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PERSPECTIVE

Generating meaningful landscapes for globalized mobile societies: pushing an international research agenda

Felix Kienast · Matthias Buchecker · Marcel Hunziker

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Abstract
Context People's well-being is influenced by the ability to establish a bond with a place and attach meanings to it. Many studies show that the longer people reside in a place, the stronger their place attachment becomes. In today's global societies, the length of residency is vastly reduced because of, e.g., individualistic lifestyles, global workplaces and forced migration (e.g., caused by war or climate change). This trend challenges landscape science: people increasingly need places (landscapes) that can be appropriated easily and quickly by many cultural groups. At the same time, however, these places should not simply become trivial and exchangeable.
Objectives Place attachment/place making studies have become popular in landscape science. However, we have identified a deficit in both the development and application of theory. The research agenda proposed here shall initiate a fundamental discourse on balancing the demands of a global society with the requirements for sustainable landscapes.
Methods Literature review.
Results/conclusions We propose a research agenda with the following pillars: (1) to expand theories and concepts of place attachment, to accommodate the new and unprecedented drivers generated by 21st century mobile societies, (2) to improve the understanding of how landscapes afford place attachment and identity-building in both long- and short-term resident and migrant groups, and (3) to establish scientific knowledge on the inclusive role of landscapes. Proposed research methods range from qualitative social science studies, in situ interviews and psychological experiments to the use of social media data and 3D landscape visualization tools.

Keywords Place attachment · Identity · Place · Landscapes · Inclusion · Mobile societies

Introduction

It has been widely recognized by geographers and sustainability scientists that landscapes[1] are coupled human–environment systems, most of which, broadly speaking, are cultural landscapes (Verburg et al. 2009, 2013a, b; Wu 2010, 2013; Kienast 2014; Turner

F. Kienast (✉) · M. Buchecker · M. Hunziker
Swiss Federal Research Institute WSL, Birmensdorf, Switzerland
e-mail: felix.kienast@wsl.ch

[1] *Definition of "Landscape" according to the European Landscape Convention (ELC):* "Landscape" means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors. Often the term socio-ecological system (Verburg et al. 2009, 2013a; Haberl et al. 2011) is used as synonym for "Landscape". *Definition of Landscape Character:* The "distinct and recognizable pattern of elements, that makes one landscape different from another" (Swanwick 2002).

and Gardner 2015; Bürgi et al. 2015a, b). There is a broad consensus that direct place experiences of these cultural landscapes—together with social integration in the neighbourhood and the local community—defines a sense of place and the strength of place attachments (Low and Altman 1992; Theodori 2001; Scannell and Gifford 2017; Lewicka 2011, 2013, Rishbeth and Powell 2013). Research shows that place attachment is a key component of well-being, involving feelings of safety, belonging, control, self-esteem and a meaningful life (Scannell and Gifford 2017). Advocates of the ecosystem services concept consider place attachment, sense of place and place identity as subclasses of cultural ecosystem services (https://cices.eu/resources/; Lengen and Kistemann 2012; Hausmann et al. 2016; Wartmann and Purves 2018). Stobbelaar and Pedroli (2011) emphasize the landscape component as an important pillar or bearer of the identity-building process. Brown et al. (2015) attempt to add a spatially explicit component to the concept by mapping place identity using a participatory GIS. Similar attempts are reported by Kayhko et al. (2011) and Hernandez et al. (2007).

Although place attachment research explicitly takes into account how people who are mobile develop a sense of place (Gustafson 2009), so far the research has not been capable of assessing the impacts of the enormous post-1980 globalization processes and the post-2000 migration patterns caused by megatrends such as the global decoupling of capital (land) and people, the global accessibility of places, global communication technologies and increasing migration of refugees of war and climate change. These megatrends generate mobile societies that entail a strongly reduced length of residency, frequently characterized by an increasing number of people that flip back and forth between the landscapes of childhood and landscapes with no correlation to early phases of socialization or other decisive phases in life (Kienast et al. 2007; Gustafson 2009; Lewicka 2011, 2013; Powell and Rishbeth 2012). Manzo et al. (2008) investigated the place attachment of highly mobile people in low-income urban settings. Buijs et al. (2009), Kloek et al. (2013) and Peters et al. (2016) presented interesting comparative studies on how immigrants and natives in the Netherlands, the US, Poland and Germany use "green" areas for recreation. The landscape demands of migrants in Chinese cities were analyzed by Qian et al. (2011). A recent review by Egoz and De Nardi (2017) sheds light on the role of landscapes in promoting inclusion. Migration and establishment of place identity from a more historical perspective were studied by Drozdzewski (2007) and by Zückert and Hein-Kircher (2016).

