. The disadvantages of this option are the involvement of considerable time and expense in carrying out the modification required and

the small number of alternative scenes they can be produced by this way and consequently the limited choice possibilities for the respondents.

b) This option involves photographing very similar forest landscapes, which differ on the attribute of interest. It concerns the depiction of physical situations, too. The disadvantage of this option lies on the lack of similarity between landscape scenes, because each landscape scene has its own identity or "personality" and it is impossible to be identified with another. Moreover, the attributes under consideration cannot be isolated from the wider landscape. This involves the risk the respondent to be influenced by other landscape features visible in one of the images, so that his response won't reflect his real preference.

c) Production of alternative scenes using vector computer graphics. It concerns the production procedure of landscape scenes, based on lines, with a computer. In this case we haven't any depiction of the visual reality and the identification of public's preferences is precarious due to the difficulties of interpretation and selection between the graphics.

d) Production of alternative scenes by raster technology. It concerns the image manipulation technology and the production of photorealistic simulations. The depiction reflects the visual reality. The difference between this option and the first one is that the alterations of the attribute of interest aren't done on-site, as in the first option, but on the digital image of a landscape scene with the help of computer. Through this procedure is given the production possibility of a great number of images with several alteration degrees in short time and low expense. Moreover the respondent has a larger variety of alterations and thus more possibilities to select.

3. The inclusion of public's preference in planning is a basic question for landscape designers. Must the designer be based only on the preference of public majority? And if the majority is limited and differentiates from the second preference by minimum? Must be given the same weight to the preferences of two different respondents? And if not, how are calculated the different weights? These are some partial questions that arise in similar researches and really make landscape designers and managers think.

The expected landscape picture, as it is mentioned above, depends on citizen's previous experiences, his aesthetic standards, psycho-spiritual parameters, educational level, knowledge about natural environment, interest about environmental issues etc. The quantification of all these variables would form the visitor-user's profile, which could explain the preference of specific landscape scenery. A quantification could also lead to the calculation of a "weight index" for each respondent, which can be used then for the "weighting" of preference results. It is obvious that this "weighting" doesn't concern the respondents' preference itself (if it is good

or bad), but the weight or the importance of preference in the planning. Such a "weighting" is logical and is needed to be done, taking into account that visitors characteristics vary sufficiently. For instance, the preference of a citizen, who visits very often a forest for recreation, is informed about it, its ecological interactions and interested in natural environment, can substantially differentiate from another who rarely or never visits forests, he knows nothing about it and its ecological functions and doesn't show any interest in natural environment. It means that the opinion of the first one ought to have a different weight in the planning from the other's. Consequently, the preferences have not to be included in the planning simply and only by sum, but after they have been "estimated" with the help of "weight indexes" considering the profile of each one respondent.

Except the above mentioned factors (previous experiences, aesthetic standards, psycho-spiritual parameters, etc.), which the preference depends on, should not be excluded cases of instant impulse. In a short-time survey, the time limits for further examination of images and consequences of interventions in an ecosystem, as it is the forest, are very short. This fact leads to choices characterised, in the most of cases, by spontaneity and based on technical aspects, where the image quality plays a great role. Moreover, it should be taken into consideration that the public's preferences vary in time, with rates faster than the rates of achieving these alterations in the landscape, especially whether the planning covers a time period of a rotation. If the public's preferences are exactly followed, then the design should be changed all the time, before the previous is completed. Which is then the way out, not to put aside the preferences of the public and in parallel to stabilize and protect forest landscape?

In that point, the role of the designer is decisive, who is called to intervene as a catalyte in two phases: first, in the creation of alternative scenes and second after the expression of public' preference.

During the first phase, production of alternative scenes, the designer should not have only aesthetic or design abilities. We should not forget that we refer to formations of forest landscapes or forest ecosystems in general, which are defined from a series of factors (climatic, geomorphological, ecological, social), characterised for their sensitivity and instability and also "work" in long rotations. The above define also the alterations limits, beyond which the negative impacts start (Ammer and Pröbstl, 1991). From this point of view the design of alternative scenes presupposes the co-estimation all the above factors, so that the suggested alternative solutions are ecological accepted. Consequently, the specialist: 1) should know in detail the above factors, the restrictions they put and should have the ability to mix all of them, even if they are opposite, and 2) should

have the ability to develop, within the predetermined framework, his design models, which should be long-range, too.

In a second level, the designer can intervene after the expression of public's preference. In the surveys, there is never a total identification of public' preference with an alternative scene.

Usually a certain scene is mostly preferred, some other less, while at the same time a third can have low preference. In these cases, it is not intentional the designer to be guided by the most preferred scene, much more when the majority is marginal. On the contrary, it is provided the discretion of a solution in between the first, second or/and third preference, under the presupposition that the alternative scenes should be defined in the way mentioned above.

