

# HOW EVIDENT IS THE APPARENT? STUDENTS' AND TEACHERS' PERCEPTION OF THE TERRACED LANDSCAPE

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## Abstract

The aim of this study is to investigate how modern people perceive and interpret terraces for agriculture. In particular, it explores the perception *per se*, as well as the interpretation in terms of values the terraced landscape may represent (economic, environmental, ecological and cultural).

In the past terracing has been proved a very effective tool for the sustainable management of the landscape in Greece in order to improve local people's living under hard conditions in remote areas. The continuously changing attitudes the last 40-50 years resulted, however, in the abandonment of terraces and, consequently, in the deterioration of the terraced landscape. This, together with an ascending rate of urbanization of living, which is visible today even in the countryside, has worsened the people's relationship with their natural environment.

The study was carried out through a survey by using a structured questionnaire to which 459 students and teachers responded. Respondents were chosen to have had different exposure to terraced landscapes. They were inhabitants of Athens metropolitan area, as well as of Lesbos and Nisyros, i.e. two islands of the Aegean where terraces prevail. The results show that "terraces" as form may escape the attention of children (something strongly related to their place of residence), but perception and interpretation of "terraces" changes significantly with the age of the children. The general attitude of the respondents regarding the "terraced landscape" was positive, a finding that underlines the necessity for environmental awareness and sensitization of all respondents still inhabiting terraced areas.

**Keywords:** terraces for agriculture, environmental education, Aegean islands, Mediterranean environment

## 1. Introduction

A fundamental aim of the geographic and environmental education is to enable citizens to act wisely in respect to the environment and its quality and to empower people to create a sustainable future (UNESCO, 2006). In this context the new Geography Curriculum in Greece (Official Gazette, issue B, nr 304/13-3-03; p. 474-475) mentions, among others, that the goal of teaching Geography is to strengthen students' *knowledge* of physical and human features of places as well as the relationships between them. The general teaching aims of Geography include the achievement of *skills* to: (i) identify and describe the essential features of the environment, (ii) understand that a responsible environmental management and conservation encompasses the interaction between people and the environment, and (iii) recognize this interaction as the effect of human activities on environment. Finally, according to the same source, another goal of teaching Geography is to help students develop a positive *attitude* towards the protection of the environment at all levels (local, national, continental and global). All the above are, indeed, supported by literature, e.g. Houtsonen (2002), who argued that geographic education may promote sustainable development by providing students with basic knowledge, skills and willingness to work towards this aim, to develop an aesthetic response to the environment, and to act with conviction in questions affecting the surrounding world.

Several studies explore the views and the holistic way children experience their environment (Mathews, 1992; Nabhan & Trimble, 1994; Mathews & Limb, 1999; Derr, 2002). Children often see and interpret environment in manner that is more detailed and personal compared to adults (Chawla, 1986; Nabhan & Trimble, 1994). Further on, local places are especially important for children's personality, because children assign these places as a special type of their "belonging" (Mathews, 1992). Access to natural green spaces enhances the attention and cognitive functioning in children (Wells, 2000; Faber Taylor *et al*, 2001).

In recent years, geographical and environmental education programs have often included the notion "sense of place" in their curricula, assuming that if children care about one place in particular, they will eventually care about the environment in general (Sobel, 1998; Leslie *et al*, 1999). According to

geographers and planners, preserving and developing this sense of place is very important for community prosperity and preservation (deGroot, 1992; Jackson, 1994; Derr, 2002). Now the challenge is to understand, first what individuals have as a sense of place within a specific context, and second whether this sense of place really matters for the above societal prosperity (Derr, 2002).

Research on teachers' thinking has grown enormously in recent years, illustrating that the way they think and practice in class depends largely on the extent of their knowledge and belief (Brophy & Good, 1986; Yount & Horton, 1992; Cotton, 2006). Relatively little research has focused on geography in schools, however, a subject that contributes to a major extent to the students' environmental education (Corney, 2000).

