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METHODS AND DATA TO DESCRIBE AGRICULTURAL LANDSCAPES AND THEIR CULTURAL VALUES ON NATIONAL LEVEL IN GERMANY: CONFUSING COEXISTENCE OR MULTILAYERED COMPLEXITY?

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Summary: Based on the results of the interdisciplinary, multi-national Eucaland Project and using various landscape definitions to illustrate different mental concepts of (agricultural/cultural) landscapes, this paper shows and compares various descriptive methods for agricultural landscapes and their cultural value using the German case as an example. A broad variety of data used as input for landscape descriptions and resulting from landscape descriptions/classifications ranging from analogue data originating in the first half of the 20th century to up-to-date digital landscape data is analysed. Multiple layers of agricultural landscapes reveal their cultural value. It is demonstrated that the complexity of the subject is not covered by a single method. Finally, the need for an integrative approach to describe agricultural landscapes and their cultural value is discussed against the background of present landscape planning instruments and participatory approaches to landscape management.

Introduction

The Eucaland Project (Pungetti , Kruse (eds) 2010) identified the need for a pan-European description and classification of agricultural landscapes as cultural heritage. The ideas and concepts developed in that project (e.g. Velarde et al. 2010) had necessarily to stay on a relatively abstract and theoretical level due to the heterogeneity of the countries involved and data available as well as the limited time frame and budget.

Both planning instruments directly affecting the agricultural landscape and the research disciplines dealing with landscape descriptions have been dominated over decades by national (and/or regional) approaches.

Therefore, the main question investigated in this paper is twofold: (a) which methods and base data can be found on a national level, using the German case, to describe agricultural landscapes and their cultural value and (b) what can be learnt from the national experience to fill the gap discovered on a European level by the Eucaland Project?

Materials and methods

An analysis of description methods covering all disciplines that have ever dealt with landscape and including all nation-wide available landscape data (both in analogue and digital format) is not feasible. In the analysis presented, the authors decided to deliver an initial insight by focusing on a series of disciplines with a clear spatial view (from geography to planning), and thus excluding, for example, disciplines like literature,

history and the fine arts, knowing that complementary approaches and concepts to describe landscapes exist within these schools of thought.

To give the analysis the necessary structure, the approaches and examples presented further below start by using characteristic landscape definitions that illustrate the underlying mental concepts of the (agricultural/cultural) landscape. Examples of description methods and data produced using these mental concepts are presented.

The basic landscape definitions used do not represent a chronological sequence of mainstream concepts but a specific sample selected following the concept of maximal variability. They represent an at least semi-hierarchical sequence from (more or less) objective structure over cultivated land to cultural landscape (including necessarily subjective aspects of perception and valuation), leading to integrative approaches. Regarding the temporal perspective, they represent the sequence from backward-focused portrayal to future-oriented planning.

Results and discussion

Landscape as objective structure: a physical geography approach

"Landscape in an objective sense is the sum of natural conditions in a specific area [translation by the authors of this paper]". This definition was written by Lehmann (1950) in his essay 'Die Physiognomie der Landschaft' (= the physiognomy of landscape). Hard (1970) calls this a "hard" geographical approach. This definition is exclusive in two ways: First, as landscape is limited to "the sum of natural conditions", even the physical results of cultural actions (e.g. agricultural cultivation, settlement construction) and all other cultural aspects are left aside. Second, as landscape is thought "in an objective sense", human perception with its inevitable subjective components is not taken into account.

One might ask why this definition was chosen when investigating agricultural landscapes and their cultural value as, at first glance, this definition does explicitly exclude those basic components. Nevertheless, as both the cultural layer of landscapes and the human perception of it are massively influenced by the underlying physical and natural conditions, this 'base layer' has also to be taken into account. Without geomorphology, topography, hydrology, vegetation and landscape ecology, and climatology (as well as many other disciplines in the field of natural sciences), a holistic view on the landscape is not possible.

Looking at nation-wide homogeneous data, remote sensing data and aerial photographs come first into one's mind. Despite their full-area coverage, their accuracy, the availability of up-to-date data as well as timelines of data, and the fact that, in times of Google Earth and Google Maps, even lay people are used to work with these data, they have one serious disadvantage if using them at nationwide level: in order to describe and classify landscapes and to analyse their inherent cultural values, the original data (unclassified raster/pixel data) require complex and expensive classification. Looking at available data that is already classified (vector data and the thematic data joined to it), the situation in Germany is specific due to the fact that surveying and cartography are the responsibility of the federal states, not the national administration.

