

APPLICATION OF QUANTITATIVE SOCIOLOGICAL APPROACHES IN LANDSCAPE PLANNING

L. Medková

Czech University of Life Sciences Prague, Faculty of Agrobiology, Food and Natural Resources, Prague, Czech Republic

Landscape and its inhabitants represent an inseparable unit. Landscape is formed by the needs of the local society, while inhabitants are shaped by the landscape they live in. However, in contemporary landscape planning practice there is only limited attention paid to the needs of the local inhabitants within the landscape. The aim of this study was to focus on a possible application of sociological approaches outlined in two case studies and to get information about how to meet the local landscape inhabitants' needs as a starting point for landscape planning. Information dealt with in this study stems from a quantitative questionnaire survey that addressed 10% of inhabitants from the micro-regions Brána Vysočiny and Údolí Lidického potoka aging over 15 years. The data obtained were statistically evaluated using frequency and correlation analyses of an SPSS program (Version 17.0, 2010). Because of the low return rate of the questionnaires an additional qualitative survey was held (focus groups, interviews, workshops), and thus the quantitative data provided by the questionnaires were complemented and deepened. We can state that local inhabitants of given micro-regions exploit the offer of local landscape to satisfy their needs. However these needs are very specific and differ depending on the place of residence (landscape character), age, education, and occupation. The participation of local inhabitants in landscape planning enabling them to project their needs into local landscape seems to be crucial.

questionnaire survey; micro-region; human needs; environment

INTRODUCTION

Landscape was and will be evaluated above all according to how it satisfies changeable human needs.¹(Löw, Míchal, 2003)

Satisfaction of human needs takes on a very diverse form based on different places with different characteristics according to different cultural traditions and different environmental conditions. Human needs are being satisfied by particular values that strengthen and evolve these needs (Librová, 1987; Nakonečný, 1995; Hansen, 1998; Mitchell, 2000).

The relationship between needs and values is embedded in the Czech law system. One of the purposes of land-use planning is to fulfill human needs in landscape while preserve landscape values (The Planning and Building Act No. 183/2006 Coll.). The equilibrium between human needs and landscape values is the basic principle of sustainable development (The Environmental Act No. 17/1992 Coll.). Despite this fact there is only limited attention paid to the needs of local inhabitants in landscape planning (land-use planning).

Maslow (1943) orders human needs into five groups: (1) physiological needs (need to breathe, need to eat, need to secrete, need to sleep, need of inner homeostasis, need of sex), (2) needs of safety (physical – personal safety, health security; emotional – finan-

cial safety, moral safety, security of family, wealth, structure and order), (3) affiliation needs (need of social contact, friendship, family, intimacy, belonging), (4) need of esteem (need of respect and appreciation, need of admiration, need to achieve high prestige, need of self-confidence and sense of own value), (5) need of self-actualization (need to express own individuality and abilities, need of knowledge, need of understanding and meaningfulness, aesthetic needs, need of deep emotional experiences, need of moral principles, need of lack of prejudice and acceptance of facts, need of problem solving).

In an urbanized landscape, Matsuo, Kaplan (2008) distinguished two basic categories of human needs: natural needs and needs of human interaction. Among natural needs they include (1) need of contact with nature (view of nature, direct immediate experience with nature), (2) aesthetic environmental preferences (beauty, tidiness, cleanness, pleasant sounds), (3) need of recreation and games (walking, running, cycling, trips, sports games). The needs of human interaction concern (1) needs of social interaction/privacy, (2) need of the sense of belonging, community and identity, (3) need of inhabitants' participation in the design of the environment.