Lewicka (2011) found in a survey that "mobility, operationalized by the number of moves, number of different cities in which one lived, and whether one worked abroad or not, contributed to place attachment much less than the pure measure of residence length in the present place. Evidence exists that mobility may change the form of place identity." Based on the dual-process theory of higher cognition, Raymond et al. (2017) hypothesized that the two types of cognitions—fast and slow—each have an as yet unknown influence on how people establish a sense of place. For the topic of migration, this insight is crucial and could open a broad field of explanation for how quickly place attachment is established and at what scale. Feldman (1990) found that with increasing mobility the attachment to concrete places decreases and is replaced by a "settlement identity", meaning an attachment to general classes of places rather than to a place endowed with specific social or individual meanings. If this is true, we must indeed initiate a fundamental discourse about the "landscape needs" of mobile societies; we must validate and expand the current theories and concepts of place attachment.

What we know: space—place and landscape negotiation

Our considerations are embedded in a well-established theoretical concept of the landscape formation process (Fig. 1) (Hunziker et al. 2007; Kienast et al. 2007). One of the core theories of this concept is the space-place theory (Bourassa 1991; Hunziker et al. 2007). This divides the conceptual framework into two components as follows.

On the left-hand side of Fig. 1 is the physical environment or "space" component, represented by physical elements such as urban fabric, infrastructure, fields, roads, etc. The patterns and processes of the "space" side are well understood and are covered in the landscape ecology literature as well as in the ecosystem service concept (Kienast et al. 2009, 2015; Burkhard et al. 2012; Haines-Young et al. 2012; Verburg et al. 2013a, b; Helfenstein and Kienast 2014;

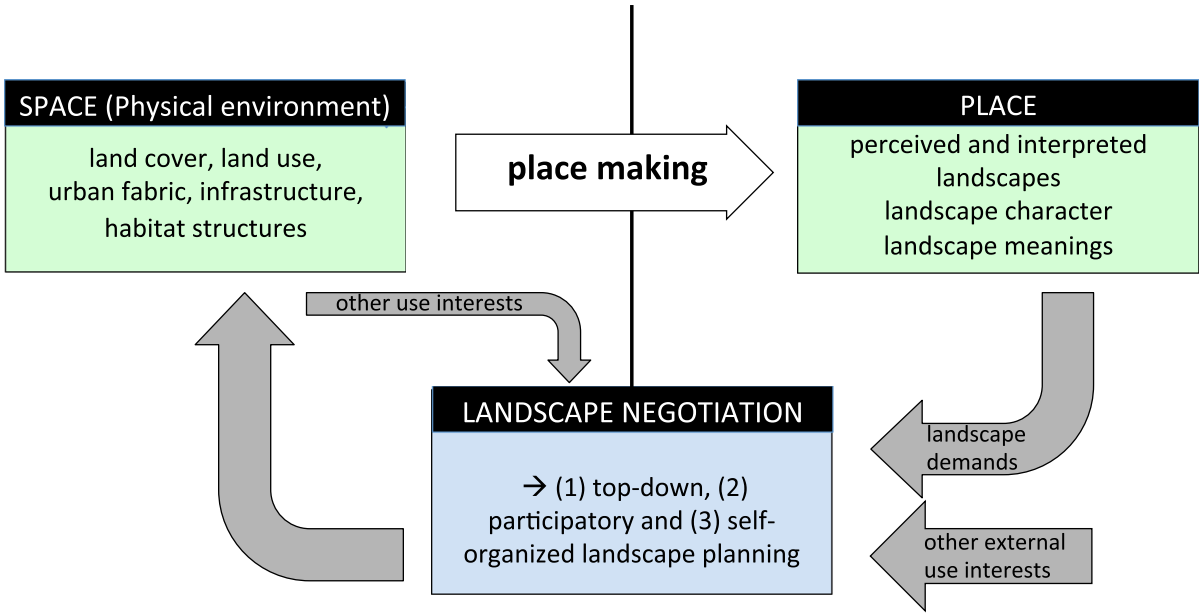

Fig. 1 Conceptual framework

Turner and Gardner 2015). The right-hand side ("place") is the life-world in a philosophical sense. Here, people assign and share cultural, social or individual meanings to landscape elements. In agreement with the current ecosystem service literature, the "place" side of the figure encompasses cultural services. Place meaning supports the identity regulation of individuals and societal groups. The unique setting of perceived and interpreted landscape elements forms the landscape character of a given area (Swanwick 2002; Haines-Young et al. 2007).

