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ÉS TÁJÖKOLÓGIAI TANSZÉKE

SZENT ISTVÁN UNIVERSITY
INTITUTE OF ENVIRONMENTAL
AND LANDSCAPE MANAGEMENT
AND DEPT. OF LANDSCAPE ECOLOGY

A TÁJÖKOLÓGIAI LAPOK CIKKEIT REFERÁLJA
A CABI, A SCOPUS, A MATARKA
ÉS AZ AGRÁROLDAL.

JOURNAL OF LANDSCAPE ECOLOGY
IS COVERED IN THE CABI, SCOPUS,
MATARKA AND AGRÁROLDAL DATABASES.

A kiadvány a Magyar Tudományos Akadémia támogatásával készült.

E lapszám megjelenését
a SZENT ISTVÁN EGYETEM MEZŐGAZDASÁG- ÉS KÖRNYEZETTUDOMÁNYI KARA,
és a TERMÉSZETVÉDELMI- ÉS TÁJGAZDÁLKODÁSI INTÉZET TÁMOGATTA.

INTRODUCTION TO THE SPECIAL ISSUE

The 28th session of the PECSRL biennial international conference (Title: European landscapes and quality of life) was held at two locations from 3–9th of September 2018 in Clermont-Ferrand and Mende, France. This special issue introduces some of the presentations of the following session:

Traditional landscapes: exploring the connections between landscape, identity, heritage, and change

The aim of the session was to discuss (the concept of) traditional landscapes, their ambiguous nature, and links to contemporary landscape research and practice. Particular attention was given to traditional landscapes within the themes of people's identity, landscape transformation, landscape management, and heritage.

In the past, within cultural landscape research, much attention has been given to unique historical, environmental, economic, social and cultural conditions that have contributed to the development of specific forms of landscapes and their management. A prominent position in these discussions occupy so-called traditional or historical landscapes where several particularities might be observed: They often seem to be rather stable and slowly developing, most often of pre-modern origin. They show unique examples of the historical continuity of local landscape forms as well as practices. We find them in marginal locations, often rarely protected. However, such a notion of traditional landscapes may be criticized from different perspectives, especially for not considering the importance of change for formation and recognition of specific meanings and values bounded with local landscapes and heritages (Renes 2015, DeSilvey 2017). It may be argued as well that the ideas of traditional landscapes still contribute to the formation of present identities and that traditional landscapes are often referred to while promoting particular regions and communities, their products and heritages. In this sense, traditional landscapes may be viewed as constructed or invented, their present recognition is a result of particular perceptions and interpretations of local environments and their pasts. According to Schein (2009) Traditional landscapes also serve as a facilitator/mediator of particular social, cultural, economic, and political intentions and debates. They can contribute to the normalization and reproduction of various social and cultural practices.

Hence, the key questions addressed by the session was:

- What is meant by traditional landscapes?
- How are they recognized and what are their characteristics and functions?
- Are there any transformations acceptable in connection with traditional landscapes?
- Can transformations of present landscapes result in the formation and recognition of new traditional landscapes?
- What is the connection between traditional landscapes and authenticity?
- Do landscape protection, management and planning contribute to the sustainability of traditional landscapes and their heritages?
- Can they contribute to the recognition of new ones?
- What are the meanings and values of traditional landscapes?
- Are traditional landscapes important for identity formation across various geographical scales? How and why?
- What is the role of local products in sustaining traditional landscapes, authentic regional cultures, and their identities?

Both, more general and conceptual contributions as well as case studies had been welcomed. It seems that the session addressed an important and well-missing topic: We received 24 submissions from 8 European countries, plus Mexico, Colombia and the US.
The following presentations had been chosen for presentation:

1. Traditional Landscapes As Challenges For The Future – H. Renes (NL)
2. How Does An Agricultural Landscape Become Traditional? Coming Back To Landscape Temporality – Viviana Ferrario (IT)
3. Rural Landscape And Quality Of Life: The Case Of Italy– M. Agnoletti, A. Santoro, M. Venturi (IT)
4. The Management Of Cultural Heritage Landscapes As New Challenge In Wallonia – Serge Schmitz, Laurent Bruckmann (BE).
5. Changing Connections Between Landscape, Tradition, And Identity: The Case Of The Czech Borderlands – Zdeněk Kučera (CZ)
6. Perception Of Landscape And Its Changes In A French-German Transboundary Area – Éva Konkoly-Gyuró (PL/DE) (Figure 1.)

Figure 1. Introducing the next speaker, Éva Konkoly-Gyúró by the actual chair, Hans Renes (further chairs were: Zdeněk Kučera, Alexandra Kruse and Csaba Centeri) (Photo: Centeri, Cs.)

7. Cultural Identity In The Historic Settlement Landscapes Of Flanders – G. Verbrugghe, V. Van Eetvelde, W. De Clercq (BE)
8. Waterways As A Factor In The Transformation Of The Cultural Landscape Of The Vistula Delta – Anna Rubczak (PL)
9. The Geul Valley: A Traditional Landscape In Transition, From A Farmers' Arcadia To A Multifunctional Landscape – Michiel Purmer (BE)
10. The National Estate Of Chambord (France): Traditional Landscapes Or A Political Willingness To Make Re-Emerge The Past? – Amélie Robert, Sylvie Servain (FR)
11. Cultural, Historical And Vineyard Landscape. Paradoxes? Case Study: Tokaj Wine Region, Hungary – Krisztina Albert (HU)
12. How To Manage Agricultural Landscape As A Heritage Category? Insights From Three Historic Agricultural Landscapes In Italy (Soave, Cinque Terre And Amalfi) – Dana Salpina (IT).
13. The Role Of Local Products In Preserving Traditional Farming Landscapes In The Context Of Developing Peripheral Regions – The Lubelskie Voivodeship, Eastern Poland – Ewa Skowronek, Teresa Brzezińska-Wójcik, Andrzej Tucki, Andrzej Stasiak (PL)
14. The Hollerroute – Landscape Awareness As A Driving Factor In Regional Development – Alexandra Kruse, Bernd Paulowitz (FR/DE).

15. Strengthening The Relationship Between The Farmer And The Countryside. Challenges Of The Erasmus Ka2+ Project FEAL – Martina Slámová, Alexandra Kruse (SK/FR)
16. Intangible Benefits From Grazing Farm Animals To Landscape And Quality Of Life – Ingrid Sarlöv Herlin (SE)
17. Traditional Communities, Traditional Landscapes? Afro-Descendant Landscapes In The Colombian Pacific Region – C. Nancy Aguirre (COL, USA).

The article of Frolova et al. (also included in this special issue) was presented in the following session: Renewable energy and landscape quality.

For more information about the authors and the abstracts, please consult the abstract book: https://pecsrl2018.sciencesconf.org/data/pages/FASCICULE_PECSRL_2019.pdf.

The session was organized by the Institute for Research on European Agricultural Landscapes e.V. (EUCALAND) in cooperation with the Historical Geography Research Centre, Charles University, Faculty of Science, Prague, Czechia. EUCALAND is an expert network that deals with cultural and agricultural.

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EVALUATION OF CASE STUDIES IN EUROPEAN AGRICULTURAL LANDSCAPES - THE FEAL PROJECT

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Keywords: multifunctional agriculture, sustainable land use, case studies, landscape typology

Abstract: The FEAL project focused on demonstrating how multifunctional and sustainable agriculture works in practice, compiling twenty-eight case studies (CS) representing best practices. It resulted in the development of online training and educational material for young farmers. The project had ambition to collect a large variety of case studies in different European Agricultural Landscapes (EALs). The article aimed at quantitative data evaluation based on case studies to confirm the variety of EALs, natural conditions as well as the national differences in the state of landscape and nature protection. Case studies data were collected through interview campaigns (from October 2017 to March 2018) in five European countries. A contingency table was used for data processing and evaluation. The following criteria were applied for data classification from case studies: type of EAL, geomorphological characteristics (selected mesoscale landforms), land cover (CORINE Land Cover), a position of a case study inside a protected natural landscape area which pointed out to the importance of the presence of farms in protected areas. Moreover, we found out that the FEAL database of EALs, developed by the Institute for Research on European Agricultural Landscapes (EUCALAND) had to be enriched by a new EAL type. Minor consolidation of the definitions was suggested for a particular EAL.

Introduction

Agricultural landscapes are strongly related to past and/or present agricultural activities or to remains of agricultural activities in the past, which can still be perceived (directly or indirectly) today. It is highly anticipated that sustainable management of traditional agricultural landscapes helps to preserve both, cultural and natural heritage of landscapes. Furthermore, many historic landscape features and structures exhibit remarkable resilience against changes – as well as settlement pressures but also more important against climate change. As periods of economic growth often induce landscape changes, periods of stagnation and stability tend towards small-scale adaptation and often preservation (Renes, 2015). Therefore, the FEAL project aims at explaining why and how knowledge about the values of agricultural landscape can be implement into sustainable farming practices – also for the (financial) well-being of the farmers.

However, in this context, the term "agricultural" includes both, large-scale, industrial farming as well as the low-input (family) farms with marginal earnings (Kruse et al. 2010). Small farms support rural employment and can make a considerable contribution to territorial development, providing specialised local/regional products as well as supporting social, cultural, and environmental services (EC, 2016[a]). Changes in agriculture still influence large parts of the landscape – not only in Europe. At the European level, agriculture is organised under the umbrella of the "Common agricultural policy (CAP)" that was launched in 1962. Agriculture has rapidly moved from pure land management with the aim of producing agricultural products towards profit maximisation since the 50-ties of the 20th century. However, subsidies of Common Agricultural Policy have improved economic viability mainly of large farms, while medium-sized, small and family farms have made low profits

subsequently often at the edge of providing a stable, sustaining living for farmer. Hence, diversification of activities on small, medium-sized and family farms appears to be a solution. The Rural Development Programmes (RDPs, html1) provide first pillar payments focused on agricultural production while the second pillar payments are explicitly aiming at the diversification of farms' income, often at the boundary between agriculture and non-agricultural activities (Weltin et al. 2017). The great diversity of the implementation within RDPs shows that the shared management of rural development measures enables their adaptation to the very diverse agricultural conditions across the European Union (EC, 2016b).

Agricultural production depends on many natural conditions which are at the moment about to vary, due to climate change; and the (direct) sale of agricultural products from farms is not easy. These reasons motivate farmers to start doing complementary business in non-agricultural activities. Under the leadership of the Technical University Zvolen in Slovakia, the FEAL project (html2) presented in this article, brought together practitioners, researchers, teachers and multiplicators from six countries: Belgium, Germany, Italy, Slovakia, Slovenia, and Spain. FEAL means Multifunctional farming for the sustainability of European Agricultural Landscapes. FEAL provides as main outcome an education and training tool of how to apply knowledge on landscape values of different landscape types into daily farming activities through the example of case studies (Kruse et al. 2017). Agri-tourism activities and direct sale, often by using (or creating) regional trademarks and brandings, are the most important activities in the diversification of farmers' income (Majković et al. 2005), especially in economically marginal regions (Kruse et al. 2017). But there are also offers from the social sector realised on farms like agri-kinder gardens and integrated housing. However, this article will focus on the meaning of the knowledge on EAL and how it was considered at the farms of the FEAL case studies.

Some types of cultural landscapes are recognisable parts of the Earth's surface which are distinguished by the degree of anthropogenic influence and they are defined by a particular configuration of landform, soil, topography, climate, vegetation, land use, history and scenery (Meeus, 1995). Due to a huge diversity of landscapes, the development of flexible methodology covering both, natural and cultural landscape types in Europe, remains a challenging task. The Pan-European LANMAP2 is an ambitious project that represents a hierarchical classification with four levels, using 350 natural landscape types. The classification is determined by climate, topography and parent material (Mücher et al. 2006). Another classification focusing particularly on European agricultural landscapes (EALs) was introduced by Zanden et al. (2016) and EALs were geographically delineated throughout Europe. Authors used a top-down expert-based classification and a bottom-up approach based on automated clustering using self-organizing maps (the same input data were applied for the land cover, land management and landscape structure dimensions of agricultural landscapes).

A different approach on EALs classification was introduced by Kruse et al. in 2010. Authors joined in the EUCALAND association provided definitions including translation of 39 EALs and agricultural landscape related terms (Pungetti and Kruse 2010). Since, it has been updated, describing one European agricultural landscape type per year (Centeri et al. 2016, Kladnik et al. 2017a,b). The authors draw attention especially to historical and cultural links among EALs on the one hand and farmers shaping their landscape features, character and identity on the other, in order to create win-win situations between farmers and the landscape (Kruse and Pungetti 2007). This vision matches the basic principles of the European Landscape Convention (ELC) (html3) underlining participatory democracy and ‘bottom-up’ approaches in EALs assessment, planning, policy, and management. This is the reason why the EUCALAND typology on was applied in the FEAL project.

Although the people living in rural areas are surrounded by EAL, their knowledge about them in terms of cultural value, history, and the emergence of it as well as its environmental value is limited (Printsmann et al. 2012). Therefore, the core output of the FEAL project was the creation of an online database of case studies of farms situated in different EALs with specific regional and local features reflecting the variety of social and economic systems developed during their unique history.

Types of EALs classified by EUCALAND allow a comparison of EALs at the European level. Regional landscape types and specificities are reflected in national landscape typologies. The compiled case studies were located in different EALs/country. FEAL compiled at the same time national landscape typologies from Germany, Italy, Slovakia, Slovenia, and Spain (html4). The Landscape Atlas of the Slovak Republic (Miklós and Hrnčiarová 2002) and the Atlas of the Landscapes of Spain (Olmo and Herráiz 2004) represent comprehensive databases of national landscape types covering the variety of both cultural and natural landscapes. Both atlases are inspirational works for other European countries. Germany has no specific classification of landscape types dealing with the heritage of agricultural landscapes. A map developed by Gharadjedaghi et al. (2004), which comes closest to a classification, uses the criteria of physiographic boundaries, land cover (CORINE Land Cover satellite imaging project), and other locally applicable landscape boundaries. Landscapes are classified into landscape types using characteristic features that are easy to spot in the field. Since lately it is accessible via a map server (html5) and is used as a planning tool. Characteristic Cultural Landscapes of national importance which shall be protected are defined. Italy has a long tradition in research on agricultural landscapes. However, a national classification of landscape types does not exist. Hence, there are regional ones. The National Observatory of Rural Landscapes in Italy manages the National Catalogue of Rural Landscapes where outstanding rural landscapes are included. There exist several regional landscape atlases, covering parts of Italy, but with different methodologies. The atlas of Slovenian landscape types determinates the most valuable (outstanding) landscapes. It is an expert basis for the establishment of Slovenian Areas and Elements of Landscape Identity. This basis is used in national planning acts and in the planning of tourism development.

The FEAL database of case studies has the ambition to demonstrate a variety of EALs in five European countries joined in the FEAL project (Figure 1) and representing countries of Mediterranean Europe (Spain, Italy), Central Europe (Germany) and The Eastern Bloc where a group of communist states existed in the past (Slovakia and Slovenia) thus, giving a full coverage of different natural, historical, cultural and socio-economic settings within the EU.

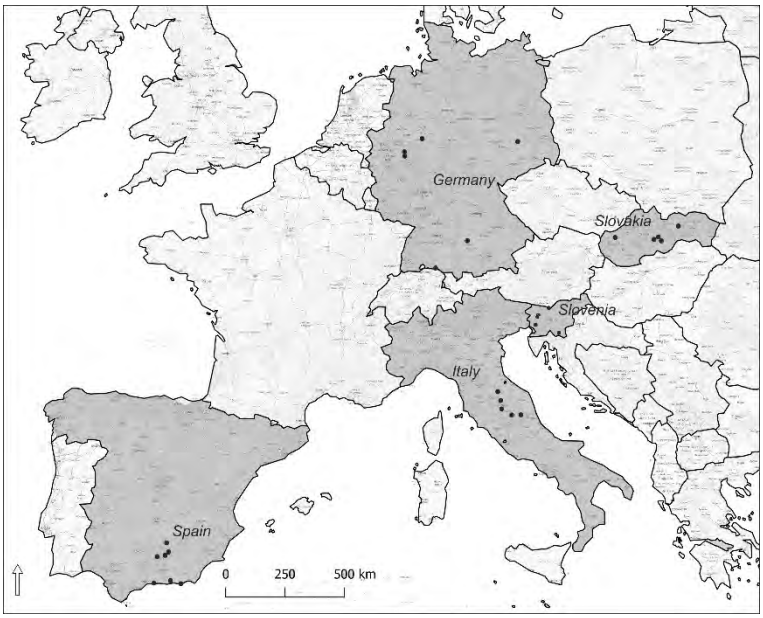

Figure 1 Location of FEAL case studies in five European countries: Germany (6), Italy (5), Slovakia (5), Slovenia (5), Spain (7). According to the partners roles, the Belge FEAL partner did not collect Case Studies. (Map by Slamova)

The article aims at confirming the variety of EALs, natural conditions and a state of landscape and nature protection presented in case studies using quantitative data evaluation from case studies. Therefore, a database derived from maps of CORINE Land Cover 2012, protected nature and landscape areas and national landscape types (geomorphological settings) was created. Maps containing these datasets were applied in interactive pdf extending the content of case studies on detailed landscape characteristics. A heterogeneous collection of case studies was promised as one of the FEAL outputs in order to bring users different case studies, from several landscapes, with different business plans and divers planning strategies. The project had to provide miscellaneous options to the later users so that they can profit from different experiences and learn from others in similar or comparable situations as was possible.

Materials and methods

Collection of case studies

The research basis is composed of interviews with 28 farmers, the collection of qualitative data and its frequency distribution within specified categories using a contingency table. In terms of content, similar but bigger research was conducted by Rois-Díaz et al. (2018): Authors performed 183 interviews in eight European countries and applied thematic narrative analysis as a categorizing strategy for qualitative data. The results from the interviews help to identify shared qualifying elements (Gullino et al. 2018).

The selection of the FEAL case studies did not happen randomly. It was a standard procedure, undertaken in the five countries in a similar way: In a first step, in 2017, communication via email and telephone with a wider range of potential farmers for cooperation proceeded. In a second step, from September 2017 to March 2018, farmers were personally interviewed during the field campaign. The interviews were conducted by means of structured questionnaires, farm data were gathered at the same time and a photo-documentation was elaborated to document the EAL in which the farm is located.

The characteristics of the case studies consist of three main sections:

- Data Section: a short introduction providing statistics or data related to the farmer, the farm and the multifunctional and sustainable farming activities maintaining and improving the EAL;

- Graphic Material: additional graphic material particularly focusing on the farming activity and the surrounding landscape.
- Personal recommendation: The farmers provide insight into how and why they have taken which decision and formulate key messages for colleagues.

An online database of case studies linked with EALs was elaborated. Search can be conducted according to different menus: country, multifunctional farming keywords or landscape types. The information is provided in the seven project languages: French, German, Italian, Slovak, Slovenian, Spanish as well as English.

Development of an interactive online EALs database

The development of the online database followed the previous work of the EUCALAND authors who defined 39 EALs and terms related to agriculture and cultural landscapes (Kruse et al. 2010). The established database is called E-Atlas. It contains main characteristics of (EAL) types and detailed characteristics of national EALs as well as photo-documentation, links, information about the national state of the art, related cultural values to name only a few points. The database is still in progress of uploading. Search can be done per country and / or an EAL type on the FEAL E-Atlas website: https://www.feal-future.org/eatlas/en.

During the interview campaign and associated field research in autumn 2017 – spring 2018, FEAL experts identified together with the interviewed persons the EALs in which the farm respectively the business place are located. In the next step, the EALs determined in the different countries were discussed with EUCALAND experts and they were compared with the existing database of 28 landscape types to ensure a proper classification within each case study. As a result, it was necessary to define "Mountain Landscapes" as a 29th landscape description (html6).

Laboratory work using geographic information systems (GIS)

In order to provide handsome and self-explanatory material and also for locating the case studies, maps of CORINE Land Cover, protected nature and landscape areas and national landscape types were processed by using Quantum GIS (QGIS). Maps were downloaded from online web map servers (WMS) (Table 1). All maps were used in interactive PDF documents which are available on the web sites of the FEAL case studies (e.g. https://cs.feal-future.org/en/case-studies2).

Table 1 WMS services, datasets, and coordinate systems

	Names of datasets			
CORINE Land Cover	Nature and landscape protection (National name)	National landscape type	**WMS service**	**EPSG code**
Germany				
			http://sg.geodatenzentrum.de/wms_clc10_2012	4839
	Naturschutzgebiete		http://www.geodienste.bfn.de/ogc/wms/schutzgebiet	
		Landschaftstypen	http://www.geodienste.bfn.de/ogc/wms/landschaften	
Italy				
WGS84-UTM33 / WGS84-UTM32			http://wms.pcn.minambiente.it/ogc?map%3D/ms_ogc/WMS_v1.3/raster/IGM_25000.map	3003

	Siti protetti - VI Elenco ufficiale aree protette – EUAP		http://wms.pcn.minambiente.it/ogc?map%3D/ms_ogc/WMS_v1.3/Vettoriali/EUAP.map	
	Siti protetti - Zone umide di importanza internazionale (Ramsar)		http://wms.pcn.minambiente.it/ogc?map%3D/ms_ogc/WMS_v1.3/Vettoriali/RAMSAR.map	
		Zoning of the rural areas in Italy	https://www.reterurale.it/areerurali	
Slovakia				
Corine Land Cover 2012 raster			http://image.discomap.eea.europa.eu/arcgis/services/Corine/CLC2012/MapServer/WmsServer	5514
	Atlas krajiny SR	Atlas krajiny SR	http://maps.geop.sazp.sk:80/geoserver/ows?	
Slovenia				
Corine Land Cover 2012 raster			http://image.discomap.eea.europa.eu/arcgis/services/Corine/CLC2012/MapServer/WmsServer	
	Environmental atlas of Slovenia		http://gis.arso.gov.si/atlasokolja/profile.aspx?culture=en-US&id=Atlas_Okolja_AXL@ARSO	3912
		Landscape types in Slovenia, Drago Perko, 2002	georeferenced raster	
Spain				
			http://servicios.idee.es/wms-inspire/ocupacion-suelo?	
	Espacios Naturales Protegidos		http://wms.mapama.es/sig/Biodiversidad/ENP/wms.aspx?	4258
		Atlas de los Paisajes de España	http://wms.mapama.es/sig/Biodiversidad/Paisaje/wms.aspx	

Analysis of FEAL - case studies and data evaluation

We analysed the following criteria derived from maps of CORINE Land Cover, protected nature and landscape areas and national landscape types (geomorphological settings). Characteristics deriving from these maps were evaluated in a contingency table using MS Excel 2010^{TM}. Rows represented EALs types which were indicated in case studies (the total number was 16) and CLC land cover categories which were found within EALs. Columns represented basic geomorphological settings and a position of a farm in protected nature and landscape areas.

- We took into account the following geomorphological settings from characteristics of landscape types: mountainous landscapes and sub-mountainous regions or hills (m), valleys (v), alluvial flats of rivers or lakes (f) and coastal areas (c).
- A position of a case study in a protected natural and landscape area was characterised as: inside (yes), on its border (border), or outside (no). Abbreviations in brackets were applied in the contingency table.

Finally, a number of case studies were summarized in given classes of geomorphological characteristics (m, v, f, c) and a number of case studies were summarized in given categories characterizing their nature and landscape protection status.

Results and discussion

As mentioned before, in total, 28 case studies were collected from five countries in Germany (DE) (6), Italy (IT) (5), Slovakia (SK) (5), Slovenia (SI) (5), and Spain (ES) (7). Thus, we ensured that the variety of EALs is presented in case studies. The 28 case studies were situated in 17 different types of EALs from 39 types defined by EUCALAND (Kruse et al. 2010): Dehesa, Delta Landscapes, Farmland, Heathland, Highlands, Huertas, Meadow, Mountain Landscapes, Orchards, Open Field, Pasture, Rural Areas, Semi Bocage, Terraced Landscape, Transhumance, Vineyard, Wooded Grasslands.

The FEAL case studies show the wide range of EALs, national landscape types and specific landscape characters in interactive pdfs (available at https://cs.feal-future.org/en/case-studies2, open one case studies, under point 4 you can download an interactive pdf) where a user can learn more about landscape values in different landscape types reported at national level and linked with a particular EAL.

- "Farmland" was the most frequent EAL; nine case studies chose "Farmland" as main landscape type for their farms; another eight case studies have chosen "Farmland" in combination with other EALs (Terraced Landscapes, Rural Areas, Pastures, Wooded Grasslands, Mountain Landscapes and twice Orchards).
- One case study was assigned to the following EAL: Delta landscapes (Orchards), Dehesa (Pastures), Heathland (Huertas) and Highlands (Meadows, Transhumance).
- Open Fields were altered with Semi-bocage, or Orchards and in the third case with Terraced Landscape.
- Pastures appeared in one case study and further were combined with Meadow or with Rural areas.
- Orchards were found in Mountain Landscape altered with Terraced Landscapes or with Vine Yards.
- One farm possessed solely Vine Yards and no other landscape type.
- Rural areas appeared individually only in one case study, mostly it was combined with Pastures or Wooded Grasslands.

The topography of Europe's mountains varies greatly, from the high mountains (the Alps, Pyrenees, Romanian Carpathians, etc.) to the 'middle mountains' that are far greater in extent. Mountain municipalities cover 40.6% of the total area of 29 European countries and they are inhabited with 19.1% of the total population (European Commission, 2004). A prevailing part of the FEAL case studies was situated in mountainous, sub-mountainous regions or hills (17), some case studies are located in valleys (5), in river or lake alluvial plains (5) and 1 case study had a coastal position (Figure 2). The 28 case studies show nicely the variety of topographic characteristics of European countries, perfectly matching with those presented in the report of the European Commission (2004).