Spirn (1998) mentions three groups of human needs (archetypal activities) in landscape: (1) need of basic survival (movement, sustenance, sense stimula-

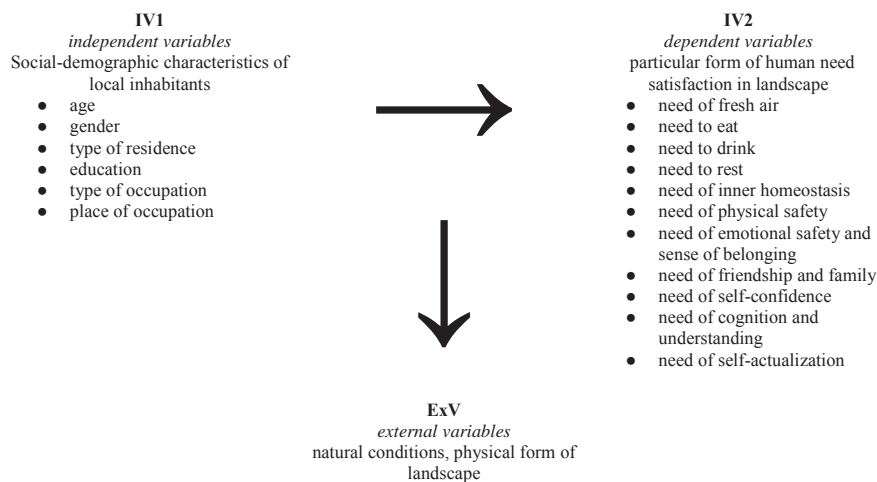


Fig. 1. Natural system describing the relationship between independent variables and dependent variables

tion, reproduction, growth, identification and control, construction), (2) social needs (belonging, communication, trade, games, learning, conflict), (3) spiritual needs (contemplation, adoration).

Mareček (2005) summarizes human needs in landscape into the concept of landscape habitability. Habitable landscape satisfies the needs of: (1) adequate microclimatic and hygienic conditions, (2) high aesthetic quality, (3) human scale of space, (4) place identity and genius loci, (5) optimal acoustic conditions, (6) visual intimacy and physical privacy, (7) sociability, (8) accessibility of dwelling places, (9) recreational amenities, (10) safety.

In this study *landscape* is perceived as an environment influenced by society – rural as well as urban, private as well as public.

The aim of this study was to recommend a method of acquiring information about a particular way of satisfying the general needs (mentioned above) of the local inhabitants within the local landscape and to validate this methodology using two case studies from the micro-regions of Brána Vysočiny and Údolí Lidického potoka.

MATERIAL AND METHODS

In order to fulfill the objective of the present paper, a quantitative sociological survey was performed. The following hypothesis for the given problem was considered: Satisfaction of human needs in landscape is specific and diversified according to the social-demographic characteristics of the inhabitants of the given municipality. This general hypothesis was developed into a natural system, where the relation between independent and dependent variables is described (Fig. 1). Independent variables represent the social-demographic characteristics of inhabitants of the given municipality,

i.e. age, gender, type of residence, achieved education, type and place of occupation. Dependent variables include the particular way, through which human needs are satisfied in a landscape. These include the need of fresh air, need to eat, drink, need to have a rest, needs of inner homeostasis, physical safety, emotional safety and sense of belonging, friendship and family, self-confidence, cognition and understanding, and the need of self-actualization. In the next step, the operational definitions of each variable were formulated (Table 1) and the set of working hypotheses based on the relationship between dependent and independent variables was compiled.

In order to address 10% of inhabitants of the given micro-regions over 15 years of age, a questionnaire was selected as a suitable tool for data gathering. The investigated population sample was selected by simple random probability sampling on the basis of a sampling frame (the list of inhabitants was provided by the municipality). The inhabitants were informed in advance about the planned questionnaire survey via municipal web sites, local press, and local broadcasting. Questionnaires were distributed to inhabitants' addresses and redistributed into the prepared collection boxes at municipal offices.

The questions were formulated based on a natural system set-up. The questionnaire comprised 10 topics with mostly closed questions: (1) social-demographic characteristics of inhabitants (age, gender, type of residence, the highest achieved education, type and place of occupation), (2) frequency and form of outdoor activities, (3) preferred way of satisfying hunger, thirst, coldness, and heat, (4) preferred form of relaxation, (5) perceived danger in landscape, (6) perceived sense of home in landscape, (7) preferred form of spending time together with family and friends, (8) frequency of individual walks in landscape, (9) preferred general image of landscape, (10) interest in participation in