In Greece the research concerning forest landscape is very restricted. It is focused on public's opinions surveys and registers verbally the wished landscape types, the failings of an often used landscape or the public's opinion about the present situation of the forest landscapes (Karameris, 1987; Eleftheriadis and Tsalikidis, 1989; Papastavrou and Karameris, 1991, Valourdos, 1993; Chronopoulou, 1995).

Recently it engages in the assessment of landscape aesthetic quality through Geographical Information Systems (Karameris and Katramatos, 1999). Surveys concerning public's preferences of forest landscapes haven't been carried out up to date in Greece, although they are an important mean in landscape planning.

RESEARCH AIM

This paper seeks to define the public's preferences related to different landscape types through the selection among three alternative scenes.

The aim of this effort is: the investigation of public's preferences through alternative options, the acceptance extent of the real landscape scenes, the comparison between the real situation and altered landscape scenes and their significance for the landscape management.

The research was carried out, from the Institute of Forest Policy of Aristotelian University Thessaloniki, in the city of Thessaloniki and the county of Fokida, as part of the EE funded project: "Detailed Visual and Amenity Design Guidelines for Forestry: Optimising Rural Resource Potential (FORAM)".

MATERIALS AND METHODS

For the preferences investigation were selected six different landscape scenes from three main forest and forest areas forms (conifer and broadleaf's forests, shrubs), that are representative for the Greek forests.

These landscape types were photographed from selected viewpoints, which are accessible to the users (roads, paths) and which the landscape scenes under consideration are completely visible for the visitors from. Each

scene was depicted in such a way that an attribute of interest is clearly distinguished. The attributes that are involved in the selected six forest landscape scenes are the following: forest interiors, geometricity, forest species integration, presence of dwellings in forest landscape, penetrability of forests and forest edges.

Afterwards, all photos scanned and saved in a digital form. From each photo were created, with the software photoshop, two photorealistic simulations with different alteration degree of the attribute under consideration, which involved in this image.

For example, in the case of forest interiors the simulated alterations included removal (partly or completely) of substore, dry branches and stumps. In the case of dwellings in a distance from the forest landscape, the simulations included dwelling at the forest edges and in the forest.

Generally, the simulations were so, that the alterations differ clearly from the real scene and between them, so that the differences among the images are distinct and the choice is easier for the respondent. In this way was created for each landscape scene a set of three images: the real scene and two simulations. At the end were formed six sets of images for equivalent number of selected landscape scenes.

The sets were used during a poll where each set of images was separately showed to the respondent, in order to express his preference.

The respondent should grade the three images according to the impression which each image caused him with respect to the landscape beauty, using a three steps scale 1-3 (1: 1st preference, 2: 2nd preference, 3: 3rd preference).

The survey was carried out in the city of Thessaloniki and the county of Fokida. The city of Thessaloniki is the second in size urban center in Greece and the bigger in North Greece. It is an important industrial, economic, commercial and cultural center. It constitutes also the main source of visitors for the forests in a radius of 100 km around. On the contrary, the county of Fokida lies in Central Greece, 200 km from Athens, far away from big urban centers and can be characterised as mountainous. The touristic demand here is focused partly on some limited areas in the periphery of the county and it hasn't any direct consequences on the wider area. The main occupation of the inhabitants here is in the primary sector. The selection of an urban center and a mountainous area was done for the following reasons: 1) to find out the preferences of two different populations (urban and mountainous) with different social, economic and educational level, with periodical or daily immediate contact with the natural landscape and with different experiences, 2) to find out possible identifications or deviations of public's preferences in both areas and 3) to be investigated the possibility of common design guidelines for the Greek landscapes on the base of

common preferences. This possibility is based on the following: 1) the selected areas can be considered in general lines representative of Greek conditions (urban centers and rural) and 2) the citizens of urban centers, although periodically, constitute the main users of Greek landscapes during their excursions on weekends and holidays, while the inhabitants of rural areas constitute the stable landscape users, but in limited extent, which is interwoven with their permanent residence. The research statistical populations included the households sum of the urban center of Thessaloniki (251.190 households) and the county of Fokida (13.565 households), which two representative samples of 400 households were selected separately for each area from.

The data were collected by personal interviews in both areas and a high percentage of completely filled questionnaires (Thessaloniki 80%, Fokida 85%) were achieved.