The few studies carried out on geography show that teachers' attitudes concern: (i) subject matter (which is generally negative as to geography: Grossman *et al.*, 1989; Klonari & Koutsopoulos, 2005); (ii) pedagogy, i.e. teaching methods related to students learning (Corney, 2000); and (iii) influences from prior educational experiences (Corney, 2000; Klonari & Koutsopoulos, 2005).

In this study we investigate the perception of a major landscape element of the Mediterranean environment, i.e. terraces for agriculture, by school children and teachers. Cultivation terraces are man-made horizontal spaces supported by dry stonewalls on hilly and mountain slopes, which have been created with the aim of managing agricultural land (Petanidou *et al.*, 2008). Although they constitute the most conspicuous and typical element within the landscape, they may escape the attention of a general viewer, therefore may result "invisible" for many people.

Terracing has been proved a very effective tool for the sustainable management of the landscape in the Mediterranean, in particular in the Aegean, Greece, and terraces have improved substantially local people's living under hard conditions in remote areas. This was more enhanced in the past, whereas most of the terraced landscape has been abandoned in recent years. And although they are still in place, they suffer dramatically from lack of management and care.

## **2. Research Aims**

The aim of this study is to investigate how Greek teachers and their students perceive and interpret man-made terraces created for cultivation. The study was chosen to be cross-age involving students of different ages, i.e. both from elementary and secondary schools (hereafter called "respondents"). Perception and interpretation were explored in terms of the values (economic, environmental, ecological and cultural) terraced landscapes may represent to individual respondents. In particular, the following research questions were addressed:

- 1) What is the impression and the knowledge school teachers and children may have on terraces and related landscape?
- 2) Does prior experience influence the respondents' perception and attitude regarding terraces?
- 3) Is there difference in knowledge and attitudes across children ages?
- 4) Are the teachers' attitudes regarding terraced landscapes reflected on the students' knowledge and attitudes?

## **3. Methodology**

### **3.1 Respondents of the survey**

A total of 459 individuals (215 males, 240 females, 4 unknown) participated in the research, a sample that is considered statistically powerful (stratified sampling technique). In addition, the composition of the sample (Table 1) reflects perfectly the national average in terms of sex, age, and social status. The sample encompasses 97 teachers (of geography) and 362 students, of which 56% originated from the greater Athens metropolitan area and 44% from the islands of Lesbos and Nisyros (Aegean). All respondents were provided with questionnaires to which they were invited to answer.

Table 1. Demographic characteristics of respondents groups

	School children groups			Teachers (TE)
	Elementary (EL)	Lower Secondary (LS)	Upper Secondary (US)	
Males (%)	47.0	45.5	43.1	53.6
Females (%)	50.0	53.8	56.9	46.4
Not stated (%)	3.0	0.7	0.0	0.0
Mean age (years)	9.8	12.7	15.7	42.6
N	100	132	130	97

### 3.2 Questionnaires

Two questionnaires were used in the research. The first was aiming to the elementary and lower secondary school children and contained 14 questions. The second questionnaire, aiming to both the upper secondary school children and all teachers, contained two additional questions (i.e. 16 in total). The questions concerned (i) personal data of the respondents; (ii) 10 or 11 closed questions, (three in scale Likert, five multiple choice, two or three scale questions (e.g. 1 for ‘less important’ – 5 or 10 for ‘most important’), and four or five ‘open-ended’ questions all referring to their own perception. Seven questions referred to their extent of knowledge on terraces, three to their familiarity with terraced landscapes, whereas the remaining questions were used to explore ideas and aesthetic views of the respondents as to the terraced landscape.

### 3.3 Data analysis

All answers of the survey were encoded and imputed into "SPSS 15.0" statistical package for analysis. Tests performed included t-test, one-way ANOVA used to compare responses across different subgroup and in order to investigate whether factors such as gender, ages, place of residence, place of origin and social status of students’ families (educational level and profession) have an effect upon the students’ and teachers’ knowledge, values and attitudes.