One standardised product, elaborated using standardised nation-wide methods, is the so-called ATKIS (Amtliches Topographisch-Kartographisches Informationssystem = administrative topographical cartographical information system). The highest resolution full-nation covering data are the DGM 25 (digital terrain model) and DLM 25 (basic digital landscape model). The DGM contains terrain information (valley, slopes, lowlands, hilly regions, mountainous regions), and secondary data relevant for the methods described in the subsequent chapters can be derived, e.g. visibility information.

The DLM contains basic land use information and, of course, classes such as arable land, grassland, specialised cultivation (vineyards, orchards, etc.), heath land and fallow land are relevant for agricultural landscape descriptions. Regarding the temporal and spatial resolution, the ATKIS data are unrivalled (equal to 1:25,000 recording scale and with an update interval of only 12 months for selected classes/attributes).

Basic topographic information is supplemented in the ATKIS dataset by a geographical delimitation of landscapes including the traditional landscape names and a classification of landscape types. Unfortunately, while dune landscapes, forest landscapes, moor, heath and urban landscapes are indeed classified; agricultural landscapes are missing up to the present. This illustrates the need for innovative methods of agricultural landscape description and classification on both a national and federal state level.

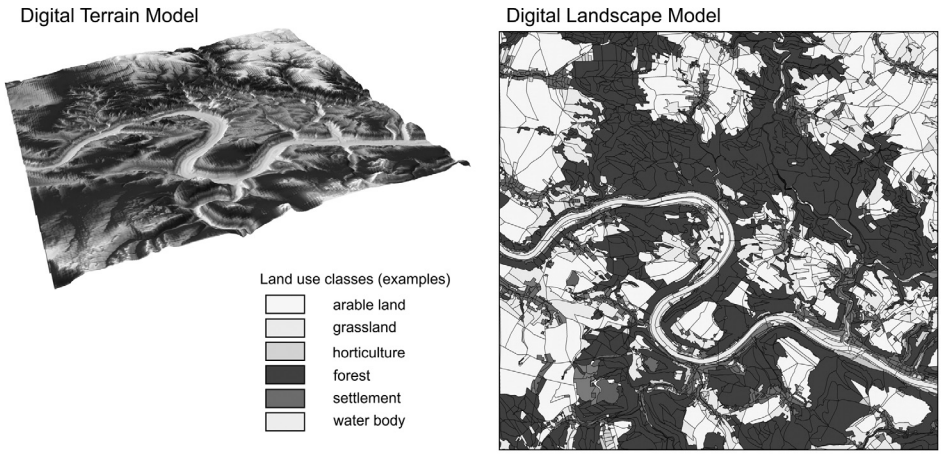

Figure 1. Example of ATKIS-DGM (digital terrain model, left) and ATKIS-DLM (digital landscape model, right) data in Germany
1. ábra Példa az ATKIS-DGM (digitális terepmodell, bal oldalon) és az ATKIS-DLM (digitális tájmodell, jobb oldalon) adatokra vonatkozóan Németországban

On the other end of the scale range (with a recording scale of 1:1,000,000), a nationwide geographical classification of natural landscapes, dating from the middle of the 20th century, has been elaborated by Meynen and Schmithüsen (1953–1962). It follows mainly geo-factors (geology, geomorphology, topography, soil, climate, and hydrology). This dataset contains 89 main regions with about 500 sub-entities; today is digitally available and it also contains verbal descriptions for each class.