The process that leads from space to place is often referred to as "place-making", i.e., the societal construction of place. The latter depends on (1) how people appropriate the physical environment by interactions, and (2) how they socially integrate into the neighbourhood and local community. It is broadly accepted that both factors are influenced by length of residency (see, e.g., Levicka 2011). An essential component of place making is how people perceive landscapes. Landscape perception has been embedded in well-known theoretical concepts described by, e.g., Dramstad et al. (2001), Fry et al. (2009), Hunziker et al. (2007) and Kaplan and Kaplan (1989). In accordance with current concepts of landscape perception research, we distinguish three pillars that govern perception: (1) a universal/biological/evolutionary pillar, (2) a socio-cultural pillar and (3) an individual pillar. It is debated how strongly each pillar contributes to perceiving the landscape. Pillar 1 is the most contested (Hagerhall et al. 2018), stemming from theories such as the savanna theory (Appleton 1975; Orians 1986), the prospect-refuge theory, and Kaplan and Kaplan's (1989) information processing theory. These theories claim that a certain part of people's behaviour is universal (biologically/evolutionarily determined). The research in pillar 2 suggests that perception is the result of socio-cultural influences and agreements (e.g., Kianicka et al. 2006; Buchecker 2009), while pillar 3 suggests that individual attitudes and preferences, but also individual outdoor activities, shape perceptions of landscapes (Hunziker et al. 2007; Kienast et al. 2015).

The process of assigning meanings to landscapes is described in Brandenburg and Carroll (1995), Stedmann (2008) and Brehm et al. (2013). Place meanings represent cognitions that individuals or groups associate with an area, rather than personal bonds such as place identity and place attachment (Jorgensen and Stedman 2006; Casakin and Kreitler 2008). The latter two concepts clearly belong to the "place" side of the conceptual model, i.e., the side that describes how landscapes are experienced by individuals.

As we proceed in a clockwise direction in Fig. 1, we enter the negotiation realm. Based on life experiences, individuals, groups or entire societies fulfil their needs and determine their landscape demands, which are—in an ideal case—then communicated via multiple forms of landscape negotiation into planning action or changes in land use. We observe that these landscape negotiations go far beyond functional aspects and are increasingly centered around place meanings, involving societal discourses on lifestyles (Ströbele and Hunziker 2017). As shown by, e.g., Devine-Wright and Batel (2017), place attachment and meanings play an important role in accepting or rejecting infrastructure projects. These demands, which are strongly influenced by meanings, must be balanced with "the capacity of a landscape to consistently provide long-term, landscape-specific ecosystem services essential for maintaining and improving human well-being" (Wu 2013). The aforementioned link of meaningful landscapes to sustainability science was also broadly discussed by Opdam et al. (2018).

Landscape demands are not by any means the only interests that enter the landscape negotiation arena. Since this paper is concerned with landscape aspects, we do not examine these issues more deeply but merely mention economic pressures or policy decisions as external use interests that are as important as landscape-related demands. Negotiation processes differ widely depending on the planning culture of a region. They may be top-down approaches, where planning action is delegated to technical experts trying to fulfil the demands of the population. Many countries also have institutionalized forms of bottom-up participation (Fürst et al. 2010). Alternatively, there is a wide range of spontaneous self-organized planning processes (Portugali 2000; Portugali and Alfasi 2008), where citizens initiate planning activities individually, as many cities have become unplannable (Portugali 2000).

What we do not know: will mobile societies be able to participate in an active discourse on landscape meanings?

We know that, over the centuries, the process described in Fig. 1 has fulfilled its function in most regions of the world by generating a wealth of authentic and fascinating cultural landscapes. Contemporary migratory effects—whether through voluntary or forced migration—cause some landscapes to lose their resident population. At the same time, the landscapes of the inward migration regions must generate livable environments satisfying a broad array of demands. Their success in providing landscapes that are meaningful to all groups depend on the following questions:

- Will there be an active dialogue on landscape issues between the increasingly mobile landscape users and the (long-stay) providers?
- How will meanings be assigned to landscapes and be socially shared in mobile societies, and by whom?
- Which landscape elements provide options or necessary affordances to allow places to be appropriated by migrant groups?
- Will there be active participation and self-organization in landscape development? Are planning agencies aware of the needs of the migrants and how can migrants be involved in these processes?
- Can landscapes maintain their inclusive and integrative role in an increasingly urban, suburban and virtual environment?
- Will landscapes become trivial and exchangeable due to these processes or could their meaning-making function even benefit from the mobile society?