## 4. Results and Discussion

### A. Students’ and teachers’ knowledge regarding the terraces.

The results show that the majority (52.3%) of the respondents in this research knows the terraces, but a very high percentage (44.0%) stated their ignorance this landscape. The interesting thing, however, regarding these results is that there is a significant difference (Pearson Chi-Square 89.4, df=6,  $a<0.001$ ) between the different groups of ages (Figure 1) and the participants’ place of residence (Figure 2, Pearson Chi-Square 59.5, df=4,  $a<0.001$ ). The place of participants’ origin shows exactly the same pattern. In fact, 50% of the Elementary (EL) and the majority (69.7%) of the Lower Secondary students (LS) stated that they don’t know “what terraces are”, while in the same question a lower percentage among the Upper Secondary students (US) and teachers (36.9% and 12.4% respectively) gave the same answer.

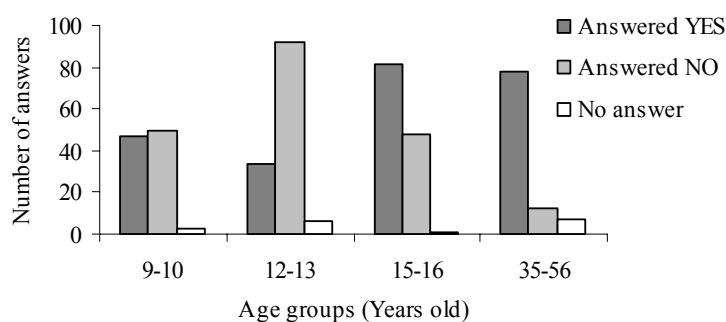


Figure 1: Participants’ knowledge about terraces, related to age

Regarding the place of residence (or origin), the results (Figure 2) show that the respondents from rural areas have better knowledge on terraces, than those from urban areas (71.8% and 37.0% respectively). It should be noted, however that these percentages are very important, having in mind that terraces are an issue of teaching and learning in school (terraced landscapes are presented in the content of geography textbooks as well as in the Primary and Lower Secondary Schools) and of course that the terraced landscape on these Aegean islands (Lesvos and Nisyros) is very common.

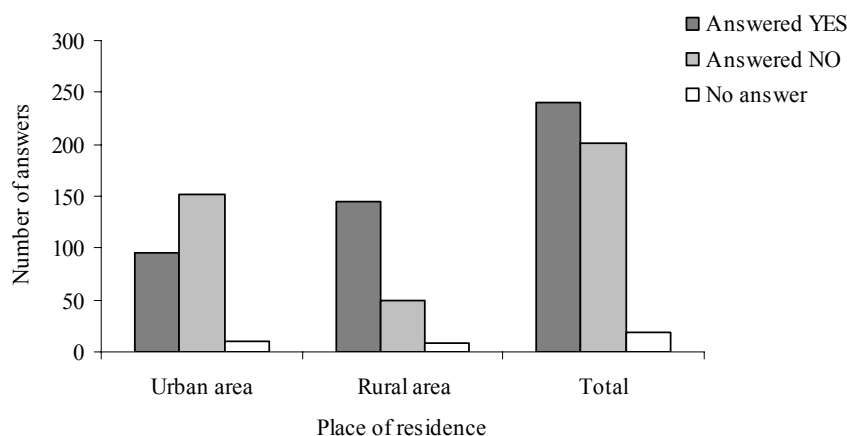


Figure 2: Participants' knowledge about terraces related to place of residence

Regarding the other questions related to the knowledge of the terraces' concept (e.g. the different names terraces were called, places where terraces exist), about the same proportion of respondents as to the first question gave the wrong answers. So, only half of the participants chose the complete correct definition for terraced landscape and then the majority was teachers and students from Upper Sec. Schools. In addition, the place of residence and origin play a significant role in their answers as the most wrong answers have chosen from the responders live in urban areas. Furthermore, the majority of the respondents did not give any other name for terraces either from place of residence or place of origin (64.7% and 58.4% respectively), while the most common name that they mentioned for terraces was "benches" (19.2%). As concern as the question "Give the name of one or more areas where you have been surprised from the density of terraces" only the 31% of the sample mentioned Lesvos and Nisyros (although about 44% of them live on these islands) and 29.5% of total sample didn't answer at all, meaning that even to students and teachers living on the two islands, terraces escape from their attention.