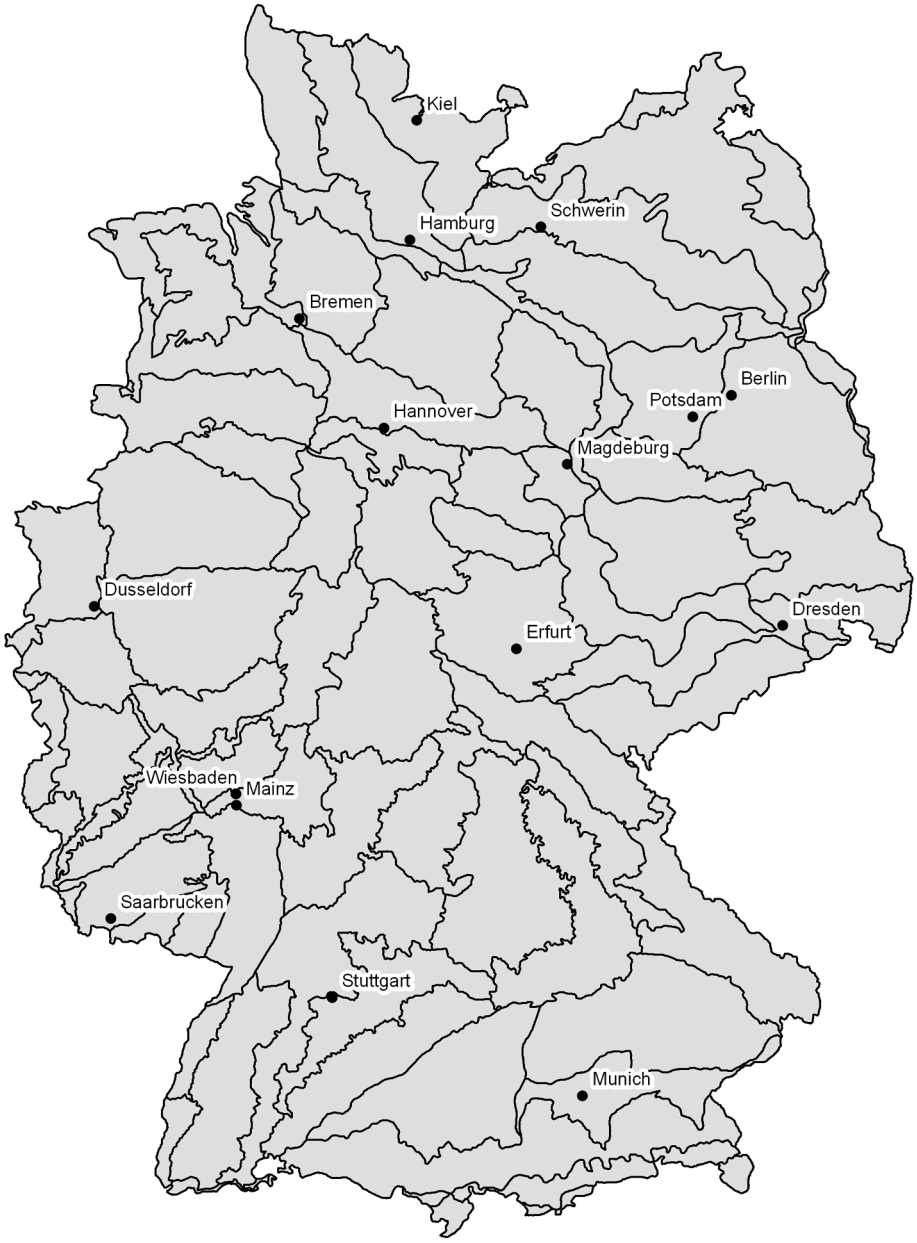

Figure 2. Geographical classification of natural landscapes following Meynen and Schmithüsen (1953–1962) – this map shows the delineation of the 89 main regions
2. ábra Meynen és Schmithüsen (1953–1962) természeti tájbeosztásának földrajzi osztályozása – a térkép 89 fő régiót ábrázol

Landscape as cultivated area: an agricultural approach

Briemle (1978) defines cultural landscapes as "an intensively used agricultural landscape that has – due to a variety of landscape elements – an ecologically relatively stable state and preserves the natural variety of physiognomical phenomena" [translation by the authors of this paper]. On the one hand, this definition can be interpreted as an anti-construct to, and a temporal successor of, the one presented in the chapter above. As natural landscapes have been massively changed by land use, the shift from natural landscape to cultural landscape (= cultivated landscape) becomes obvious. On the other hand, this definition is as exclusive as the one presented above, as it limits cultural landscape to agriculturally used land. To follow the tendency of politically acceptable, intermediatory definitions, links to ecology and nature conservation are established.

From an agricultural perspective, area-wide data on production prerequisites exist, such as the assessment of soil quality for agriculture (Liedtke and Marschner 2003) and production statistics, e.g. number of livestock per area, share of area with organic farming, and the relative economical importance of agriculture (Federal Office for Building and Regional Planning 2005). As the definition presented in this section explicitly includes human activity, and the latter is also dependent on other economical factors influenced by global developments, data like the region-specific retreat probability of agriculture have been calculated (Federal Agency for Nature Conservation 1999). From a cultural heritage point of view, this is of great relevance, as the abandonment of agriculture can also pose a major threat to agricultural landscape elements and whole cultural landscapes.

In his book "Bauernhaus und Landschaft" (= farmhouse and landscape), Ellenberg (1990) delivered a profound view and (regarding Germany) complete picture of farmhouse types and village types, not only in Germany but also the neighbouring countries (Austria, Switzerland, France, The Netherlands, Belgium, Denmark, Poland, The Czech Republik and Slovakia). A detailed verbal description, illustrations of different building types combined with maps of farmhouse and village type regions as well as raster mappings of the dispersion of single farmhouse types can be seen as an integrative approach to link natural conditions, agricultural cultivation methods and settlement history in rural areas.