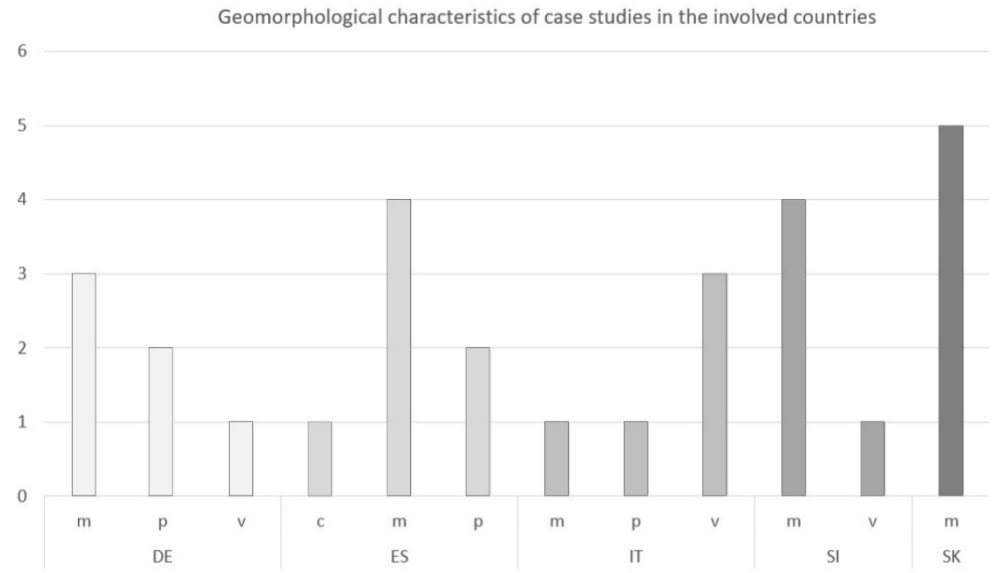

Figure 2 Analysis of the FEAL case studies considering their geomorphological characteristics: mountainous, submountainous regions or hills (m), valleys (v) alluvial flats (f) and coast (c) in the case studies countries: Germany (DE), Italy (IT), Slovakia (SK), Slovenia (SI), and Spain (ES)

The integrated management approach of protected areas implements cultural values of landscapes into models promoting their sustainable development and these models shall reflect in a valorisation policy (Saviano et al. 2018). A deep-rooted relationship of residents with the landscape and their identity are necessary to understand the importance of cultural and natural values protection (Fagerholm et al. 2019). Hence, the role of small and family farmers to provide adequate maintenance to common and protected landscape is very important as well. The FEAL project brought a set of case studies; in protected nature and landscape areas were located 10 case studies, 10 case studies were in landscapes without any protection and 8 were located on the border of protected areas (Figure 3). Thus, we documented successful implementations of landscape maintenance by farmers proportionally distributed in protected landscapes and in "common" landscapes as well.

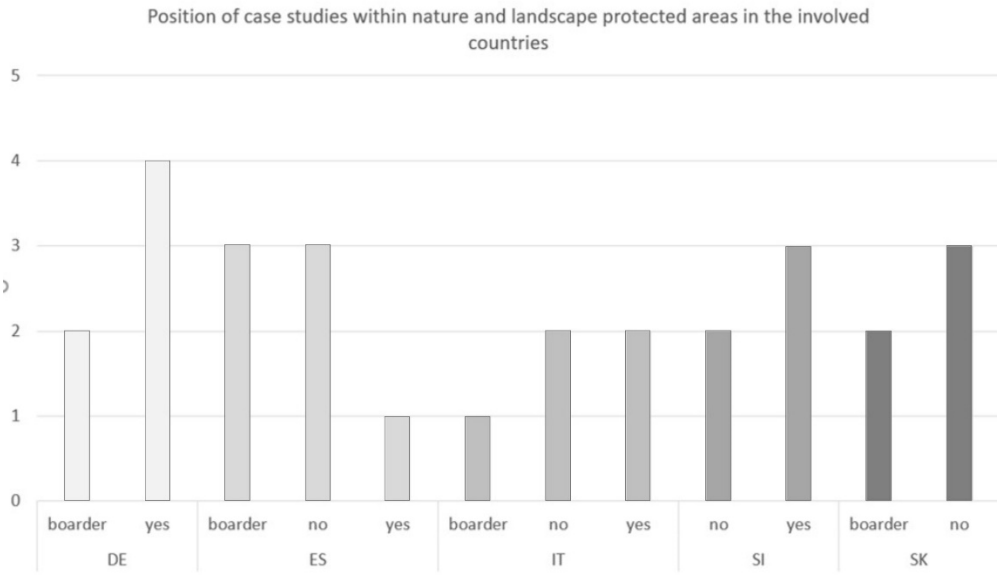

Figure 3. Analysis of the FEAL case studies according to their position within nature and landscape protected areas: inside (yes), on the border, outside (no), in the case studies' countries: Germany (DE), Italy (IT), Slovakia (SK), Slovenia (SI), and Spain (ES)

Table 2 Analysis of the FEAL case studies in EALs with respect to their geomorphological characteristics and position in protected areas

European agricultural landscapes (EALs)	**Geomor-phological character**	**Protected nature and landscape areas**			
Corine Land Cover 2012		no	border	yes	**Sum**
Dehesas, Pasture				1	1
- Agroforestry systems	m			1	1
Delta Landscapes, Orchards			1		1
- Agricultural areas, arable land, permanently irrigated land	f		1		1
Farmland		1	2		3
- Heterogeneous agricultural areas and land principally occupied by agriculture, with significant areas of natural vegetation	m		1		1
- Heterogeneous agricultural areas and land principally occupied by agriculture, with significant areas of natural vegetation - Agricultural areas, pastures	m	1			1
- Non-irrigated arable land - Heterogeneous agricultural areas and land principally occupied by agriculture, with significant areas of natural vegetation	m		1		1
Farmland, Orchards				1	1
- Heterogeneous agricultural areas, land principally occupied by agriculture, with significant areas of natural vegetation - Agricultural areas, pastures - Discontinuous urban fabric	f			1	1
Farmland, Orchards, Mountain Landscapes		1			1
- Forest and semi-natural areas, scrub and/or herbaceous vegetation associations, sclerophyllous vegetation	m	1			1
Farmland, Pasture		1			1
- Heterogeneous agricultural areas and land principally occupied by agriculture, with significant areas of natural vegetation - Agricultural areas, pastures	m	1			1
Farmland, Rural Areas				1	1
- Agricultural areas, pastures - Non-irrigated arable land - Forest and semi-natural areas, coniferous forest	m			1	1
Farmland, Terraced Landscapes				1	1
- Agricultural areas, pastures - Forest and semi-natural areas, coniferous forests - Discontinuous urban fabric	m			1	1
Farmland, Wooded Grasslands			1		1
- Agricultural areas, permanent crops, fruit trees and berry plantations - Forest and semi-natural areas, scrub and/or herbaceous vegetation associations, sclerophyllous vegetation	f		1		1
Heathland, Huertas		1			1
- Forest and semi-natural areas, scrub and/or herbaceous vegetation associations, natural grasslands	c	1			1
Highlands, Meadow, Transhumance				1	1
- Agricultural areas, non-irrigated arable land - Forest and semi-natural areas, scrub and/or herbaceous vegetation associations, natural grasslands	m			1	1

- Agricultural areas, pastures					
Open Fields, Orchards		1			1
- Heterogeneous agricultural areas, complex cultivation pattern - Forest and semi-natural areas, broad-leaved forest	v	1			1
Open Fields, Semi Bocage			1		1
- Non-irrigated arable land	m		1		1
Open Fields, Terraced Landscapes		1			1
- Non-irrigated arable land - Agricultural areas, pastures	m	1			1
Orchards, Terraced Landscapes, Mountain Landscapes			1		1
- Olive groves	m		1		1
Orchards, Vine Yards, Mountain Landscapes		1			1
- Agricultural areas, permanent crops, fruit trees and berry plantations - Forest and semi-natural areas, scrub and/or herbaceous vegetation associations, sclerophyllous vegetation	m	1			1
Pasture		1	1		2
- Agricultural areas, pastures	f		1		1
- Agricultural areas, pastures - Forest and semi-natural areas, scrub and/or herbaceous vegetation associations, transitional woodland-shrub	m	1			1
Pasture, Meadow		1			1
- Forest and semi-natural areas, broad-leaved forest - Heterogeneous agricultural areas - complex cultivation pattern	f	1			1
Pasture, Rural Areas				1	1
- Agricultural areas, pastures - Non-irrigated arable land	v			1	1
Rural Areas				2	2
- Forest and semi-natural areas, coniferous forest - Land principally occupied by agriculture, with significant areas of natural vegetation - Forest and semi-natural areas, mixed forests	m			1	1
- Land principally occupied by agriculture, with significant areas of natural vegetation	m			1	1
Rural Areas, Pasture				1	1
- Agricultural areas, pastures	m			1	1
Rural Areas, Wooded Grasslands				1	1
- Forest and semi-natural areas - broad-leaved forest - Agricultural areas - non-irrigated arable land	v			1	1
Terraced Landscapes, Orchards			1		1
- Agricultural areas, olive groves	v		1		1
Vine Yards		1			1
- Heterogeneous agricultural areas, complex cultivation patterns - Forest and semi-natural areas, mixed forests	v	1			1
Total		**10**	**8**	**10**	**28**

* Geomorphological characteristics: m: mountains/hills; f: river/lake flat; c: coast; v: valley

Mountainous regions dominate as landscape types within the FEAL case studies. Among archetypes of mountain ranges, exist several cultural patterns with close correlation to the relevant environment variables (Hreško et al. 2015). Generally, we can say that traditional agricultural landscapes often occur in mountainous and sub-mountainous regions. We found the following land cover CORINE classes indicating presence of traditional landscapes in mountainous and sub-mountainous regions presented in case studies: agroforestry systems

(Elevitch et al. 2018) (EAL of Dehesas); heterogeneous agricultural areas and land principally occupied by agriculture, with significant areas of natural vegetation (Špulerová et al. 2018) (EALs of Farmland, Orchards, Pastures, Meadow); olive groves (Maldonado et al. 2019) (EALs of Orchards, Terraced Landscapes, Mountain Landscapes), heterogeneous agricultural areas - complex cultivation pattern (Levers et al. 2018) (EALs of Vine Yards, Pasture, Meadow), and agricultural areas, permanent crops, fruit trees and berry plantations (Orchards, Vine Yards, Mountain Landscapes, Farmland, Wooded Grasslands). From the other aspect, some traditional landscapes as Transhumance or Semi-Bocage were not particularly characterised by a class land cover CORINE 2012 which could indicate the presence of the traditional landscape. Therefore, to characterise landscape types of case studies comprehensively, EALs landscape types were enriched in land cover CORINE 2012 classes and vice-versa. Totally, we found land cover CORINE 2012 classes indicating traditionally cultivated landscapes in 14 case studies. However, we realize that this dataset does not contain sufficiently detailed information about the characteristic features of traditionally cultivated land that may locally occur in any type of EAL. Therefore, information on landscape types was supplemented by photo documentation representing the characteristic features of the country in case studies.

As mentioned before, in 2017, Weltin et al. published a broader study based on an empirical approach and a survey of 2154 farms from 11 European regions. The authors explained on and off-farm diversification choices in relation to the CAP. Their findings confirmed the importance of the adaptation of environmental management and diversification measures by young farmers. The FEAL case studies show the same result but provide also some more ideas and experiences from praxis which will hopefully inspire farmers from across Europe. Therefore, examples of success stories documenting best practices of multifunctional and sustainable farms in case studies - www.feal-future/casestudies2/en are powerful educational and training tools on how to learn from real successful business strategies of case studies promoters.

Conclusion

Agricultural production depends on many natural conditions, and the sale of agricultural products from farms is not easy. Mountain regions are economically handicapped due to their difficult topography and their special climate conditions (European Commission, 2004). Today, mountainous and sub-mountainous EALs suffer from residents' exodos and abandonment of the countryside more than EALs in intra-mountain basins or lowlands. These reasons motivate farmers especially in mountain and sub-mountain areas to start doing additional business in the non-agricultural sector. Farmers widen their activities in order to receive a stable income which is self-sustainable, not that much depending on CAP-subsidies and not too much depending on perfect climate conditions. The results of the analysed case studies underline this finding. The case studies presented in the FEAL project brought insight on diverse EALs located in different geographical regions and geomorphological characteristics. Nature and landscape conservation were proportionally distributed throughout all the case studies and in every country involved in the research. We can conclude, that the FEAL project will enrich the existing database of EALs developed by EUCALAND. However, besides the presented results we would like to note that increasing the EALs awareness by experts and the public still remains a challenging task for future projects based on international cooperation.

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Internet links

Html1: https://ec.europa.eu/agriculture/rural-development-2014-2020_en

Html2: http://cs.feal-future.org/

Html3: https://cs.feal-future.org/en/page/o1a6-summary-report

Html4: https://geodienste.bfn.de/landschaften?lang=en&layers=+:Landschaften/3

Html5: https://www.feal-future.org/eatlas/en/landscape-category/mountain-landscapes

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THE HOLLERROUTE – LANDSCAPE AWARENESS AS A DRIVING FACTOR IN REGIONAL DEVELOPMENT

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Abstract: The Holler Landscapes are a European testimony of a marsh and dyke landscape through land reclamation starting in the High Middle Ages. This Dutch originating cope cultivation were found in many places in Europe, but spread particularly in Germany and Poland. These landscapes had, and for most of their part still have in common that they were created by Dutch water experts – most often on demand from local authorities, like archbishops or kings – and are therefore called Holler Colonies. The tangible landscape heritage was often linked to the import of many Dutch society features (e.g. related to laws, habits, equal rights of men and women), making the Holler Colonies a unique document to the intangible heritage as well. Today, the remainders of these landscapes give an important testimony to European economic and social history. These landscapes were predominately shaped during the great clearances in the High Middle Ages, with some of them, in particular Poland, dating from a later period. Of course, not all landscapes and associated traditions have survived until today. Several Holler landscapes have been completely transformed by more recent land reclamation processes or due to abandonment. The examples that still bear the vivid impression of the land transformation are therefore not only a unique but as well rare testimony of tangible and intangible heritage of European history. The article focusses on an awareness raising process that took place in the Altes Land (Lower Saxony, Germany) within the last 15 years: After a difficult beginning, finally the understanding of the historical transformations and of the particularity of this traditional cultural landscape became a trigger towards local and regional development strategies. The awareness on the Dutch landscape heritage lead to an identification process among the inhabitants and last but not least, triggered local development. It helped finally to start the will to sustain the historic regional character, allowing a sustainable economic development, and is accompanied by tourism and awareness building measures. One of them is the "Holler Route" – a project recognized within the European Year of Cultural Heritage, which will develop, among others, teaching materials about Holler Landscapes which will be integrated into the official geography curriculum for schools and will be available at the online-education server (NibiS) of the Federal State of Lower Saxonia.

Introduction

Holler Colonies are settlements in European marsh and dyke landscapes, mostly along rivers, not to be confused with coastal marsh landscapes. They were created by land reclamation starting in the High Middle Ages by Dutch water experts that had most often been hired by local leaders, e.g. kings or archbishops. We find Holler Colonies in the Netherlands, in Germany, Poland, and France but also in South England, South Sweden, Denmark and certainly other countries (Danner et al. 2005; Figure 1 and 2). Some Holler colonies were later abandoned others remained. Several of those that have survived were often changed by later land reclamation processes (Renes and Piastra 2012). Today, the remaining of these landscapes are visible proof of the intangible and tangible heritage of European economic and social history.

Holler Colonies are a European landscape typology in many different regards: First, they are the consequence of a large-scale European knowledge transfer of Dutch water pioneers. Especially important, they have always been built on demand by local leaders also including the social diffusion of Dutch laws, traditions and society models (Kruse and Paulowitz 2019). Second, they may be considered a European landscape type as such, defining European wetland areas along large rivers from the Middle Ages onwards. However, their uniqueness is based on the techniques applied, the social processes involved, and their long duration.

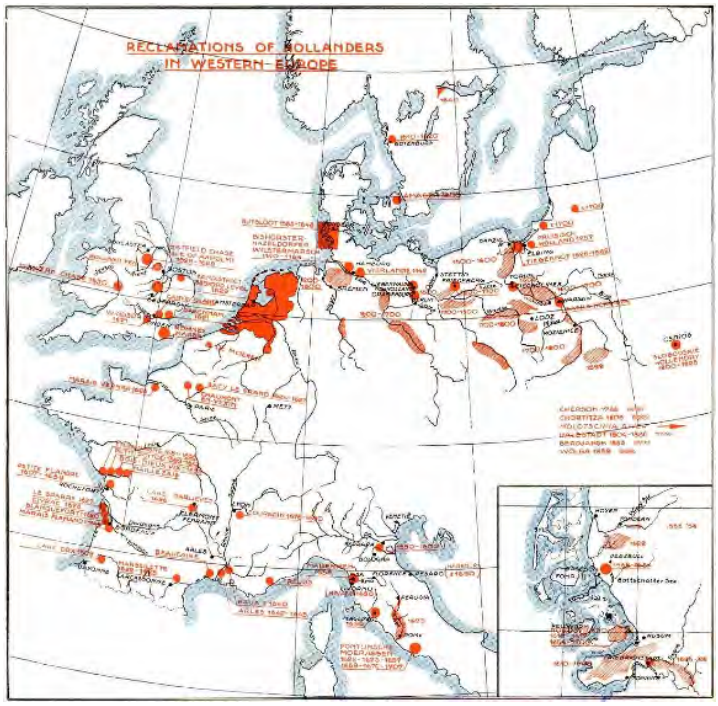

Figure 1. Land reclamation and improvement measures carried out by the Dutch (Source: Renes 2005, according to Van Veen 1955)

The following article illuminates the potential that traditional landscapes may have on regional society and economic development even today. The focus is on one of these Holler Landscapes, the Altes Land, located at the southern shores of the Elbe River close to Hamburg, which bears still many tangible features and as well strong expressions of the land use and popular traditions going back to the "colonists". The remnants that still exist to the century old way of live find their manifestation in a citizen's initiative that wants to raise awareness on this unique European heritage and to motivate the local producers, mainly fruit growers, to see this unique heritage not as a limitation but as a chance for sustainable development (http1) that could be used for branding, too. Thus, increasing the resilience of the landscape. The citizen's movement, formalized as a non-profit association in 2008, uses the nomination for recognition as World Heritage as a tool to work for a common future of the region (http2).

Figure 2. This aerial view of the fields of Ladekop in the Altes Land shows the distinctive linear structure echoing that of the mother landscapes in the Netherlands, e.g. Lopikerwaard, Wowbrugge, Teckop; it can also be found in other Holler Colonies, e.g. Malborg in Poland. (Source: With kind permission of Martin Elsen).

The Altes Land is characterized by a linear landscape structure: long-stripe fields, canals, ditches, roads, ways and settlements following these ditches (figure 2, 3). It is a traditional fruit production landscape, today the biggest closed fruit production area in Northern Europe. Some figures about extent and economy can be found at http3, http4. Particularly for the fruit producers, the envisaged protection status would mean some limitations and obligations, not least keeping the historic ditches intact, although they limit the working width appreciated for the use of machines but also the use of chemical substances. On the other hand, it may be the main motor to safeguard the land, its society and economy in a sustainable way. The future of the region as a high-quality agricultural production region and as a tourist destination, considering that tourism is the second largest income point of the region, are additional strong arguments for maintaining the Altes Land as it still is.

Figure 3. Linear structures: fields, canals & ditches, farms patterns, streets and dykes, fruit trees parallel to the linear water structures. (All photos by Kruse, A.)

In the last 15 years, the association's members organised many awareness-raising campaigns, including national and international symposia and exhibitions. Although not without difficulties and continuous discussions, the group succeeded in getting fruit producers, municipalities, tourist organisations and the general public behind their common goal. And, much more important, the association has become a focal point for local development and protection planning in general. Although all working at a voluntary basis, they were the driving force and competence centre in developing the Altländer Charta, a guiding principle (Leitbild 2007), which sets guidelines on how to live and interact with the tangible landscape and built heritage in the region. In the same direction, a building guide (Baufibel 2011), focusing on the protection of the built heritage was published and helps to conserve and sustain the heritage. Finally, in 2014, a regional development concept, set-up in a participatory process, was established.

These processes help to sustain the historic character while allowing a sustainable economic development are accompanied by tourism and awareness building measures. One of

them being the latest project "The Holler Route Altes Land: Understanding the beginning, experiencing the heritage" (http5). The project is funded with national money out of the "European Year of Cultural Heritage" funding (http6). Among others, modernising of local museums, development of education material and creating participative cultural activities especially for children and youth will be realised. The project is an important step towards the long-term aim of constructing the Holler Route, an interpretive cycling path, which shall be included in the European cultural routes program. The route targets at informing vividly about the history of Holler Colonies. At the end, the Holler Route aims at connecting the Altes Land with Holler Colonies in different countries, starting with the Netherlands and Poland. Based on its European history – speaking a European language is in the focus of all activities.

Materials and methods

As far as we know today, planned drainage started in the 13th century (Renes 2005, Verein 2009). Dutch technical knowledge was almost immediately highly demanded by land owners and authorities elsewhere across Europe; soon the Dutch experts were invited to come and helping to drain lowlands (figure 1). A later period of population growth between 1450 and 1650 triggered a second phase of reclamations, especially in the Low Countries and also in Eastern Europe, characterised by an intensive use of existing arable and pasture lands (Renes 2010). However, this later movement of overall reshaping created less clearly visible and regionally distinct landscapes like did the first ones in the 12th to 13th century.

The Dutch water experts and enriched communities with their often advanced knowledge and expertise: Not only labour, but new forms of social and political organisation, commercial and economic networks, and last but not least, the knowledge of how to drain and to maintain these wet landscapes which had been so far more or less unproductive (Lewandowski and Szewczyk 2008, Hofmeister 2009, Verein 2009). Other contributions included legal traditions, capital investment and place names, particularly in the Altes Land. Thus, material interventions in holler landscapes have always been closely linked to immaterial heritage. The local historian Adolf Hofmeister published after decades of archive research a two-volume-book about settlement and constitution of the Stade Elb Marsh in the Middle Ages: Volume I: "The Stade Elb Marsh before the colonisation in the 12th century" in 1979 and a second volume in 1981 "The holler colonisation and the land community Kehdingen and Altes Land". He clearly distinguished several unique characteristics of the Altes Land:

- With the emergence of the major crews (Hauptmannschaften) in the 14th century, the separation between jurisdiction and administration was already being anticipated in the Altes Land. This separation of powers occurred in central Europe mostly only in the 19th century.
- The autonomy of the district of Jork lasted until 1932 when the centuries-old unity of the Altes Land was reshaped.
- Since the 15th century, farms have remained undivided property of one family for generations.
- Many of the features, like the ownership structure, topography, rule-based conditions, contractual arrangements and legal relations, which shaped the daily lives of people in the Altes Land in a special way over the past centuries, were based on the Dutch origins, which was introduced into the area in the 13th century.
- The "Olden Landes Ordeninge und Rechteboeke" regulated the rule of law – as an original, self-contained legislation.
- Woman always held a very strong position in the Altes Land so that, for example, a jointly composed will could not be unilaterally changed to the detriment of the other. Furthermore, they had the right to inherit.

From mother to daughter…

In the context of Holler Landscapes, we use the term „mother landscapes“ – for the original, first reclaimed wetlands in the low countries, mainly the Netherlands but also in today Belgium – and “daughter landscapes” for the same landscapes outside the low countries, but created by Dutch polder experts. Most of the “mother landscapes” have been transformed or overlayed in the meanwhile – due to natural (sinking) processes but also economic pressures (Renes 2005). The today state of conservation of the daughter landscapes varies. Lewandowski and Szewczyk 2008 stated in their book about (endangered) cultural landscapes in Poland that in particular the Dutch settlements in Poland are today under pressure and could well be inscribed in a ‘Red Book of Landscapes’ – if only such a book would exist, like it is well-known for threatened species in fauna and flora. In order to underline the historic importance of the Holler Landscapes, two short summaries on the developments of France and Poland will be provided. From 2004–2010, the authors have been in charge to describe the landscape history and development of the Altes Land in general and the characteristics of Holler colonisation as well in the Altes Land as in other European countries. The findings, based on intensive literature research, on-site visits, international exchange and conferences, built the foundation for the envisaged UNESCO World Heritage nomination (Kruse and Paulowitz 2012).

Excursus: Dutch reclamation activities in France

In 1597, France and the Netherlands signed a diplomatic treaty. In the course of this contract, France asked in 1596 for four Dutch dike and land reclamation engineers. The drainage of wetlands was part of the great policy of rehabilitation and development of French agriculture, small industries and rural infrastructure, after the destruction of the civil war. However, there were only two hydraulic engineers, Jan Gerritsz and an anonymous dike farmer from the province of Zeeland, who replied. Together with Humphrey Bradley they carried out the projects of the following years. Humphrey Bradley was the son of an English wool merchant, but lived in Bergen op Zoom (NL). The first project was the drainage of the marais (marsh district) of Chaumont-en-Vexin (department Eure/Oise). 8. April 1599, Bradley was appointed for life as French functionary by King Henry IV (Toussaint 2005). Since 1639, the following Marais had been reclaimed: Marais of Bordeaux, Bruges, Blanquefort and Perempuyre; Marais of Saintonge and Poitou; Marais of Lesparre; Marais of Vernier; Marais of Sacy; Marais of Languedoc, Marais of Arles; Marais de Baux; Marais of Dauphiné (Figure 4).