#### B. Students' and teachers' perceptions and aesthetic view about the terraced landscape.

The answers in this section didn't show any statistically significant difference between groups of ages or between place of residence (or origin). This is the reason that the following results are presented in aggregate way (teachers and students) and not separately.

There were three questions concerned with the students' and teachers' aesthetic view. The first question was "how interesting is a terraced landscape for you". It seems that there is an agreement between all groups since almost 73% of them stated that a terraced landscape is very interesting. The second question was about "the characteristics preferred to describe a terraced landscape" and addressed only to Upper Secondary students and teachers. The responders that answered this question (many of them did not) use mainly characteristics which have a strong relationship with their uses or way of constructions like "Soil support devices". An artistic or cultural characteristic is given after that (Table 2).

Table 2: Answers given to the multiple choice question related to the description of a terraced landscape from aesthetic view

Description	No of choices
No answer	62
Another	40
Soil support devices	28
Handmade geometric designs	27
Levels breaking the uniformity	23
Handcrafted Wrinkles	21
Quilt patchwork of various colours	15
Breath on the land	14
Straps keeping the land together	5

On the question about “*the relationship of terraces with man*” the participants had to grade (from 0 to 10) the given answers. Results are given on Figure 3. Some of the first choices of responders were “*admiration for the farmers*”, “*balance between nature and man*” and “*challenge for re-land use*”.

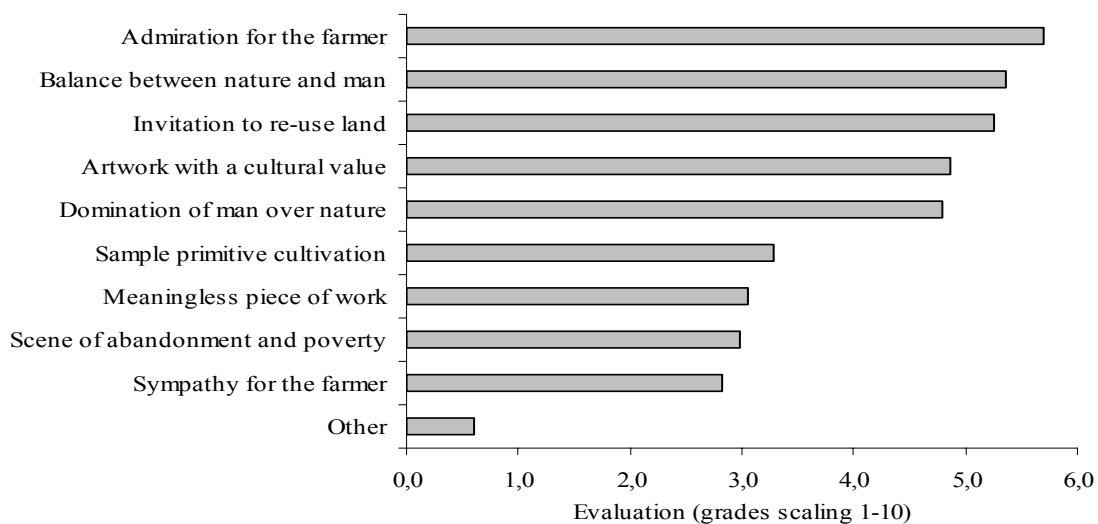


Figure 3: Respondents' evaluation on question about the relationship of terraces with man

### C. The role of participants' experiences (the environments they grow up in or live in) in the perceptions and values regarding the terraced landscape.

The majority of participants (52.3%) stated that they were not familiar to the terraced landscape but there is a statistical difference in relation of the place of residence. Only 35.4% of respondents from urban area said that it is well known vs. 61.3% respondents from rural area. Their justification (56.6%) was that they learned about terraces from places where they live or from places of summer holidays (related to place of origin). It should be noted, however, that only 9.2% of the respondents stated that they have learned about terraces from school.

Regarding the students' and teachers' perception as well as the interpretation in terms of values of the terraced landscape, the results of data analysis showed that the responders (independently of age) focused on the use of terraces for the soil and water management and less on their use for cultivation, but there were 84 individuals who believed that they haven't any importance anymore (Table 4).

