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Landscape Atlas of Flanders+10: a decade of experiences outlining integrated landscape research for the future

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Introduction

The landscapes of Flanders (Belgium) are very diverse, small scales and extremely fragmented. They are the result of the continuous and rapid changes, but, are still containing different heritage and landscape values. The paper illustrates how cultural landscape values in Flanders (Belgium) were valorised in the Landscape Atlas of Flanders in the 1990's (Hofkens &Roossens 2001). The Atlas was introduced in 2000 as a response to the European Landscape Convention. Looking back to the last 10 years, the paper will discuss how the Atlas induced new academic and non-academic landscape research in Flanders and how it became a basis for a new integrated landscape policy, fitting in the framework of the ELC.

The beginnings of the Landscape Atlas

How it all started

In the 1990's, there was a need for an inventory giving a state of the art of the landscape heritage and cultural landscape values in Flanders. Existing older inventories were found insufficient, because they did not focus on cultural values, were outdated, did not have a scientific methodology and were not applicable in the environmental impact assessment and spatial planning (Schoenmaecker 2001). As a result, the Flemish government decided in 1995 to start with an inventory of the relics of the traditional landscapes, aiming a more effective landscape conservation policy and applications in environmental impact assessment.

Methodology and results of the first version of the Landscape Atlas (2000)

The objective of the Landscape Atlas of Flanders was to indicate zones with well-conserved relics of the traditional landscapes. Those traditional landscapes are the combined result of natural capabilities (topography, soil, geology) and human land occupation through history before the modern changes started in the Revolution Age (18th century) (Antrop 1997, <http://www.geoweb.ugent.be/landscape/projects/traditional-landscapes>) and used as a base and framework in the landscape policy in Flanders. The relics particular related to the cultural

and historical heritage values of the landscape, which still can be recognized on the (current) aerial photo maps of 1990, used as the reference to assess the actual landscape condition. A holistic method was set up, using time series of historical maps and aerial photographs. The map of count de Ferraris, covering the whole region, was used as basis historic document. The historical map of Count de Ferraris (1775, made for the Austrian emperor) covers the whole of the land that became Belgium in 1830. The map is very valuable for historical landscape research, because of the very detailed scale (1/11,500) and because it is made just before the important changes, which started with the Industrial Revolution, the start of the modern urban expansion (ref?).

Four types of relics were recognized and mapped on scale 1/50,000, mainly based upon recognition, legibility and coherence and not upon nature or age (Antrop 2003). Relic zones are vast areas containing ancient landscape structures such as settlement and field patterns and land zonings. Anchor places are complexes made by related elements sharing a common history. Linear elements consist of ancient roads, fortifications, water works etc. Punctual elements mainly consist of monuments and architectural important buildings.

The result is a cartographic inventory of cultural and historical landscape heritage, published as GIS-database in 2001 (Figure 1), including detailed descriptions of the different relics. This first version of the Landscape Atlas was combined with a publication discussing new impulses and approaches for landscape management in Flanders (Hofkens &Roossens 2001).

The resulting Landscape Atlas was realised in 5 years, using a holistic method integrated in a GIS-environment with a working scale 1:50,000. In the small scaled, highly urbanised and fragmented landscapes of Flanders, the results were surprising for many, as 39% of the area of Flanders region was indicated as relic area, and 318 anchor places were designated, covering 16% of the territory.