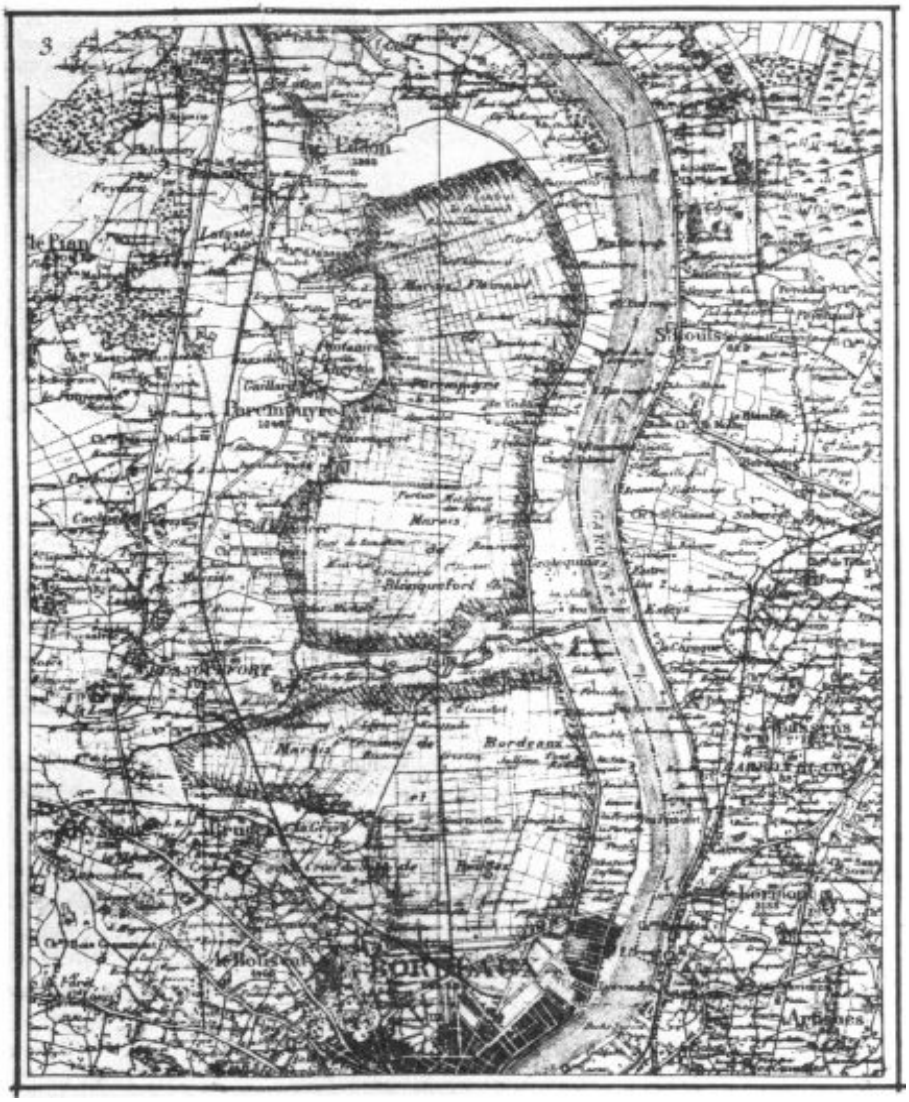

Figure 4. Marrais around Bordeaux, Bruges, Blanquefort and, Perempuyre from 1892 (Toussaint 2005)

The land thus obtained was divided among the investors according to their financial share. The investors came not only from France, among them were also Flemish and Dutch investors. The project areas were located between the coast to the English Channel, in the Charante, in the estuary of the Gironde and in the Midi. There were also other projects throughout the country. After the annulment of the Edict of Nantes, which established Catholicism as a state religion, but ensured still tolerance of the Huguenots, through the Edict of Fontainebleau in 1685, most Dutch and Flemish had to leave the country, regardless the fact that they had been naturalized in the years or sometimes even decades before. However, their role in France ended, their land was expropriated. The rights to land drainage were given to the local authorities, who in turn relinquished them to local residents.

The reason for the drainage measures in France was the conviction that an upscale agriculture was the basis for nationwide prosperity. Therefore, in the 19th century a second large-scale drainage operation began when a rapidly growing population required new agricultural land. This agricultural development and improvement has been accompanied by an improvement of rural infrastructure. The focus was on the Atlantic coast as well as to the rivers Seine, Loire and Rhône and last but not least in the Midi (southwest France). Between 1852 and 1862 58,000 ha were drained.

It is not known to the authors whether and how many Dutch settlers came again to France. However, it is known that the measures were not always undertaken with, but partly against the

will of the local people. The measures had a strong impact on the local population, adapting from fishermen and hunters to farmers. With the exception of the area around Poitevin, not much Dutch influence has survived, e.g. to the economy that was considered progressive throughout Europe. At least for the Dutch and Flemish investors, most projects were not profitable, e.g. because of the high repair costs and the court costs - both had not been considered or expected in the calculation phase. The polders of Petit-Poitou, Dauphiné, Lesparre and the lake of Sarlève harbor have an enduring heritage of Flemish-Dutch hydraulic engineers, especially in the fact that a "Societé" was founded for this purpose. This approach was retained even after the departure of the Dutch for the implementation of such projects. Furthermore, the Dutch have introduced sustainable management, implementation and maintenance of polders. Thus, until 1982, the "Societé de Marais" remained responsible for the maintenance and operation of the seventeenth-century polder. A further Dutch heritage is the surveying of the Petit-Poitou polder, which resembles in detail the Beemster polder, which also dates back to the seventeenth century. Some field names are still reminiscent of the Dutch past.

Excursus: The Case of Poland – one of the last holler colonisations

Parts of present-day Poland were colonized under Dutch law between 1547 and 1864, the resulting areas are known as "olenderski" (Dutch) (figure 5). The designation points already out that this is not just a purely technical process, but also the adoption of legal and social structures. This process was also related to settlements where other nationalities lived. The reason was above all the economic power of the Netherlands. The adoption of Dutch law was later mixed with the takeover of German elements, such as the introduction of so-called basic money (okupne) as well as the function of mayors or “Schulze” (soltys, sheriff). The colonization under Dutch law proceeded in three stages: 1547–1655/1659, 1660–1793/1795 and 1793/1796–1864. During this time, the self-government on the Dutch model was present.

According to Chodyla 2005, between 1547 and 1793/95, at least 1200 settlements under Dutch law were established in more than 12 regions of the Polish-Lithuanian Empire (within the boundaries of 1772). The term "under Dutch law" does not necessarily mean that these had been (only) Dutch settlers, but in fact that the settlers in this place did receive Dutch rights. Considered to be progressive and attractive, settlers and farmers moved to barren or inhospitable areas. These foundations were always associated with certain creeds (Anabaptist, Mennonites, etc.). The Dutch emigrants of the first stage came mainly from the provinces of East Frisia, Groningen, West Frisia, the Frisian Islands, from the Drenthe, Oberijsel, Gelderland, Utrecht, North Holland. The olenderski settlement was a planned, organized process with recruiting agencies; the land developers came individually or in groups. The settlers made contracts with the regional ruler. They often came with their own savings and financed the journey themselves; one can therefore conclude that they were not poor. Besides the fact that they were mostly religious refugees who came to Poland to make the land arable, a second very important reason was the containment of the great floods. For example, In 1540 and 1543 an area of more than 100 km² was inundated - as a result of regulatory measures of the Vistula River, which King Sigismund I had had executed. Dutch emigrants modernized and extended the drainage system of the Vistula River in the delta area and in the Vistula Marshes: Gdansk, Malbork, Elblaskie, Sartowicko-Nowskie lowlands. The system itself existed since the fourteenth and fifteenth centuries. Furthermore, they worked on the lowlands of the rivers Warthe, Notec, Pilica, Bzura and Bug.

The natural conditions in these marshlands resembled those in Holland, Zealand but also the coastal areas of Lincolnshire, Cambridgeshire and other areas in European that were the subject of drainage during this period. The main technical difference between the "Dutch drainage" and the already existing drainage was the distance to the body of water (lake, river,

sea), which was significantly larger for the Dutch. In some areas, after the completion of the drainage measures, the Dutch design influence was so strong that the areas looked like Dutch polders.

The Dutch heritage is still visible in the landscape today. The western Vistula bank at Malbork (Marienburg) still has a very similar landscape structure as in the Altes Land. The area southeast of Gdansk: Wislinia (wedding) is also located at a river (Motlawa) and is also structured very similar to the Altes Land. Dzierzaznia is another example of a Dutch settlement (figure 5). It is a street village, located 76 km northwest of Warsaw in the catchment area of the Vistula.

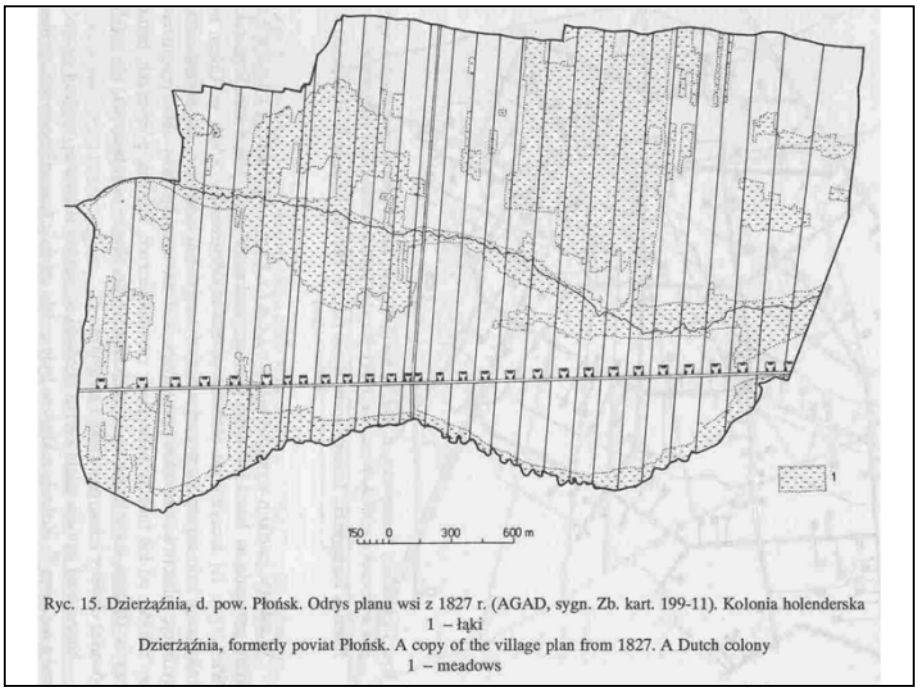

Figure 5. Field map from 1827, showing the so called Dutch village Dzierzaznia, provided by H. Renes.

In the 17th century settlers (Mennonites) from the Netherlands and Friesland came to Kujawy, they founded numerous villages and built their houses in a traditional-leaned construction, some buildings are still preserved today. They formed independent village communities, which distinguished themselves for the time by highly developed agricultural knowledge. They had special knowledge in the management of their fields, which they irrigated by using canals. Above all, they farmed wasteland and fallow land.

To summarise, according to Chodyla (2005) settlers from the Netherlands founded around one fifth of all Dutch settlements in Poland between 1547 and 1864, and invested enormous amounts of money and labour to cultivate at least 100,000 hectares of land. They created or improved hundreds of miles of dikes, thousands of kilometres of canals and drainage ditches, planted thousands of trees and shrubs that could absorb the water, and they also built thousands of drainage facilities, creating a unique cultural landscape - even with special farms in the villages, with houses of worship, schools, cemeteries, orchards and rows of trees. The structure is still recognizable and in parts well preserved with the exception of the windmills, which have mostly disappeared. The wooden houses have largely not survived (about 15% of the stock of 1945). Due to the subsequent changes, many buildings are overflowed each year during inundations. Landscaped hills have been eroded over time, trees and shrubs have been cleared, and ponds are silted up. Other cultural elements which are not landscape related are still preserved and maintained as Skowronek et al. (2018) have presented 2018 at PECSRL conference.

Results and discussion

In the foregoing, we have learned about the history and the meaning of Holler Landscapes in different European countries – as a prototype of European processes and creating of a European landscape type. Therefore, we understand the motivation of the local citizens in the Altes Land to use the landscape itself as a mean of identification. Here, the original linear structures of the farmland that follow the old ditches still exist in their medieval design and appearance. The Altes Land stands still out as best preserved example of the historic diffusion process originating in the "Low Countries". The authenticity of the area, in particular clearly visible linear structures and the canal, ditch and dyke system, is higher than in any other comparable European area and in particular more recognisable in comparison with the current-day Netherlands. As a result, we find a stunning integrity of this regional structure on a fairly large scale.

The local group of citizens named "Association for the Recognition of the Altes Land as UNESCO World Heritage e.V." (http1) - has been working since the beginning of this millennium on protecting the historic cultural landscape through regional, national and international recognition. The goal: to nominate the Holler Colony Altes Land as UNESCO World Heritage. At the beginning, the group met local resistance, in particular from fruit growers who feared the World Heritage status would bring new restrictions. They pointed out their bad experience with environmental protection regulations, especially Natura 2000 (http8). The association had to become much more professional and enduring. Its aim was to act for but also with the people, therefore, it was not an option to choose a top-down approach. However, step-by-step, people became convinced and supported the idea. The whole concept worked only due to the awareness raising activities: local, regional, national and international meetings and conferences, various exhibitions on the tangible insitu heritage, modernisation of the local museums in order to present recent research on Holler Landscapes, to name only a few. The people from the Altes Land appropriated themselves the idea that sustainable economic progression can also foster the long-term protection of their heritage and therefore provide unique selling qualities. This largely contributes to the resilience of the region as well in times of climate changes and the tidal change of the Elbe River. The self-awareness helps to anticipate the problems and discuss them in a largely participative approach. The association became expert in many planning issues and political debates, the concept of World Heritage itself evolved into a vehicle for regional development. The new Landscape Plan, as main instrument for local development and planning, includes the Association's goal of getting the Altes Land onto the UNECO World Heritage list (Samtgemeinde Lühe 2017). Although the farmers are correct that an internationally recognised label would impose some limitations or even obligations, for example to keep historic ditches intact, they also realise that the label helps safeguarding the Altes Lands as a high quality agricultural production region and as a tourist destination.

The local reflection and participation process that the Association has fostered over the last 15 years shows very well how strong the acknowledgement of landscape heritage can become as a driving factor. Although not without encountering difficulties and negotiating continuous discussions, the association succeeded in getting farmers, municipalities, tourist organisations and the general public behind a common goal. In 2007, the association was the driving force and competence centre in developing the Altländer Charta, which sets out a central guiding principle (Leitbild) for tourism, planning, and economic development, fostering the awareness of the historical Holler Colony heritage. It set out guidelines for local people and decision makers on how to deal with the region, what to do and what not to do. It also describes the history, characteristics, and current status of the landscape. Similarly, in 2011 a building

guide (Baufibel) was published, focusing on the protection of the built heritage (figure 6). Several exhibitions and publications have been produced since, the latest one just opened in 2019 and is a success by the number of visitors (Bohlmann 2019). ON a more general level, it set up a participatory process in which citizens and policymakers in 2014 came together and drew up a regional development concept, the first for the greater region. The Centre for Research on Holler Colonies, founded 2012, coordinates further participatory processes, enabling locals to base their positions and arguments based on sound knowledge.

Figure 6: The Altländer Farm is a special type of Northern German half-timber hall house with mixed use. Dominating colors are red and white. Most of the 300 – 400 years old buildings are protected monuments. The Hogendieksbridge is a reconstruction, recalling the Dutch heritage. Still 12 original parade gates exist insitu. They are known only from the Altes Land. (All photos by Kruse, A.)

Rural development in the case of Altes Land means:

- A change in the economic set-up: Restructuring the land use in a changing economy and global competition. While 15 years ago, organic farming still was disapproved, today already 14 % of the fruit production grows under different organic labels and their number is increasing. In-line, the percentage of direct marketing has increased rapidly these last years (figure 7).
- Negotiations for filling historic ditches have stopped. Today, farmers accept the historic layout and have adapted their production processes accordingly. However, negotiations and special regulations are daily present in order to cope with national and international regulations which sometimes do not “fit” to this particular landscape layout, e.g. the European Water Framework Regulation (http9).
- A mean to deal with the urban development pressure of the close and densely populated city of Hamburg and especially the port of area of Hamburg has to be found. Only resurging awareness and identity of a proud and independent holler landscape helps to have a stronger position towards the big city and the internationally important harbor.
- The pressure to enlarge and deepen the Elbe-River for use by ever larger container and cruise ships, which changes the river’s biodynamic is a steady danger not only for the historic landscape layout but also for the ecological balance as well as for dyke stability. The ground-water level is sinking, in return, the soils get dryer and salty, which complicates the agricultural activity.

Figure 7: The Herzapfelhof (heart apple farm) was one of the first who did a progressive marketing: Different images at the apples themselves, thematic wooden boxes and a great variety of local products. The deep relation between the insitu landscape and the production itself is displayed already at the entrance to the farm. (All photos by Kruse, A.)

As already described, the landscape and identity awareness is done by, for and with the people. Within the framework of Sharing Heritage: European Year of Cultural Heritage 2018 (http6), the municipalities, under the lead of the Association, submitted an ambitious project "The Holler Route in the Altes Land: Understand the beginning, experimenting the heritage" which consists of three pillars:

1. Education, with special focus on schoolchildren, but not only.
2. Cultural performances in order to live and understand history and meaning, performed by children and young people.
3. A cycling route, which shall connect the Altes Land with other Holler Colonies throughout Europe, starting with Poland and The Netherlands.

The project contains a strategic education plan which will be developed for pupils of different age in order to tell the landscape history in a new way with the aim to watch at and understand the environment newly and also in order to explore the(ir) cultural heritage in a new way. The teaching aids follow today education standards and are attached to the official geography curriculum in Lower Saxony. The history and today situation of the Holler Colony Altes Land provides many links to recent topics like globalisation, climate change, city-countryside-relation, economic pressures, migration, land use, prices, tourism. The witnesses and remains of this special cultural landscape will be made accessible at different intermediation locations. The aim is that this new understanding and new awareness will lead to heritage worth shipping which shall contribute to the maintenance of the Altes Land.

Next to the pupils, the project aims also at informing locals & visitors at the same time, using interactive and motivating approaches with barrier free methodologies.

Conclusion

To resume: at the beginning, there was the Association's goal of being inscribed onto the UNESCO World Heritage list, based on the unique cultural landscape and its heritage. The association became an expert in many planning issues and political debates. It achieved recognition through heritage and environmental protection and labelling through ongoing symposia and exhibitions, cultural and scientific, national and international exchange. The

concept of the World Heritage nomination itself evolved into a vehicle for regional development. Today it plays an important role in the local discussion of how to develop the Altes Land into a living area marked by quality and prospect. Even if the nomination to World Heritage still struggles the Association has achieved many successes. Cooperation with Holler Colonies in other European countries is ongoing and impulses towards the regional development arising from the awareness of the fact of being a Holler Colony are omnipresent. The latest efforts concentrate on education, for pupils but also for the Altländer people and tourists.

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A LANDSCAPE HISTORY OF THE GEUL VALLEY: FROM A FARMERS' ARCADIA TO A MULTIFUNCTIONAL LANDSCAPE

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Keywords: landscape biography, nature management, Arcadian landscape, landscape transformation, sustainability, landscape history

Abstract: This article describes the role of Natuurmonumenten, a Dutch NGO for nature conservation, in the preservation of cultural landscapes. The case study is the traditional rural landscape of the Geul River, South Limburg, The Netherlands. The Geul Valley was recognized for its natural, geological and Arcadian beauty early in the 20th century. The nature conservationists took action in the early 20th century when industrialization already threatened the area. However, it was only after the Second World War, that nature conservation societies like Natuurmonumenten (Natural Monuments Society) bought parts of the Geul Valley in order to preserve the landscape. The Arcadian argument was strong: not only did Natuurmonumenten buy the flowery meadows, but also a castle, watermills, and ancient farmsteads. All within the paradigm of the traditional landscape. In the decades following the Second World War, however, the surrounding landscape changed dramatically due to increased tourism, intensive farming, growing population, land reallocations, etc. The contrast between the nature reserves and the surrounding parts of the valley grew. Now, in the early 21st century, new challenges arise: will nature management continue to strive for the preservation of the traditional landscape, or will nature development like rewilding take place? Climate change is an important issue and the sustainability of the management of the nature reserves is under discussion. This article uses the Landscape Biography method not only to describe the history of the management of the nature reserves of Natuurmonumenten in the Geul Valley, but also to look at the role of the cultural and natural heritage of this landscape in the transitions to come. The aesthetic aspect of the landscape also referred to like the beauty of the landscape, should play a role in the ongoing debate on the future of these landscapes.

Introduction

In 1909, my great-grandmother received a postcard. Willem and Anna congratulated her on her birthday and chose a postcard from the Geul Valley to send her. Willem and Anna apparently were there on holiday. Depicted on the postcard is an Arcadian landscape; the river meadows, cows grazing and drinking from the Geul River, a rustic fence and the colors of the setting sun (Figure 1).

Figure 1. Postcard of the Geul Valley near Geulem sent in 1909 (Collection M. Purmer)

In this article, I look at this river valley in the southernmost part of The Netherlands from a landscape-biographical point of view. I will examine the role of nature conservationists of Natuurmonumenten in the preservation and management of the Geul River valley. Natuurmonumenten (Natural Monuments Society), a Dutch NGO for nature conservation, is well known in The Netherlands. It is much less known however that the society also manages an impressive collection of cultural heritage. Properties include castles, country estates, cultural landscapes, and archeological remains. In short, Natuurmonumenten owns a broad array of typical Dutch landscapes, together with hundreds of historical buildings, wooded banks, hedges, lanes, and other landscape heritage.

This article is based on research on the management of the cultural heritage of nature-oriented organization. The focus lies on the historical-cultural landscapes Natuurmonumenten manages in the Geul Valley from historical perspective. With this article, I hope to draw attention to the role of the society for cultural heritage and more specifically cultural landscapes. The Geul Valley is one of four case-studies presented in my doctoral thesis (Purmer 2018).

Material and method

Landscape biography is the main scientific method used in this article. Landscape biography studies the relationship between man and landscape. The relationship, however, is not characterized by a slow and graduate process. Specific events or actions form the biography of a person, this is equally the case for landscapes. The landscape is therefore dynamic and changes over time. Nature and man relationship are also determined by the action of man in a certain landscape. In this perspective, it is possible to identify authors in the landscape: people or events that have a lasting impact on the landscape (Kolen and Renes 2015).

In this article, Natuurmonumenten is studied as an author in the nature reserves in the Geul valley managed by society. The 20th-century landscape history of the present-day nature reserves of Natuurmonumenten in the Geul Valley is based on references, oral history, archival research, and fieldwork.

Results

The Geul Valley around 1910

The Geul River valley is situated in the southern part of the province of Limburg, the southernmost province of The Netherlands. The Geul is a right bank tributary to the River Meuse and is often seen as one of the most beautiful small rivers in The Netherlands. The landscape here is elevated: hills reach a height of more than 300 meters above sea level. The rivers, like the Geul, Gulp, and Meuse, are deeply incised in the landscape thus presenting a hilly landscape with a foreign look for most Dutchmen. This is one of the reasons the region attracted tourists already in the 19th century.

A book about the Geul Valley, written by a nature conservationist-writer, which was published in 1911, turned out to have an important influence on the future of the valley. His name was Eli Heimans and he described the Geul River valley as an Arcadian landscape with an abundance of beauty and geological and natural rarities in his book ‘Uit ons Krijtland’ (from our Chalkland) (Heimans 1911). His lyric description of the Geul Valley gives much attention to the aesthetic aspect of this Arcadian landscape. The book was based on his own experience, gained during a holiday he spent in the region in 1910.

The term Arcadian is related to the picturesque in art and suggests a certain harmony between nature and man. An Arcadian landscape contains nature within man-made landscapes (Renes 2018). Often, there is an aesthetic aspect of the appreciation of the landscape involved.

In this period, tourism found its way to the Geul Valley, helped by early train connections. In 1853 already, the small town of Valkenburg aan de Geul was connected with a railway link to Maastricht and Aachen in Germany. The first tourist information organization of The Netherlands was founded in Valkenburg in 1885. Around the turn of the century, there were dozens of hotels present in the small city. The postcard sent in 1909 to my great-grandmother illustrates the Arcadian landscape which was one of the tourist attractions at the time, together with other sites like the ruins of Valkenburg Castle and underground quarries in the same city. These quarries of Valkenburg were open to the public and even decorated with murals for touristic purposes (Renes 1988). Tourism spread to the surrounding villages like Epen and Slenaken as well. Heimans stayed in Epen during his holiday in 1910. The part of the Geul Valley between the Belgian border and this village was described in his book.

However, the landscape Heimans described was mainly an agricultural landscape. This landscape was subject to change; land use changed under the influence of supply and demand on the market and the growing mining industry nearby. Topographical charts of the period show a small-scale landscape in the river valley, with a combination of meadows and orchards surrounded by hedges in lower parts, forests on steep slopes, pastures, arable lands and orchards on more gentle slopes and open, large-scale arable fields on the plateaus. These landscape patterns basically date from the Middle Ages, although the man had been present in this landscape since prehistoric times. Around 1910, cattle breeding and the fruit industry were important in the agricultural sector. This resulted in an increase of orchards and cow pastures in the region. Arable fields were used to grow cattle feed (Bieleman 1992). It is this landscape in change that Heimans recorded in his book.