The high importance of agricultural production for cultural landscape description and classification expressed in the landscape definition by Briemle (1978) can also be seen in the landscape description and classification published by the German Federal Agency for Nature Conservation (Gharadjedaghi et al. 2004): seven of the 24 classes used are directly linked to agricultural production. They are classified as "cultural landscapes" with a distinction between those with an open character and those well structured, as shown in figure 5.

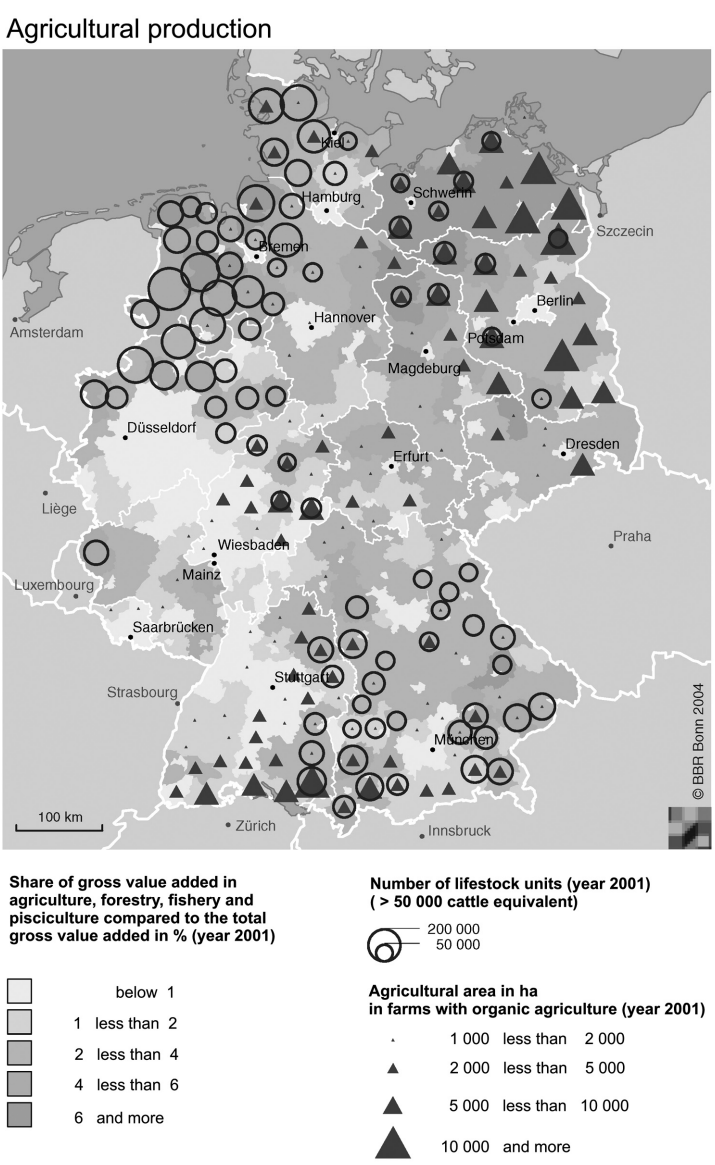

Figure 3. Distribution of agricultural production in Germany (Federal Office for Building and Regional Planning 2005)
3. ábra A mezőgazdasági termelés alakulása Németországban (Federal Office for Building and Regional Planning 2005)