These unsolved questions for both the theory and practice of landscape stewardship (Penker et al. 2013) and people's well-being (Buchecker and Degenhardt 2015) are the starting points of this framework proposal.

Research challenge: the formation of place attachment in mobile societies

The questions raised above challenge the model in Fig. 1 considerably. Is it robust enough and sufficiently process based to mimic landscape development under considerably changed boundary conditions? To answer this question, a multidisciplinary research effort should be initiated, considering hundreds of individuals having different mobility patterns, as shown in Fig. 2.

This setting is in line with the analyses of, e.g., Gustafson (2009), Lewicka (2013) and Peters et al.

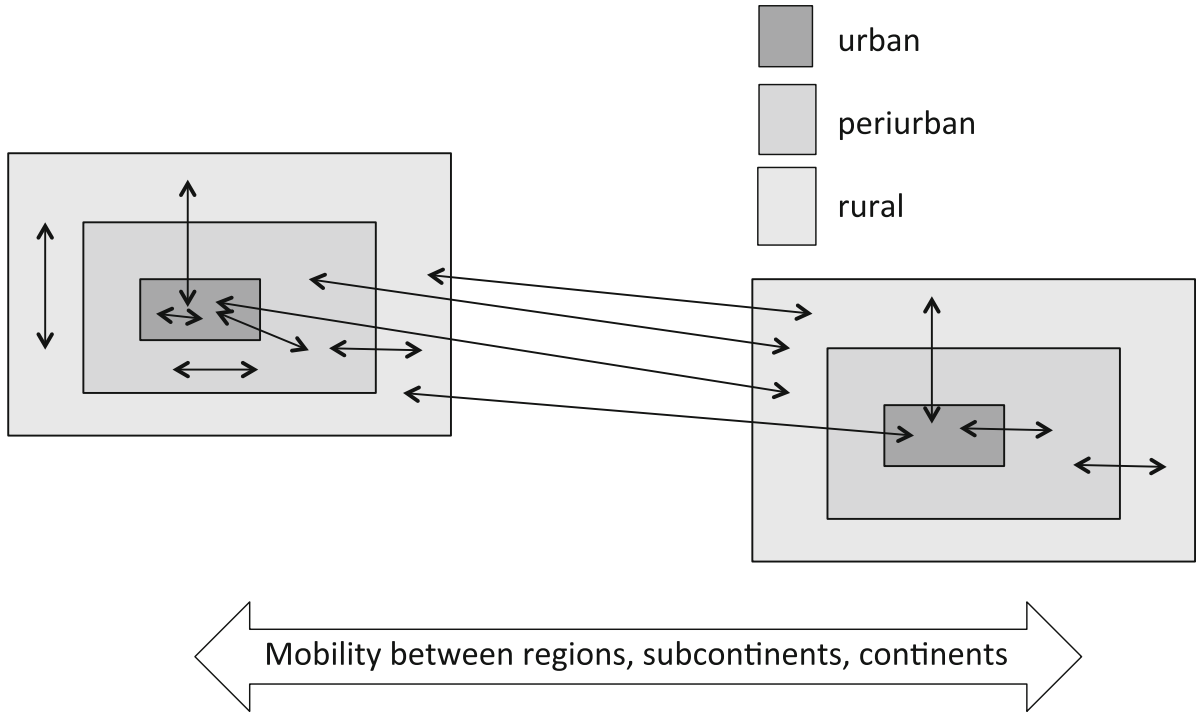

Fig. 2 Schematic mobility patterns of the population

(2016), who studied place attachment in mobile segments of the population. Table 1 highlights some examples of population segments that are highly relevant for studying place attachment in mobile societies. There should be a special focus on how mobile people perceive landscapes, either in terms of self-reflection (experiences and achievements) or social integration (values, norms, symbols and meanings) (Hunziker et al. 2007; Ströbele and Hunziker 2017). In addition, focus-group studies should gather the visual, sensual and social-psychological landscape demands of the target groups.

The following foci should be of special relevance in the proposed research agenda.