Table 1. Operational definitions of independent and dependent variables

Independent variables	age	Number of years from birth to the present.
	gender	The person's officially registered gender.
	type of residence	The character of person's long-term residence in a given place from the point of view of the relationship to other places of long-term residence (present permanent residence, permanent residence with temporary absence, temporary present residence).
	education	The education level obtained by fulfilling the conditions of successful graduation at the highest educational institutions studied (elementary school, apprenticeship, high school, college, university – bachelor degree, master degree, doctoral degree).
	type of occupancy	Occupation sector (agriculture and forestry, local crafts and industry, services, student, retired, unemployed, parental leave).
	place of occupancy	Current place where the occupation or other activity is performed (in local municipality, local micro-region, local region, other).
Dependent variables	need of fresh air	Need to breathe – to receive oxygen and exhale carbon dioxide, which is manifested for example by various forms and frequency of landscape visits out in the fresh air (landscape stays during working time, leisure time, transportation time – by walking / by bike/ by motorbike / by car / by public transport).
	need to eat	The intake of sustenance is necessary whereby satisfaction in the landscape takes various forms according to the type of food, method and place of consumption (at home, with friends and relatives, in a restaurant, snack carried along, picnic and barbecue, fruit picked in the landscape).
	need to drink	The intake of liquids is necessary whereby satisfaction in the landscape varies according to the type of liquid, method and place of consumption (at home, with friends and relatives, in a restaurant, liquids carried along, from a spring, stream, public well or water pipe).
	need to rest	Need to balance physical and mental fatigue caused by everyday work and duties whereby satisfaction in a landscape is given by a particular form of leisure time spent in an active way (landscape walking and tourism, running, cycling, horse care and horse riding, field sports, swimming, mushroom and forest fruit picking, fishing, hunting, gardening, hobbies and handicrafts) or in a passive way (reading, listening to music, visiting cinema / theater / exhibitions, watching TV).
	need of inner homeostasis	Need to maintain constant body temperature (prevent overheating or under-cooling) which can be satisfied by external factors (forest shadow, shadow under the trees in a landscape, shadow in the garden, cool place by the water, bathing in a pond / stream, bathing in a public outdoor swimming pool, bathing at home in the garden, a cool place at home) (sunbathing in a sunny place, at a bonfire, a warm place in a restaurant, warm at home, warm place by a friend or relative).
	need of physical safety	Need of safety from harm to human health that could endanger inhabitants in a local landscape (mugging, collision with car traffic, poor conditions of the environment).
	need of emotional safety and sense of belonging	Need of home, a familiar place connected with close relatives and friends, with human and intimate associations and that is emotionally connected to a sense of belonging, background and safety (house, house and garden, village, village and surrounding landscape, further landscape on a regional scale).
	need of friendship and family	Need of shared time and experience with close friends and relatives (talking, landscape walking and trips, sport activities, cultural activities, help and shared care of family, household and homestead).
	need of self-confidence	Need to find own identity that is satisfied in leisure time by focusing on oneself, by searching and experiencing oneself. This searching can be connected with stays in a landscape, which reflects the inner feeling and emotions of an individual (frequency of landscape walking alone).
	need of cognition and understanding	Degree of ecological and cultural consciousness (preference of comparing pictures of the same place in two different landscape contexts - undertaken by Librová, 1987).
need of self-actualization	Need to confirm and evolve one's own abilities, deepen own knowledge and develop oneself by creative work connected to self-actualization. This is applied for example on the cultivation of landscape, improvement of the aesthetic, ecological and cultural aspects of the landscape (participation in landscape planning, realization of landscape improvements, landscape maintenance).	

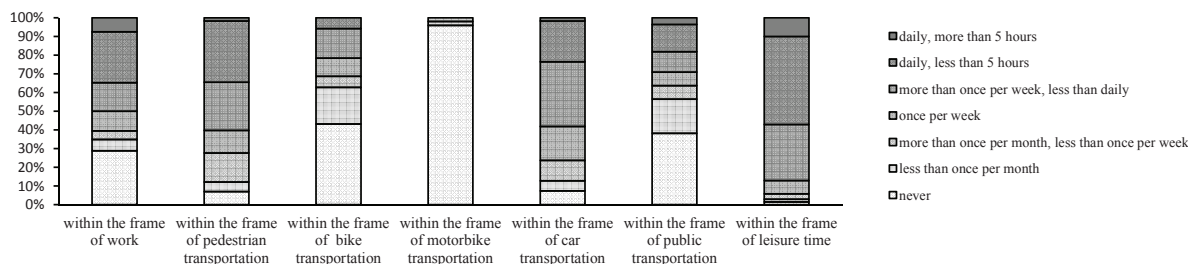


Fig. 2. Natural system describing the relationship between independent variables and dependent variables

activities leading to improvement of environmental quality in the village and surrounding landscape. The questionnaire was supplemented with a cover letter giving instructions on how to fill in and submit the questionnaire.