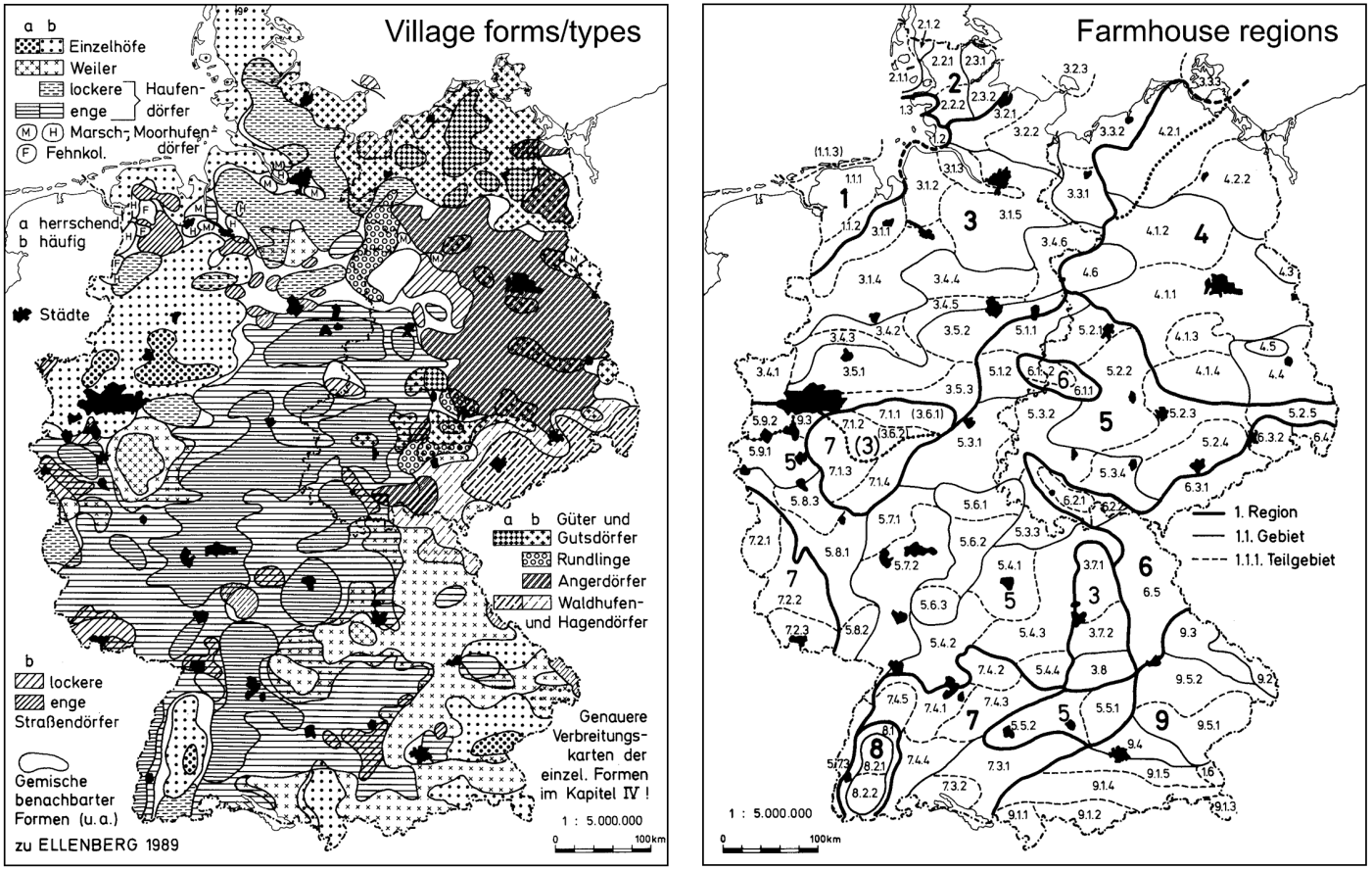

Figure 4 Village types (left) and farmhouse regions (right) in Germany (ELLENBERG 1990: 189 and 191)
4. ábra Falutípusok (balra) és farmház régiók (jobbra) Németországban (ELLENBERG 1990: 189 és 191)