Table 4: Answers concerning students' and teachers' perceptions about the values of terraces

<i>The main reasons for terraces construction</i>		<i>The role of terraces today</i>	
Answers	No of choices	Answers	No of choices
Retention of soil	364	Protection from soil erosion	329
Water management	343	Protection from water erosion	299
Land flatten	320	Land suitable for crops	294
Creation of arable land	299	Land suitable for special crops	219
Property borders	276	Beautiful landscape	217
Improving ecological value	245	Fields for financing	150
Creating more aesthetical landscape	235	Preservation of cultural heritage	126
Access path	232	Contribution in Agritourism	104
Use of stones	207	Not so important anymore	84
Another	52	Another	40
No answer	0	No answer	25

Finally the last two questions have been concerned with the reasons of abandonment the terraces and asked from participants to express their opinion for the reconstruction of the destroyed terraces (if it is worth to spend money for this purpose). The answers given by all the subgroups were more all less the same. As first reason they mentioned the “*industrialization of agriculture*” (19%), second the “*changes in life style*” (12.5%) and third the “*urbanization*” (8%). It is important to notice that a great number of the sample (41%) don't answer in this question.

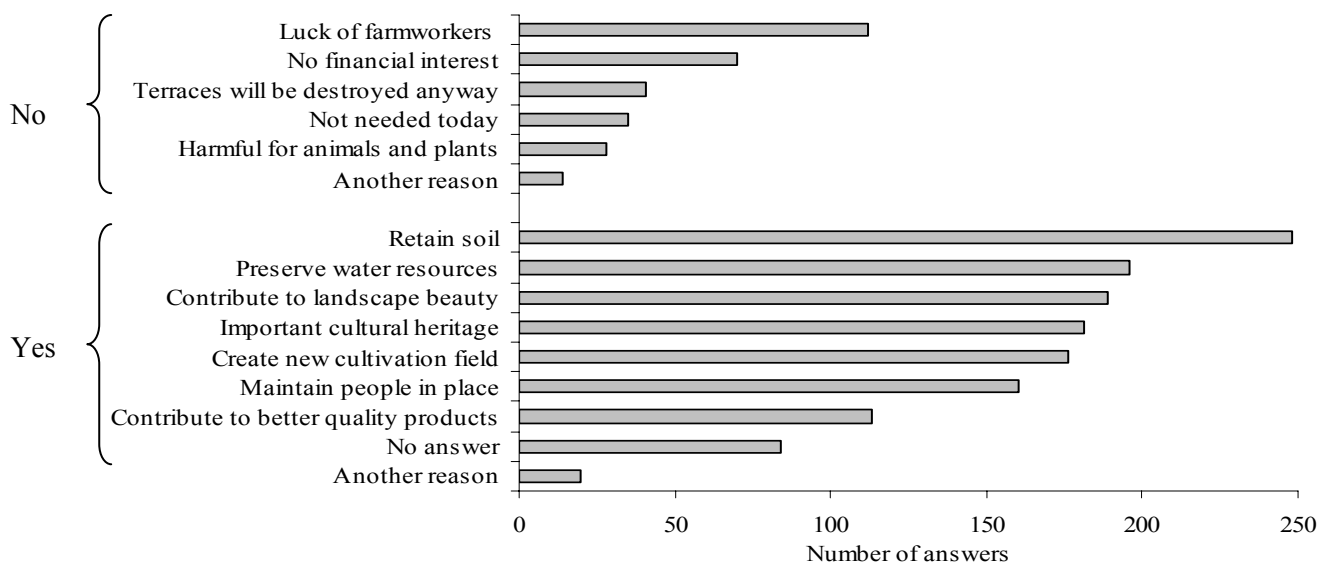


Figure 4: Reasons for public financing or farmers' spending their own money for rebuilding destroyed terraces

From the responses to the last question it seems that there is a positive attitude towards their opinion about *spending money for reconstruction of the destroyed terraces* (only 45.1% 3.5% of them answered negatively) but the main reason for this remains the soil and water management (Figure 4).

The data analysis showed that there no statistically significant differences between male and female as well as between students' with different family characteristics, such as parents' educational level and profession, in terms of their knowledge and perceptions about the terraced landscape.