Data from the respondents were coded and statistically analyzed using the SPSS program. The frequency and correlation analyses identifying the frequency of particular responses and the statistically important relation between independent and dependent variables were performed.

Because of the low questionnaires' return rate an additional qualitative survey was held. The qualitative survey (focus groups of local inhabitants, seniors, members of the Czech Touristic Club; interviews with municipalities, workshop with students of selected basic schools) supplemented and deepened the data obtained by quantitative questionnaires.

The data obtained from the quantitative and qualitative survey were compared with the offer of local landscape. The planning goals and arrangements were defined to balance the disproportion between human needs and landscape values. These planning arrangements proposed physical change of landscape (landscape plan) or the change of the behaviour of local inhabitants (motivational programs).

The proposed methodology was validated using two case studies from the micro-regions of Údolí Lidického potoka and Brána Vysočiny. The respective micro-regions were selected on the basis of different natural, cultural, and social-demographic conditions. The Údolí Lidického potoka micro-region is situated in a suburban landscape close to Prague. It comprises ten municipalities covering 4135 ha with 6903 inhabitants in total. The population size of the municipalities varies from 182 to 2273 and the population density makes 167 inhabitants per km² (i.e. above the Czech Republic average). The Brána Vysočiny micro-region is situated in the rural landscape close to Pelhřimov. The micro-region comprises six municipalities with an area of 7681 ha and 2407 inhabitants in total. The

size of the municipalities ranges from 86 to 1147 inhabitants. Population density is 31 inhabitants per km² (i.e. below the Czech Republic average).

RESULTS

Ten municipalities in the Údolí Lidického potoka micro-region and six municipalities in the Brána Vysočiny micro-region were asked to join the questionnaire survey. Finally five municipalities from each micro-region agreed to the involvement. The total return rate was 15% (19% in the Brána Vysočiny and 12% in the Údolí Lidického potoka micro-regions), which made any attempts at generalization of the results on the whole population problematic.

Among the respondents, the most represented are women (60%), as well as people with permanent residence (93%) and upper intermediary education (35%). There are more respondents with an apprenticeship (31%) than with a university diploma (bachelor, master, and doctoral degrees – 21% in total). The average age of the respondents is 50 years. As concerns the occupation, most of the respondents work in services (32%) and are retired (31%). Only 7% of the respondents work in agriculture and forestry and 5% are unemployed. A majority of the respondents (81%) spend most time in their municipality, 8% in other municipalities in the region, and 11% outside the region.

The most frequent form of outdoor activity is walking and car transportation (a few times per week on average) (Fig. 2). The time spent outdoors in a car rises proportionally to the education level of the respondents. Men spend more time cycling outdoors than women.

During their outdoor activities, a majority of the respondents would prefer to satisfy hunger and thirst by returning home or by consuming their own snack/drink. Respondents from the Brána Vysočiny micro-region prefer to satisfy hunger by picking up forest fruits, fruits from the trees, crops in the fields, and to quench their thirst with water from a public well

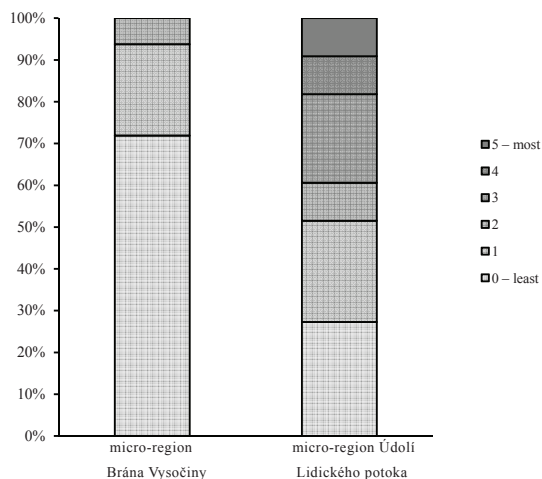


Fig. 3. % of respondents in the given micro-region that perceive threat of harm to one's health because of poor environmental conditions in local landscape

or water tap. Visiting a restaurant when hungry or thirsty is mostly preferred by respondents working in the service industries.