Landscape meanings and the role of early phases of socialization: It would be useful to know what landscape elements carry negative or positive connotations, depending on where people grew up, where they are currently living and what outdoor activities they engage in. One might concentrate on well-established perception concepts such as authenticity, fascination and the four Kaplan and Kaplan dimensions of complexity, coherence, mystery and legibility, as well as landscape beauty (Hunziker et al. 2007; Kienast et al. 2015), or, it might be challenging to explore the role the remembered physical space of childhood and other decisive phases in life play in landscape perception and forming place meanings in new places (Sebba 1991; Shamai 1991; Adevi and Grahn 2012). Considering the currently increasing forced migration, special attention should be given to war refugees. Links to trauma research are possible

Table 1 Proposed segments of the population that are highly relevant for place attachment studies in the context of mobile societies

Voluntary migration	Short-term stay	Skilled	Retired	Moving within the same culture	Young	Male	Socially integrated
Forced migration	Long-term stay	Unskilled	Active	Moving to different culture	Old	Female	Not integrated

and should be intensively sought. The papers of Taylor (2008), Rishbeth and Powell (2013), Powell and Risbeth (2012) and Egoz and De Nardi (2017) give some indication of how this research could be focused and directed towards the novel theme of the role of landscapes in facilitating inclusion in (forced) migrations.

For all mobile groups, the meanings of the landscape elements seen or experienced at the place of origin and at the current place could be analyzed, as was done in an earlier study on local long-term residents and tourists in Alpine settings (Kianicka et al. 2006). This is aimed at identifying landscape elements with different physical appearances but similar self-related meanings in the new environment. Various forms of visualization should be explored to gain insight into various cognitive, psychological and cultural aspects of assigning meanings and establishing a bond with a place. Nowadays, such visualizations range from simple hand drawings to visual 3D video labs with devices to measure physiological reactions (Grêt-Regamey et al. 2013; Schinazi and Thrash 2018).

Social interactions (Manzo and Perkins 2006; Manzo et al. 2008): Despite the strong focus on landscape, we do not neglect the fact that place-identity development is strongly influenced by social networks, both at the individual and the community level. Some authors (e.g., Hidalgo and Hernandez 2001) even suggest that social interactions are more important than attachment to physical places. We argue that many social interactions evolve while engaging in landscape-related activities, such as gardening or taking part in outdoor activity groups, and that social interactions and landscape-related activities are mutually dependent on each other. As shown by several authors, leaving traces of one's own activities in a landscape can support place attachment and the identity-building process (Buchecker et al. 2003; Manzo and Perkins 2006; Buchecker 2009). It would be interesting to investigate what activities are possible in the various study regions that allow mobile people to leave traces, thus appropriating places. In urban environments this could be activities such as urban gardening or ways of being involved in landscape stewardship. In rural environments it could consist of participating in farming activities or even having one's own piece of land. The latter has been suggested as a driver of place attachment by Jorgenson and Stedman (2006) (ownership predictor) and the former in a study by Mühlmann and Buchecker (2013).

Impacts

This research will improve our theoretical understanding of the landscape-forming processes of increasingly mobile, global societies. The findings will contribute considerably to the implementation of the recommendations of landscape conventions [e.g., the European Landscape Convention (ELC)] and show how the public can be involved in a participatory way in protecting, managing and designing sustainable landscapes that balance demands and capacity of a landscape properly (Wu 2013; Opdam et al. 2018).

The research agenda should also be supported by the Global Land Project (GLP), the International Association for Landscape Ecology (IALE), the International Association People-Environment Studies (IAPS) and the Global Landscape Forum. The knowledge gained in the proposed research will not only be crucial for establishing and expanding theories of landscape experience and place attachment, but also for establishing novel forms of landscape planning, ranging from very formalized strategic master plans to spontaneous planning activities (Portugali and Alfasi 2008). These planning activities should be able to incorporate—besides the current negotiation rules—the newly gained knowledge about the landscape demands of mobile groups and novel planning rules and incentives. Technically, the foreseen models come closest to the "Pimp your landscape" tool developed during an Interreg III A project (Fürst et al. 2010) or other multiple-criteria platforms, e.g., those described by Koschke et al. (2012), Brown and Robinson (2006) or Villa (2014). Finally, the knowledge gained will contribute considerably to understanding the role of landscapes in the migration process. At present, leading think tanks such as the MPI (Migration Policy Institute) ascribe inclusive and integrative potential almost exclusively to urban areas. Investigating the inclusive potential of all landscapes—including rural areas—is considered an innovative step forward.