## 5. Conclusions

In general there is a remarkable ignorance about terraces and terraced landscapes among students (all groups of age) and teachers. This concerns also those from rural areas (44%) where terraces constitute a very common landscape.

The general knowledge about terraces is inadequate, although this concept and issue exist in the contents of geography's text books in primary and secondary schools. This is perhaps not surprising as teachers themselves are not very familiar and probably not very interested in this kind of landscape. As a result teachers don't try to make students aware of this subject. This is an extremely significant issue as they are and will be responsible for shaping the views and attitudes of students (and future generations of children).

Furthermore, the majority of the participants believe that the main value of terraces is concerned with the soil and water management, while their aesthetic or cultural value seems to be not very important for them. A remarkable number of respondents stated that terraces are not important at all. This is in accordance with the general reluctance for spending money (or state financing) for the reconstruction.

Of particular significance was a general consensus across the different group ages that the experiences in every day life have a positive impact in the formation of their attitudes towards the local environment. The lack of this experience is the main reason that the grade percentage of the sample coming from urban areas has less knowledge and is less sensitive towards terraced landscape, a landscape not involved in their every day life.

There is a need for more effectively professional development in geographic and environmental education of primary and secondary teachers in Greece. Any input in teachers' education needs to make them aware of the link between way of people everyday life and environmental damage, and provide them with skills to discuss these issues sensitively with their classes. Furthermore, teachers need to be made aware of the importance of engaging their students in local environmental activities as is suggested by Fien (2000) who argued that the active involvement of students in generating solutions to environmental problems, would promote confidence in the possibility of change.

If teachers are effectively trained in geographic education pedagogy and have a positive attitude towards this subject and if finally have a sound of awareness of the environmental concepts and issues, then under the new curricula, they may be able to make a greater positive impact on their students geographical knowledge and ultimately on the quality of environment they wish to enhance for future generations.

## 5. References

- Amir, S., Gibalizon, E., (1990). Expert-based method for the evaluation of visual absorption capacity of the landscape. *Journal of Environmental Management*, 30, pp. 251-263.
- Arriaza, M., Cañas-Ortega, J. F., Cañas-Madueño, J. A., Ruiz-Aviles, P. (2004) Assessing the visual quality of rural landscapes, *Landscape and Urban Planning*, 96, pp. 115-125.
- Brophy, J., & Good, T. (1986) Teacher behavior and student achievement. In M. Wittrock (Ed.), *Handbook of research of teaching*, 3<sup>rd</sup> Ed., pp. 328-375, McMillan, New York.
- Cantril, J.G. and Senecah, S.L. (2001) Using the 'sense of self-in-place' construct in the context of environmental policy-making and landscape planning, *Environmental Science and Policy*, 4(4-5), pp. 185-203.
- Cheng, A., Ktuger, L.E. and Daniels, S.E. (2003) 'Place' as an integrating concept in natural resource politics: Propositions for a social science research agenda, *Society and Natural Researches*, 16 (3), pp. 87-104.
- Chawla, L. (1986) The ecology of memory, *Children's Environments Quarterly*, 3(4), pp. 34-42.
- Chawla, L. (Ed.) (2002) *Growing in an Urbanising World*, UNESCO/Earthscan, London.
- Corney, G. (2000) Student Geography Teachers' Pre-conceptions about teaching Environmental Topics. *Environmental Education Research*, 6 (4), pp. 313-329.
- Cotton, R.E.D. (2006) Implementing curriculum guidance on environmental education: the importance of teacher's beliefs, *Journal of Curriculum Studies* 38 (1), pp. 67-83.
- deGroot, R. (1992). *Functions of Nature: Evaluation of Nature in Environmental Planning, Management and Decision-Making*. Amsterdam: Wolters-Noordhoff.
- Derr, V. (2002) Children's sense of place in Northern New Mexico, *Journal of Environmental Psychology*, 22, pp.125-137.