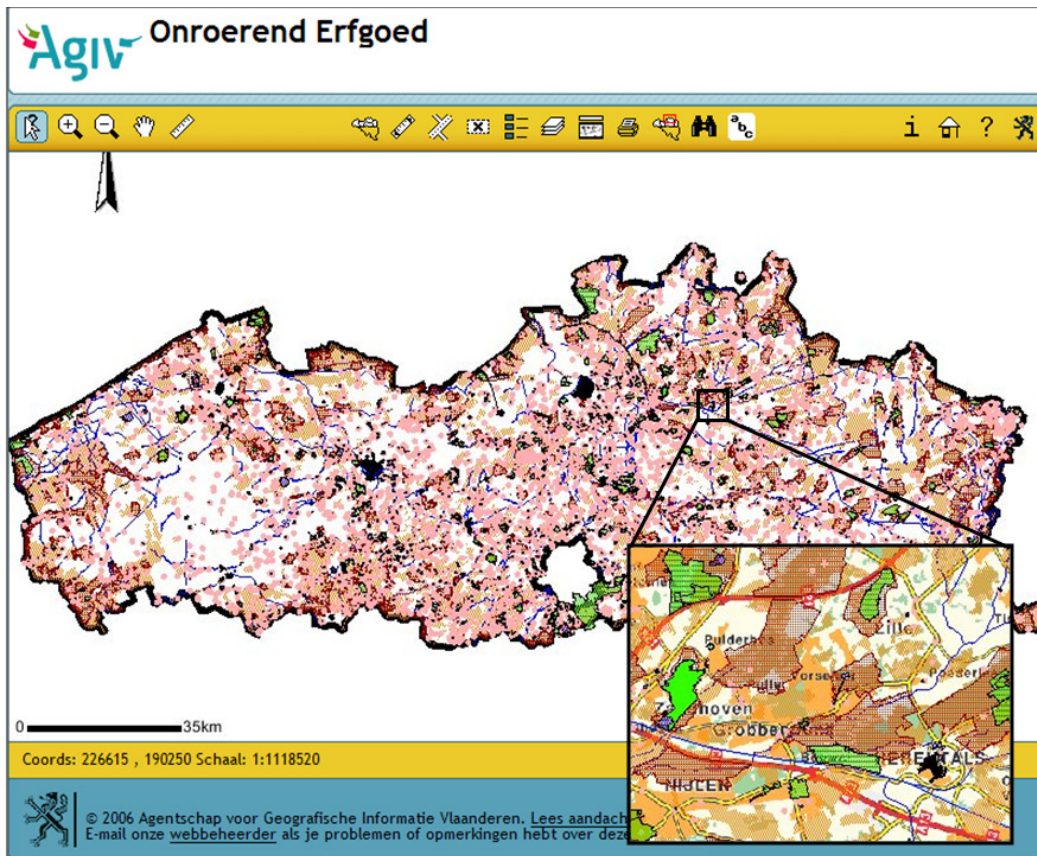


Figure 1 Selected relics of the traditional landscapes of Flanders region, Belgium. The internet geoportaal of the Flemish Landscape Atlas showing all categories of relics. Note the blank (white) areas. (Agency of Geographical Information (AGIV), extracted 2010).

Thanks to you, ELC

As the atlas inventory was finalised in 2000, the Flemish minister of Monuments and Landscapes judged it to be an appropriate moment to in launching a new policy on integrated landscape management. At that moment, the European Landscape Convention was opened for signature (Florence, 2000) and in Flanders, the landscape inventory was considered as a first step in the implementation of the Convention. It was decided to publish the atlas and promote it broadly to all policy levels and sectors and to the public in general, considering principles of sustainability, subsidiarity, participation and transdisciplinarity. This new approach was legally formalised in the new Flemish decree on landscapes of December 21, 2001. As a consequence, the Flemish Landscape Atlas became widely used in landscape conservation, spatial planning, and environmental impact assessment.