The Geul Valley and nature conservation until 1940

The book 'Uit ons Krijtland' illustrates that conservationists showed an early interest in the Geul Valley. Heimans was befriended with Jac. P. Thijsse, one of the founders of the society Natuurmonumenten in 1905. Thijsse and Heimans corresponded about possibly interesting grounds to obtain for the young society in the Geul Valley already before the book was published in 1911. Heimans advised the society to try to acquire one of the rare forests in the area, Het Bovenste Bos (literally The Upper Forest) and some of the geological interesting small quarries. As in the rest of The Netherlands, mostly forests, heathlands and not-reclaimed bogs were directly threatened by reclamation and cuttings. The meadows of the Geul Valley, rich in floral diversity, were not considered as threatened.

In the first half of the 20th-century conservationists like the society, Natuurmonumenten did not buy grounds in the Geul Valley in order to establish a reserve but tried to avoid large scale developments in the area that were threatening the landscape, for instance, a projected water reservoir in 1931. The idea presented by the Dutch State Mines was to build a hydroelectric power station. One of the reservoirs proposed would flood a large part of the most southern stretch of the Geul Valley, including the biodiverse meadows. The plans aroused nationwide protest from conservationists' circles and there was a debate in the papers. In a letter to the chairman of Natuurmonumenten Pieter van Tienhoven, Thijsse states that this reservoir would not only destroy the vegetation but would also affect the landscape. The argumentation was aimed at the preservation of the threatened species and the aesthetics of the landscape. Conservationists from different societies and organizations gathered to discuss the matter in a meeting in Utrecht in February 1932. Here, the idea was conceived to establish a committee devoted to the protection of threatened landscapes, the so-called 'Contact-Commissie voor Natuur- en Landschapsbescherming' (committee for the protection of nature and landscape). In the end, the plans for the reservoir were withdrawn. The Contact-Commissie existed for years and played an important role in nature conservation in The Netherlands (Gorter 1986).

The discussion about the water reservoir showed that conservationists came into action when the Geul Valley was being threatened, but not by buying grounds. Natuurmonumenten had to wait till after the Second World War for an opportunity to acquire a country estate in the Geul Valley.

Natuurmonumenten and the Geul Valley (1955-1975)

It's only shortly before and during the Second World War that the provincial nature conservation organization Het Limburgs Landschap obtained some grounds in the Geul Valley. One of the geological rarities of the Geul Valley, a small quarry where Carboniferous layers came to the light, was rented from the owners in 1936. Later, the quarry was named after Heimans, who had died unexpectedly while on an excursion in Germany in 1914. Het Limburgs Landschap also managed to buy some lime grassland in the proximity of the Geul in 1942.

Natuurmonumenten had some properties in the province of Limburg after the Second World War, but all in the northern parts of the province and nothing in the so much appreciated Geul Valley. This changed in 1955: Genhoes, a large country estate near Valkenburg came on the market that year. A public auction was held on October 18th, 1955. Natuurmonumenten was interested in buying the Genhoes country estate including its castle, farmsteads, meadows, forests and arable fields. Natuurmonumenten was to celebrate its 50th anniversary in 1956 and wanted a special acquisition to mark the jubilee. Also, there was money available since the late chairman of Natuurmonumenten Pieter van Tienhoven had left the society an inheritance which was to be spent in the spirit of the deceased. Staatsbosbeheer (National Forest Service) had shown interest in the forests of the estate, so negotiations before the auction were necessary to avoid conflicts on the auction. Natuurmonumenten wished to keep the estate intact, buildings and grounds included.

In the end, Natuurmonumenten succeeded in buying the estate, including more than 84 hectares of ground. A series of photos was taken shortly after the purchase. It shows an agricultural landscape, with all the typical Geul Valley elements: orchards, meadows lined with poplars, arable fields and forests on the steep slopes (Purmer 2018) (Figure 2).

Figure 2. Poplars along the Geul in 1955, part of the Genhoes estate
(Photo by J. van Dijk, Photo archive Natuurmonumenten, 's-Graveland, The Netherlands)

Around 1955, the landscape of southern Limburg was changing fast under influence of changing agriculture and a rapidly growing population. This was one more reason to establish nature reserves in this region. The biodiversity of the recently acquired Genhoes was enormous, according to the well-known ecologist Victor Westhoff, who advised Natuurmonumenten at the time (Purmer 2018). His only concern was the disappearing flora of the arable fields and he advised the society to make sure that species like poppy and cornflower were preserved.

The aim of the management was to preserve the existing landscape. The management of the forests and trees was mainly conducted by the National Forest Service. The iconic poplars for instance were replanted on the shores of the Geul. Grasslands were used by farmers, who leased some of the plots. Natuurmonumenten supported the restauration of the nearby village church because of the century-old connections with the castle. The castle itself needed a thorough restauration, after which it was rented out to a painter. The agricultural landscape however was still used by farmers and more or less kept in the state of 1955. The aesthetics of Arcadian landscape was thus preserved.

In 1961 Natuurmonumenten had the opportunity to buy a property in the Geul Valley described by Heimans in 1911. The Bovenste Bos, a forest lyrically described by Eli Heimans as the most beautiful place in the country, came on the market. Natuurmonumenten started a campaign to fund the purchase. The campaign titled 'Het Bovenste Bos Behouden!' (The Bovenste Bos preserved!) became a success: there was media attention, new members joined the society and money was raised for the purchase. After the acquisition, the forest was named the Heimans Reserve the Bovenste Bos, in honor of the man who focused on the natural beauty of the forest and was born exactly hundred years earlier. His son, a biologist himself, revealed a memorial plaque in the forest. Again, the National Forest Service was in charge of the management (Purmer 2018).

Few years later, another country estate neighboring Genhoes came on the market. The estate called Schaloen drew the attention of Natuurmonumenten. Again, the society wished to acquire the whole estate, including the small castle, watermill and a 17th century hermitage which historically was maintained by the owners of the castle (Figure 3). The slope forests which were part of the estate were especially interesting from a nature perspective. The forests were coppiced and this management enabled orchids and other rare species to flower here.

Figure 3. The 17th century hermitage called 'De Kluis' historically belonging to the Schaloen country estate (Photo: M. Purmer 2015)

This time however, Natuurmonumenten wasn't able to raise enough money from government grants. Because of the purchase of an important forest in the Veluwe in Gelderland, the Deelerwoud, Natuurmonumenten did not have own finances available. In the end, the local government of the municipality of Valkenburg was willing to buy the castle and some adjoining grasslands. This suited the municipality as there were plans for a small recreational lake in the adjoining part of the Geul Valley. As a result, the Schaloen estate was split. In 1967, Natuurmonumenten got the much-desired forests and also the hermitage. Hermits had been living in this remote corner of the estate from the late 17th century till the beginning of the 20th century. At that time, the growing number of tourists from Valkenburg made a life of prayer and contemplation on this location difficult. The last hermit had left in 1930. It illustrates the growth of the tourism in the region, a process which continued after the Second World War.

Tourism was not the only pressure on the landscape. Infrastructure to accommodate tourism and other economic developments threatened the Geul Valley. In 1957, a highway was projected through the Genhoes estate. This was prevented by conservationists, so the highway was built outside the nature reserves but still in the Geul Valley. Elsewhere, existing old roads where broadened and improved to accommodate the growing traffic. In the sixties and early seventies, the world around the Geul Valley in Southern Limburg was rapidly changing and this was the main reason for another campaign fifteen years later.

Action Geuldal (1977)

In the seventies, land consolidation was planned in Southern Limburg, which threatened the Geul Valley landscape. Once again, conservationists organized a campaign to preserve the most valuable parts of the Geul Valley, still in agricultural use. Natuurmonumenten and Het Limburgs Landschap together organized the Geul Valley campaign, 'Aktie Geuldal' in 1977. Main objective of the campaign however was heritage oriented: the purchase of the historic watermill the Volmolen and two old farmsteads with their surrounding grounds. Although the symbol of the campaign became the small zinc violet, growing on debris from old 19th century zinc factories in Belgium, attention was focused on the preservation of the typical Geul Valley landscape. Posters highlighted the beauty of the Arcadian landscape threatened: vernacular architecture, the wild and untamed Geul River, flowers and trees and small chapels and crucifixes typical for the landscape.

Again, the action was very successful. Throughout The Netherlands, the poster with the zinc violet was seen. A special medal was issued, which showed the zinc violet on one side and the meandering Geul on the reverse (Purmer 2018) (Figure 4).

Figure 4. Medal with the zinc violet and the meandering Geul on the reverse. The text on the medal states: 'to preserve the Geul Valley 1977' (Collection Natuurmonumenten)

There was also protest: farmers in the village of Epen were afraid that protection of the Geul Valley as nature reserve would make farming impossible. The campaign however provided Het Limburgs Landschap and Natuurmonumenten with the financial means to buy the properties which were targeted as goal. Natuurmonumenten bought the typical farmstead 't Höfke with the grasslands and orchards belonging to it and the Volmolen watermill in Epen with surrounding meadows. The mill illustrates another aspect of the heritage of the Geul Valley (Figure 5). The mill was built in the 18th century and served the cloth industry in nearby Vaals. It was converted into a corn mill late 19th century (Van Lochem et al. 2015).

Figure 5. The Volmolen (Photo: M. Purmer 2018)

The campaign generated so much money that another historical building could also be bought: the Bovenste Molen watermill on the Geul near Mechelen. However, the acquired meadows in the Geul Valley did not have the botanical richness as was described in 1911. The typical zinc-based vegetation had largely disappeared. The Arcadian landscape described by Heimans about 65 years earlier had changed dramatically. In the end, Natuurmonumenten had acquired parts of the so much desired Geul Valley meadows, but without the rich biodiversity mentioned by Heimans. The question was now how to manage the newly acquired reserves.

Management in two directions: wilderness and Arcadia (1980-2015)

When studying the management plans for the period after 1977, the main theme seems to be an Arcadian oriented management. The Genhoes estate and the other Geul Valley properties of Natuurmonumenten were managed as an agricultural landscape. Coppice, grazing and mowing were used to manage the reserves. New orchards and hedges were planned to restore the historic cultural landscape. In this period, the historical landscape of the region gained attention. In 1987, a first historical geographical study of the landscape of Southern Limburg was published (Barends et al. 1987). In the following year, a thorough study of the history of the landscape was published by the historical geographer Hans Renes (Renes 1988).

The environment outside the reserves however was still changing under the pressure of large-scale and modern farming and the growing pressure of tourism. In the late eighties, the idea of creating large-scale nature was developed. The first plans for nature development along the Dutch rivers were presented in 1987 (De Bruin et al. 1987). In 1990, articles were published

on the possibility of large-scale nature development in the Southern Limburg river valleys. The Geul is mentioned as a possible location for nature development (Hendrix and Schepers 1990).

The idea of large-scale nature development brought different opinions on the management of the reserves. On the one hand large-scale wilderness was the objective, but on the other hand maintenance of the Arcadian small-scale landscape was desirable as well. In reality however the Arcadian landscape Heimans described was under constant pressure and vanishing slowly. Het Limburgs Landschap decided in the late nineties on large-scale nature development along the Geul, west of Valkenburg (Staal and Ovaa 2006). Natuurmonumenten had plans for small-scale nature development projects in the reserves but otherwise held on to a management aimed at preserving the Arcadian landscape in the nature reserves. Especially in the management of the Genhoes and Schaloen country estates, heritage played an important role in the management.

Despite of this, there was also critique on the management of Natuurmonumenten in the Geul Valley. The Dutch NGO De Landschapswacht (landscape watch) wrote a very critical report: they stated that hedges, wooded banks and orchards were neglected (Landschapswacht 2004). The Landschapswacht was at least partly right. The management of Natuurmonumenten, which aimed to preserve the Arcadian landscape, wasn't always successful, could be concluded.

With the growing attention for cultural heritage and cultural landscapes since the late nineties-early years of the twenty-first century however, Natuurmonumenten focused more on restauration of the small-scale landscape. An inventory of the historic elements in the Geul Valley reserves showed that from a heritage perspective, restauration and consolidation was needed in some cases. On the other hand, the landscape was far more intact in the nature reserves than in the surroundings (Purmer and Burger 2010) (Figure 6).

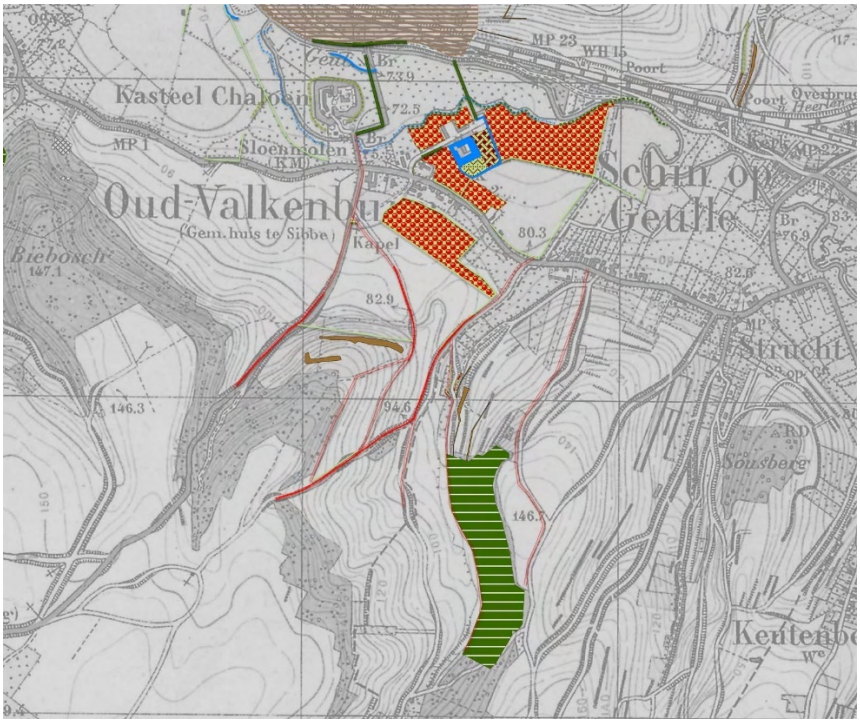

Figure 6. Inventory of historic elements in the present Genhoes estate landscape projected on an old topographical chart dating around 1900. Most present features were already there a century ago. For example, orange with dots represents still existing historical orchards, red and green lines old roads and avenues (Purmer and Burger 2010)

Again, the world outside nature reserves was changing rapidly. For now, the challenge for the future seems to be to find an equilibrium between heritage and nature inside and outside the reserves.

To the future

Today, large-scale nature development in the river valleys in southern Limburg is still high on the nature conservationist's agenda. Now, the concept of rewilding is used to look at the ecological potential of river valleys like the Geul Valley (Monbiot 2014).

When one is walking in and around the nature reserves today, it's possible to make some observations. Inside the reserves, there is still much present that reminds of the past of the landscape. Sometimes it's well-maintained orchards or hedges, traditionally cut every year, sometimes a sole pollard tree is a relic of the past. These trees stood once in the hedges or stood along small streams in the meadows (Figure 7).

Figure 7. Two ancient pollard trees, who most likely stood along a tributary small river of the Geul, near the hamlet of Hurpesch (Photo: M. Purmer 2017)

If we compare photographs of the turn of the century with the current situation, one could see that the landscape around 1900 was more cultivated as the landscape was mostly in agricultural use. Parceled grazing and mowing, together with coppice and hedges to divide the plots resulted in a small-scale landscape. The Geul River itself was meandering through this landscape, the riversides relatively open (Figure 1). Nowadays, the management of the conservationists is more large scale and extensive, resulting in more trees and bushes along the Geul itself and disappearance of elements of hedges and pollards elsewhere (Figure 8).

Historical buildings and especially the watermills have a strong relationship with the surrounding Geul Valley landscape. The connection of buildings and landscape is also important for the Genhoes country estate. The castle itself is built on the edge of the valley, with the water from the Geul nearby enough to hold the moat filled, but without the risk of frequent flooding. The large-scale property belonging to the estate is still recognizable in the landscape.

Figure 8. Spontaneous and planted vegetation along the Geul between the villages of Mechelen and Epen, with the trunk of a fallen poplar in the stream (Photo: M. Purmer 2017)

The arable fields, the orchards, and the meadows are therefore historically relatively large scale compared to other parts of the Geul Valley. The forests are still coppiced, with results for the biodiversity. The cultural landscape of the Genhoes estate, however, remains largely intact (Figure 9). Outside the reserves, however, such relics and elements are scarce.

Figure 9. The landscape of the Geul Valley on the Genhoes estate, with forests, poplars along the Geul and the arable fields in the background (Photo: M. Purmer 2008)

For the future, choices have to be made. On the one hand, nature is very much under pressure in the reserves. On the other hand, managing the small-scale landscape with all the elements in it is expensive. Consolidation plans are often drawn up from either heritage or an ecological perspective. The combination of heritage and nature, however, seems fitting in this centuries-old cultural landscape. The management aimed at preservation of the small zinc

violet, for instance, requires frequent mowing of the meadows, thereby copying the former agricultural use of the river meadows for the harvest of hay (Figure 10).

Figure 10. The zinc violet (*Viola lutea* subsp. *calaminaria*) in the Geul Valley near Epen (Photo: M. Purmer 2017)

There seems to be a lot to gain, both for an ecological and a heritage aspect of the landscape of the Geul Valley. Old elements in the landscape, like wooded banks and hedges of hawthorn, function as a migration route for different species of plants and animals. A lot of these elements connecting the worlds in and outside the reserves have disappeared. Ecology and heritage could profit from restauration (Van Tooren et al. 2015).

What should the landscape of the Geul Valley look like? From a rewilding perspective, one could think of large-scale nature development alongside the Geul, including grazing and trekking forests, spontaneously developing where grazing allows it. From a heritage perspective, one could look at still used, small-scale valley landscapes elsewhere in Europe. The landscape of the Una river valley in Bosnia-Herzegovina resembles the situation in Southern Limburg around the time of Heimans' writing (Figure 11).

On the terraced hills of this Bosnian river valley -now a national park- one recognizes the features Heimans described. Orchards, wooded banks, hedges, and river meadows are still in agricultural use. The small-scale landscape in Bosnia-Herzegovina could be a reference for the Geul Valley. It must be considered, however, that the management of such a small-scale landscape is intensive and could be expensive. On the other hand, this management respects the long history and the layerdness of this landscape. Preservation of the old cultural landscape seems to be coherent with the beauty of the landscape Heimans described. Even then, it is probably not possible to manage all the reserves in the Geul Valley this intensively.

For the nature reserves of Natuurmonumenten in the Geul Valley, a form of zoning could bring a solution. More intensively managed zones of small-scale cultural landscapes surrounding historic buildings such as water mills, castles and farmsteads could be alternated with more extensively managed grounds.

Figure 11. Small-scale terraced landscape in the Una River valley, Bosnia-Herzegovina (Photo: M. Purmer 2018)

In both cases, however, the Arcadian landscape described by Heimans more than a hundred years ago can be inspirational. This seems fitting for nature reserves which were spared from too drastic changes in the past 65 years. The Geul Valley nature reserves that Natuurmonumenten manages tell the story of centuries human-nature relationships. Man has been shaping this landscape since at least medieval times and the use of man in the past is visible everywhere. The late medieval castle of Genhoes, the 18th-century watermills and old farmsteads testify human presence. The landscape was formed by generations of farmers. This mainly agricultural landscape was the scene for Heimans' Arcadia. Conservationists took this layered landscape as reference for their management.

From a landscape biographical point of view, Natuurmonumenten was and is an author in the landscape of the Geul Valley. By buying and managing nature reserves in Southern Limburg since 1955, the society played an active role in the shaping of the Geul Valley landscape. In this way, conservationists added another layer to this already layered landscape.

Even with this rather conservative management, the contrast between the reserves and the outside world grew. Therefore, to base the management of the future on the cultural landscape at hand seems logical. With zoning both ecological and heritage goals can be served. Large scale nature development could lead to the loss of the cultural heritage present in the landscape. The layerdness of this century-old landscape could be affected, thereby losing parts of the rich history still visible in the current landscape.

Conclusion

Landscape-biographical research in the nature reserves of Natuurmonumenten in the Geul Valley shows the role of the society as an author in this centuries-old landscape. The Geul Valley landscapes Natuurmonumenten tried to preserve are part of a dynamic and layered landscape. This research illustrates the dynamic nature of the reserves, with different layers in the landscape illustrating a long history of development. The pressure on this Arcadian agricultural landscape has only been growing since then.

The history of the management of Natuurmonumenten in the nature reserves in the Geul Valley shows, that the society mainly strived for the preservation of the existing cultural landscape, including the diverse collection of heritage buildings the society acquired over the

years. Succeeding staff members of Natuurmonumenten, from the forester in the field to the chairman of the society, all had their influence on the landscape. The chosen vision on nature was maintained locally throughout the years, even when on a national level the insights changed, as we saw in the period of large-scale nature development.

These days, the challenges for integrated management of nature reserves are big. Sustainability, spatial quality, landscape, and climate change all will have their effects on the terrains of Natuurmonumenten, as well in the Geul Valley as elsewhere in The Netherlands. The concept of a dynamic nature reserve is appropriate when taking the often long historical and ecological development of the landscape into account. The scale of the landscape, historical perspective, and attention for the existing layerdness of the landscape should play a role in the discussion on the future of the nature reserves in this man-made landscape. Management measures should be reviewed on their influence on the landscape and if it respects the layerdness of the existing landscape. The aesthetic aspect of the landscape, also referred to as the beauty of the landscape, has long been absent from the discussions on landscape change.

This study shows, that the aesthetic aspect always played an important part in the management strategy of Natuurmonumenten in the Geul Valley, most clearly illustrated by the attention for the preservation of the Arcadian landscape. Therefore, the beauty of landscape deserves a place in the discussion on the future of the landscapes at hand. After all, the Dutch landscape remains for the most part a man-made landscape, or is at least very strongly influenced by men. Nature management in the Dutch landscape is a cultural act. For the future of the Geul Valley, integration of ecological and heritage goals could be the foundation for an overall management strategy which is based on the preservation of the Geul Valley cultural landscape. In this landscape, there is room for the beauty of the landscape Heimans described, including rare species like the zinc violet and valuable heritage as the Volmolen watermill as well.

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TRADITIONAL COMMUNITIES, TRADITIONAL LANDSCAPES? AFRO-DESCENDANT LANDSCAPES IN THE COLOMBIAN PACIFIC REGION

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Abstract: This work addresses gender dimensions of traditional agricultural landscapes, in collective lands titled to Afro-descendant communities in the Pacific region of Colombia, South America. Historical and current information on environmental, socio-economic and settlement processes provided a comprehensive portrait at a subdivision of the collective land-title "Los Delfines", named "El Cedro". The remote sensing process (a mainstream method for identifying land use and land cover change) helped exploring the spatial setting of this traditional landscape under the lenses of researching their gendered dimensions. Statistical analyses on both census data (secondary data) and survey sample data (fieldwork data) allowed to reassert a set of three groups of gendered land uses, namely, women-akin, men-akin, and gender-inclusive uses. However, a narrative perspective helped to bond previous theoretical, spatial and quantitative outcomes, under the lenses of the practical experience of fieldwork, which also by way of participatory observation and semi-unstructured interviews brought to the researcher (me) valuable insights and information besides the previous outcomes. The found rearrangement of settlement spaces and production systems provided practical indications that women´s roles, decisions, and strategies on this traditional landscape have restructured settlement patterns, and landscape dynamics of large areas at heterogeneous spatial and temporal scales.

Introduction

This work addresses traditional landscapes (Antrop 1997, Cullotta and Barbera 2011, Fischer et al. 2012) under lenses of researching gender dimensions of Land Use and Land Cover Change (LULCC) in the last few decades in a collective land titled to Afro-descendant communities in the Pacific region of Colombia, South America, and examines socio-economic and political signifiers affecting land-use decisions, rights, and responsibilities (Aguirre 2013).

Colombian territory encompasses five major regions: Andean, Caribbean, Pacific, Amazonia, and Orinoquia. The Colombian Pacific region is bordered by the Pacific Ocean to the west and the Western Andean mountain range to the east, and includes four secondary level political-administrative units (i.e. the Departments of Choco, Valle del Cauca, Cauca, and Nariño) (Figure 1).

The Pacific region encompasses roughly ten percent of the Colombian territory, is mainly covered by tropical rain forests, and has the world´s largest plant biodiversity (IGAC, 2002, Moreno et al. 2016). Law 70 in 1993 recognized collective land rights of rural areas settled by Afro-Colombian communities (Peña 2017) with traditional production practices in the Pacific region, and encompasses three basic endeavors: collective land tenure, cultural identity protection, and improving quality of life through economic and social development (Diario Oficial, No. 41.013, August 31, 1993). Offen (2003: 44) states that "this novel collective land titling project is among the most ambitious and radical territorial reordering ever attempted in Latin America" (Offen, 2003), yet is an ongoing process.

Between 1997 and 2011, community councils in the Pacific coast were able to gain collective land titles to more than 5.2 million hectares, evidencing the recognition of new forms of democratic participation in the 1991 constitution (Almario 2005).

According to IGAC-MADS (2000), due to the Pacific region's geographic location (approximately between 1 to 8 degrees north latitude and 75 to 78 degrees west longitude), its tropical rainforest (heterogeneous forest) climate is mainly influenced by the Intertropical Convergence Zone (ITCZ), maritime air masses with orographic lifting rainfall, and regional phenomena such as the La Niña / El Niño Southern Oscillation (ENSO); this tropical climate is characterized by low annual range temperature with an annual mean rarely exceeding 28 °C, and high relative humidity (more than 80% year-round), while mean annual rainfall is amongst the highest in the world, reaching 13,000 millimeters in some areas.

