PLUS CHANGE

# PLANNING LAND USE STRATEGIES: MEETING BIODIVERSITY, CLIMATE AND SOCIAL OBJECTIVES IN A CHANGING WORLD

## D2.2 – NARRATIVES OF DETERMINANTS OF LAND USE CHANGE AND THEIR DIVERSITY ACROSS EUROPE

### WORK PACKAGE 2, TASK 2.4

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# List of Abbreviations

| Term | Description |
|---|---|
| WP | Work Package |
| PC | Practice Case |
| EU | European Union |

# Executive Summary

This Deliverable is part of Task 2.4 *Time-geographical approach to generate a new historical overview of land use change patterns over Europe*, within Work Package 2 *Historical Land Use Change*.

Deliverable 2.2 is an illustrated report of how land use change has been shaped across Europe (EU+GB and CH), in and between the twelve (12) Practice Cases involved in the PLUS Change project.

Grounded in time-geography and adopting transdisciplinary methodological approaches in data creation and analysis, the deliverable presents a new enriched understanding of historical land use trajectories over the last century.
By integrating the different forms of evidence produced within WP2, Deliverable 2.2 links socioeconomic, geopolitical, and environmental factors of land use change directly from combined local knowledge and new spatial data. Furthermore, it highlights diverse spatial and temporal unfolding of land use changes, previously undocumented. This has been done by comparing the narratives of land use change compiled in WP2 and framing further the results of this comparison within major global historical events of the 20th century.
These findings shed light on the determinants and drivers that may have shaped the historical evolution of land use in the geographical areas represented by the Practice Cases, as well as raising new lines of inquiry into land use dynamics of the future.

## Content alignment with other PLUS Change deliverables

The PLUS Change project encourages collaboration and exchange between partners, Work Packages, and the Tasks within.

Work Package 2 (WP2) synthesises the diverse quantitative and qualitative information on land use changes over Europe from 1950 until today, collected in Tasks 2.1, 2.2., 2.3 and 2.4.

The work done in WP2 is framed in line with WP1. Adopting a transdisciplinary research approach (as detailed in Section 2.2, Methodology and Data), WP2 addresses the justice "situations" identified in WP1.
Looking at how the diversity of approaches to the investigation of historical land use changes can help in better understanding what has driven those change dynamics, WP2 combines diverse methodologies and integrated them with local perspectives as well.
Therefore, we address the epistemic injustice inherent in conventional framings of spatial changes (and consequently in land use changes as well), which often neglect the influence of narratives, perceptions, and values in shaping spatial changes and their multiple representations (cf. Merriman 2011). Spatial changes over time are in fact not only the products of socio-cultural, political, and ecological dimensions; they are also inherently constructed

through discourse and narrative. Recognising this aspect of reality allows for analysis of spatial changes in land use through a power lens, enabling us to see how specific discourses on spatial change may have constrained certain identities while privileging others (Leander 2001).
WP2 addresses the issue of recognitional justice as well, showing how representations, narratives and meanings associated with spatial changes may also be temporally biased. The passage of time can in fact serve to stabilise or modify narratives of land use change. This issue is addressed in WP2 by acknowledging the co-existence of multiple baselines and viewpoints for understanding land use change, alongside multiple narratives and discourses. This approach aims to provide an alternative to single-component and hierarchical approaches unable to capture the complexity of land use and broader socio-environmental phenomena over time.
In this process, the Practice Cases play a key role as interfaces with local narratives of land use change. Furthermore, the involvement in the project of numerous and diverse local actors and stakeholders in the twelve Practice Cases provide a unique opportunity for exploring the co-existence of multiple baselines and perspectives on land use phenomena.

The work done in WP2 has been developed in alignment with the Work Package 3, Task 3.2 – *Report on Policy Drivers of Land Use Change*, by identifying how governance-related factors may have shaped land use changes in Europe and how these interventions have affected the geographical areas being studied from a sustainability perspective.

Increasing our knowledge on historical trajectories of land use change is not only important to understand our present state, but – thanks to reflections on path dependency and past analogues - it can provide relevant insights to better tackle the uncertainty naturally related to unknown futures. For this reason, the results of WP3 will feed into the coming WPs of PLUS Change. In particular, WP2 will contribute to:
- Tasks 3.4 and 3.5 of WP3 Future sustainable land use strategies
- Tasks 4.1, 4.2 and 4.4 of WP4 Transformation pathways for land use strategies
- Tasks 5.2 and 5.4 of WP5 Experimenting and piloting behaviour and decision-making change

# 1 Introduction

## 1.1 Scope

Deliverable 2.2 summarises the findings of Work Package 2, a piece of PLUS Change project which aims to investigate land use change dynamics in both the twelve Practice Cases involved and at a broader European scale. This investigation employed a historical-geographical approach to analyse the various factors influencing these changes as they have emerged from a diverse range of narratives of land use change.