References

Adevi AA, Grahn P (2012) Preferences for landscapes: a matter of cultural determinants or innate reflexes that point to our evolutionary background? Landscape Res 37:27–49

Appleton J (1975) The experience of landscape. Wiley, London

Bourassa S (1991) The aesthetics of landscape. Belhaven Press, London

Brandenburg AM, Carroll MS (1995) Your place or mine—the effect of place creation on environmental values and landscape meanings. Soc Nat Resour 8:381–398

Brehm JM, Eisenhauer BW, Stedman RC (2013) Environmental concern: examining the role of place meaning and place attachment. Soc Nat Resour 26(5):522–538

Brown G, Raymond C, Corcoran J (2015) Mapping and measuring place attachment. Appl Geogr 57:42–53

Brown DG, Robinson DT (2006) Effects of heterogeneity in residential preferences on an agent-based model of urban sprawl. Ecol Soc 11:46

Buchecker M (2009) Withdrawal from the local public place: understanding the process of spatial alienation. Landscape Res 34:279–297

Buchecker M, Degenhardt B (2015) The effects of urban inhabitants' nearby outdoor recreation on their well-being and their psychological resilience. J Outdoor Recreat Tour 10:55–62

Buchecker M, Hunziker M, Kienast F (2003) Participatory landscape development: overcoming social barriers to public involvement. Landscape Urban Plan 64:29–46

Buijs AE, Elands BHM, Langers F (2009) No wilderness for immigrants: cultural differences in images of nature and landscape preferences. Landscape Urban Plan 91:113–123

Bürgi M, Salzmann D, Gimmi U (2015a) 264 years of change and persistence in an agrarian landscape: a case study from the Swiss lowlands. Landscape Ecol 30:1321–1333

Bürgi M, Silbernagel J, Wu J, Kienast F (2015b) Linking ecosystem services with landscape history. Landscape Ecol 30:11–20

Burkhard B, Kroll F, Nedkov S, Müller F (2012) Mapping ecosystem service supply, demand and budgets. Ecol Ind 21:17–29

Casakin HP, Kreitler S (2008) Place attachment as a function of meaning assignement. OpenEnvironmentalSciences 2:80–87

Devine-Wright P, Batel S (2017) My neighbourhood, my country or my planet? The influence of multiple place attachments and climate change concern on social acceptance of energy infrastructure. Global Environ Change 47:110–120

Dramstad WE, Fry G, Fjellstad WJ, Skar B, Helliksen W, Sollund M-LB, Tveit MS, Geelmuyden AK, Framstad E (2001) Integrating landscape-based values—Norwegian monitoring of agricultural landscapes. Landscape Urban Plan 57:257–268

Drozdzewski D (2007) A place called 'Bielany': negotiating a diasporic Polish place in Sydney. Soc Cult Geogr 8(6):853–869

Egoz S, De Nardi A (2017) Defining landscape justice: the role of landscape in supporting wellbeing of migrants, a literature review. Landscape Res 42(sup1):74–89

Feldmann R (1990) Settlement identity: psychological bonds with home places in a mobile society. Environ Behav 22:183–229

Fry G, Tveit MS, Ode A, Velarde MD (2009) The ecology of visual landscapes: exploring the conceptual common ground of visual and ecological landscape indicators. Ecol Ind 9:933–947

Fürst C, König H, Pietzsch K, Ende HP, Makeschin F (2010) Pimp your landscape—a generic approach for integrating regional stakeholder needs into land use scenario design and sustainable management support. Ecol Soc 15(3):34

Grêt-Regamey A, Celio E, Klein TM, Wissen Hayek U (2013) Understanding ecosystem services trade-offs with interactive procedural modeling for sustainable urban planning. Landscape Urban Plan 109:107–116

Gustafson P (2009) Mobility and territorial belonging. Environ Behav 41:490–508

Haberl H, Fischer-Kowalski M, Krausmann F, Martinez-Alier J, Winiwarter V (2011) A socio-metabolic transition towards sustainability? Challenges for another great transformation. Sustain Dev 19:1–14

Hagerhall CM, Sang AO, Englund JE, Ahlner F, Rybka K, Huber J, Burenhult N (2018) Do humans really prefer semi-open natural landscapes? A cross-cultural reappraisal. Front Psychol 9:822