When the respondents need to warm up, most of them prefer to return home, or to take a sun bath. Sun bathing is the preferred option of senior citizens.

Most of the respondents prefer to cool down by searching for shade in the garden, going inside the house or hiding under the trees. Cooling down by searching for shade under the trees in a landscape or by bathing in the pond is more preferred by the respondents in the Brána Vysočiny micro-region than in the Údolí Lidického potoka micro-region. Cooling down by walking near water or by swimming in the public swimming pool is more preferred by students (Fig. 3).

A majority of the respondents favour a diversified landscape with small landscape elements rather than a landscape that is dominantly intensive with agricultural use. Major reasons for such a preference are higher forestation, genuine nature and diversity of the

landscape, cosy and pleasant feeling of it, presence of animals, environmental friendliness, tranquility, interest and feeling of well-being, more opportunities for leisure time activities, closeness, beautiful views, landscape's reminiscence of home and youth, presence of life, charm of landscape unburdened by agricultural use, opportunity for walking, landscape offers shade, landscape is ideal for children, landscape protects the village against the wind. Nevertheless, some respondents prefer landscape with a dominant agricultural use because of its perceived fit to the rural area, that it is more typical for the local region, more reminiscent of home and an inhabited landscape.

Respondents walk alone in the landscape a few times per month on average, most of them less than once a month. 9% of the respondents do not walk alone in the landscape at all, while 11% of them take such a walk daily.

As the biggest threat in a landscape the asked inhabitants perceive the risk of conflict between pedestrians/cyclists and car traffic. Respondents between the age of 55–75 years and respondents in the Údolí Lidického potoka micro-region perceive more intensively the danger of bad health and injury caused by poor environmental conditions. Compared to men, women perceive the threat of mugging in a landscape more intensively, as well as the threat of conflict between pedestrians and car traffic.

Respondents most often associate the sense of home with the house and garden they live in. With the rising size of the location (house and garden – village – village and surrounding landscape in the given municipality – region) the sense of home declines, and the tendency is more apparent in the graduates.

Respondents most often prefer relaxing at home and in close surroundings by walking in a landscape, by gardening and watching TV, a little less by listening to music, reading, mushroom picking, hobbies, cycling, and tourism (Fig. 4). Compared to men, women prefer relaxing by gardening, resting in the garden, and reading. Field sports and swimming are more preferred by younger respondents (students and people between the age of 20–30 years) and by middle-aged

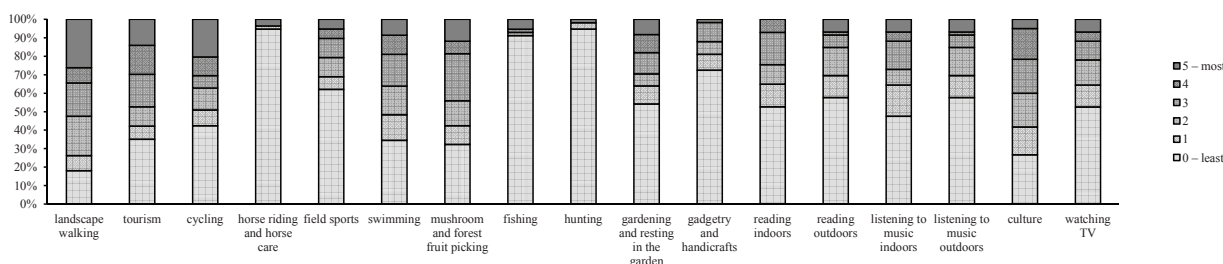


Fig. 4. % of respondents that give particular preference rate to given form of leisure time spent in further landscape

respondents (around 50 years old). Cycling is a form of relaxation more preferred by students. With rising age, passive relaxation (reading) is generally more preferred. Landscape walking and tourism are most preferred with respondents working in the service industries.