Research taking account narratives of land use change remains significantly under-explored, particularly at the pan- European scale. The literature on land use change at European scale has several critical gaps. Firstly, it often lacks a comprehensive integration of diverse spatial and temporal perspectives, thus leading to an incomplete understanding of land use dynamics, which are multiscale and complex by their very nature. Secondly, the existing literature predominantly adheres to traditional spatiotemporal frameworks to explain change, neglecting the influence of other crucial drivers shaping land use dynamics, such as governance systems, societal values, as well as narratives, authorised and/or repeated discourses on land use change.

While there are plenty of studies that utilise narratives to understand land use change at local level, comprehensive, pan-European analyses comparing multiple case studies across different scales (e.g. local versus regional/continental) and dimensions (e.g. rural - urban) are still absent. Similarly, empirical studies examining the cumulative impacts of governance (policies and policymaking, planning and administrative decision-making) on land use changes across different countries are scarce (Balikçi et al. 2022). Consequently, our understanding of the key governance-related factors that have shaped land use change have also so far remained limited.

In this respect the PLUS Change project, and particularly Work Package 2 (WP2), offers significant added value to the state-of-the-art literature on understanding land-use change, by emphasising the multi-faceted nature of these changes. Recognising the need for a more nuanced understanding of land use dynamics across Europe over approximately the last century (1950 – 2024), WP2 incorporates diverse spatial and temporal scales encompassing different geographical contexts, represented by twelve (12) case studies across a range of diverse Practice Cases in terms of their historical and geopolitical circumstances, spatial and demographical scales, and positions on the urban – rural gradient (Table 2). Drawing upon a broader investigation within WP2 of the interplay between quantitative change, perceptions of change and values, and the influence of policy frameworks and governance arrangements on land use trajectories, this report captures the results of the combined analysis across historical narratives on land use from the 12 PCs.

Table 1. Practice Cases (and relative Project Partners) involved in PLUS Change.

| Practice Case | Country | Project Partner |
|---|---|---|
| **Kaigu peatland** | Latvia (LV) | BSC - BALTIC STUDIES CENTRE |
| **Nitra City** | Slovakia (SK) | UKF - UNIVERZITA KONSTANTINA FILOZOFA VNITRE |
| **Province of Lucca** | Italy (IT) | Provincia di Lucca |
| **Green Karst** | Slovenia (Sl) | RRA ZELENI KRAS |
| **Three Countries Park** | Belgium, Netherland, Germany (BE, NL, DE) | EMR - EUREGIO MAAS RHEIN (BE) |
| **Warsaw Functional Area** | Poland (PL) | Mazovian Region |
| **Flanders** | Belgium (BE) | VLM - VLAAMSE LANDMAATSCHAPPIJ |
| **South Moravia** | Czech Republic (CZ) | JINAG - JIHOMORAVSKA AGENTURA PRO VEREJNE INOVACE JINAG SPOLEK |
| **Ile-de-France** | France (FR) | Region Ile-de-France |
| **Parc Ela** | Switzerland (CH) | Verein Parc Ela |
| **Surrey** | United Kingdom (UK) | SURREY COUNTY COUNCIL |
| **Amsterdam metropolitan area** | The Netherlands (NL) | STICHTING VU |

Within the overall framework of PLUS Change, a key contribution of WP2 lies in its methodological approach, which aims to create new knowledge on land use change in Europe over Europe by integrating and synthesising the evidence generated by each of its four Tasks, in a lifting up process in which each single Practice Case narratives of land use changes have been analysed in comparison to each other, thus crossing diverse spatial scales and local histories.

By integrating findings from individual WP2 Tasks within a time-geography framework, WP2 acknowledges time as both an intrinsic driver of spatial change and a multi-scalar phenomenon. This approach considers how the speed and magnitude of change varies across different time intervals and geographical locations. At the same time, and equally important, WP2 recognises the significance of narratives, discourses, and perceptions in shaping and hybridising spatiotemporal contexts of land use change.