Territorial formation in the Pacific region witnessed processes of slavery and liberation during the 16th to 18th centuries when Spaniards brought African slaves as the principal labor force in gold mining (Sharp 1976, West 1957, Friedeman 1995, Vargas 1999, Tubb 2015). In Colombia, the abolition of enslavement was sanctioned by law in 1851, however, juridical and philosophical controversies lasted for all the independence period wars (Friedemann 1995). Most slaves were sold at mining areas where notary records are now inexistent, although population accountings corresponding to rural Chocó in 1759 lists mining crews of 500 slaves evidencing significant slave investments by some families (Colmenares 1991).

Crews were composed of just men initially (Colmenares 1979) but subsequently included women who became the 'medullar elements of matrifocal families' creating their own language of social and genetic kinship (Romero 1991). According to Romero (1991), the reference for these enslaved groups was the ancestor original of the familiar group that could be a woman – mother or grandmother. It is possible that some freed slaves ceased being itinerants after colonial mines and established at places where they began to create a system that these days is known as 'troncos' (logs): Cognitive groups of consanguineous relatives traced their lineage through both the maternal and the paternal ancestor, with working and inheritance rights on mining lands and crop plots claimed by the founder as the property of their offspring (Friedeman and Briceño 1990).

Independence in 1810 and enslavement abolition in 1851 prompted free slaves to migrate to different locations and thus inhabiting all the Pacific territory. Many of them searched for new places following river courses, coastlines, and old indigenous trails (Jiménez 2000). Manumission (the process of slave liberation after which the slave acquired his/her freedom) engendered a novel colonization process in the region that produced a new territorial appropriation model (Aprile-Gniset 1993). The migration of black communities to the Pacific lowlands caused the retreating of indigenous peoples to upstream areas of many rivers (West 1957, April-Gniest 1993, West 1957, Leal and Restrepo 2003).

'Manumisos' could have followed the life paths of previously illegally freed Cimarron by down streaming various rivers and arriving to the Pacific coast by the end of the 19th century (Mosquera and April-Gniset 2001). Since then, in the middle and lower parts of the Pacific region (lowlands) 'Black Communities' have developed different forms of production and resource access that were, and still are, strongly based on kinship relations (Friedmann 1974); "more than individual property, cleared lands are patrimony of a kin group, and this phenomenon takes the form of a collective property" (Mosquera and April-Gniset 2001).

Nowadays, widespread river networks are the focus of all economic, domestic and social activities of the Pacific region's populations that endure physical and economic marginality with respect to the rest of the country (Oslender 2001 and 2016). Main livelihoods include fishing and agriculture in lower to higher reliefs, and the combination of other activities in each of these areas including hunting, gathering, and logging. Domestic animal breeding has also

been in practice in all ecosystems based on local interchange networks on a seasonal basis (Moreno and Monje 2006).

Working conditions and technological progress are today similar than during colonial times; men and women had been socialized from early ages to work in the jungle, and eventually as proletariat in ports and cities, and kinship has been an effective social resource connecting social networks in both rural and urban areas (Friedemann 1995). The extractive economy has been the economic model practiced in the Pacific region since colonial times: It is aimed at supplying natural resources to external markets and has seen 'boom and bust cycles', each incorporating new products and institutions (Leal and Restrepo 2003, Tubb 2015, Oslender 2001 and 2016). These new cycles have included the collection of plant ivory seeds and latex from rubber trees; logging of red mangroves for their bark tannin; and wood extraction as economically significant since the 1940s (Leal and Restrepo 2003).

Finally, as Losonczy (1999) puts it, these communities are comprised inside a 'mythic mold' resulting from ontological rather than historical records where the latter becomes clear and precise again only in narratives of postcolonial periods: The myth has been replaced by history by erasing black people's collective memory on Africa and slavery.

The objective of this work is to reassert these traditional landscapes based on a gendered approach to its Land Use and Land Cover Dynamics in the last few decades. Within this general purpose the special goal was to show how locally, resettlement processes also resulted in novel spatial rearrangements of land tenure and use in the study area. Practical evidence also shows that current gendered LULCC (GLULCC) have resulted from historical events previous to the last few decades in which this research is focused, under broader and longer traditional societal processes leading to particular customary laws and practices (Aguirre 2013).

Materials and methods

The study area is a subdivision of the collective land "Delfines", namely "El Cedro", in the Department of Choco, in the Pacific region of Colombia, which comprises a large agricultural floodplain surrounded by tropical rain forests. West (1957) introduced the regional perspective of these traditional landscapes: "culturally the area is one chiefly because of its predominant Negroid population; because a common way of life-based mainly on subsistence agriculture, fishing, and primitive mining; and because of similar historical development which differs from that of adjacent areas" West (1957).

The Department of Choco is located in the northern part of the Colombian Pacific region, limiting with Panama, and comprises 31 municipalities, among them Bahia Solano where the study area is located (Figure 1). Out of a total of 32 departments nationally, Choco comprises the highest biodiversity in Colombia (25% of plant and bird species), and hydrological basins with rivers flowing both to the Pacific Ocean and the Caribbean Sea. In the national context, Choco is considered one of most marginal departments, enduring amongst the poorer transportation infrastructure and lowest quality of life.

"Los Delfines", a collective land legally titled to local Afro-descendant communities in the year 2002 to 1,329 families or 5,846 persons (according to INCORA Resolution 03 of December 2002) encloses an area of 67,327 hectares. It is inside the municipality of "Bahía Solano", Corregimiento of the "El Valle", at the coastal area of the Department of Choco. Multiple political-administrative units overlap. "Los Delfines" is delimited by another Afro-collective title named "Jurado" to the north, and the National Natural Park "Ensenada de Utria" and the Afro-collective title "Los Riscales" to the South. Two indigenous *resguardos* (i.e. Boroboro, and El Brazo and Poza Manza) are neighboring to the east. By 2007, the total population in the study area ranged approximately from 2,300 to 2,500 persons (with an average of five persons per family) (NGO Natura 2004). The study area under the Local Community

Council (LCC) of El Cedro has an extension of approximately 15,000 hectares and comprises six distinct management areas recognized by their local people (Figure 2). Supervised classification of a LANDSAT TM image shows Land Cover in the El Cedro, including forest, secondary forest, cropland, pastures, and built-up areas, among others (Figure 3).

The El Cedro is located over cretaceous basaltic rocks and quaternary deposits. Landforms include marine and fluvial plains, and low range hills with a maximum relief of 800m in some areas (but more commonly of 300m). Poorly drained, acid soils, with low to moderate fertility are most common. The main rivers inside the study area include "El Valle" (the largest one), "Boroboro", "Tundo", and "Nimiquia".

This rural area, where traditional land uses and livelihoods still prevail, is currently almost uninhabited (but essentially in use) with locals now clustered inside a small village (i.e. El Valle). In the field, this area was 'surveyed' using satellite images, thematic maps, global positioning systems, and exploratory walkthroughs. Participatory observation, structured interviews with men and women at the individual and household levels, and unstructured/semi-structured interviews with open-ended questions to many local community leaders, and governmental and non-governmental organizations' officials working in this region were also conducted. Empirical evidence allowed identifying gender-based time allocation, resource-use power relations, and reproductive strategies (Aguirre 2013).

Reflection on the knowledge that may be produced or constrained about these traditional communities' landscapes was based on Land Use and Land Cover Change (LULCC) surveys, particularly on image processing and interpretation (i.e. remote sensing) for visualization and representation, and on the collection of 'data' by way of structured surveys/interviews (Aguirre 2013). Main land-use categories in the El Cedro were further compared with the Anderson et al. (1976) hierarchical "resource-oriented" Land Use and Land Cover Classification System for Use with Remote Sensor Data, in land use planning and management activities. Notwithstanding that this classification was developed to meet the needs of Federal and State agencies in the US, it served to better explain and compare the local settings, as the research was undertaken under a doctoral dissertation defended in this country.

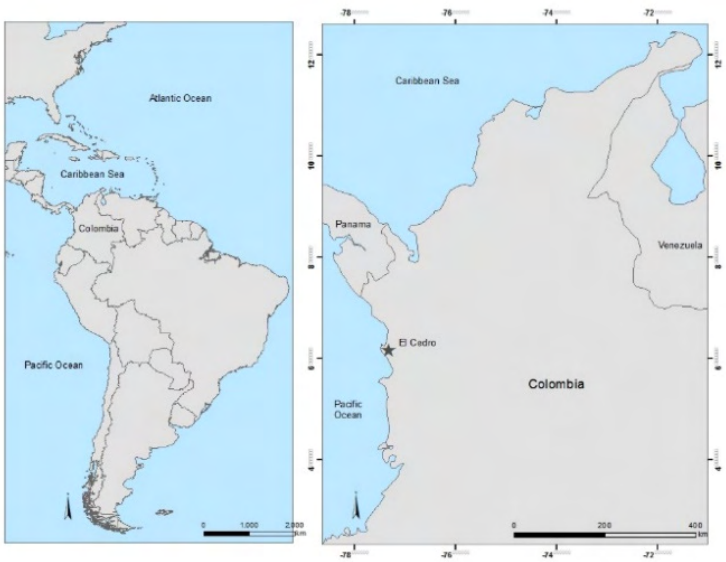

Figure 1. Location of the studied area

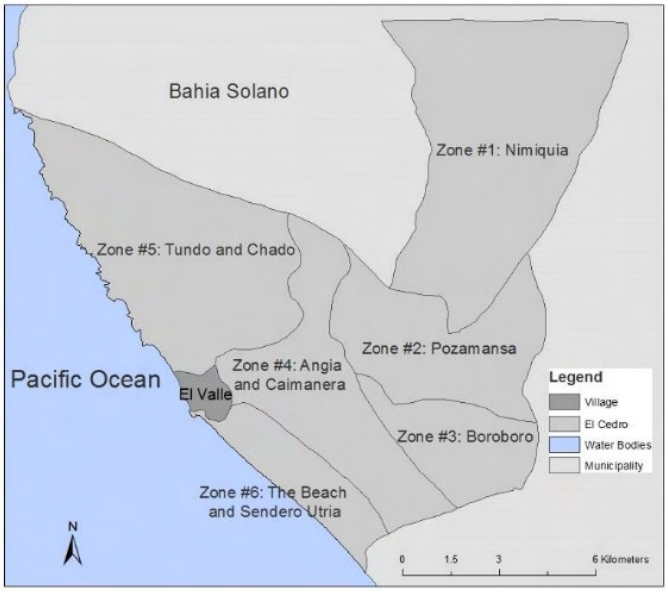

Figure 2. "El Cedro", inside the collective land title "Los Delfines"

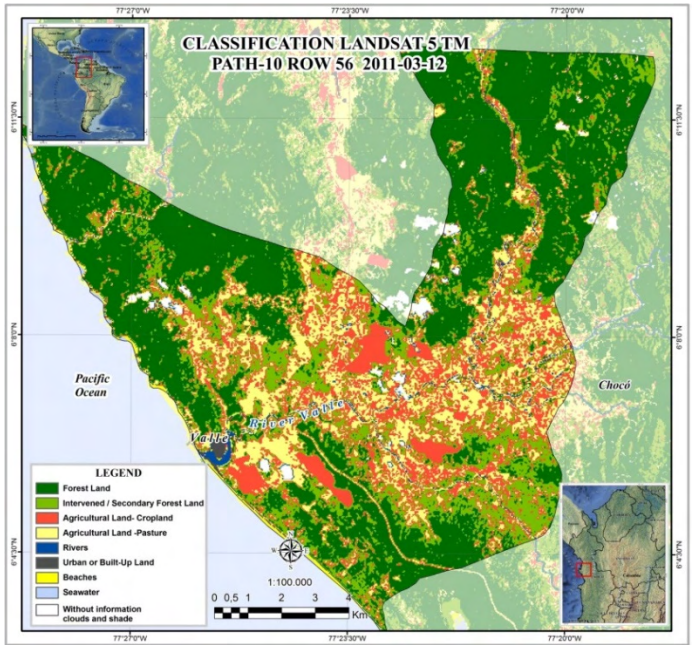

Figure 3. Supervised classification of Land Cover (2011, El Cedro)

Statistical procedures to both primary and raw secondary datasets on socioeconomic, cadastral, and land use questions at the research area provided ancillary data for gendered land use assessment. Raw secondary data of a twofold census survey (NGO Natura 2004) on the relative location of 'fincas' (farms) including their land use and tenure types, and on demographic information with emphasis on the educational attainment of local inhabitants were analyzed. Primary data was also obtained by conducting structured and semi-structured interviews during a fieldwork campaign that took place in 2006–2007. The resulting figures sought to assess whether or not statistical models could also help explain or reinforce evidence on gendered land use obtained by qualitative and spatially explicit research methods (Aguirre 2013).

Finally, a narrative perspective of gendered land use and land cover change GLULCC helped to bond, previous theoretical, spatial and quantitative outcomes, under the lenses of the practical experience of fieldwork that brought to the researcher valuable insights and

information besides the previous outcomes. The results of the research undertaken, which are explained in the next section are those bonded by this narrative of traditional landscapes in the study area.

Results and discussion

Assessments of the demographic development of the Pacific region by Mosquera and Aprile, (2001) suggest that down streaming the rivers Atrato, San Juan, and Baudo in the Department of Choco, African slaves arrived to the pacific coast by the end of 19th century; during 1920 to 1930 more than 60 small villages were founded in the coastal areas, with fishing economy playing an important role in their livelihoods; after 1930 current configuration of coastal settlements remains basically the same. The exploitation of ivory plant and rubber (latex) during the second half of the 19th century until the first decades of the 20th century fostered the consolidation of migratory processes to these coastal areas in the Pacific region (April-Gniset 1993, Valencia and Villa 1992). Mosquera and Aprile, (2001), thus propose a generalized settlement process for the pacific lowlands: Collectors of ivory plant and rubber (mainly black settlers) arrived at a given location and established a small settlement with one or two families; other groups that were part of the latter families arrived at locations close to the previous settlement, and established their livelihoods there; each settlement core was connected to the other by way of their family members, which in turn participated in the formation of other settlements through 'reciprocal marriage exchange', and the 'inter-village circulation of spouses (the "exchange of couples" probably fostered development of productive forces in the area, while the resulting demographic growth prompted the transition from collection to agriculture).

Today the territory of the El Cedro (El Valle) may be broadly subdivided into four main or primary land use (and land cover) types, plus one secondary land-use type that are openly differentiated and recognized by the community (Table 1), namely: Monte (bravo and viche), Respaldo, Rastrojo –including Potreros (Figure 6) for cattle raising, the El Valle village (Figure 7**Hiba! A hivatkozási forrás nem található.**), and Azoteas (Figure 8) (Aguirre 2013). The Monte is often part, or all, of the Respaldo. The marginal portion of fincas (farms) due to their access difficulty, their lower quality of soils, or their higher costs of production (Doolittle 1988), more general is named Respaldo; alternatively, these lands are reserved for both logging and hunting activities and for inheritance purposes more general. Thus, Respaldo may overlap or correspond completely with those lands that are identified as Monte bravo or Monte viche. Hitherto, Respaldo is considered as an integral part of fincas and therefore hold customary (or legal) property rights. Yet, the ways in which the Respaldo is used, are normally the result of verbal agreements on who could use these lands and for which purposes (e.g. family, neighbors, community; for logging, hunting, or gathering). Azoteas are elevated container gardens found in all the pacific lowlands next both to rural and urban houses.

Figure 4. Monte bravo (right); Monte viche (left)

Figure 5. Rastrojo in the El Valle River natural levees

Figure 6. Potrero in the pathway to Utria

Figure 7. Urban and built-up area of El Valle village

Figure 8. Azoteas in the village

The above renders the classification process problematic considering that added uses (significances) diverging from land use and land cover properly (including those related to tenure and nuances of use conditions, or that are symbolic) may be also important for thorough local classification schemes.

Under a land use and land cover classification scheme (e.g. Anderson et al. 1976) the above may be broadly interpreted as follows: Monte bravo, approximately corresponding to primary forest with different levels of fragmentation and relatively less fertile soils; Monte viche, approximately corresponding to secondary forest, mixed bushes and shifting agriculture; Rastrojo, corresponding to agricultural lands, pastures (Potrero), mixed agricultural lands, bushes and pastures, and gardens; and Azoteas, which are elevated container gardens found in all the pacific lowlands next both to rural and urban houses. These could be further grouped into four terrain mapping units more general:

i.) Denudational hills comprising most Monte bravo, are exclusively used for hunting and logging and are primarily men's spaces, whereas hill slopes that are often covered by Monte viche, and shifting cultivation, are gender-neutral or inclusive spaces (Figure 9).

ii.) Alluvial floodplains in which most Rastrojo (including Potreros) and patches of Monte viche are found. These plains comprise a larger portion of fincas (farms). Natural levees and river terraces are among the best farmlands; whilst parts of fincas are cultivated for about six years and then abandoned. Alternatively these fincas are cultivated every other year if planted in maize or sweet manioc. Rice is often grown on back swamps (Figure 10).

iii.) Beach ridge areas of marine and fluvial origin. To the north, beach ridges formed on top of Mesozoic rocks (erosional coastline). These are the preferred areas to private properties of inhabitants from the interior of the country who acquired those lands around 30 years ago for tourism and leisure purposes. 20 years ago, these beach ridges that are intersected by head shores and rock formations, were sites of abundant clams (shelve fish). To the southern part of the study area are found a larger extension of beach ridges (approximately 9km in length). These areas have been traditionally owned by locals with very few exceptions. Today its landforms comprise many fincas (farms). Coconut, sweet manioc and pineapple are among the main crops (Figure 11).

iv) Ciudad Mutis-El Valle road corridor (on denudational hills and floodplains), comprise Monte viche, Rastrojo and many Potreros. Mixed secondary forest, bushlands and pastures are

found. This area is rich in fruit and palm trees such as ivory nut, and rubber, among others. Due to its high accessibility, this corridor is preferred by women and children for gathering seeds, tree products, and medicinal plants (Figure 12).

Figure 9. Monte bravo in denudational hills

Figure 10: Rastrojo in alluvial plains of the El Valle River

Figure 11. Leisure and Rastrojo in northern beach ridges

Figure 12. Monte viche and Rastrojo in the Ciudad Mutis-El Valle corridor

Table 1: Gendered Spaces and Uses in the El Cedro (Aquirre 2013)

Local (translated to USA *) Classification schemes			**Gendered Space**			**Gendered Use**	
Level I	**Level II**	**Physical Characteristics**	♀	♂	B	♀	♂
Monte (* Forest Land - Tropical rain forest - may include Forested Wetland)	Monte bravo (Primary Forest)	Denudational terrain, higher relief, relatively less fertile soils, slash and mulch shifting cultivation		♂			Logging, Hunting
	Monte Viche (Secondary Forest)	Hill slopes, upstream tributary floodplains, upstream main river floodplain			B	Gathering, Animal husbandry (E),	Logging, Hunting, Fishing

Respaldo (* Forest and Transition between Forest and Agriculture)	Partial or complete overlap with Monte (Forest land)	Marginal lands and/or to be inherited			B	Gathering, Fishing, Animal husbandry (E),	Logging, Hunting, Fishing None
Rastrojo (* Agricultural Lands)	Cropland	Best soils, flatter relief; closer to rivers, the village, and the sea			B	Agriculture, Animal husbandry (E), Gathering, Fishing	Agriculture, Fishing
	Azoteas (Nurseries, Horticulture)	Neighboring to houses	♀ E			Gardening (Nurseries, Horticulture) (E)	
	Potrero (Pastures)	Farther to the village, close to rivers and roads, low relief, soils of any quality			B	Cattle raising (I), Gathering, Animal husbandry (E)	Cattle- raising (I)
El Valle village (* Urban or built-up area)	Residential	Multiple-unit structures of urban cores, high to low density, farmsteads, rural residential and recreational subdivisions, may have forest or agriculture			B	Paid labor (I), Handcrafts (I), Gardening (I), Animal husbandry (I)	Paid labor (I), Handcrafts (I), Residential

♀ = Women B = Gender-neutral (I)= Incipient 30-40 years ago
♂ = Men (E) = Almost Extinct

***** Anderson et al. (1976) Classification scheme Levels I and II. As the research was part of a doctoral dissertation in the USA, this classification scheme was used to help explain local land use and land cover types.

Although the above local classification is widely used in the Colombian Pacific region, nuances of these classes have encroached inside local perceptions and beliefs. It is unclear how perceptions of younger generations towards land and its uses will continue endorsing current classifications. Shifting values towards land may result in fluctuating customary laws throughout time, leading to future assessment opportunities (Le Dû-Blayo 2011, Ho 2016, McKay 2018).

In addition, Monte bravo is basically a men space, whereas Monte viche and Rastrojo are gender-neutral spaces, of both women (including children) and men. Potreros (pastures) are gender-inclusive spaces more general. Inside these chief subdivisions are included subunits resulting both from gender and kinship relations, and symbolic practices, although these boundaries 'are porous and flexible, and patterns of usage change on a seasonal basis' (Arocha 1999). Subsistence farming is still the most important occupation of the population.

Azoteas are exclusively women activity where they grow food plants, cash crops, medicinal plants, and tree species, among other uses (Camacho 2001). This type of gardening is pivotal both to the consolidation and transfer of women's knowledge of their environment and to their social coherence. Various functions of Azoteas have been evidenced by scholars, among them, as food sources, as vessels for food and seed interchange between the broader community members, and as containers for keeping symbolic linkages to their extended families and lands (Leyton et al. 2001, Mena et al. 2001, Camacho 2001). Further research may explain why Azoteas are nearly extinct in the study area, perhaps by continuously losing their value to the community.

Subsistence agriculture in fincas (farms) is an activity in which men and women participate. Pertinent actions such as slashing, cropping, and harvesting are shared both by

women (children) and men. However, agriculture is decreasing over time due to a generational value-related change. For younger women who seek to engage in urban types of activities, subsistence agriculture is becoming increasingly a secondary task. Whereas some of the younger men are becoming more inclined to activities such as fishing and logging that could increase more their income.

Fishing (in rivers and the sea) is a gender-neutral activity, which products are intended both for their own consumption and for cash benefits. However, aquatic spaces of rivers and the Pacific Ocean include sites that are used specifically by women and/or men. Women are mainly river fishers and use their own tools for this purpose; but, they also fish in the ocean at bay areas, or close to the shore, at head shores, or near cliffs. During the fieldwork campaign, at the study area women did not drive motored canoes, thus, fishing in open-ocean spaces was commonly performed only by men, who may also fish at rivers.

Livestock raising began in the 1970s. During the early to mid-90s cattle heads augmented while forest clearing increased in many areas resulting in transitions of the forest land cover into grasslands. This is mainly an activity performed by men. New colonizers from the interior of the country fostered the above changes using paid labor for slashing, forest clearing, pasture planting, and cattle raising, among other activities. This deforestation took place mainly along the dirt road to Ciudad Mutis and along a walking path to the Utria National Natural Park.

Likewise, Logging, is exclusively a men's activity. Most part of the logged wood is sold for cash to intermediaries who ship and market these products along the Pacific coast. Currently, logging is one of the major cash sources for men, although wood products are also used by locals for carpentry and construction.

Finally, Animal husbandry takes place close or within the local population's houses (mainly in corrals). Animals are more often raised by women, both for subsistence and for cash income. Notwithstanding, corrals are built largely with the aid of men. One of the most rapidly domesticated animals brought by Spaniards, by the indigenous population, was the pig who used to roam in Rastrojo near inter harvest periods (West 1957), thus playing ecological functions. Traditional pig horde practices are currently disappearing in "El Cedro", and therefore pigs are now largely maintained inside corrals within houses. Other corral animals include chicken and ducks.

Based on the above, and as stated by Bakker and Veldkamp (2008), is worth recognizing that land use properties and land cover properties are closely related but fundamentally different -and that there is a 'causality' between these two where land cover is constantly transformed by land-use change: "While 'primary land use', refers to the traditional concept of land use that directly affects and controls the land cover (e.g. Agriculture and forest as the dominant primary land uses), the secondary land-use does not claim a certain area, nor it has a significant impact on the land cover (e.g. leisure/tourism, extensive grazing, and hunting) and can co-exist with primary land uses and with each other."

On the other hand, labor exchange or cooperative labor groups (minga, mano cambiada, and mateo) are the main ways in which the labor force is provided by these communities for agricultural purposes saliently. Today, some paid labor is used especially for few days of slashing, while wealthier locals may use additional paid labor for cattle raising, and construction, among other activities.

We may assert that currently in the rural research area, men-akin (secondary) land uses (logging, hunting) are under the trend of almost completely controlling Forest land cover in the near future. Whilst the now (women-akin) secondary uses linked to rural agricultural lands (Rastrojo), as are gardening and animal husbandry, are practically collapsed, thus shifting to only agriculture (a primary use) more general. More so, also in Rastrojo, young women are in the trend of either abandoning the gender-neutral/inclusive agricultural-use or of reducing dramatically its frequency (Aguirre, 2013).

Conclusion

It is evident that the collective titling process to afro-descendant traditional communities in the Pacific region of Colombia has been official recognition of historical customary tenure and use of lands. Thus, the causes and consequences of this collective titling of traditional landscapes under the lenses of land use and cover change (as far as this research has shown) must be regarded prospectively as opposed to retrospectively.

Undeniably, the collective titling to the study area in 2002 seemingly controlled unwanted devastating effects of novel colonization land uses by agents and organizations with different (possibly lucrative) interests that could have led to radically different land cover trajectories (and to more impacted livelihoods), imaginably contrasting those envisioned/constructed by these communities (Goyes and South 2015).

But today, the progressively affected productivity is saliently perceived by villagers as a reduced diversification of food-crops, cash-crops, and wood-products throughout time (not only of lower quality). Various formerly cultivated crops have now almost disappeared (e.g. ivory plant, rubber, rice, maize, sugar cane), whilst plantain, and sweet manioc (yucca) that was a minor product, are increasingly becoming the main starch food in the last few decades.