Belgium signed the European Landscape Convention already on October 20th, 2000. As landscape policy belongs to the regional authorities, it had to be ratified by six governmental bodies (regions, communities and federal), a process that was finalized on October 28, 2004. So, in the federal country of Belgium, the ELC entered into force only on February 1, 2005. As a consequence, slight adaptations of the existing regional legislation were necessary, which in Flanders region were realised on February 13, 2004. However, the decree on the landscape was altered several times since (March 10, 2006; June 16, 2006; March 27, 2009),

showing the gradual adaptation and implementation of the new integrated approach, changing concepts and new needs. Important to note is the fact that the Landscape Atlas was included formally in the degree and became a legal instrument. Thus, some of its concepts, such as anchor places and relic zones, became the most important objectives to be realized and the integrated landscape management became embedded in spatial planning. Doing so, landscape policy was integrated into spatial policy like suggested in the European Landscape Convention (Council of Europe 2000). Consequently, the updating, management, quality improvement and control of the Landscape Atlas became important issues.

Five years later, time to evaluate and update the Landscape Atlas

Methodology

As the first Landscape Atlas referred to the situation of 1990, it was decided in 2005 to make an updated version, using the most recent orthophotos then available, i.e. of 2000. Simultaneously with the geometrical and temporal update, a critical evaluation of its concepts and application was made. An inquiry was carried out about the experiences of the users so far. Most interviewed users belonged to the governmental administrations involved in heritage management and landscape protection, experts in environmental impact assessment, archaeologists, agronomists, nature conservationists and spatial planners. Many experts worked in private consultancy agencies. The field of application proved to be very broad and was certainly not restricted to the sector of landscape management and conservation alone.

Findings of the inquiry of the use of the Landscape Atlas (2000) and results of the second version (2005)

Until 2005, three sources were available for using the digital atlas: (1) the CD-Rom with the original data files and a standalone viewer, (2) an internet geo-portal (<http://geo-vlaanderen.agiv.be/geo-vlaanderen/landschapsatlas/>), and (3) some well equipped organisations made original data files available on their intranet. These three sources contained both the digital maps of the different relic types and the extended form with descriptions of the situation, characteristics and heritage values of the relics. The CD-Rom was used only for quick consultancy and as a data source for more professional analysis and applications using the original data files in shape- and dbf-format. The internet portal proved to be interesting for pure consultancy and was preferred because of the easy combination with other themes available on the geo-portal, such as protected sites.

Of the four categories of relics inventoried in the atlas, the anchor places had been consulted most frequently, showing the importance of the legal context that was simultaneously created with its publication as well as the new policy priorities. The active engagement of politics in the integrated landscape management policy proved to be an important factor in the fast general acceptance of the Landscape Atlas as a reference base in many policy domains, also beside landscape policy like environmental impact assessment and structure planning at provincial and local level. However, the focus on the anchor places in policy and legislation made the other categories in the atlas less well known and less used. Also the description quality of the relics other than the anchor places was considered to be not detailed and substantial enough. Incompleteness was considered as errors (Antrop & Nolf 2005).

To groups of users could be identified according to different scales in the application and expertise. Detailed local and regional applications by experts confronted the information contained in the atlas with field observations and other data sets, trying to integrate all data.

Typical results were composite maps made by overlaying different themes and aiming at an as complete coverage as possible for the area of interest. Less-expert users were interested mainly in the map-layers and presentations, often discarding the descriptive database linked to it.

Concerning the manner and quality of its use, the following could be noted. Positive was that the atlas clearly stimulated a more interdisciplinary and integrated landscape policy and management. Negative were many copy-paste uses associated with lack of understanding of the basic definitions and background concepts of the atlas and thus leading to false interpretations. The communication by the responsible administration for managing the atlas with all users was generally judged as being insufficient. Other shortcomings and suggestions for improving were following (Antrop & Nolf 2005):

- the scale of 1:50,000 was considered too small. Many users made a 'blow up' of the map layers to scales of 1:10,000 or larger, thus inflating the geometrical precision to noticeable displacement errors. There was a clear need to be able to use the information at a (cadastral) field level;
- landscape being dynamic, the necessity was felt to indicate changes and disturbances of the initial selected relics;
- as the non-mapped 'white areas' also contained landscape, extending the atlas to a full coverage mapping was considered to be essential;
- the not mapped historical city centres need to be included as well at an appropriate scale;
- the descriptive information for other relics (zones, linear, punctual) needed to be extended to the level, quality and detail as the one of the anchor places;
- extending and improving the descriptive content, i.e. adding policy and management objectives for relics when already defined, adding legal constraints, etc.;
- more and better linking with other existing databases and themes;
- offering the possibility of adding or joining ongoing research and results from practical applications.