The first task of WP2, (T2.1), has provided a quantitative assessment of historical land use changes and their environmental and socio-economic impacts since 1990 (cf. Deliverable 2.1). Task 2.2 examines the influence of diverse governance mechanisms on land use trajectories, by investigating how governance (in the sense of societal "steering" through policies and policy-

making, planning and administrative decision-making), land tenure and management have shaped different land use change in a diversity of land use patterns, spatial levels and biogeographic conditions.
In WP2, similar attention has been given to the role of motivations and values in impacting land use change patterns. Task 2.3 investigates how values and motivations associated with land use have changed over time (with a specific focus on the period 2000-2024), drawing on local newspapers articles that mentioned land use change phenomenon in four Practice Cases representing a variety of geo-historical and socio-cultural contexts across Europe (Nitra City, Kaigu Peatland, Green Karst, Amsterdam Metropolitan Area). Building upon the findings from Tasks 2.1, 2.2, and 2.3, Task 2.4 incorporates into these narratives of land use change the perspectives of local stakeholders who have directly experienced those events. Through participatory mapping workshops, local narratives of land use change have been elicited and the content integrated into broader historical processes. Such a collaborative approach acknowledges the valuable insights of local actors and stakeholders, recognising the legitimacy and importance of their experiences and living memory as authentic historical sources to be integrated into a larger and more holistic research process.

The historical evidence created has then been further analysed and synthesised within the framework of time-geography, providing a novel understanding of land use change patterns across Europe over approximately the last century. Such a synthesis identifies recurring themes, highlights both similarities and differences in change trajectories at the aggregated Practice Cases level thus at European scale, and shows their correlation with various influencing factors, including environmental conditions, governance systems, and societal values. Using such a synthesis, WP2 has also aimed to understand the role of change dynamics themselves in shaping different pasts, affecting the present and how these could potentially influence the future. By transitioning from preconceived notions of land use change to a more nuanced understanding of its nature and detail, WP2 has aimed to empower local communities as active agents of research and knowledge production.

## 1.2 Document Structure

The document is organised as follows:
Section 1 - Introduction: description of the purpose and scope of the document and its structure.
Section 2 – Theory and Methods: in depth coverage of the Deliverable theoretical framework, the methodological approach adopted as a result and the type of data used for the analysis.
Section 3 – Results: the new knowledge and evidence produced as result of the analysis done is presented here, tracing, firstly, trajectories of land use change and then unpacking their diverse spatio-temporal unfolding in and between the Practice Cases.
Section 4 – Concluding discussion: the results of WP2 analysis are here further discussed in terms of what we can learn from the past for the benefit of future land use planning.
Section 5 - References

# 2 Theory and Methods

## 2.1 Theoretical framework

Understanding contemporary landscape conditions depends on our knowledge about past land uses, as these are the legacy from which current landscapes come (Cevasco et al. 2015). Policies and planning interventions that are developed without consideration of such legacies risk not being effective if they fail to address the root causes of present-day challenges (e.g. environmental degradation, marginalisation, resources depletion, loss of cultural heritage to name just a few).

Land use is inherently a dynamic process, characterised by high temporal and spatial variability. Driven by human needs, social demands, and natural processes, land use patterns constantly vary in terms of function, intensity, spatial distribution and scale (Munoz et al. 2014). These dynamics are shaped by complex and ever-changing interactions between ecological, socio-cultural, and economic-political factors (Ferrara and Wästfelt 2021). Furthermore, these interactions occur at and across diverse scales, from local to regional/national and even global, and unfold at different speeds. Transitions between land use types are in fact rarely linear or uniform, instead they often exhibit diverse degrees of intensity that vary over time (Aldwaik and Gilmore 2012).

The variability in the intensity, scale, and speed of land use changes is a key driver of landscape change dynamics, which historically explains the diverse spatial patterns observed in landscapes today. This perspective draws upon an academic tradition that emphasises the historical dimension of space (Hägerstrand 1991), recognising it as being constantly in the process of making (Massey 2004). Space and place are not static entities but dynamic processes, inextricably linked with time. People and places interact over time through complex, nonlinear, and mutually influential, relationships. Land use changes, as spatial changes, also happen at varying speeds of change within the same space and, similarly, different extents of spatial change may happen across both the same and different time periods. From time-geography, we adopt a perspective that includes also a consideration of the potential barriers that may have constrained specific land use events or stages from occurring (Pred 1996). Furthermore, while the past undoubtedly influences the present, present actively engages with the past and shapes it today. The diversity and heterogeneity of the relationships that people have with places evoke “multivocal” understandings of the past, in “a conjunction of many histories and many places” (Massey 1995, p.191).