- Egoz, S. and Bowring, J. (2004) Beyond the Romantic and Naïve: The Search for a Complex Ecological Aesthetic Design Language for Landscape Architecture in New Zealand. *Landscape Research*, **29** (1), pp. 57-73.
- Faber Taylor, A., Kuo, F. E. & Sullivan, W. C. (2001) Cooping with ADD: the surprising connection to green play, *Environment and Behaviour*, **33**(1), pp. 54-77.
- Fien, J. (2000) Listening to the voice of youth: Implications for educational reform. In Yencken, Fien and Sykes (Eds) *Environment, Education and Society in the Asia-Pacific: Local Traditions and Global Discourse*, Routledge, London.
- Grosman, P.L., Wilson, S.M. and Shulman, L.S. (1989) Teachers of substance: Subject matter knowledge for teaching. In M.C. Reynolds (Ed.) *Knowledge Base for the Beginning Teacher*, pp. 23-26, Pergamon, Oxford.
- Hart, R. A. (1997). *Children's Participation: The Theory and Practice of involving Young Citizens in Community Development and Environmental Care*. New York: UNISEF.
- Houtsonen, L. (2002) Introduction: Geographical education for sustainable living, *GeoJournal*, 0 pp.1-2.
- Hull, R.B., Revell, G.R.B., (1989) Issues in sampling landscapes for visual quality assessments. *Landscape and Urban Planning*, **17**, pp. 323-330.
- Jackson, J. B. (1994). *A Sense of Place, A Sense of Time*. New Heaven:Yale University Press.
- Klonari, Aik., Koutsopoulos, K., (2005) Primary and Secondary Educators' Attitudes on School Geography. In Donert, K. & Charzynski, P., (Ed.), *Changing Horizons in Geography Education*. Herodot Network, Torun, pp.151-155.
- Leslie, C. W., Tallmadge, J., Wessels, T., Zwinger, A. (1999). *Into the Field: A Guide to Locally Focused Teaching*. Nature Literacy Series No. 3. The Orion Society, Great Barrington, MA.
- Mathews, H. & Limb, M. (1999) Defining an agenda for geography of children: review and prospect, *Progress in Human Geography*, **23**(1), pp. 61-90.
- Mathews, H. (1992) *Making Sense of Place-Children's Understanding of Large-Scale Environments*, Harvester Wheatsheaf, Hemel Hempstead.
- Nabhan, G.P. & Trimble, S. (1994) *The Geography of childhood: Why Children Need Wild Places*, Beacon Press, Boston, MA.
- P.I. (2003) A Cross Thematic Curriculum Framework for Compulsory Education, *Official Gazette*, B, 1196, pp. 16509-16519.
- P.I. (2003) National Curriculum of Geology-Geography for Compulsory Education, *Official Gazette*, B, 304, pp. 473-505.
- Petanidou, T., Kizos, T., Soulakellis, N. (2008) Socioeconomic dimensions of the agricultural landscape change in the Mediterranean: the case of the abandonment of cultivation terraces on Nisyros island, Greece. *Environmental Management* (DOI: 10.1007/s00267-007-9054-6). Impact factor: 1.097
- Sobel, D. (1998). *Mapmaking with Children: Sense of Place Education for the Elementary Years*. Portsmouth, NH: Heinemann.
- Tunstall, S., Tapsell, S. & House M. (2004) Children's Perceptions of River Landscapes and Play: What children's Photographs Reveal, *Landscape Research*, **29**(2), pp. 181-204.
- UNESCO (2006) Education for sustainable development: United Nations Decade 2005-2014, Online document assessed 23.1.2008: On <http://portal.unesco.org/education/en/>
- Wells, N. M. (2000) At home with nature: effects of "greenness" on children's cognitive functioning, *Environment and Behaviour*, **32**(6), pp. 775-795.
- Worster, A.M. and Abrams, E. (2005) Sense of place among New England commercial fishermen and organic farmers: Implications for socially constructed environmental education, *Environmental Education Research*, **11** (5), pp. 525-535.
- Yount, J. R. and Horton, P.B. (1992) Factors influencing environmental attitude: The relationship between environmental attitude defensibility and cognitive reasoning level, *Journal of Research in Science Teaching*, **29** (10), pp. 1059-1078.