Haines-Young R, Langanke T, Potschin M (2007) Landscape character as a framework for the assessment of environmental change. In: Petrosillo I, Muller F, Jones KB, Zurlini G, Krauze K, Victorov S, Li B-L, Kepner WG (eds) Use of landscape sciences for the assessment of environmental security. NATO Science for Peace and Security Series C-Environmental Security. Springer, New York, pp 165–174

Haines-Young R, Potschin M, Kienast F (2012) Indicators of ecosystem service potential at European scales: mapping marginal changes and trade-offs. Ecol Indic 21:39–53

Hausmann A, Slotow ROB, Burns JK, Di Minin E (2016) The ecosystem service of sense of place: benefits for human well-being and biodiversity conservation. Environ Conserv 43(2):117–127

Helfenstein J, Kienast F (2014) Ecosystem service state and trends at the regional to national level: a rapid assessment. Ecol Ind 36:11–18

Hernandez B, Hidalgo MC, Salazar-Laplace ME, Hess S (2007) Place attachment and place identity in natives and non-natives. J Environ Psychol 27:310–319

Hidalgo MC, Hernandez B (2001) Place attachment: conceptual and empirical questions. J Environ Psychol 21:273–281

Hunziker M, Buchecker M, Hartig T (2007) Space and place—two aspects of the human-landscape relationship. In: Kienast F, Wildi O, Ghosh S (eds) A Changing World. Challenges for Landscape Research. Landscape Series. Springer, New York, pp 47–62

Jorgensen BS, Stedman RC (2006) A comparative analysis of predictors of sense of place dimensions: attachment to, dependence on, and identification with lakeshore properties. J Environ Manag 79:316–327

Kaplan R, Kaplan S (1989) The experience of nature. A psychological perspective. Cambridge University Press, Cambridge

Kayhko N, Fagerholm N, Asseid BS, Mzee AJ (2011) Dynamic land use and land cover changes and their effect on forest resources in a coastal village of Matemwe, Zanzibar, Tanzania. Land Use Policy 28:26–37

Kianicka S, Buchecker M, Hunziker M, Müller-Böker U (2006) Locals' and tourists'sense of place: a case study in a Swiss Alpine village. J Mt Res Dev 26(1):55–63

Kienast F (2014) Landscape - increasingly important for Environmental Decisions (in German). GAIA 23:294

Kienast F, Bolliger J, Potschin M, deGroot D, Verburg PH, Heller I, Haines-Young R (2009) Assessing landscape functions with broad-scale environmental data: insights gained from a prototype development for Europe. Environ Manag 44:1099–1120

Kienast F, Frick J, van Strien MJ, Hunziker M (2015) The Swiss landscape monitoring program—a comprehensive indicator set to measure landscape change. Ecol Model 295:136–150

Kienast F, Ghosh R, Wildi O (eds) (2007) A changing world: challenges for landscape research. Landscape Series. Springer, New York

Kloek ME, Buijs AE, Boersema JJ, Schouten MGC (2013) Crossing borders: review of concepts and approaches in research on greenspace, immigration and society in Northwest European countries. Landsc Res 38:117–140

Koschke L, Fürst C, Frank S, Makeschin F (2012) A multicriteria approach for an integrated land-cover-based assessment of ecosystem services provision to support landscape planning. Ecol Ind 21:54–66

Lengen C, Kistemann T (2012) Sense of place and place identity: review of neuroscientific evidence. Health Place 18(5):1162–1171

Lewicka M (2011) Place attachment: how far have we come in the last 40 years? J Environ Psychol 31:207–230

Lewicka M (2013) Localism and activity as two dimensions of people-place bonding: the role of cultural capital. J Environ Psychol 36:43–53

Low S, Altman I (1992) Place attachment. Plenum Press, New York

Manzo LC, Kleit RG, Couch D (2008) Moving three times is like having your house on fire once: the experience of place and impending displacement among public housing residents. Urban Stud 45:1855–1878

Manzo LC, Perkins DD (2006) Finding common ground: the importance of place attachment to community participation and planning. J Plan Lit 20:335–350

Mühlmann P, Buchecker M (2013) Aktive Partizipation – Bürger als Freiwillige in der Landschaftspflege. NuL 45 (10/11):307–314

Opdam P, Luque S, Nassauer J, Verburg PH, Wu JG (2018) How can landscape ecology contribute to sustainability science? Landscape Ecol 33(1):1–7

Orians GH (1986) An ecological evolutionary approach to landscape aesthetics. In: Penning-Rowsell EC, Lowenthal D (eds) Landscape meanings and values. Allen and Unwin, London