Likewise, it has been asserted that traditional forms of local cooperation among Afro-Colombians are also progressively declining in the El Cedro apparently due to that less time is dedicated to agriculture throughout time (Valencia and Mosquera 2006). Seemingly, age is also an indication of the breakdown process of some secondary land uses, and thus of changes in traditional subsistence livelihoods (under customary tenure) and the landscape. Farms are gradually shifting to lone primary land uses (i.e. agriculture, or pastures, or forest), controlling land cover (causal relation), and hence showing trends towards a downfall of gendered secondary uses in the fields. For younger women who seek to conduct an urban type of activities, subsistence agriculture is increasingly becoming a secondary task. Whereas some of the younger men are inclined nowadays to activities such as fishing and logging that could increase more their income. However further research is needed to assess the novel activities and economies in which local inhabitants are now involved. Albeit, those collective lands already titled to Afro-descendant communities in the Colombian Pacific region need to keep their main traditional production practices to continue being protected by this legal figure in the country. Thus, potential migration processes of the younger population seeking novel livelihoods may be linked to this situation.

The Pacific region has been regarded as a ‘cultural landscape’ of ethnic groups that embodies a community living project. Although the national government does allocate financial resources to collective titling to afro-descendant communities (Melo 2015a), Local Community Councils (LCC) claim not envisaging coherent actions leading to the promised development objectives after collective titling (LCC personal communication).

It has been stressed that Afro-descendant communities’ most valuable asset is land (Camacho 1999), making land use and cover dynamics even more closely linked to land tenure. Now that tenure has been secured for the El Cedro community under the sanctioned collective land title of 2002 (Law 70) the progression of kin relations and customary rules to their ethnic identities is yet to come to light. Decisions outside the collective land have affected these community in countless ways, including armed conflict processes, and development and territorial plans at national and subregional scales; indeed, in the near future, one of strongest impacts could be the proposed construction of transportation infrastructure connecting the El Valle village to the interior of the country via Nuqui (a neighboring village), which is an existing government plan. To be sure, interrelations between social and environmental processes will continue changing in many complex ways -particularly those linked to the

Colombian contemporary armed conflict peace process-, including insecurity for land claimants, disputes among regional and national elites, challenges to identify land rights' beneficiaries and contradictions between development and restitution policies (Melo 2015b). The latter, notwithstanding conjunctional agrarian politics "of land and territory that "unfold below the surface" of what is legible through a simplified understanding of post-conflict geographies" (Eloisa 2017).

Although African culture still prevails, vivid memories have sunk under centuries of social changes. And these changes have resulted in novel reconfigurations of livelihoods and landscapes. Afro-Colombians have created the Monte, Rastrojo, Azoteas, and their Respaldo, in sum, their traditional landscapes. These were the foundation for the passing of Law 70 in 1993, which sanctioned the titling process of collective lands to Afro-descendant communities in the Pacific region with traditional livelihoods and long settlement histories, and for the protection of cultural and ethnic identities of the "Black communities" of Colombia.

But outstandingly, according to the found rearrangement of settlement spaces and production systems inside this collective title, it was manifest that women´s role on LULCC, as well as their decisions and strategies, have significantly restructured settlement patterns, and land-use dynamics at various spatial and temporal scales to produce these 'traditional landscapes' (Aguirre 2013). Recognition of the gender dimensions of these traditional landscapes could significantly support more sound development and territorial initiatives to these communities by acknowledging their landscapes and community values; by protecting and supporting knowledge transfer of traditional agriculture, Azoteas, and animal husbandry, and thus food security, and by opening new avenues for improved economies based on their traditional livelihoods.

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DIVERSE ENERGY TRANSITION PATTERNS IN CENTRAL AND SOUTHERN EUROPE: A COMPARATIVE STUDY OF INSTITUTIONAL LANDSCAPES IN THE CZECH REPUBLIC, HUNGARY, ITALY, AND SPAIN

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Keywords: renewable energy, institutional landscapes, drivers of transition, policy, comparative analysis

Abstract: Growing awareness of anthropogenic climate change, deep cuts in CO_2 emissions, and the exhaustion of easy-to-extract fossil fuels have led to a growing interest in developing renewable energy sources as a part of the (desired) transition to a low-carbon society. The target of the European Union for 2020 is to cover 20% of final energy consumption by renewable energy sources, and for 2030 it should reach at least 32%. While there are ambitious goals to boost the energy transition, it is becoming increasingly evident that the processes run differently in different countries, some of which still prefer path-dependent options and resist major changes. This comparative study applies a historical institutionalist approach to examine the institutional factors influencing the development of renewable energies in the Czech Republic, Hungary, Italy and Spain, countries with different geographies, political and socio-cultural traditions, belonging respectively to Central and Southern Europe, whose comparison has so far been largely neglected in the literature. The general objective of this paper is to investigate and exemplify how diverse energy traditions, institutional frameworks, policies, and practices shape the processes and outcomes of the renewable energy transition.

Introduction

In response to climate change, limited fossil fuels, national energy security, and rising global energy demand, renewable energies (RE) have been rapidly developing throughout Europe. Since 1990 most European countries have adopted policy frameworks and measures in order to stimulate a transition to more sustainable energy systems (Klessmann et al. 2011). The target of the EU for 2020 is to cover 20% of final energy consumption by RE, and for 2030 it should reach at least 32% (EU 2030 Energy Strategy, http1). The overall EU target of 20% of final energy consumption from renewable sources by 2020 was allocated to the different member states according to their current mix and potential for contribution. In Southern Europe, the targets vary from 17% in Italy and over 20% in Spain and France to 31% in Portugal. Among the Central European countries, the Czech Republic and Hungary (both 13%) have one of the highest proportions supposed to be reached in the region (Chodkowska-Miszczuk et al. 2017, RES21 2019).

While these targets are subject to constant evolution, as has happened in the 2030 EU framework (EU, 2014), they have already led member states to define, adopt and implement more or less ambitious renewable energy policy measures. The policy support heavily influenced the pace of development of renewable energy, that have undergone dramatic changes and adjustments, which have resulted in some unintended environmental and socioeconomic

consequences (Ajanovic 2011, Luňáčková et al. 2017, Martinát et al. 2016), such as new land-use conflicts and disconnections between policymakers and stakeholders (e.g., Calvert and Mabee 2015, Warren 2014).

Social-technical transitions involve far-reaching changes along different dimensions, such as technological, material, economic, organizational, institutional, political and sociocultural (Markard et al. 2012). In addition to the technological dimension, the energy transition includes changes in user practices and institutional (e.g. regulatory and cultural) structures (idem). While there are ambitious objectives to boost RE transition, it is more and more evident that it is going differently in different European countries, as the nature of restructuring trends in the energy sector is contingent upon regional and national circumstances (Bouzarovski and Tirado Herrero 2016). Thus, the desired end state of the energy transition is understood differently in the EU countries. In Southern European countries (SEC), where energy transition is framed within the decarbonization of the economy, the countries like Spain and Italy have been ahead in the energy transition process, although their development trajectories were interrupted due to the scaling back of financial support mechanisms (Wang and Zhan 2019). In the former socialist Central and Eastern European countries (CEEC), which have been lagging or even resisting until recently the expansion of new developments, energy transition has been considered primarily as a liberalization and privatization of the energy sector with key changes occurring in the structure of ownership and the role of competition (Bouzarovski 2009).

Thus, it is of utmost importance to understand what is the role of energy policies and landscape planning systems in the EU states with different heritages of energy systems and political and cultural planning contexts which have been shaping the energy transitions in each case (Suškevičs et al. 2019, Frolova et al. 2019). This understanding can provide valuable hints for effective policymaking and avoid the risk of one-size-fits-all energy policies that time to time resonates in political discussions. Based on a comparative analysis of institutional landscapes in four European countries (the Czech Republic, Hungary, Italy, and Spain), the objective of this paper is to investigate and exemplify how diverse energy traditions, institutional frameworks, policies, and practices shape the processes and outcomes of the ongoing low-carbon energy transition.

Material and methods

Numerous studies have examined the diffusion dynamics and factors affecting differences in renewable energy deployment outcomes across European countries (Buen 2006, Toke et al. 2008, Pettersson et al. 2010, Davies and Diaz-Rainey 2011, Chen et al. 2014, Frolova et al. 2015, Chodkowska-Miszczuk et al. 2017, Lauf et al. 2018, etc.). Simply said, these factors may be divided into two groups, including ‘hard’ and ‘soft’ factors. The hard factors include geographical determinants important for a local scale, as for example geographical potential, urban forms, concentrated or dispersed settlement structure, etc. These factors are more static, i.e. change very slowly or do not significantly change throughout time. By contrast, the soft factors, related to political-institutional, economic, social and cultural characteristics of each country, are crucial for a wider scale (regional and national), and generally are much more dynamic (changing in time) than ‘hard’ factors.

A widely-cited study by Toke et al. (2008) introduced a conceptual framework for a comparative analysis involving four main types of institutional variables, which have an impact on wind energy deployment outcomes, including planning practices and systems, landscape protection norms and organizations, the financial support mechanisms, and ownership patterns of projects. This conceptual framework has been further developed and specified by Ferguson-Martin and Hill (2011). Apart from the system of planning and approvals, renewable incentive

systems, market structure and patterns of ownership, and stakeholder support and opposition, they pointed out also the role of path dependency and structural and technological factors, such as the historical use of particular energy technologies and the grid infrastructure (Ferguson-Martin and Hill (2011).

Being inspired by the works of Toke et al. (2008) and Ferguson-Martin and Hill (2011) and their calls for further testing of their conceptual frameworks through additional case studies, this comparative study applies a historical institutionalist approach to examine the factors influencing the development of renewable energies in the Czech Republic, Hungary, Italy, and Spain. Our main hypothesis is that there are two patterns in the renewable energy development configuration in these countries, namely Southern and Central-Eastern European patterns, with substantial differences between them.

Our selection is conceptually based on an attempt to compare factors affecting the development of renewable energies in countries with different geographical location (in Central and in Southern Europe), and diverse political and socio-cultural traditions, whose comparison has so far been largely neglected in the literature (Suškevičs et al. 2019). Our research consisted of two main parts. Firstly, we have reviewed existing literature, policy documents, industry reports, and other stakeholder publications to identify differences and similarities between studied countries. Secondly, selected statistical data obtained from the International Energy Agency and national statistical reports for the period from 1990 till 2017 were harmonized and interpreted, being summarized into tables and explanatory graphics presentations. We start with the comparison of basic indicators related to the energy production in each country, after which the main factors identified in the conceptual framework by Ferguson-Martin and Hill (2011) were compared and contrasted in our analysis. Finally, lessons to be learned from different patterns of the energy transition in each region are defined and discussed. Several policy recommendations on how the future development of renewable energy sectors could be directed in a more sustainable way were also outlined.

Results and discussion

Energy dependence and the share of resources in electricity generation

On the overall EU-28 level, net imports of electricity in 2016 represented 1% of overall electricity consumption by end-users (http1). However, there is a substantial difference if we focus our attention on this data for the Czech Republic, Spain, Italy, and Hungary. While Hungary had the biggest share of imports in their electricity consumption with 34%, the Czech Republic was the biggest exporter with 20% of electricity produced. In 2016, the biggest net importers of electricity among them were Italy (43,181 GWh) and Spain (21,845 GWh), while, on the other hand, the Czech Republic, with its 24,791 GWh was the biggest net exporter of electricity among four studied countries (Table 1). As for energy imports, for Italy, Spain, and Hungary, we have found high energy dependency ratios with imports of about 76%, 71% and 58% of energy respectively. Only the Czech Republic imports less than 32% of energy (Table 1).

Table 1. Electricity consumption and trade, and energy imports in the Czech Republic, Hungary, Italy and Spain (Source: Eurostat, 2016; IEA Statistics © OECD/IEA, 2014)

Country	Final consumption of electricity (GWh)	Electricity imports (GWh)	Electricity exports (GWh)	Net imports of electricity (GWh)	Share of imports (%) on electricity consumption	Energy imports net of energy use (%)
Czech Republic	56,050	13,817	24,791	-10,974	-20	31.62
Hungary	37,118	17,951	5,240	12,711	34	57.67
Italy	286,027	43,181	6,154	37,027	13	76.42
Spain	232,515	21,845	14,178	7,667	3	71.43

The view on the national energy mixes (Figure 1), respectively on the availability of domestic resources that contribute to electricity production in particular countries, can help us explaining different energy transition patterns and the levels of renewable energy development (Figure 2). In Italy, the development of renewable energies has been driven by the absence of nuclear power plants and efforts to reduce the dependence on imported coal. Although Spain has its own nuclear power plants (which generated nearly one-third of the total electricity in 2018), it is still, together with Italy, among the top coal importing countries in the world (Ricketts et al. 2017). This has also been an important driver that pushed both countries to exploit domestically located renewable energy sources such as wind and sun. On the other hand, the Czech Republic and Hungary are typical by relying on their nuclear power plants and coal reserves from a long-term perspective, which in fact caused that the pressure on developing renewable energy has not been so strong.

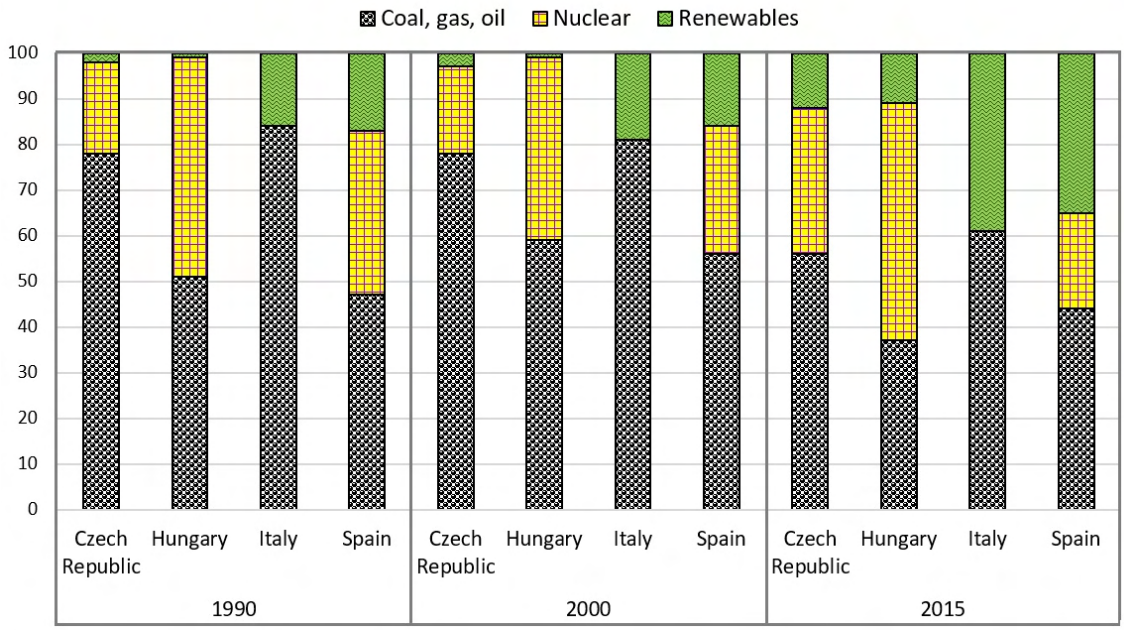

Figure 1. Share of energy resources (%) on total electricity generation (1990, 2000, 2015) (Authors´ elaboration, Source of data: IEA 2018)

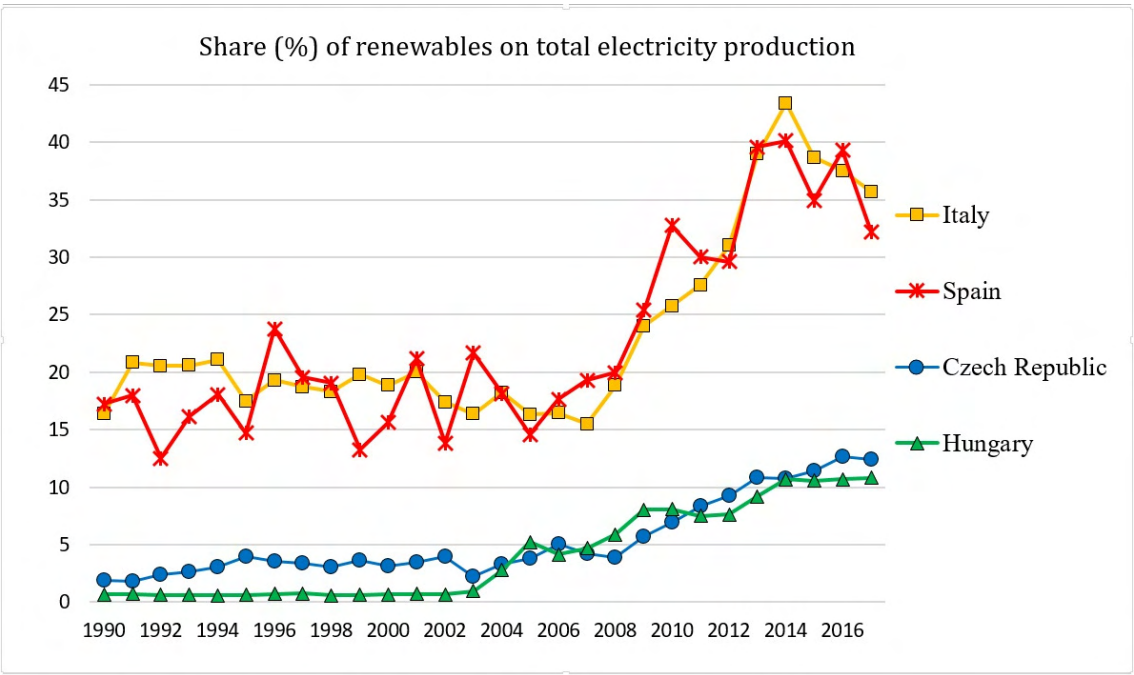

Figure 2. Share of renewables in total electricity production (1990–2017) (authors´ elaboration, source of data: IEA (2018))

In all studied countries, we are able to identify certain characteristics related to the structure of renewable energy sources contributing to electricity generation that variously reflect historical settings and development of their energy policies, national specifics, and contextual differences. Let us start our analyses with the focus on the structure of renewable energy in each of countries (Figure 3).

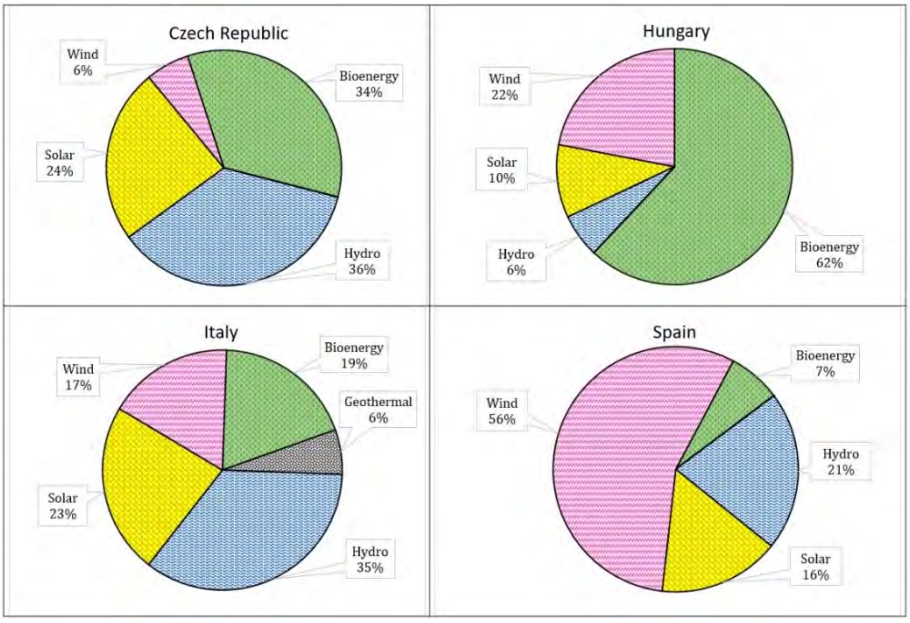

Figure 3. Share of sources in renewable electricity generation (2017)
(Authors' elaboration, Source of data: IRENA (2019))
Note: The category of bioenergy includes energy from renewable waste, solid biofuels, liquid biofuels, and biogas.

First, we must mention a significant difference in the total amount of electricity production from renewable energy sources. The total annual production (in 2017) was 103,910 GWh in Italy, 88,384 GWh in Spain, while only 9,621 GWh in the Czech Republic, and 3,468 GWh in Hungary (IRENA, 2019). The Czech Republic is characterized by the biggest shares of electricity generation from bioenergy, particularly from agricultural AD plants, hydropower plants and solar PVs and, on the other hand, by the smallest share of electricity generated from wind energy. This is quite a paradoxical finding if we consider the high realizable potential of wind energy in the country. The electricity generated from renewable energy in Hungary is primarily based on bioenergy (particularly from renewable waste and solid biofuels) and partly from wind power. In this case, the share of hydropower is very small. As is visible in Figure 3, Italy is the only from studied countries that effectively exploit geothermal energy, but in total, the dominant source of renewable electricity in Italy is hydropower followed by solar PVs, bioenergy and wind energy. In Spain, wind farms and hydropower plants are two dominant producers of renewable electricity. Spain has the lowest share of electricity production from bioenergy in the four studied countries.

Concerning the territorial distribution of RE within studied countries, it is interesting to compare the installed capacities of solar photovoltaic energy (Figure 4), wind energy (Figure 5) and bioenergy (Figure 6). The information on installed capacities presented in maps for the NUTS3 regions' level corresponds to the province/county level in individual countries (*kraje* in the Czech Republic, *megye* in Hungary, *province* in Italy and *provincia* in Spain). The most recent data that we worked with were influenced by the availability of information for NUTS3 regions level in individual countries. For Italy and Spain, we worked with data from 2018, while for the Czech Republic and Hungary it was 2017. To enable the comparability of data on wind energy, only onshore installed capacities were included in analyses. Concerning bioenergy, it is appropriate to note that Spanish data contains power plants that use as main fuel biomass from energy crops, agricultural livestock or gardening activities, forestry exploitation and other forestry operations in forest stands and green spaces. On the other hand, bioenergy data for the Czech Republic includes installed capacities of biogas plants based on agricultural materials, which affects the comparability of this data. NUTS3 regions with the highest installed power capacities of solar, wind and bioenergy are summarized in Table 2.

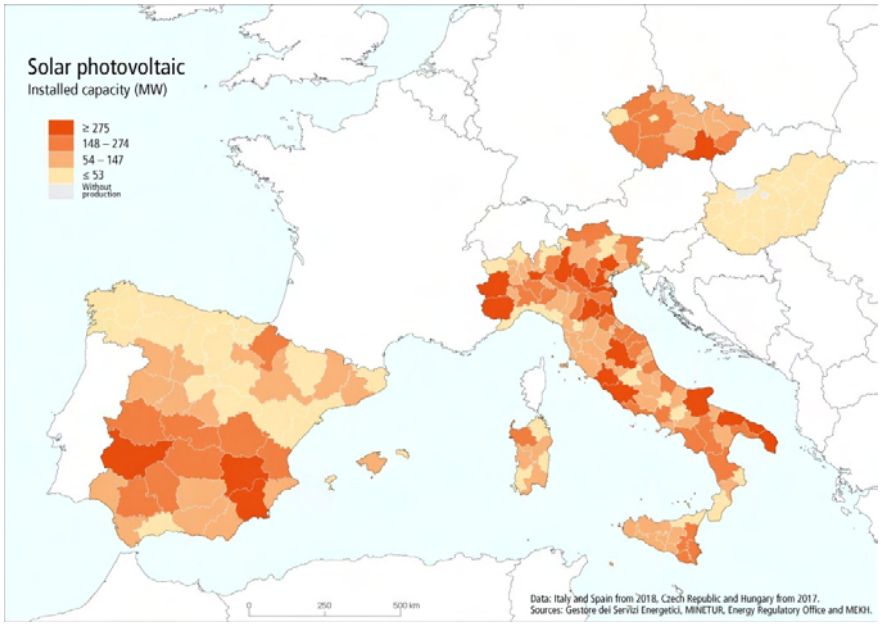

Figure 4. Photovoltaic installed capacity (MW) in the Czech Republic (2017), Hungary (2017), Italy (2018) and Spain (2018) at NUTS3 level. (Authors' elaboration, source of data: Energy Regulatory Office, MEKH, GSE, and MINETUR).

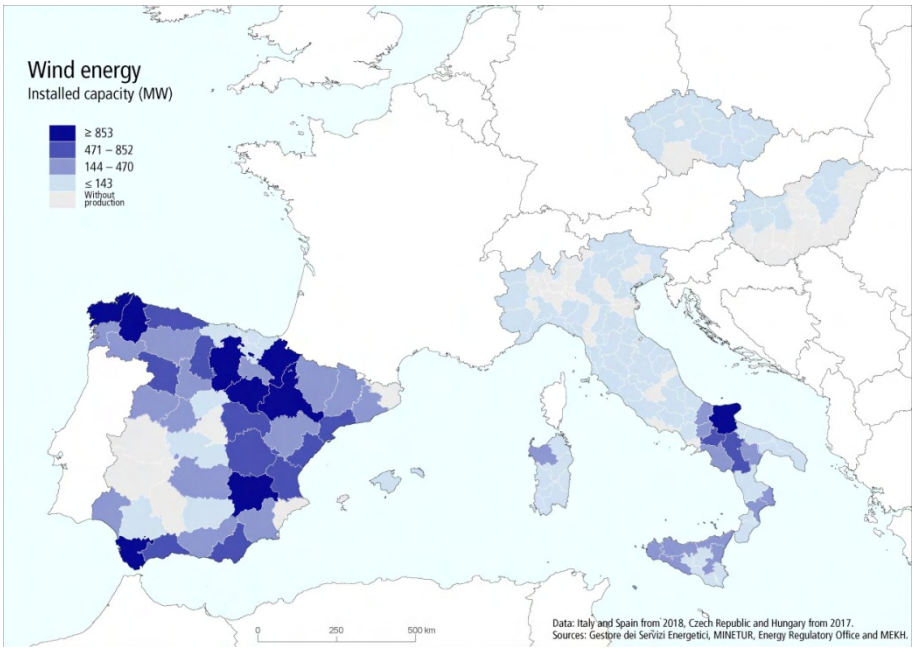

Figure 5. Wind energy installed capacity (MW) in the Czech Republic (2017), Hungary (2017), Italy (2018) and Spain (2018) at NUTS3 level. (Authors´ elaboration, Source of data: Energy Regulatory Office, MEKH, GSE, and MINETUR).