As a consequence, some improvements were realised already during the update. Priority was given to the upscaling with simultaneous adjustments and corrections of the delineations from a 1:50,000 scale to 1:5,000 scale (cadastre-field level) (Figure 2). Also the descriptive content for anchor places and relic zones was completed and extended, but not for the linear and punctual relics as many of these were already described in other databases such as the built heritage database. Finally, the number of polygons in the map database was reduced by restructuring the links to the descriptive database.

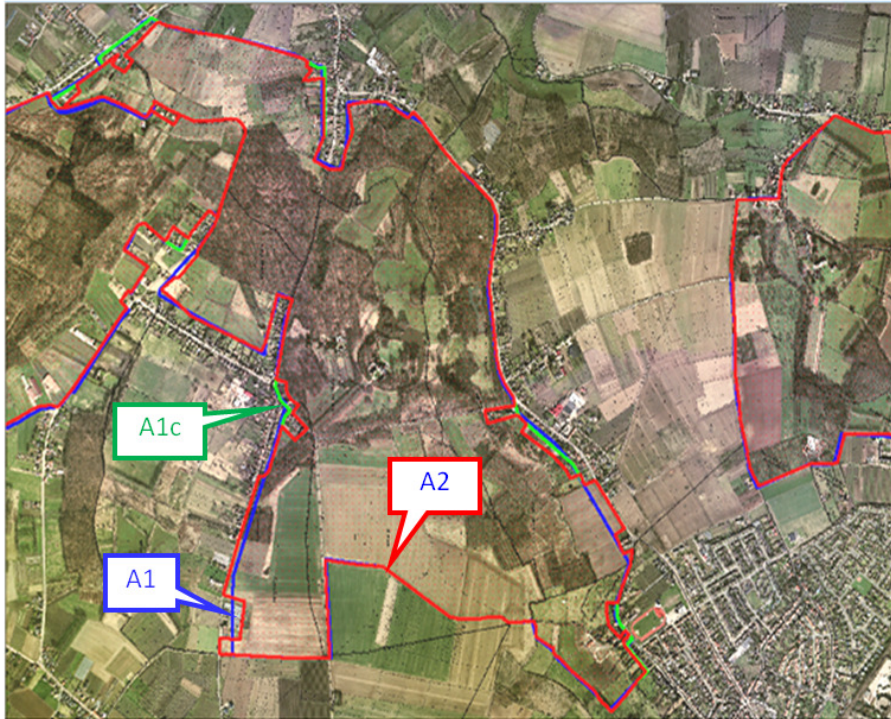


Figure 2 Example of the updating and up scaling of an anchor place: A1 indicates the delineation in the first edition of the Landscape Atlas on scale 1:50,000; A1c is the corrected boundary according to geometrical errors; A2 the final delineation with a fit to cadastral field borders on scale 1:5,000.

The update was finalised in 2005 and the management of the atlas was assigned to the *Flemish Institute for Heritage* (VIOE). However, due to important and ongoing restructuring of the Flemish administration and many other excuses, this new version is still not made available for general use.

Integration of landscape heritage in the Flemish spatial planning policy

The importance of the atlas for a renewed policy in integrated landscape management was rapidly recognized and, as the Landscape Atlas fitted very well within the general measures proposed in the European Landscape Convention, the Flemish government adopted the inventory as an important reference document for its landscape management and heritage conservation policy since 2004, a strategy to integrate landscape management in spatial planning was introduced (Van Olmen & Heyn 2009). The heritage landscapes, based upon the anchor places, became a legal tool for the maintenance of heritage values. They are integrated within the spatial planning tools and will get a landscape management plan and commission, including local stakeholders. Currently, 32 anchor places are indicated for heritage landscape, meaning that they must be integrated into the spatial planning instruments and major changes with negative effect on landscape character must be approved by the administration and commission (www.onroenderfgoed.be).