RESULTS

The preferences, as they expressed by the respondents and classified in 1st, 2nd or 3rd range, are shown in **table 1**. For instance, the image 1.1 was classified in the 1st position from 13,5%, in the 2nd from 14.1% and in the 3rd position from 72.4% of Thessaloniki's respondents. The public's preferences in both areas are similar in three of the six cases (sets 3,4 and 5), where the majority of the sample classified the same images (3.1, 4.2 and 5.1) as first priority. It concerns the cases: forest species integration, presence of dwellings in forest landscape and penetrability of forests. The results show that preferred landscape scenes are: a) mixture of forest species in dispersed groups, not in big area (50%), b) partially covered buildings into forest landscape and c) closed forest edges with limited penetrability. However, beyond the similar opinion in these three cases, there is a significant differentiation in the preferences between the two areas. This differentiation focuses on the different preference percentages of these images. For example, image 4.2 is preferred by the majority in both areas, but the preference percentages for the Thessaloniki is much higher (68.35%) than in Fokida (46.8%).

There is no opinions' similarity about the rest landscape scenes in the two areas. The 1st priority preferences in these cases are not the same and they differentiate statistically significantly between them. (Set1: 2=41,28 fd=2, s.l.=0.1%, set2: 2=13,6 fd=2, s.l.=1%, set 6:2=13,52 fd=2, s.l.=1%). This fact shows the intense preferences'

Table 1 Preference of landscape scenes (in%).

Photo		Thessaloniki City			Fokida County		
		Scale			Scale		
		1st	2nd	3rd	1st	2nd	3rd
Set 1	1.1	13.5	14.1	72.4	31.9	9.1	59.1
	1.2	36.1	51.1	12.9	34.5	59.1	6.4
	1.3	50.5	34.8	14.7	33.6	31.9	34.5
Set 2	2.1	53.6	29.5	16.9	45.0	45.3	9.6
	2.2	34.2	42.9	22.9	46.8	42.4	10.8
	2.3	12.2	27.6	60.2	8.2	12.3	79.5
Set 3	3.1	49.5	27.6	22.9	48.2	35.1	16.7
	3.2	28.8	46.1	25.1	12.6	21.9	65.5
	3.3	21.6	26.3	52.0	39.2	43.0	17.8
Set 4	4.1	11.6	24.5	63.9	28.7	42.6	28.7
	4.2	68.3	20.7	11.0	46.8	17.8	35.4
	4.3	20.1	54.9	25.1	24.5	39.5	36.0
Set 5	5.1	65.8	17.2	16.9	52.9	11.4	35.7
	5.2	20.4	44.8	34.8	10.8	74.0	15.2
	5.3	13.8	37.9	48.3	36.3	14.6	49.1
Set 6	6.1	30.7	27.9	41.4	58.5	26.9	14.6
	6.2	44.8	32.3	22.9	14.0	21.9	64.1
	6.3	24.5	39.8	35.7	27.5	51.2	21.3

divergence concerning these scenes. So, a) the majority of Thessaloniki's public (50,5%) prefers forest interiors, with high visibility, trunks with cut brunches and removed coppice, while the majority of the Fokida's respondents prefers less visibility, but with removed coppice and dry trees, b) the straight fire-break zones are preferred by the majority of Thessaloniki's public (53.6%), while the public in the second area prefers non-geometrical fire-break zones, and c) the preference of most people from Thessaloniki is focused on geometrical forest edges, while the majority in Fokida (58.5%) prefers non-geometrical forest edges. These results provide some indications about the specific preferences that each public has. The analysis of the preferences per image in both areas has showed statistically significant differences for all cases. It means that the public's preference as it concerns the given landscape scenes differentiates generally in both areas and therefore the public's perception to these landscape scenes is not identical.

This was more or less expected because the research concerns two different populations with high declines in social, educational, economic, and environmental level as well as in experiences. It could be argued that the given landscapes and their alterations have not a wide acceptance and therefore they can be applied neither in national nor in regional level. This is reinforced by the fact that similar preferences that are observed in specific landscape scenes (first case above) are significantly different, too.

Consequently, the public preferences vary from place to place and every alteration in the landscape should have a local character corresponding to local public preferences. It is self-evident that a wider research, e.g. in national level, could certificate differentiation or pos-

sible identification of preferences, in a way that it is possible to establish guidelines for each case, as it concerns the local scenes and their alterations. In relation to the real landscape scenes, are observed preferences identification (1st preference) with the current situation in only two cases (identification percentage 33% for each area).

The real landscape scenes respond to the preferences of Thessaloniki's public concerning a) the geometricity of fire-break zones and b) the form and the mixture extent of broadleaf, while Fokida's public: a) the form and mixture grade of species and b) the type of forest edges (fade and non-geometrical). In all other cases the differentiation between preferred and real scenes in the various sets, as well as between real scenes and alterations for each set, is statistically significant in level 0.01%. These findings indicate that the real forest landscape scenes identify with the public's expectations in low grade, concerning the aesthetic quality they have.