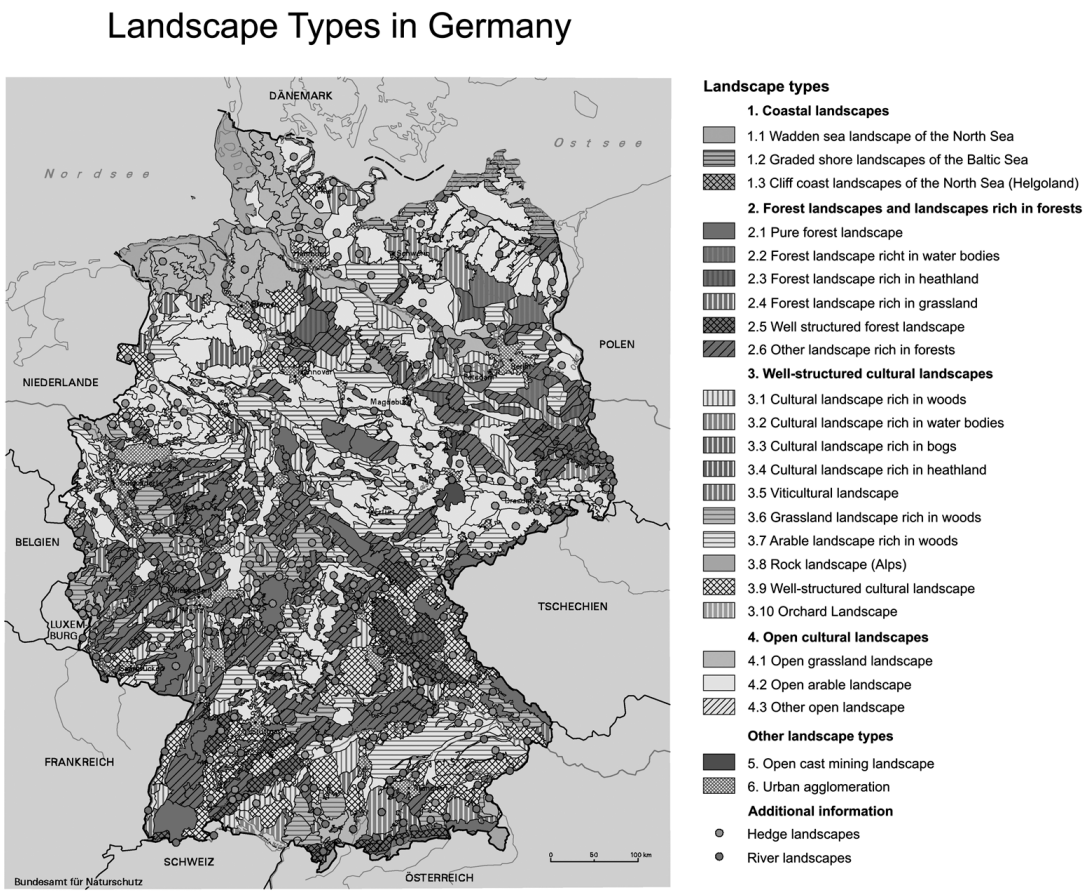

Figure 5. Landscape types in Germany (GHARADJEDAGHI et al. 2004)
5. ábra Tájtípusok Németországban (GHARADJEDAGHI et al. 2004)

As the landscape classification by the Federal Agency for Nature Conservation (Gharadjedaghi et al. 2004) is available as an interactive online publication and contains hyperlinks to detailed maps of the 858 landscapes distinguished as well as additional verbal descriptions and photographs for each landscape, it has a much wider outreach than the traditional book publication, especially for the general public, and it can be updated more easily.

Landscape as cultural product: a historical/sociological approach

Whereas human influence was only mentioned indirectly in the definition that served as the basis for the last section, in this chapter, two definitions will be used to illustrate mental concepts of landscape that are explicitly based on human action and human perception: Wöbse (2001) defines cultural landscapes as "landscapes designed by man, whose economical, ecological, aesthetical and cultural services and conditions are in balance, that ensure a continuous evolutionary dynamic and that are suitable on a lasting basis to serve as homeland for people" [translation by the authors of this paper]. In the European Landscape Convention (Council of Europe 2000), landscape is defined as "an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors".

The search for landscape description methods and landscape classifications following these concepts produced mainly results on the regional and local level. The numerous examples on a local level can't be listed here; besides, they are not the focus of this study with a nation-wide focus. On regional level, several outstanding examples can be found, listed in Table 1.

Table 1. Examples of cultural landscape descriptions on regional level (own, non-conclusive list)
1. táblázat Példa kultúrtáj leírásokra regionális szinten (saját, nem-teljes lista)

No.	*Reference*	*Original Title*	*Translated title*	*Area of investigation*
1	LWL & LVR (2007)	Erhaltende Kulturlandschafts-entwicklung in Nordrhein-Westfalen	*Conserving development of cultural landscapes in North Rhine-Westphalia*	Federal state of North Rhine-Westphalia
2	MIR & SenStadt (2007)	Kulturlandschaften – Chancen für die regionale Entwicklung in Berlin und Brandenburg	*Cultural landscapes – Opportunities for regional development in Berlin and Brandenburg*	Federal states of Brandenburg and Berlin
3	StMLF (2001)	Ländliche Entwicklung in Bayern: Historische Kulturlandschaft	*Rural development in Bavaria: Historical cultural landscape*	Several landscapes in Bavaria

Contd Table 1.
1. táblázat folytatása

No.	*Reference*	*Original Title*	*Translated title*	*Area of investigation*
4	LfU & BLfD (2004)	Die historische Kulturlandschaft in der Region Oberfranken-West	*The historical cultural landscape in the region Upper Fraconia West*	Planning region "Upper Franconia West"
5	Schmidt et al. (2004)	Kulturlandschaftsprojekt Ostthüringen - Historisch geprägte Kulturlandschaften und spezifische Landschaftsbilder in Ostthüringen	*Cultural landscapes project Eastern Thuringia – Historically shaped cultural landscapes and specific scenery in Eastern Thuringia*	Planning region "Eastern Thuringia"

On a national level, cultural landscape descriptions and cultural landscape classification with human action and perception at the focus are rare in Germany. One example with a nationwide approach (for Western Germany in its pre-1989 boundaries) was published by Liedtke (1984), who named and delimited landscapes at a scale of 1:500,000.