Need for new research

Meanwhile, it became clear that the Landscape Atlas did not meet the requirements of the European Landscape Convention in several aspects and that new research was needed to solve the shortcomings.

Our first finding was that no landscape identification was made covering the whole Flemish territory, but only selected relics were inventoried (Figure 1). The not mapped “white” areas corresponding to ordinary landscapes, industrial landscapes, and urban landscapes did not have a proper identification and demanded more attention. However, no authority was willing to change the initial concept of the atlas because of the many legal consequences and adaptations needed to realise this, fearing creating new problems in the implementation of the gradually accepted concepts in other policy domains.

As a consequence, the Landscape Atlas does not reflect the actual landscape character types but shows only areas where the characteristics of the traditional landscapes are best preserved and which are most often situated in the less urbanised periphery of municipal territories (Van Eetvelde and Antrop 2005). To solve the problem of the lack of a full coverage landscape characterisation, a new landscape typology for the whole territory was developed at different scales, simultaneously allowing transborder integration with Brussels Capital Region and Wallonia (Van Eetvelde 2007, Van Eetvelde and Antrop 2009a). This new landscape typology of Belgium fits perfectly into the European Landscape Convention to characterize contemporary landscapes in a trans-regional and trans-border perspective (Van Eetvelde et al 2006) and makes an integration at the European level possible (Wascher 2005). The method used a combination of holistic and parametric approaches at two scale levels, resulting in two different landscape typologies. Four datasets covering Belgium were used (DTM, CORINE Land Cover, a soil map, and a satellite image) to define eighteen variables, describing the landscape characteristics of square kilometre cells at the first scale level. These variables are used to assign a landscape type to each cell. The spatial patterns formed by these grid landscape types are delineated into landscape units at the second scale level, and described using landscape metrics. The types and patterns composition properties of the units are used in a cluster analysis to define landscape types at the second scale level. Beside the cartographic visualisation of the typology, an open landscape GIS-database was set up, enhancing the landscapes characterisation at both scale levels. The variables used to differentiate landscape types and character areas can be extended by additional descriptive variables of very different sources relating for example to regional classifications, cultural, historical, scenic properties and even iconographic documents (Van Eetvelde and Antrop 2009a).

Secondly, the mapped relics were described according to the natural and historical properties, but were not grouped into different types, nor different character types were differentiated internally in the relics. Also, the wide variety of rural settlement types is not recognised.

To characterise the urban landscapes, which are extremely diverse in Flanders, a new interdisciplinary methodology was developed (Antrop et al. 2008), which will be carried out in a case study in 2010. Furthermore, a new detailed and appropriate inventory and typology of the historic settlement types was needed. To include the time dimensions and the landscape dynamics, historical landscape characterisation and landscape trajectories should be applied as well, both in rural as in urban landscapes (Van De Velde et al 2010). Some case studies showed that this give more insight into the dynamics of a relic area (Van Eetvelde & Antrop 2009b) and that historic landscape characterisation can be useful in formulating an integrated management plan of a protected landscape (De Vlaeminck 2009). Although a lot of examples of landscape paths and qualitative descriptions of landscape evolutions exist (Antrop et al

2006, Antrop et al 2007), an similar approach an general overview on the Flemish level is still missing.

As third conclusion, we state that the perceptive and aesthetic properties of landscapes described in the Landscape Atlas were considered insufficiently and too softly formulated to be operational. In the database of the relics, the aesthetic characteristics are included, but not extended. Perceptive properties and landscape preference are missing. Recent research showed that landscape perception research is valuable, but however time-consuming to compile on a regional level (Sevenant 2010). Furthermore, the priority of the Flemish administration and the *Flemish Institute for Heritage* (VIOE) is still more focussing on the heritage perspective of landscape.