The questioned inhabitants most often spend shared time with the family and friends by talking, by shared care of the family, home and household, by walking, and family visits. Walking with family is more preferred by women than men. Most of the respondents prefer to spend shared time with family and friends at home and the close surroundings than in remote places. However, compared to the Údolí Lidického potoka micro-region the Brána Vysočiny micro-region respondents prefer to spend time with the family by trips to a faraway landscape. Time spent together with friends takes an almost similar form – most preferred are talking and visits, walking, and cultural activities. With the rising education level of the respondents the preference for walks with friends in a close landscape declines. Time spent with friends by common care of the family, household, and homestead is more preferred by respondents working in agriculture and forestry.

Among the respondents, there is an obvious interest to participate in activities leading to improvement of the local environment. 36% of the respondents would participate in a planning process where they could project their ideas and comments (most often people around the age of 40 years). 40% of the respondents would participate voluntarily to realize improvement arrangements (mostly respondents between the age of 45–55 years and students), 45% of the respondents would participate in voluntary maintenance of the landscape environment. 20% of the respondents would be willing to apply improvement arrangements on their allotments (mostly people working in agriculture and forestry), 5% would give some financial support. 11% of the respondents (prevalently from the Údolí Lidického potoka micro-region) would not participate in these activities because of the lack of time. None of the respondents think that environmental quality of the local landscape is not their concern.

The results of the additional qualitative survey confirmed that local inhabitants are aware of the role of landscape in human needs fulfillment, particularly physiological needs, needs of physical comfort and safety, health and exercise, landscape perception, identity and sense of home, work and recreation, creativity. As the most important need in the landscape the need to breath, to drink and need of silence were mentioned. The high preference and the rich list of social activities in landscape confirmed the significance of the landscape as a part of human identity, especially the role of the landscape in anchoring in the society. Despite these generally valid needs in landscape, some specifics were acknowledged. Based on the outputs of the questionnaires, the qualitative

survey confirmed that the inhabitants of the micro-region Údolí Lidického potoka fulfill their needs in local landscape less than the inhabitants of the Brána Vysočiny micro-region.

Identified specifics of satisfaction of local inhabitants' needs in local landscape were reflected in proposed planning arrangements.

DISCUSSION

Comparison of the surveys' results with those of other authors confirmed especially the importance of fresh air, landscape walking, sports activities, and sunbathing. Respondents fulfill the need to breathe fresh air most often by walking (landscape walking as a leisure time activity and as a transportation mode). The importance of walking not only as a relaxation activity but also as a transportation mode is stressed by Leslie et al. (2005). The significance of sports activities in a landscape for satisfaction of the need to breathe is mentioned also by Henrych, Tůma (2009), who say that breathing is more intensive while moving out in the fresh air. Matsuka, Kaplan (2008) go further when they state that the opportunity to breathe fresh air is one of the main reasons why people go outdoors into the park. Landscape walking plays an important role in fulfilling not only the need to breathe, but also the need to relax, socialize, and support personal identity. Respondents mention landscape walking as one of the most preferred leisure time activities, an activity shared with family and friends. More than half of the respondents walk alone in landscape at least once per week. Apart from walking, respondents practice also other sports activities (cycling, swimming, field sports), generally more preferred by young people as confirmed by Niedomysl (2008) and Matsuka, Kaplan (2008). When staying outdoors, landscape plays an important role in creating conditions for warming up in cold days and cooling down in hot days. According to the respondents, sunbathing is one of the most preferred forms of warming up during a stay in landscape, mostly for seniors. Fanger (1973) also stresses the importance of warming up during the stay in landscape for older people, because they get hypothermia faster than young people.