Landscape as action arena: an integrative planning approach

Progressive approaches define landscape as an "action arena" (Fürst et al. 2008). As a supplement to and integration of previous landscape concepts, this definition adds the future-oriented perspective that for decades has been inherent to landscape planning. A modern understanding of landscape planning reflects the dual role both of planning and planners: first, to provide methods and information necessary to solve societal tasks that were normatively defined (e.g for landscape planning in the Federal Nature Conservation Act) and, second, to facilitate the process of elaboration and implementation of the necessary concepts.

When dealing with landscape functions (cf. Marks et al. 1992), such as water retention, climate melioration, biomass production, biodiversity and recreation, the physical landscape (cf. section 3.1) is one key source of information. But without other information, e.g on agricultural activity (cf. section 3.2) such as production, processing and marketing, and the history of the landscape (cf. section 3.3) including past land use, landscape structure, historical practices or traditions, the picture remains incomplete. Global driving forces have also to be taken into account (e.g. climate change, market economy, agricultural policy, environmental policy, landscape policy) when aiming at sustainable development.

As planning always has to choose between various options, the inclusion of human perception and valuation, as well as the participation of the public(s), are key prerequisites for the acceptance and implementation of the concepts developed and thus for successful planning.

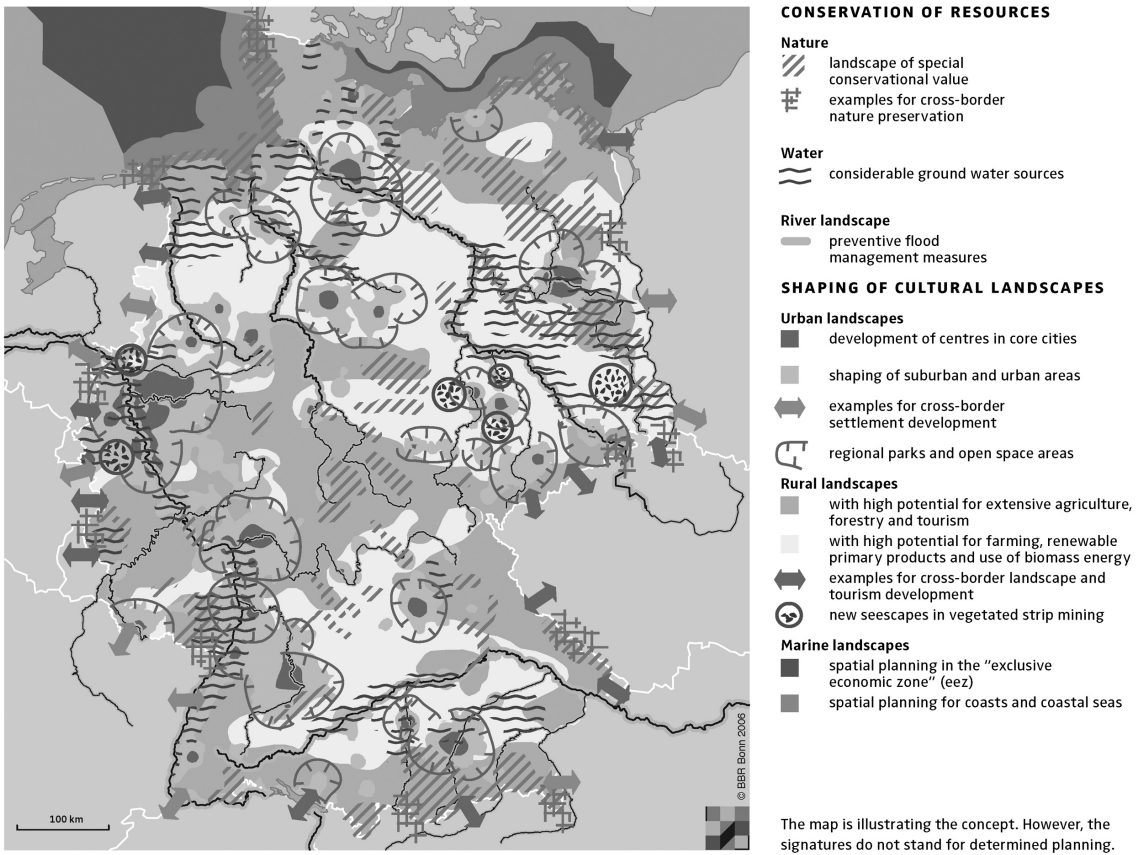

Figure 6. Concept 3 of the perspectives of spatial development in Germany: "conservation of resources, shaping of cultural landscapes" (Federal Office for Building and Regional Planning 2006)

6. ábra Példa három területi fejlesztési perspektívára Németországban: „erőforrások megőrzése, kultúrtájak alakítása" (Federal Office for Building and Regional Planning 2006)

One of the rare examples of such an integrative planning approach on a national level in Germany is the "perspectives of spatial development in Germany" published by the Federal Office for Building and Regional Planning (2006). These perspectives contain three main concepts/general principles. The concept 3 "conservation of resources, shaping of cultural landscapes" contains explicitly the task of developing cultural landscapes. According to this concept, rural landscapes (with several sub-categories) are one category to which this task of cultural landscape development should be applied.