Finally, no landscape quality objectives were yet formulated for the relics in the atlas, which made its use more difficult in all kind of planning applications. However, in 2004, the concept of heritage landscapes was introduced in a new extension of the landscape decree and also the necessary procedures for integration in spatial planning were legally defined. From this moment on, landscapes could not only be protected, but there was now also a possibility to manage, restore and create landscapes to the procedure of regional and town planning according to the ELC (Antrop & Van Eetvelde 2007). This was focused and restricted on the anchor places selected in the Landscape Atlas. To allow this, a new methodology was created to delineate, map and inventory (photographs) selected anchor places, allowing the formulation of landscape quality objectives, as well as guidelines for the implementation in spatial planning (Van Olmen & Heyn 2009). This task was initiated and completed by the regional administration for the heritage conservation. Today, already 32 anchor places have been designated and are in procedure for recognition as heritage landscapes. Simultaneously, a thematic-typological approach was started for the conservation and management of specific heritage elements. Thus, an inventory was initiated of historical gardens and parks and a new method was realised for the inventoring and typology of solitary monumental trees, hedgerows and coppice trees. The latter inventory can be considered as a partial refined of some specific linear and punctual relics from the Landscape Atlas.

Academic and non-academic landscape research

The renewed interest in the landscape initiated new research in various fields in Belgium, as well as stimulating inter- and transdisciplinary research (Antrop et al. 2004). An interesting distinction can be made between research done by academics and non-academics, which does not necessarily differentiates between pure and applied research. The academic merit system requires academic researchers to submit and publish their results on an international forum, which is however almost of no interest of policy makers, administrators, local and regional authorities and practitioners. They are interested mainly in results that can be applied easily and fast, and the results have to be reported in the local language (Dutch or French). Most often their objectives are specific to the local social and legal context and their interest is more on practical results than theoretical and methodological issues. Thus, this kind of research is less fundamental and suitable to be of interest for the international research community. These differences in perspective have consequences in the funding of research, in the positioning of the researchers and in the diffusing and publishing of the results. The funding body defines primarily if the research is fundamental or applied. Fundamental or pure research funded by scientific foundations rarely result in practical applications, and the research process is seldom linked to urgent societal demands. Research funded by

governmental authorities at the regional or local level has no primary scientific publication as objective or output and is deeply embedded in a transdisciplinary process where often commissioners and stakeholders influence and even steer the research process (Antrop & Rogge 2006). Only if this research is performed by academics, a secondary spin-off of international publications is still possible but after submitting and accepting of the research report by the authorities.

The research performed by non-academics results in grey literature or in the best case results in often well illustrated books in the local language. However, good and applicable examples are available, like the method and inventorying of biotic landscape elements, the inventory of historical towns and build up heritage and the designation of archaeological zones (Figure 4). The focus lies clearly on inventorying and building databases, for examples the ones coordinated by the Flemish Institute for Heritage (VIOE). These inventories are available on the internet for consultation, but only in the native language (www.vioe.be/inventarisatie). It should be noted also that many new initiatives were taken at different levels of governance (for example Flemish region, provincial level and local level), and not always consistent and co-operative with each other. This development is partly the result of the application of the subsidiary principle given more responsibility to the local levels. A good-practice example is the integration of several data sets in one composite database as the landscape map of the province of Antwerp (http://www.provant.be/leefomgeving/natuur_en_landschap/landschapskaart/) (Figure 3). The landscape map is an extended source of information for NGOs, authorities, private persons and different stakeholders with interest for landscape issues (inventories, education and sensibilisation, landscape management, restoration, maintenance). In the database, different categories are included like the physical system, natural and cultural landscape elements, and settlements, each of them represented by different landscape elements (points, lines, polygons). The open database allows the users to add new elements and update existing information. Furthermore, it makes an integration with existing inventories, like the Flemish Landscape Atlas.