However, in the most of cases, where are observed significant divergences between the public's preferences and real landscape scenes, they don't respond totally to the expectations of the public and alterations are necessary for the improvement of their aesthetic quality. These results are not very different from the findings of recreation characteristics, according to which the Greek forests, although they have a variety of characteristics, can satisfy a wide spectrum of interests and have a variety of types and sizes, must be managed in a way that the forest landscape beauty is improved (Karameris, 2000). Consequently, the divergences between public's preferences and real forest landscape scenes indicate the "distance" between expectation and current situation and, indirectly, the kind of management interventions that have to be done to minimise it, so that be maximized the public' experiences.

CONCLUSIONS

The public' preferences in both research areas are similar in 50% of the researched cases. The similarity consists in the preference of the scenes: forest species integration, presence of dwellings in forest landscape and penetrability of forests. But despite the higher percentages, the preferences are significantly differentiated. In the other cases the differentiation is greater. Taken into consideration the above results and the results of a simultaneous survey about public's views for the Greek forests and its recreational behaviour can you argue that the two statistical populations are completely different relative to the issues under consideration. This differentiation doesn't allow any generalization of the results in wider areas and restrict their strength in local level. This ascertainment constitutes suspending factor for the establishing general guidelines for landscape formation and management in wider geographical areas and much more in national level.

Consequently, the guidelines, oriented to public's preferences, should be spatial differentiated from case to case. A lower preference's identification (33% of the cases) is observed in relation to the real landscape scenes.

The identification concerns 1) the forest species integration in both areas and 2) the geometricity of fire brakes in the first area and the forest edges in the second. In combination with the preferences for the other landscape scenes it seems that the citizens prefer more the geometricity of the landscape attributes in contrast to the inhabitants of rural areas.

The partial identification of the real landscape scenes with the public's preferences indicate the divergence between the reality and the expected aesthetic quality as well as the need of taking the appropriate management measures for improvement of the landscape aesthetic quality. ●

REFERENCES

- Ammer, U. und Pröbstl, U. (1991) Freizeit und natur. Probleme und Lösungsmöglichkeiten einer ökologisch verträglichen Freizeitnutzung. Pareys Studentexte 72. Hamburg, Berlin.
- Arbeitskreis Forstliche Landespflege (1991) Waldlandschaftspflege. Hinweise und Empfehlungen für Gestaltung und Pflege des Waldes in der Landschaft. Ecomed. Landsberg-lech.
- Arthur, L. M., Daniel, C.T. and Boster, S. R. (1977) Scenic assessment: an overview. Landscape planning, vol 4, pp. 109-129.
- Chronopoulou, P. (1995) Recreation research in municipality of Patras. Unpublished diploma thesis. Thessaloniki.
- Daniel, T. C., Wheeler, L., Boster, R., and Best, P. (1973) Quantitative evaluation of landscapes. Man-environment systems, vol. 3, pp. 330-344.
- Eleftheriadis, N. and Tsalikidis, I. (1989) Tourism at the zone of coastal pine forests. Aristotelian University Thessaloniki. Special edition. Thessaloniki.
- Karameris, A. (1987) Recreation research and the contribution to land-use planning. Scientific annals of the Department of forestry and natural environment, vol. 30. Thessaloniki.
- Karameris, A. (1989) Die Walderholung in Griechenland. Allgemeine forst zeitschrift. Sonderheft über Griechenland, heft 4. München.
- Karameris, A. and Katramatos D. (1999) The assessment of landscape aesthetic quality as a substantial element of recreational planning. Annals of the department of forestry and natural environment, vol. 40. Thessaloniki.
- Karameris, A. (2000) Public's views about Greek forests. Annals of the department of forestry and natural environment. Thessaloniki. (under publishing).
- Papastavrou, A., Karameris, A. (1991) Characteristics and tendencies of recreational demand in the urban centers of North Greece. University Thessaloniki, Institute of forest policy. Thessaloniki.
- Schauman, S. (1986) Countryside landscape visual assessment. In foundations for visual project analysis. Edited by R. C. Smardon, J.F. Palmer and J.P. Felleman. Wiley. New York.
- Scherzinger, W. (1996) Naturschutz im wald. Ulmer Verlag. Stuttgart.
- Schwann, C. (1995) Aesthetik in der bewertung. "Landschaft sehen". Garten & Landschaft, 9.
- Valourdos, E. (1993) Recreation research in the municipality of Nikea. Unpublished diploma thesis. Thessaloniki.
- Zundel, R. (1987) Naturschutz und Landschaftspflege. Blv Verlagsgesellschaft. München, Wien, Zürich.