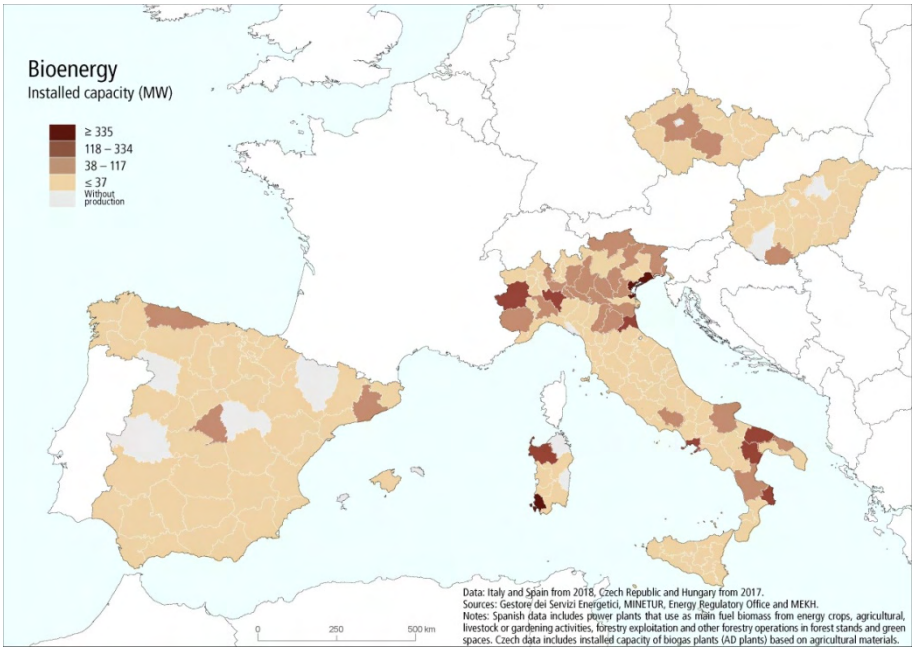

Figure 6. Bioenergy installed capacity (MW) in the Czech Republic (2017), Hungary (2017), Italy (2018) and Spain (2018) at NUTS3 level. (Authors' elaboration, source of data: Energy Regulatory Office, MEKH, GSE, and MINETUR).

Table 2. Ranking with the 10 NUTS3 with the highest installed power capacity according to renewable sources in the Czech Republic (2017), Hungary (2017), Italy (2018) and Spain (2018). (Authors' elaboration, Source of data: Energy Regulatory Office, MEKH, GSE, and MINETUR)

No.	Wind energy		Solar photovoltaic		Bioenergy	
	NUTS3	MW	NUTS3	MW	NUTS3	MW
1	Albacete (ES)	2057.7	Lecce (IT)	531.8	Venezia (IT)	725.0
2	Foggia (IT)	1997.6	Cuneo (IT)	475.7	Carbonia-Iglesias (IT)	587.0
3	Burgos (ES)	1864.6	Jihamoravský (CZ)	446.2	Sassari (IT)	334.1
4	Zaragoza (ES)	1414.6	Murcia (ES)	436.0	Ravenna (IT)	258.8
5	Lugo (ES)	1401.5	Brindisi (IT)	425.1	Torino (IT)	238.3

6	Cádiz (ES)	1318.2	Bari (IT)	410.2	Bari (IT)	224.5
7	Navarra (ES)	1253.2	Brescia (IT)	375.8	Napoli (IT)	218.5
8	La Coruña (ES)	1174.4	Rome (IT)	355.2	Crotone (IT)	191.8
9	Soria (ES)	1164.6	Foggia (IT)	351.2	Matera (IT)	163.1
10	Potenza (IT)	852.0	Torino (IT)	351.2	Pavia (IT)	151.5

Energy traditions and energy policies: common points and divergences

There is no doubt that renewable energy development in the studied countries is affected by certain similarities as it is generally shaped by the common EU energy policy. However, divergences are also obvious. These divergences are linked to national energy tradition in each country, which is influenced by a complicated and complex past and present developments and contexts of particular energy sectors (Table 3).

While Italy and Spain entered the EU before the beginning of the development of European energy policies (1997), in 1957 and 1986 respectively, the Czech Republic and Hungary became the full members of the EU much later, in 2004. Therefore, both the latter mentioned countries started the implementation of European RE policies later, in 2005. In spite of the EU energy policy, that is common for all four countries, the public and political support for renewable energies is closely interconnected to specific configurations of the energy sector in particular countries. The differences in the institutional landscapes of these countries allow us to distinguish two patterns of the configuration of renewable energy development, namely Southern and Central-Eastern European patterns, with substantial differences among each other.

Both Italy and Spain developed their renewable energy policies in a context of very limited conventional energy sources, external energy dependence, diversity of resources in energy mix and availability of a wide range of renewable energy sources (e.g. Mahalingam and Reiner 2016, Pareja-Alcaraz 2017) (Table 3).

Table 3. General contexts of the development of renewable energy policies in the Czech Republic, Hungary, Italy and Spain (Source: authors' elaboration)

Country	**Conventional energy sources**	**Support for nuclear power**	**External energy dependence**	**Diversity of resources in the energy mix**	**Energy markets**	**Energy intensity of national economies**	**Availability of RE resources**
Czech Republic	Coal and Nuclear power	High	Lower	Dominance of coal	Centralized	Higher Ratio	Wind, biomass, solar PV
Hungary	Nuclear power	High	Moderate	Dominance of nuclear power	Centralized	Higher Ratio	Solar, wind, biogas
Italy	Little oil reserves	Low	High	High diversity of energy resources	Decentra-lizing	Lower Ratio	Wide range of RE
Spain	Nuclear power	Low	High	High diversity of energy resources	Decentra- lizing	Lower Ratio	Wide range of RE

On the contrary, energy sectors of the Czech Republic and Hungary are typical by a dominance of only one energy source in the structure of national energy production (it is hard coal in the Czech Republic and nuclear energy in Hungary) and a narrower range of renewable energy sources available (e.g. Ürge-Vorsatz et al. 2006, Buzar 2007, Frantál and Kunc 2010,

Lofstedt 2008, Martinovský and Mareš 2012, Chodkowska-Miszczuk et al. 2017, 2019). Another substantial difference between the two mentioned modes of renewable energy development is the energy intensity of national economies (the ratio between energy supply and gross domestic product measured at purchasing power parity (http2)). From the 1990s to 2015, Italy and Spain have been having a relatively low ratio of such intensity (0.85 and 0.92 kWh/$ respectively), which means that less energy is used to produce one unit of economic output. On the contrary, the Czech Republic and Hungary have been developing from a very high energy intensity of their economies in the 1990s (2.81 and 1.9 kWh/$ in 1990 respectively) to moderate energy intensity in 2015 (1.53 and 1.20 kWh/$) which is in line with the transition of these economies from their focus on heavy industry during the Socialist era. In addition, these two modes differ by a degree of centralization of their energy markets: while in Italy and Spain energy markets are gradually decentralizing, in the Czech Republic they are rather centralized which enormously affects ongoing energy transition. Traditionally state-controlled energy industry (based on the coal and nuclear power plants) is still persisting and thus, energy issues are primarily solved on the national level. Finally, RE in Southern European countries have been developing in the context of low public support for nuclear power (even in Spain where a substantial share of electricity production is from nuclear power) (Eurobarometer, 2008), while in the Czech Republic and Hungary there is a high support for nuclear energy among the general public (Eurobarometer 2008, Frantál 2015).

Among other important characteristics of energy sectors in the Czech Republic and Hungary several authors (Frantál 2015, Chodkowska-Miszczuk et al. 2017, Frantál and Prousek 2016, Suškevics et al. 2019) cite following factors:

- Persisting energy dependency on Russia,
- Agriculture shaped under the socialist regime (during this period, after confiscation and nationalization of small private farms, large-scale and state-owned farms were created) which persisted until the early 1990s (Chodkowska-Miszczuk et al. 2017),
- The backwardness and inconsistency of the planning and decision-making process in which regional authorities interpret the national energetic strategy differently and apply willfully the correlative legislation norms,
- Low level of trust in state institutions that affects attitudes of population towards RE subvention schemes and their misuse,
- Limited linkages between the transition of energy policies and environmental consequences.

Market structure and patterns of ownership

In wind and solar PV energy the Spanish market, which peaked in 2007-2009, was dominated by large-scale systems (del Rio and Mir-Artigues 2012, Frolova et al. 2014). The dominance of large-scale industrial plants in Spain is related to the top-down planning without the involvement of local actors into the RE planning process (Dewald and Truffer 2011, Hammarlund et al. 2016, Kriechbaum et al. 2018).

In addition, the dominance of the large-scale segment in the Spanish solar PV market from 2004 to 2008 (so-called solar orchards/"huertas solares") could be explained by an ownership structure that allowed investors to divide large installations into small participations. By applying such a measure that they could obtain the high feed-in tariff level for small installations and thus to reduce costs for large installations and consequently to reach higher profitability than originally expected by the regulators (Kriechbaum et al. 2018). Therefore, the financialization of the solar PV market caused PV investments to become a financial product rather than a renewable investment (Prieto and Hall 2013). This situation has changed, primarily

due to different restrictive measures which will be discussed in the following sections. However, due to price cuts, including lower production costs by 80% over the last 10 years, better frameworks for self-consumption of solar power both on state and regional levels, and the cancellation of fees and charges, the large volume of investments in the development of photovoltaic projects occurred and has once again positioned Spain as a benchmark worldwide in solar PV projects development. Solar PV installations increased by 94% in 2018 compared to the prior year, of which around 90% (235.7MW) of last year's deployment was in the rooftop self-consumption segment, with the other 26 MW in ground-mount projects, according to the data registered by Spanish solar association, UNEF (http3 https://unef.es/).

As for ownership patterns, in Spain, leading electricity companies (Ibedrola, Acciona, Gamesa Eólica, etc.) are the main owners of wind farms. Solar PV owners are numerous Spanish and foreign companies: Endesa, Acciona Solar, Soltec Energías Renovables, Green Power Technologies, Enel Green Power, etc.). However, there are very few community or farmer-owned wind and solar PV installations. Finally, for bioenergies there exist a wide variety of ownership patterns, from micro-SME or family-owned companies to large companies operating in different energy subsectors or even in other economic sectors. Companies involved in the development of electricity and biofuel projects use to be larger and often collaborate with different biomass suppliers (industries, cooperatives or farmers) (Agencia Andaluza de la Energía, 2018).

As for Italy, the energy market, in general, continues to be strongly influenced by the legacy of the nationalization period. In 2015, the former national monopolist, ENEL, still dominated the Italian electricity production with a share of 25.7%, followed by ENI (8.6%), and EDISON (6.4%). The first 6 operators produce nearly 50% of the Italian power generation (AEEGSI 2016). These are also leading companies in the different energy sectors on a global scale. Otherwise, as regards renewable energy, the Italian market structure is quite uneven.

Italian PV ownership pattern, for example, is considerably less concentrated than other European countries. Considering only industrial and large-scale capacity, in 2014 the first 10 operators represented just 10.3% of the total, against 68% in the UK, 28% in France and 18% in Spain (Cruccu et al. 2014). With regard to wind energy, installed capacity is mostly concentrated in the southern regions. Even if the total number of plants is quite high (5,579), around 90% of wind power generation is produced by farms over 10 MW of installed capacity. Contrary to PV, the wind sector is dominated by large players, led by ERG (more than 11% of the market share in 2017). As regards bioenergies, installed capacity is concentrated mainly in northern regions. The ownership structure is highly dependent on different sub-sectors, with larger companies mostly involved in biofuel and bioliquids production. As for biofuels, it is worth noting that only 27.5% of biofuels released for consumption in 2017 were produced in Italy, as the rest was imported from abroad (and mainly from Spain). Regarding biogas, a large number of small plants are owned by farmers. The average installed capacity of new biogas stations decreased significantly in the last years, as incentives were limited to small plants up to 300 kW in order to limit the use of food crops (like maize, sorghum, and wheat), typical of larger plants until 2012. Finally, it is to be mentioned that in Italy various grassroots initiatives in the field of community energy exist across different sectors, although they are still quite limited if compared to other European countries (Candelise and Ruggeri 2017).

REs implementation meets many obstacles in Hungary and the Czech Republic. Investors have to tackle with prices of technologies that are imported mainly from Western Europe, fluctuations of energy prices, etc. (Chodkowska-Miszczuk et al. 2017).

The energy sector in the Czech Republic is heavily influenced by the central position of the state-owned (from 70%) the ČEZ company in the energy market as it generates almost three-quarters of the total electricity generation in the country. The influence of the ČEZ company on the formulation of Czech energy policy is enormous as they own major facilities for energy

generation in the Czech Republic (two nuclear power plants, ten coal mines, etc.). Investments of the company are spread beyond the Czech Republic in Bulgaria, Germany, Hungary, Poland, Romania, Slovakia, and Turkey. Four other major owners of facilities for energy generation could be found but their share market does not exceed a tenth of the total energy production. The concentration of energy generation in the Czech Republic is enormous. The ownership of renewable energies is various. Plenty of investments into renewable energies originate in Austria (wind energy) or Germany (biogas energy). On the other hand, the majority of agricultural biogas stations are owned by farmers that usually operate their farms on large acreages (in comparison to other EU countries). Community ownership of facilities for generating renewable energies is rather rare but successful examples might be found. The boom of solar installations that occurred in the Czech Republic as a result of generous subsidies scheme at the end of the first decade of the 2000s caused a situation when phenomena of unknown ownership of solar installation occurred. Consequently, together with plenty of scandals and controversies, the reputation of renewable energy among the public was significantly affected.

The structure of the Hungarian electricity market was basically formed around 1995, when the majority of the production capacities, the providers for public use and distribution networks were detached from the former owners and then they were privatized one by one, in a way that the single units were mostly bought by foreign investors (RWE, AES, EdF, Electrabel, etc.). The Hungarian Electricity Works (MVM) Group is the only, nationally owned actor in the electricity sector with 6 plants. It is operating as a Recognized Corporate Group since 2007. MVM is a successful, vertically integrated, nationally-owned energy group with a portfolio that covers the total domestic energy system.

The biggest energy producer in Hungary is the Paks Nuclear Power Plant (also belongs to the MVM Group). Besides, there are coal, gas and biomass plants in the system and in smaller proportions of hydro and wind plants. At the time of writing, there are 19 big plants and more than 270 smaller (<50 MW) plants operating in Hungary. The total gross built capacity of the big plants was 6996 MW while the smaller ones were 1621 MW on the 31st of December, 2017.

MVM Ltd. is buying produced and imported electricity. The process is controlled by MAVIR (Hungarian Electricity Energy Industry Transmission System Coordination) Ltd, organizes the distribution of electricity that is finally distributed to local users by local electricity providers. The renewable and waste-based electricity energy falls into a specific selling category that MAVIR Ltd. is obliged to buy at an obligatory price (called KÁT).

While the production of the plants decreased by 22%, the consumption and import increased by 3 % since 2008. The production decreased due to the aging of the plants and the lack of new investments after the policy landscape changed with the central regulation of the prices, with the distraction from the sector and the decrease of the computability (stability) of the regulatory environment the sector became non-attractive for investors. A slight improvement can be seen from 2015 due to mainly the PV plant constructions.

Almost half of the total electricity production of Hungary was produced in the Paks Nuclear Power Plant in 2018. However, its production was decreasing, similarly to the coal, gas, oil-fueled, or wind and biogas plants. All national renewable energy production is decreasing since 2015. In RE production the biomass is dominating, but the quantity of production based on biomass is decreasing since 2015, it decreased by 10% in 2018. Its proportion in RE is still above 70% (it was almost 80% in 2014). Among the primary renewable sources, there was a decrease of the produced quantity in case of communal waste, biogas, geothermal and hydro based production in 2018, while the production of biofuels and solar energy is increasing since 2014 but it was getting only bigger than wind energy (where the last production capacity building was in 2010, and its proportion is just over 2% in the total RE production) in 2017.

Until the end of 2018, there was 726 MW PV capacity connected to the grid. In 2018 there were approximately 400 MW new capacity built, the former capacity more than doubled in one year. There was approximately 80–100 MW (as part of the 400 MW) new capacity originating from the household size (<50 kW) small plants. Half of the capacity (35 000 plants) belongs to households with an average of 5.6 kW capacity, 50 % belongs to other (non-natural) owners, with an average of 18.7 kW capacity.

There was a considerable increase in the case of the <0.5 MW built-in capacity, non-household size plant category, where the biggest investments were in PV plants. It was the decreasing investment costs and the support in the FIT system that boosted this size category.

Renewable incentive systems

Regulatory policies played an essential role in RE deployment. Spain, the Czech Republic, Hungary, and Italy have introduced various support mechanisms for RE production technologies (Table 4), adapting their policies to different national circumstances. The most effective of them was the development of the feed-in system. The feed-in systems for renewable energies – most often first for wind power and solar PV – have been introduced in the Southern European countries about ten years earlier than in Central and Eastern European countries studied: first in Italy (1992) and Spain (1994–1997), then in the Czech Republic (2002) and Hungary (2004). This price-based instrument uses two different options: the feed-in tariff (FIT), consisting of the fixed price paid to RE producers per unit of electricity, and more market-oriented feed-in premium (FIP), consisting of payment on top of the electricity market price (premium). The premium has been used in Spain, the Czech Republic, and Italy, as the main support system or in combination with other incentive systems (Schallenberg-Rodríguez 2017). FIT support was always used at least during the first stage of development of renewable energy markets, although at the further stages the most part of the studied countries reduced and even suppressed their FIT/FIP rates as in the case of Spain (REN21 2019).

Table 4. Institutional contexts of the development of renewable energy policies in the Czech Republic, Hungary, Italy, and Spain during 2000-2018 (adapted from Toke et al. 2008, Iglesias et al. 2011)

	Spain	Italy	Czech Republic	Hungary
Compe-tences and administra-tive levels of REs planning	**State**: national energy strategy, legislates on RE, authorizes plants >50 MW **Regions**: regional legislation and energy planning, authorizes plants ≤50MW, regional registry of plants **Local-level**: Municipal land-use plans, granting of building permits	**State**: national energy strategy, legislates on RE **Regions:** "Unique authorization" for plants >250 kW "Simplified authorization " for plants from 20 and 250 kW **Local-level**: Communication to the municipality for small domestic installation	**State**: national energy strategy, legislates on RE **Regions**: regional energy strategies, EIA and SEA processes **Local-level**: Municipal land-use plans, granting of building permits	**State**: national energy strategy, legislation **Regions**: NUTS 3 regions develop plans but have to follow the national plan. Small modifications of the national plan are permitted **Local-level**: Municipal land-use plans, otherwise it is the same as NUTS 3 level
Financial support system (Source REN21, 2019)	FIT/FIP, Tendering, Net metering/billing, Biofuel blend obligation/ mandate, Renewable heat obligation, Fiscal incentives, and public financing	FIT/FIP, Tendering, Net metering/billing, Biofuel blend obligation/ mandate, Fiscal incentives and public financing, Green certificates	FIT/FIP, Biofuel blend obligation or mandate, Tradable REC, Fiscal incentives and public financing, Green bonuses	FIT/FIP, Tendering, Biofuel blend obligation or mandate, Fiscal incentives and public financing

Stability of financial support	Varying/unstable, with retroactive measures	Varying	Varying/unstable, with retroactive measures	Stable
Characteristics of administrative procedure	Differ considerably from region to region with mismatches between different administrative levels, complexity, and tardiness	Differ from region to region with mismatches between different administrative levels, complexity	Hierarchical with mismatches between different administrative levels Complexity and tardiness	Hierarchical. Regions can decide which part of the national administration procedure can be followed less strictly
Grassroots initiatives (historical roots)	Rare Dispersed and localized, grassroots initiatives against large-scale RE power plants	National anti-nuclear movement Dispersed and localized grassroots initiatives against new power plants. Environmentalist associations criticize RE policy	Regional anti-coal and anti-nuclear movements Localized initiatives against new wind power plants and hydropower projects	Strong national opposition against a large hydropower plant (Bős-Nagymaros) in 1988 Dispersed and localized grassroots initiatives against some RE plants
Level of land-use and landscape planning systems	Regional, supra-municipal	Regional, municipal No specific spatial planning needed for RE plants	Regional, sub-regional (municipalities with extended power), local (municipal)	National, regional and local

For example, most of the PV infrastructures have been installed under a feed-in scheme in all the four countries (Figure 4), where the feed-in system implementation has led to the strong stimulation of formally insignificant PV markets. The "booms" of PV development in Spain in 2008, in the Czech Republic in 2010 and in Italy in 2011 were caused by a lack of adaptation of the tariff level (Figure 7) to the rapid price decrease of solar PV technology cost (Schallenberg-Rodríguez 2017). Only in Hungary, FIT/FIP support has been maintaining relatively stable, although in spite of growing FIT/FIP rates in Hungarian Forints due to their devaluation this increase cannot be appreciated in Euros, on Figure 4.

Among regulatory policies, that provide access to grid networks and remuneration for surplus electricity that is fed into the grid, net metering and billing is a primary mechanism used at the residential and commercial levels (REN21, 2019). These policies often help to spur the development of small-scale rooftop solar PV systems, as it happened in Spain in 2018, due to the revision of its net metering policy for solar PV in order to simplify registration procedures and to remove the charge on self-consumption. As for other regulatory policies that incentivize RE development, biofuel blend obligation or mandate is applied in all the four countries and tendering - in the most part of our study area, - except the Czech Republic.

Another mechanism for support RE are fiscal incentives and public financing – tax incentives and biofuel blend obligation or mandate (applied in all the four countries), grants and rebates or tax credits (used in Czech Republic, Italy and Spain), reduction in sales, energy, CO_2 or other taxes (used in Czech Republic, Italy, and Hungary) (REN21 2019). However, they played only a secondary role in renewable energy development and deployment.

Spain is an interesting case of discontinued development of feed-in schemes. Together with Germany, it was the first European country that supported the diffusion of solar PV systems on a larger scale by implementing effective FIT and FIP from the late 1990s (del Rio and Mir-Artigues 2012, Schallenberg-Rodríguez and Haas 2012, López Prol 2018, Kriechbaum et al. 2018). However, the Spanish feed-in systems were not shaped for self-generation solar PV systems and gave priority, from the beginning to the ground-mounted grid-connected plants

(Talavera et al. 2016). In response to the REs growth (mainly the exponential growth in wind energy installations) Royal Decree 436/2004 allowed RE generators to sell their products into the electricity market and guaranteed feed-in tariffs for wind energy technology. Due to the essential growth of REs, especially wind, new integration was needed in order to improve the stability of the premium options, and a cap and floor system were introduced (Schallenberg-Rodríguez and Haas 2012). In order to control the incomes of RE producers that were under premium option, Royal Decree 661/2007 adjusted the premium on an hourly basis, depending on the hourly wholesale electricity prices and the cap and floor values (idem.). These Decrees have also promoted the growth of solar PV sector by extending the feed-in tariff system to medium and large scale plants and guaranteed the future continuity of these subsidies, leading to growth of the rate of installations of PV systems (Azofra et al. 2016, Kriechbaum et al. 2018) and to so-called "Spanish PV power boom (2004–2008)" (de la Hoz et al. 2013). This exponential growth led to a corresponding large increase in public spending to pay for the production premiums, just at a time of beginning of economic crisis and growing concerns about so-called "tariff deficit", i.e. the difference between the high cost of the energy system and the relatively low income it generated (de la Hoz et al. 2013, Mérida-Rodríguez et al. 2015).

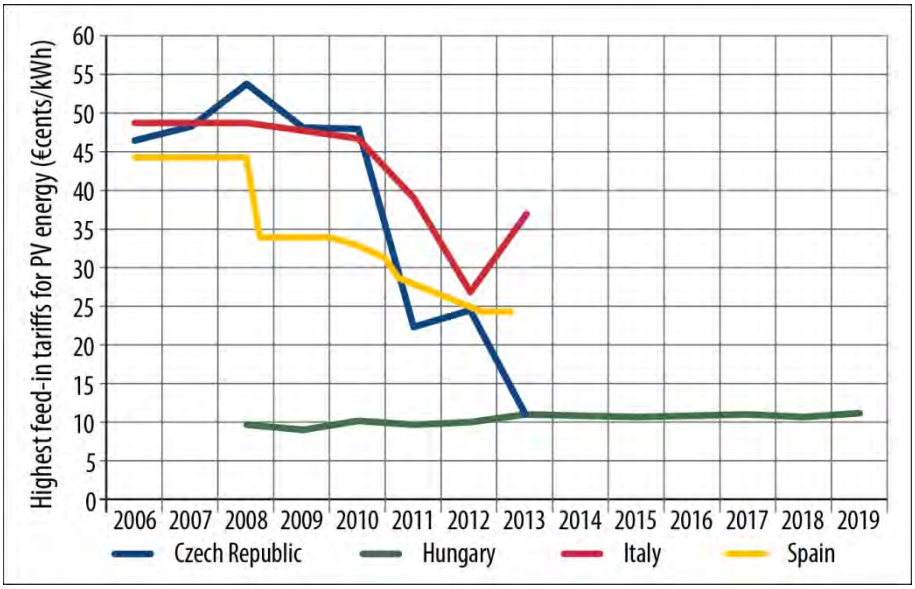

Figure 7. Evolution of the highest FIT for PV energy in the Czech Republic, Hungary, Italy, and Spain between 2006 and 2019 (Source: authors' elaboration).