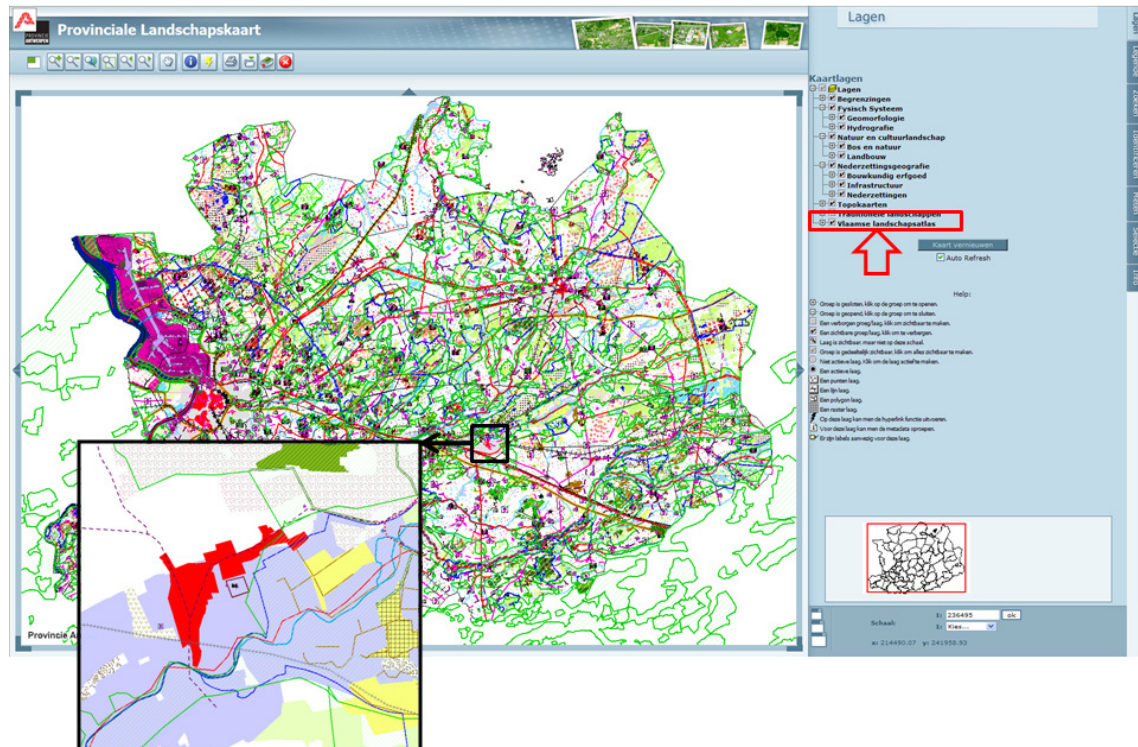


Figure 3 The landscape map of the province of Antwerp is an example of a composite map overlaying several themes of which the Landscape Atlas is one (indicated by the arrow in the legend) (<http://gis1.provant.be/Geoloketten/geoloket.jsp?geoloketid=111>).

Between the Flemish and Walloon communities in Belgium clear differences in funding, publishing and involving academic researchers exist. A lot of innovative methodological research of non-academic experts in Flanders remains unknown internationally. The work in Wallonia is well diffused in the Latin part of Europe but less known in the English-speaking international scientific community. Significant for this difference is the way Belgium is represented internationally in the Conference of the Council of Europe. The report of the 5th Conference of the Council of Europe on the implementation of the European Landscape Convention (Council of Europe, 2009) illustrates well the difficulties in communication of the federal Belgian state with its autonomous regions and with the international community. Landscape policy is a regional responsibility and today Belgium is represented in the European Landscape Convention more visible by the Walloon administration. Thus, the state-of-art document on the implementation of the ELC in national policy only contains information on the Walloon region of the country and is lacking of the Flemish situation. The representation of Belgium as a whole never comes from non-academic research but only from academic research, for example the collaboration of different universities for editing the new version of the Atlas of Belgium (Van Hecke et al 2010).