Conclusions

It has been shown that all methods of landscape description and the resulting classifications are linked, implicitly or explicitly, to different mental concepts of landscape. These underlying mental concepts influence the degree to which human action, especially agricultural activities, human perception and the human appreciation of cultural values are reflected in the respective landscape description.

Concluding from the analysis described above, it seems possible that one reason for the lack of methods of cultural landscape description on a European level can be found at the national level. The further the analysis went in the previous chapters, the less concrete examples and data on a national level were found. Thus, bottom-up approaches seem a successful strategy to fill the gaps discovered, as at the more detailed levels, a longer history of dealing with the matter can be found and best-practice examples were identified.

The reason for the lack (on a national level) of cultural landscape descriptions and cultural landscape classification which have human action and perception at their focus can only be found to a minor extent in the federal structure of nature conservation and landscape planning; until-now this was the de-facto primarily responsible administrative sector for cultural landscapes in Germany. At the moment, other administrative sectors in Germany are discovering cultural landscapes as their subject, above all regional planning, which is organised similarly in different federal states. First research results and the latest modification of the 'Regional Planning Act' show promising indications that "competition is good for business", as a popular German saying tells.

Landscape is a multi-layered, complex entity and no single discipline can handle it alone. Interdisciplinary – or better transdisciplinary – research is needed to provide methods for integrative landscape description and classification, taking into account cultural values and heritage and providing a sound basis for participatory landscape management. Landscape data and methods from all disciplines taken into account in the analyses in the previous chapter have to be taken together, providing a toolkit consisting of multiple disciplinary approaches and thus allowing a multi-disciplinary view.

Besides administrative structures and disciplinary boundaries, empirical research on cultural landscape perception and valuation from a national perspective, and concepts for nation-wide cultural landscape management, are also deficient .

Cultural landscapes should not be seen as an isolated topic, as they are linked to various other processes regarding their history and their present state, as well as their future development.

Landscape planning can serve as a facilitator for the processes mentioned, on the research, administrative and the practical management level, due to its integrative structure and intermediatory position between natural sciences and humanities.

Acknowledgments

The authors of this paper wish to thank the members of the Eucaland Network and the participants in the Eucaland Project for fruitful discussions on the handling of agricultural landscapes as cultural heritage and cultural resources in their countries. These discussions helped to identify congruencies and discrepancies between various disciplinary and national approaches. The authors also wish to thank the editors of the Hungarian Journal of Landscape Ecology for the open and holistic understanding of landscape ecology they showed when they agreed to publish this special issue.

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MÓDSZEREK ÉS ADATOK A MEZŐGAZDASÁGI TÁJAK JELLEMZÉSÉHEZ, VALAMINT AZOK KULTURÁLIS ÉRTÉKEI NEMZETI SZINTEN NÉMETORSZÁGBAN: ZAVARÓ EGYÜTTÉLÉS VAGY TÖBBSZINTŰ ÖSSZETETTSÉG?

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Kulcsszavak: tájleírás, tájosztályozás, kulturtájak, digitális tájadat, integrált tájtervezés

Az interdiszciplináris, multinacionális Eucaland Projekt eredményei alapján, és felhasználva számos tájdefiníciót a különböző elméleti tájkoncepció (kulturális/mezőgazdasági) bemutatására, a cikk bemutatja és összehasonlítja a különböző leíró módszereket a mezőgazdasági tájakra és azok kulturális értékeire vonatkozóan egy német esettanulmány példáján át. Bemenetként sokféle adat használatára került sor a táj leírására. A tájleírások/osztályozások eredményei részben analóg (20. század első fele), részben modern, digitális adatok elemzésével készültek. A mezőgazdasági tájak sok rétege felfedi azok kulturális értékét. A vizsgálat tárgya – összetettsége miatt – nem vizsgálható egyféle módszerrel. Végül felhívjuk a figyelmet arra, hogy a mezőgazdasági tájak és azok kulturális értékeinek leírásához integrált megközelítésre van szükség szemben a mai tájtervezési eszközök által használt háttérrel és a tájkezelésben használt részvételi megközelítéssel.