After this first phase of development, in order to control the further diffusion of PV, the government reduced the premiums and established a procedure of pre-assignation of tariffs for photovoltaic installations, which distinguished between ground-mounted installations (photovoltaic plants) and those installed on roofs (BIVPs); the latter which until then had been in a very small minority would now be prioritized and would receive higher premiums. In order to limit further expansion, annual quotas were established for each type of production, and these were more restrictive for ground-mounted installations (de la Hoz et al. 2013, Mérida-Rodríguez et al. 2015). For other RE technologies in 2009 and 2010 Royal Decrees 6/2009, 1565/2010 and 1614/2010 reduced the tariffs and introduced an annual cap of maximum installed capacity and made additional retroactive cutbacks (i.e., cutbacks of already granted remunerations).

During the third phase, in 2012, characterized by stagnation of REs deployment, Royal Decree 1/2012 removes all incentives for REs. Additionally, cost-containment mechanisms were implemented for solar PV between 2010 and 2013, undermining the profitability of already existing installations and increasing the investment risk for future potential projects by

increasing legal uncertainty (Talavera et al. 2016, López Prol 2018). The Law 24/2013 and Royal Decree 900/2015 abolished the feed-in tariff, replacing it with a per kWh charge, and increased charges to grid-connected consumers with accumulation (battery storage) (Hernández-Jiménez et al. 2018).

Italy had discontinued the development of RE support mechanisms, too. These mechanisms suffered the overlapping of different approaches and measures through time. Like in Spain, incentives to PV and to other RE need to be distinguished. At first, photovoltaic was supported by a feed-in tariff (named "Contoenergia"). From 2005 to 2013, five editions of the Contoenergia were launched, each characterized by different criteria and tariffs. Being too much repaying and non-restrictive, the first editions favored the investment into large plants on agricultural land, raising concern from the point of view of soil consumption. As a consequence, at a later time, higher tariffs were set in support of building-integrated photovoltaics and in 2012 ground PV stopped to be subsidized. The average new PV capacity reached its peak in 2011 (54.7 kW), then decreased until 8.8 kW in 2018. From 2013, once the budget for the fifth Contoenergia was depleted and direct subsidy to new plants had ended, photovoltaic could anyway still indirectly benefit from tax relief in the framework of building renovation (50% until 2018, decreased to 36% in 2019). The possibility of selling exceeded self-produced energy was also maintained. After the boom terminated (Schallenberg-Rodríguez 2017) the PV sector continued to slightly expand (+6.2% in 2018 compared to 2017) (GSE 2018). At the end of 2018, the average capacity of PV installations in Italy is reported to be 24.5 kW and 90% of total installations are lower than 20 kW. With regards to other RE – included wind, hydroelectric, geothermal, biomass, biogas, landfill gas, and bioliquids – a double support mechanism based on Green Certificates and feed-in tariffs was into operation from 2002 and 2011, then converted from 2012 into a unique feed-in tariff (named "Tariffa onnicomprensiva") differentiated for plant size and technology type. For plants exceeding 5 MW of capacity, incentives are defined on the base of public auctions. Finally, other incentive schemes – like "Certificatibianchi", "Contotermico" and tax reliefs on energy efficiency interventions – support investments in the reduction of energy consumption as well as in the generation of thermal energy from domestic RE plants.

Among various forms of support for energy production from REs in the Czech Republic and Hungary, the price system prevails, including the support by feed-in tariffs and bonuses (Chodkowska-Miszczuk et al. 2017). In the Czech Republic, historically, the governmental support for the generation of renewable energy has been based on the Act no. 180/2005, on support for the usage of renewable energies from 2005. In 2012, the act has been replaced by Act no. 165/2012, on supported sources of energy that came into force from 2013. This was in response to the Directive 2009/28/EC and consequently the National Action Plan for Renewable Sources of Energy in the Czech Republic. One of its fundamental targets is a share of energy from renewable sources to amount to 13.5% of gross energy consumption in the Czech Republic by 2020. Due to generous support for renewable energy generation, we have experienced tremendous development of renewable energy in the Czech Republic. As a result of the dramatic decrease in prices for PV technology in 2008–2009 that has not been reflected in the supporting scheme, plenty of new PV plants occurred in 2009–2010. Before the supporting scheme was adopted in 2010, the Czech Republic became with 2067.2 MW of solar installed capacities one of the solar energy leaders in Europe (despite not so favorable solar irradiation in comparison to the South-European countries). As a result of chaotic support in the second half of the 2000s, electricity generated from PV plants commissioned before the end of 2010 is purchased by the state for twenty years for highly generous guaranteed prices (with an annual minimal increment of 2%). Almost two-thirds of total solar installed capacities were commissioned during the critical year of 2010 before the support was ended. Such a situation when plenty of speculative capital (sometimes with the hidden origin and unknown owners)

appeared in the solar energy sector in a short time caused plenty of scandals and damaged reputation of renewable energy among the population for a long time. Another way how renewable energy is supported in the Czech Republic is the utilization of green bonuses as a state contribution to generated renewable energy. As a reply to the state to a dramatic increase in PV plant, the solar tax has been introduced in 2010 (26% of the guaranteed purchase price of electricity and 28% of green bonuses. The necessity for paying the tax has been later reduced just for PV plants commissioned in 2010 and the tax was reduced to 10% (11% in case of green bonuses).

For other sources of renewable energy, the guaranteed purchase prices stay at an original higher level. Controversies are also linked to the support of the development of biogas energy. Due to strong support from both national and the EU levels, in addition to the above-mentioned guaranteed purchase prices of electricity it was possible to get half of the investment in biogas plant funded by subsidies. This measure has caused the boom of the biogas sector until the end of 2013 when all subsidies for new installations were stopped. Consequently, more than 550 biogas stations appeared (with an installed capacity of 366 MW) that are processing agricultural waste for energy only partially and are rather focusing on the processing of purpose-grown crops (like maize). Development of wind energy (currently 320 MW) is concentrated in the sub-mountain parts of the country in western Bohemia (the Krušné Hory Mts.) and in north Moravia and west Silesia (the Jeseníky Mts.). Further development in other parts of the country is rather symbolic due to local protests and rejection by regional administrations. Despite suitable nature conditions other biomass energy (besides the biogas plants using usually agricultural products) has not been significantly utilized yet.

In Hungary, the FIT/FIP support has been stable: between 2008/2009 and 2019 they with an increase of approximately 11-13% between 2008 and 2019 (in HUF) in all kinds of renewables. After France, Italy, and Belgium, Hungary (together with Spain) are the leader of solar PV installations in Europe with its 0.4 GW installed in 2018 (REN21, 2019). In 2018 Hungary had a record year (410 MW added for a total of around 700 MW), driven by a FIT and net metering (REN21 2019). In accordance with the Hungarian National Energy Plan, there are numerous programs for energy saving (including insulation of houses, change of windows and doors, change of heating system, etc.) and support of investments in RE for households and for bigger PV plants equally. There was a 60% support for households to place PV on the roof. This support does not exist anymore, although a long-term loan with 0% interest is offered. It has always been criticized that this small size PV has very little effect on the overall share of energy consumption and production, but a continuous increase is visible and after a certain time can reach a threshold that we can calculate with. There are certain civil movements to collect/calculate these grid inputs in a group to call attention to its importance. For bigger PV investments there are billions of HUF (1EUR=320HUF at the time of the call) for certain calls, and sometimes in these cases, 1–3 applicants are expected and funded. These biggest PV plants siting could be considered as good examples of RE projects planning, as all of them are sited on former landfills, open mining areas, etc.

Biomass plays an important role in the production of REs in Hungary. The sustainability of bioenergy development is questionable, as in many cases natural or semi-natural forests are cut to feed some of these plants and new tree plantations are created from alien (and even invasive) species that draws many criticisms from environmental, landscape protection and nature conservation perspectives (Möckel 2017a,b).

There is a hold on wind projects investments, however, wind power is not favored by the Hungarian government. No one can install any new windmill at the time of writing.

Systems of planning and approvals

The administrative procedure is considered as one of the main access barriers to RE development (de la Hoz et al. 2013).

The siting of RE schemes in Spain and Italy is decided at a regional level. For example, Spain's autonomous regions have full powers to legislate on industry, town-planning and the environment, with the result that the authorizations and permits required to set up RE installations have been regulated independently by each region (IDEA, 2010:64). Planning procedures for PV installations practiced by regional authorities is very complex, and specific regulations and handling in practice may differ considerably from region to region (PV Policy Group, European Best Practice Report 2006). The location of facilities for the generation of renewable energy is not permitted in natural protected areas.

Since 2001, the energy sector in Italy is subjected to concurrent legislative competence between national, regional, and sectoral authorities. This causes a fragile administrative background, characterized by frequent institutional conflicts between the central State and regional governments and by uneven procedures of authorization between different and sometimes contiguous territories. As a consequence, such a condition has always been considered as an important brake to renewables' development. In response to this scenario, with the aim of reducing spatial and institutional heterogeneity, a unique authorization procedure has been centrally defined by a government decree in 2010 (DM 10/09/2010). According to the decree, the authorization process depends on the power capacity and on other characteristics of the power plants, such as cogeneration and building integration. In the case of small domestic installations, a new plant between 20 and 250 kW - depending on the type of energy source can be authorized through a simple communication to the Municipality, though a "simplified authorization procedure" (*procedura abilitativa semplificata*). Larger power plants are authorized through a "unique authorization" (*autorizzazione unica*) released by all the competent authorities at once. Public participation in decision making is not required.

As for the Czech Republic, since the introduction of Czech legislation for support of renewable energies in 2005, strong decision-making power is given to regional authorities (NUTS3 level). Consequently, the distribution of facilities for the generation of renewable energies strongly regionally differs. This is clearly visible in the case of wind, biogas, but also solar energy. The permission for the operation of renewable energy projects is usually issued by local authorities, however, this is conditioned by the size of a particular project. From a certain size (various for different types of renewable energy), the decision is to move to the regional administration when also the approval of the environmental impact assessment for larger particular projects is authorized. Various local stakeholders are usually having their voices in the process of permission. Within the permission, necessary preconditions for future operations are usually stated and need to be kept (like the specification of the structure of biomass to be fed in biogas stations, particularly technology requirements). The location of facilities for the generation of renewable energy is not permitted in areas with designated landscape protection.

In Hungary, the authorization of the energy plants is a complex process, the number of permissions and thus the number of authorities are as follows: 3–6 chief/main authorities, 5–20 authorities depending on the size and type of the plant. There is another legal possibility, if an investment is announced by the government as of national (or outstanding) importance, the authorization process is much faster and easier. In the process of authorization, the authority of a given region (County Government Authority, NUTS3) is making the decision according to the national regulation, based on the local circumstances. National authorities must be involved if needed (e.g. in case of plants above 5 MW, as it is considered "element of national and regional importance" thus the State Chief Architect must agree), or local governments (e.g. the

notary public of the municipality government). Municipalities (LAU2) can announce their requirements in case of a given authorization process (as mentioned above) or in general, based on the Municipality Land Use Plan (certain land-use types, activities, by the controlling/prohibition/allowance of facilities/machinery.

An interesting example of the difference in administrative and grid procedures between the four countries is a survey on onshore wind project development hold in 2010 (EWEA 2010). It demonstrated that Spain has the longest lead time for the administrative procedure (76 months), more than 20 months above the EU-27 average, while the three countries are below the average, although the Czech Republic has a longer procedure (39 months), comparatively to Hungary and Italy (about 32 months). The same difference could be observed for the time necessary for grid access procedure: while Spain needs 33.5 months (above the EU-27 average of 26 months), the Czech Republic, Hungary, and Italy need only about 25, 18 and 19 months respectively (Survey on administrative and grid procedures for wind projects development in 2010, EWEA 2010, Wind Barriers survey).

Land-use planning and landscape protection

In Spain land-use planning and related policies are shaped on a regional level; several autonomous regions incorporated landscape as an important issue in land use regulation through their landscape laws and municipal norms. Contrarily, land-use planning in Italy is defined at the municipality level, within a general frame provided by Regional spatial planning and Regional landscape planning. Regional landscape plans are co-planned by the Regions and the Ministry of Cultural Heritage. In some regions, spatial planning and landscape planning coincide. The renewable energy transition is rarely taken into account by spatial planning procedures, while it recently began to be considered by Regional Landscape planning and Landscape protection policies.

Although there are many national and regional tools which directly or indirectly concern landscape conservation and the term “landscape” is used in many of the recent laws approved after signing the ELC, energy planning systems, which are often based on engineering and economic considerations, are difficult to match with landscape management on a local level.

In spite of the new laws, landscape impacts have only a secondary role in the decision-making process concerning wind farms (Hammarlund Kramer et al., 2016). As recent research has demonstrated, local authorities in Spain do not have the capacity to introduce landscape impacts of RE projects as a substantial factor in the decision-making process, since they have limited power in this process (de la Hoz et al., 2013). For example, there are only three requirements for giving wind farm license by these authorities: wind turbines should be situated out of any protected natural area, they should be close to electric evacuation line and in case of wind power they should correspond to a territory officially defined as “wind resource area”. The process of planning and authorization in Spain does not give enough power to landowners and the general public in the environmental impact assessment process. Information about projects and procedures lack transparency and clarity. The landscape is considered in EIA of RE projects, and there are some specific guidance for RE planning in some municipalities, affected by large-scale RE projects (Hammarlund Kramer et al. 2016).

In Italy, according to the 2004 National Law on Cultural Heritage, the landscape is planned by Regional authorities in cooperation with the Ministry of Cultural Heritage. The situation is nowadays extremely fragmented since some Regions have delivered and approved a landscape plan, while many others are still in the process and others have not started yet. Except for some cases, in regional landscape plans, REs are rarely and/or only generically mentioned. At the National level, however, some guidelines have been adopted to better integrate new plants in the landscape. The Ministry of Cultural Heritage published some

guidelines in 2006 (landscape integration of wind power plants) and in 2013 (landscape integration of new energy plants). Besides, in 2010 the Ministry of Economic Development, in accordance with the Ministry of Cultural Heritage, the Ministry of Environment, and the Regional Authorities, delivered national guidelines for the authorization of renewable energy plants, containing a specific part dedicated to the landscape integration of the new plants (D.M. 10/09/2010, part IV). Guidelines also give criteria for the identification of "unsuitable areas", where renewable energy plants have a low probability to be authorized. Unsuitable areas are defined in accordance with the general principles of environmental protection, landscape, and cultural heritage preservation. Each Regional authority was expected to adopt the national guidelines and to integrate them with additional areas, considering the potential impact of each renewable energy source (biomass, photovoltaic, wind, hydroelectric and biogas). Nowadays, however, not all the regional governments have adopted the guidelines and the national framework still results as spatially heterogeneous.

A potential landscape impact is definitely the bone of contention and a major limiting factor for further development of renewables in the Czech Republic. The protection of landscape character was enshrined in §12 of the Act No.114/1992 Coll., *On the Conservation of Nature and Landscape,* as amended. Since then, a number of methodologies and expert approaches have been developed for the assessment of landscape quality and landscape character being based either on biogeographical or architectural approaches. In 2009, the Ministry of the Environment issued a *"Methodological guide to the assessment of the location of wind and photovoltaic power plants in terms of the protection of nature and landscape"*, which has set out a procedure for the preparation of preventive studies identifying the interests of nature and landscape protection at the regional scale and determines (in the form of negative delimitation) the inappropriateness or potential suitability of the power plants´ construction in a particular territory. The document gives basic information about the value and significance of the landscape in terms of nature and landscape protection. The individual regions vary in the rate of rigidity, however, and most of them commissioned their own methodological studies as a base for regional territorial planning documentation.

In 2011, an ambitious project called *Regional Sustainable Energy Policy based on the Interactive Map of Sources* (ReStEP) supported by the European Commission and the Ministry of the Environment and lead by the Czech University of Life Sciences was launched to introduce a new comprehensive method for urban management and regional planning in the field of proposing and assessing renewable energy projects. The result is an interactive web-based map in form of GIS layers, which is to define the potential and contexts of all renewable energy sources in the selected territory taking into account the landscape character, technical capabilities of the transmission grid, but also the existing needs of municipalities and regions. The wider use of this tool in the planning and decision-making practice remains a question so far, however.

In Hungary, the main guidance for land use planning is the National Land Use Plan. The new national plan is operative from the 15th of March, 2019. The next level is the county level (NUTS3) and the final level is the municipality level. Municipalities have 2 years to check their land use planning tools and to change them if necessary. The new plan makes it easier to build a house. Furthermore, whenever the government decides that construction is of high importance, basically the majority of the regulations can be neglected. However, it emphasizes that environmental and natural conditions must be maintained.

The fourth version of the Landscape Protection Handbook was published on-line in 2014 (http4) but it only deals with wind power investments. As the handbook is not a legal decree, it only lists suggestions, such as wind pylons should not be built 800-1000 meters from any protected land (local, national and international (e.g. Ramsar and Natura 2000 sites, etc. also included). The handbook connects landscape protection regulations with any possible legally

binding documents but it seems like solar parks and biomass/biogas plants are not included in the suggestions at all. There are suggestions for energy plants above 20 MW but the majority of the plants are just below or equal to 20 MW.

Stakeholder support and opposition

According to Eurobarometer (European Commission, 2013), while in all the four countries, RE sources is the most mentioned priority for energy option, Spain, Italy, and Hungary (81%, 77%, and 74%, respectively) have the highest percentage of respondents who consider RE as the best energy option, while in the Czech Republic this percentage is the lowest in EU (52%).

In Spain, REs installations have a positive image (Frolova and Pérez Pérez 2011; Mérida-Rodríguez et al. 2015), although their development has not been free of conflicts. These conflicts are dispersed and grassroots initiatives against large-scale RE power plants have local character (Hammarlund Kramer et al. 2016). The absence of strong and organized opposition to REs infrastructures with strong visual impact (as large-scale wind and solar farms) in Spain is related to limited role of public opinion in decision-making process and the absence of powerful landscape protection organizations rooted in socio-cultural traditions explain the fact that landscape concerns, in a social and cultural sense, have appeared late in Spain's discourses on renewable power landscapes (Frolova and Pérez Pérez 2011).

Despite REs in Italy have always been strongly supported by the Government, new energy plants are often contested by grassroots initiatives (see Figure 8). According to official data, of the 300 controversies every year, more than 57% is referred to the energy sector, and 75% of them are against REs (Nimby Forum 2018). This data could be underestimated, since Ferrario and Reho surveyed more than 20 controversies in 2013, only against biogas, in a single region (Ferrario and Reho 2015).

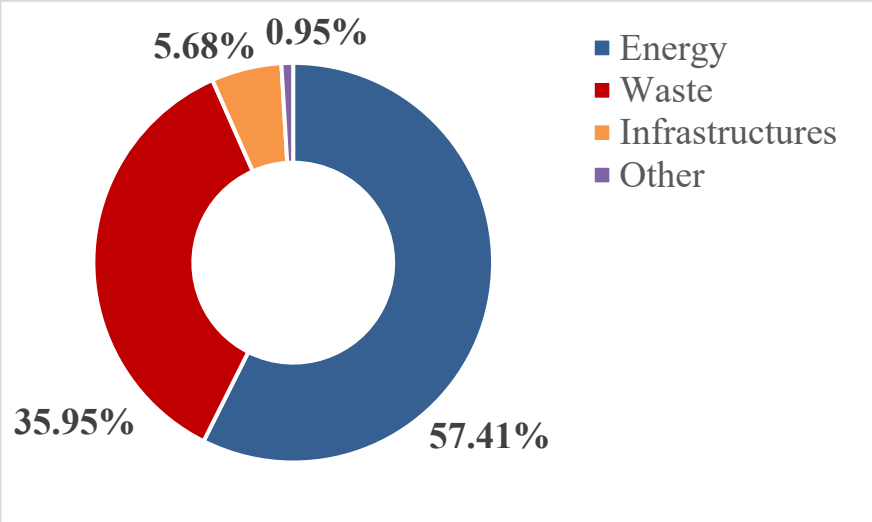

Figure 8. Energy has the largest share of grassroots initiatives against new plants in Italy in 2017 (Nimbyforum 2018)

Major environmentalist associations, while supporting energy transition as an important sustainability goal, alert against the landscape and environmental impact of Res (Legambiente 2011). In some cases, the high level of controversy pushed the producer's associations to react positively. For example, the biogas producers developed a protocol (Biogasfattobene/Biogasdoneright), aiming at minimizing the negative aspects of the production process (CIB 2011).

In the Czech Republic, renewable energy developments are primarily supported for economic benefits, not for environmental reasons or as an alternative to coal or nuclear power

(Frantál 2015, Frantál and Prousek 2016, Van der Horst 2018). The image of and political attitudes to renewables have been adversely affected by the unrestrained boom of solar business between 2008-2011 (Williams 2010) and by few ´bad-practice´ examples of wind farms and biogas plants, which are often presented in the media as common standards. It often happens that proposed wind farms are being accepted by local communities (for economic reasons) but the projects are rejected at the regional level. The primary argument of the opponents is the negative impact on the local landscape character.

There was a decisive bad example of the creation of a huge hydropower plant in Hungary (http5). The plan was already discussed in the 1950s; finally, there was an agreement between Hungary and Czechoslovakia, but people started to demonstrate against some of the decisions at the end of the socialist era of Hungary. Tens of thousands of people were demonstrating against the hydropower plant, so finally the Hungarian part was never finished. This was such a huge event that there was never again such a big opposition about a huge energy plant. The new National Land Use Plan makes it possible again to start construction (not only REs) without any public hearing. Its effect is not known yet. There was some opposition against wind parks but no more plants can be installed since 2010. In the case of other RE plants, there was not any considerable opposition. The people support PV on roof that is visible from the number of small plants installed all over the country.

Conclusions and implications

This study provides an overview of different patterns of energy transition in the four countries. These patterns have some common features and divergences. Some common features between the Czech Republic and Hungary (CEEC), and Italy and Spain (SEC) can be explained by the contexts in which their energy transitions are framed, and similarities between energy traditions and energy policies. There is a clear difference between a centralized model of CEEC, based on the dominance of only one energy source, and a rather decentralized and diversified model of SEC. The high support of nuclear power and lack of trust in CEEC creates an additional barrier for RE development.

While the similarities between the general contexts within CEEC and SEC are clear there are different patterns of institutional contexts in the four countries. Market structure and patterns of ownership follows the general context patterns, with the less centralized market in Italy and Spain, which have a wide variety of ownership patterns, especially in bioenergies, followed by solar PV, and much more centralized market in the Czech Republic and Hungary, influenced by the important role of state-owned companies.

The main support system used in Spain, the Czech Republic and Italy, was the premium, normally in combination with other incentive systems. However, FIT/FIP support was used mostly during the first stage of development of renewable energy markets, while at the further stages the most part of the studied countries reduced and even suppressed this support. The exception is Hungary, where FIT/FIP support has been maintaining relatively stable.

As for systems of planning and approvals, some of the differences between relatively small Hungary and the Czech Republic, and relatively big Italy and Spain can be explained by their size. Due to these differences in size between two groups of countries, national and regional regulations have totally different effects in the first two and the last two countries. For example, in Hungary and Czech Republic national regulations are more determinative than in Italy and Spain, as the NUTS 2 and 3 levels are much smaller in the first two countries. In Italy and Spain where some regions can have the size of entire Hungary or the Czech Republic, regional planning has a much bigger effect on RE planning.

Land-use and landscape planning are held on regional and sub-regional levels, with the exception of Hungary, where the national level is important. Landscape impacts considerations

are stronger in the normative of the Czech Republic and Italy, where it became a major limiting factor. Finally, while in Spain RE facilities have a positive image and are widely supported by the population, in Italy and the Czech Republic they are contested by grassroots initiatives. During the last years, probably also due to the high rate of landscape conflicts, some guidelines for better control of RE impact on the landscape have been adopted in all the countries examined. Their application is an interesting topic to be analyzed in the future, to see if a greater landscape sensibility can better shape the process and outcomes of the energy transition.

Our study offers useful lessons to be learned from different patterns of energy transition in the analyzed countries:

1. The historical and political heritage greatly influences national RE policy, it takes time to change these roots and this time has not passed yet which means that in these individual cases more non-national (e.g. EU) measures are needed to increase the willingness and will of RE investments.
2. The national specialties, such as the size of a country and its geographical conditions are strong modifiers of RE use and its policy. This should be taken into account in future RE planning and policy issues.
3. Nuclear power still plays an important role in energy production in the Czech Republic, Hungary, and Spain. The policy based on the use of more nuclear than renewable energy does not necessarily reflect people's feelings.
4. European RE policy should be more adapted to national and regional singularities to be more efficient. On the other hand, specifics that are common in Central or Southern Europe are also visible and worth consideration.
5. It is necessary to diversify the economic support mechanisms with respect to specific typologies, location, natural and social conditions and technologies to consider landscape aspects of RE plants.
6. It is essential to apply sustainability measures into supporting schemes, based on changes in technology prices.

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