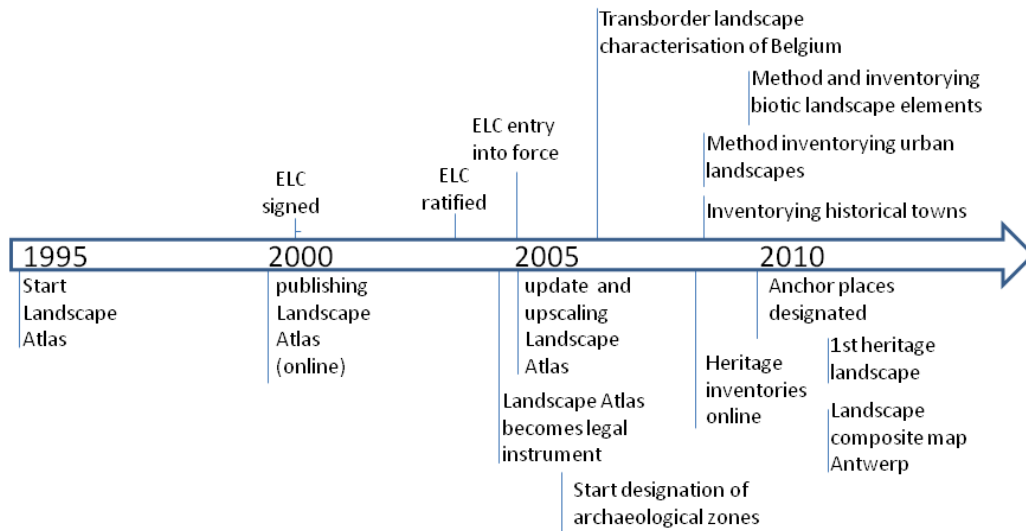


Figure 4 Timeline of important events and policy initiatives and research in Flanders related to the Landscape Atlas (1995-2010)

The future

The two versions of the Landscape Atlas are static and do not contain information about forces and pressures transforming the landscapes, nor indicators to monitor these changes. However, a methodology for an integrated monitoring in a landscape ecological perspective was already developed in 2000 (Antrop et al 2000, De Blust & Van Olmen 2004), but this was not yet implemented in policy. Technology and data availability changed deeply since and new demands appeared. Recently, the growing interest in climate change and its possible impacts on landscape and heritage demand flexible landscape inventories for specific modelling and scenario building. Visualisation and representations will become very important in public's participation as well.

Conclusion

The Landscape Atlas of 2001 was successfully implemented in the new landscape policy and became a reference document that is used in a wide variety of domains. It also stimulated interdisciplinary landscape research and a more integrated policy in Flanders, like illustrated in Figure 4. However, practice showed also many shortcomings which demanded additional research in specific fields and the need for updating and upscaling of the digital maps as well as improving the link with other data sources. Although the interaction between research and practice proved to be mutual, stimulating and beneficial, landscape research gradually developed along two parallel lines according to the goals of the funding bodies and objectives of the researchers. Interesting research was done by non-academics in the development of appropriate methods and typologies for inventorying specific landscape elements, and in the integration of landscape significant information in other data sets useful in planning. However, there is little interest to diffuse this research in the international community. Academic researchers are more oriented in publishing internationally and focus on issues that policy makers and local authorities consider uninteresting or at least no priority. This is for

example the case in perception and preference studies, transborder integration in an international European perspective, methodological issues of representation and visualisation of the time dimension and dynamics of landscape and monitoring.

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