The results of the questionnaire survey supplemented with the outputs of the qualitative survey point out the significance of particular landscape planning topics. Respondents prefer diversified landscapes with higher degree of genuine nature and a better offer of recreational options than a landscape with dominant intensive agricultural use. Landscape planning should therefore focus on non-productive functions of agriculture with emphasis on the aesthetic, dwelling, recreational, and ecological function. The survey's results stress the risk of collision between pedestrians/

cyclists and car traffic, due to a considerable popularity of landscape walking perceived by the respondents as the biggest threat in the landscape. The creation of a safe network of pedestrian and cyclist pathways separated from car traffic seems to be one of the crucial points of landscape planning. Respondents from the post-industrial landscape of the Údolí Lidického potoka micro-region, if compared to respondents from the Brána Vysočiny micro-region, more intensively perceive the threat of health injury caused by poor environmental conditions. Therefore, more attention should be paid to the topic of the relationship between the landscape and human health (quality of air, water, soil, conditions for recreation and mental health). Questionnaire results confirm the importance of public participation in landscape planning. None of the respondents consider that improving the local landscape environment is not their concern. It seems there is a great potential for public participation and for using sociological approaches to obtain information about the demands of a local society in a local landscape.

CONCLUSION

We can conclude that inhabitants of given micro-regions do take advantage of the values offered by the local landscape to fulfill their needs. When satisfying local inhabitants' needs within the local landscape, we need to take into account the particular place (landscape offer), the inhabitants' occupation (e.g. seniors, students), age, and education. The needs of given inhabitants in a given landscape are very specific, public participation in landscape planning seems to be crucial in definition of optimal planning arrangements in landscape.

On the basis of the results of the questionnaire survey supplemented with qualitative outputs, three topics of landscape planning that lead to the deepening of the relationships between the needs of local inhabitants and local landscape were identified: (1) non-productive functions of agriculture with the emphasis on aesthetic, dwelling, recreational and ecological function, (2) network of pedestrian and cycle pathways in landscape separated from car traffic, (3) quality of water, air, soil, and the relationship between landscape

and human health (recreation, mental health). In order to define particular goals and arrangements of each of the landscape planning topics, public participation seems to be crucial.

REFERENCES

- Fanger PO (1973): Assessment of man's thermal comfort in practice. *British Journal of Industrial Medicine*, 30, 313–324.
- Hanssen BL (1998): Values, ideology and power relations in cultural landscape evaluations. Dissertation, University of Bergen.
- Henrych M, Tůma L (2009): Controlled ventilation in small buildings. *Transfer inovací*, 14, 61–64. (in Czech)
- Leslie E, Saelens B, Frank L, Owen N, Bauman A, Coffee N, Hugo G (2005): Residents' perception of walkability attributes in objectively different neighbourhoods: a pilot study. *Health & Place*, 11, 227–236.
- Librová H. (1987): Social need and value of landscape. 1st Ed. J.E. Purkyně University in Ústí na Labem, Brno. (in Czech)
- Löw J, Míchal I (2003): The landscape character. 1st Ed. Le-snická práce, Kostelec nad Černými Lesy. (in Czech)
- Mareček J (2005): Landscape architecture in rural seats. 1st Ed. Česká zemědělská univerzita v Praze, Prague. (in Czech)
- Maslow AH (1943): A theory of human motivation. *Psychological Review*, 50, 370–396.
- Matsuoka RH, Kaplan R (2008): People needs in the urban landscape: Analysis of Landscape and Urban Planning contributions. *Landscape and Urban Planning*, 84, 7–19.
- Mitchell D (2000): Cultural geography. A critical introduction. 1st Ed. Blackwell Publishers, Oxford.
- Nakonečný M (1995): Psychology of personality. 1st Ed. Academia, Prague. (in Czech)
- Niedomysl T (2008): Residential preferences for interregional migration in Sweden: demographic, socioeconomic, and geographical determinants. *Environment and Planning*, 40, 1109–1131.
- Spirn AW (1998): The language of landscape. 1st Ed. Yale University Press, New Haven.
- The Planning and Building Act No. 183/2006 Coll.
- The Environmental Act No. 17/1992 Coll.

Received for publication on January 14, 2013

Accepted for publication on July 22, 2013

Corresponding Author:

Ing. Lucie Medková, Ph.D., Czech University of Life Sciences Prague, Faculty of Agrobiology, Food and Natural Resources, Department of Garden and Landscape Architecture, Kamýcká 129, 165 21 Prague 6-Suchdol, Czech Republic, phone: +420 739 667 455, e-mail: lucie.medkova@kontinual.cz