Penker M, Enengel B, Mann C, Aznar O (2013) Understanding landscape stewardship—lessons to be learned from public service economics. J Agric Econ 64:54–72

Peters K, Stodolska M, Horolets M (2016) The role of natural environments in developing a sense of belonging: a comparative study of immigrants in the U.S., Poland, the Netherlands and Germany. Urban For Urban Green 17:63–70

Portugali J (2000) Self-organization and the city. Springer, New York, pp 49–72

Portugali J, Alfasi N (2008) An approach to planning discourse analysis. Urban Stud 45:251–272

Powell M, Rishbeth C (2012) Flexibility in place and meaning of place by first generation migrants. Tijdschr Econ Soc Geogr 103:4–17

Qian JX, Zhu H, Liu Y (2011) Investigating urban migrants' sense of place through a multi-scalar perspective. J Environ Psychol 31:170–183

Raymond CM, Kytta M, Stedman R (2017) Sense of place, fast and slow: the potential contributions of affordance theory to sense of place. Front Psychol. https://doi.org/10.3389/fpsyg.2017.01674

Rishbeth C, Powell M (2013) Place attachment and memory: landscapes of belonging as experienced post-migration. Landscape Res 38:160–178

Scannell L, Gifford R (2017) Place attachment enhances psychological need satisfaction. Environ Behav 49(4):359–389

Schinazi VR, Thrash T (2018) Neural correlates of geographic and spatial thinking. In: Montello D (ed) Handbook of behavioral and cognitive geography. Edward Elgar, Cheltenham

Sebba R (1991) The landscapes of childhood: the reflection of childhood's environment in adult memories and in children's attitudes. Environ Behav 23:395–422

Shamai S (1991) Sense of place: an empirical measurement. Geoform 22:347–358

Stedman RC (2008) What do we ''mean'' by place meanings? Implications of place meanings for managers and practitioners. In: Kruger LE, Hall T, Stiefel MC (eds) Understanding concepts of place in recreation research and management. Gen. Tech. Rep. PNW-GTR-744. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, pp 61–82

Stobbelaar DJ, Pedroli B (2011) Perspectives on Landscape Identity: a conceptual challenge. Landscape Res 36:321–339

Ströbele M, Hunziker M (2017) Are suburbs perceived as rural villages? Landscape-related residential preferences in Switzerland. Landscape Urban Plan 163:67–79

Swanwick C (2002) Landscape Character Assessment: Guidance for England and Scotland. Prepared for the Countryside Agency and Scottish Natural Heritage by Carys Swanwick. Countryside Agency

Taylor K (2008) Landscape and memory: cultural landscapes, intangible values and some thoughts on Asia. In: 16th ICOMOS General Assembly and International Symposium: 'Finding the spirit of place—between the tangible and the intangible', 29 Sept–4 Oct 2008, Quebec, Canada

Theodori GL (2001) Examining the effects of community satisfaction and attachment on individual well-being. Rural Sociol 66:618–628

Turner MG, Gardner R (2015) Landscape ecology in theory and practice, 2nd edn. Springer, New York

Verburg PH, Mertz O, Erb KH, Haberl H, Wu WB (2013a) Land system change and food security: towards multi-scale land system solutions. Curr Opin Environ Sustain 5:494–502

Verburg PH, van Asselen S, van der Zanden EH, Tehfest E (2013b) The representation of landscapes in global scale assessments of environmental change. Landscape Ecol 28:1067–1080

Verburg PH, van de Steeg J, Veldkamp A, Willemen L (2009) From land cover change to land function dynamics: a major challenge to improve land characterization. J Environ Manag 90:1327–1335

Villa F, Bagstad KJ, Voigt B, Johnson GW, Portela R, Honzak M, Batker D (2014) A methodology for adaptable and robust ecosystem services assessment. Plos One. 9(3):e91001

Wartmann FM, Purves RS (2018) Investigating sense of place as a cultural ecosystem service in different landscapes through the lens of language. Landsc Urban Plan 175:169–183

Wu JG (2010) Landscape of culture and culture of landscape: does landscape ecology need culture? Landscape Ecol 25(8):1147–1150

Wu JG (2013) Landscape sustainability science: ecosystem services and human well-being in changing landscapes. Landscape Ecol 28(6):999–1023

Zückert M, Hein-Kircher H (2016) Migration and landscape tranformation. Changes in Central and Eastern Europe in the 19th and 20th century. Vandenhoeck Ruprecht. https://doi.org/10.1371/journal.pone.0091001