To gain a nuanced understanding of land use change trajectories and patterns within the PLUS Change Practice Cases, it is, then, crucial to "unpack" the inherent spatiotemporal complexity of their current landscapes and land uses within a historical perspective. Traditional land use change analyses from past to present are often based on step-wise approaches that consider one single spatial scale at a time. These approaches are based on the identification of land transitions in a specific space from state A to state B, quantification of change patterns, assumptions on the underlying processes and drivers (Macleod and Congalton 1998) by combining quantitative and qualitative data (Aldwaik and Gilmore 2012).

A key methodological challenge lies in effectively capturing and analysing multiple spatial and temporal scales at once. A deeper understanding of land use dynamics in historical periods can only be achieved by fully acknowledging such complexity and unpacking it. This can be done by integrating both the quantitative and the qualitative dimensions of spatial data. While, in WP2, Task 2.1 has provided quantitative evidence on land use change, Tasks 2.2, 2.3, and 2.4 have explored three distinct qualitative dimensions of spatiotemporal change: decision-making, wellbeing & values, and narratives. Task 2.2 investigates how specific causal mechanisms (governance interventions) have shaped particular land use change outcomes within specific contexts, employing Pawson's (2006) "context-mechanism-outcome" framework (c.f. Theoretically-Informed Research Protocol [TIRP] developed in Task 2.2). The aim here is to understand the role of governance in steering, or not steering, land use change towards sustainable trajectories supporting biodiversity conservation and climate change mitigation. Task 2.3 explores the underlying values and wellbeing aspects that may shape land use decisions, by analysing problem framing, stakeholder voices and the objectives of land management strategies, using the IPBES Life Value Frames (Pascual et al. 2023) and wellbeing domains by Cummins (1996). In four PCs (Nitra City, Kaigu Peatland, Green Karst, Amsterdam Metropolitan Area), press articles published in national newspapers from 2000 to 2024 has been adopted as source of information on perceived land use changes, whose discourse analysis has been then compared to the land use change narratives directly given by the Practice Cases. This activity allowed for a deeper exploration of how land use change has been driven, and shaped, by societal outcomes.
Task 2.4, drawing upon the concept of "geospatial epistemic discomfort" (Ferrara et al. 2024a) and inspired by critical cartography (Crampton and Krygier 2005), has engaged local actors in a collaborative process of mapping land use changes over the last century. Using such a transdisciplinary approach, co-designed with the Practice Cases and the WP2 team, has fostered dialogue and knowledge co-creation, allowing local perspectives to emerge, inform, and enrich the understanding of land use change dynamics drawn from the other WP Tasks.

## 2.2 Methodology and Data

WP2 reconstructs land use changes in Europe over the last century by integrating and synthesising the evidence generated by each of its four Tasks. This synthesis has been done through a cross-scale analysis, within a time-geography perspective that conceptualises time not merely as an internal factor of spatial change, but as a multi-scale factor that can explain variations in the size and speed of change across different geographical spaces. Furthermore, this analysis incorporates a narrative dimension, considering how local meanings and representations of space have evolved over time and how such temporal elements have contributed to stabilise and/or transform spatial meanings and narratives.

Thanks to this integrated methodological approach it has been possible to identify novel and previously “untold” land use change trajectories, which would not have been discernible if we had analysed the land use history of each Practice Case alone or if we had considered the

outcomes of each WP´s Task individually. Such an integrated approach has facilitated our understanding of how change dynamics have shaped the past, influence the present, and will likely impact future land use patterns. Emerging themes and findings have been identified and discussed with the Practice Cases and other project partners, while new promising themes will be investigated further throughout the project's remaining implementation.

Compiling land use histories presents significant challenges. To capture adequately the complex interplay between historical, socio-economic, cultural and ecological dynamics happening over time in a given place, we must utilise diverse sources of evidence so as to be able to incorporate multiple perspectives, particularly those of people and communities who have directly experienced those phenomena (Duncan et al. 2010; Ferrara et al. 2024b). For this reason, the methodological approach grounding WP2 relies on **transdisciplinary research**, actively involving the Practice Cases in the co-production of knowledge throughout WP2 activities. By engaging local stakeholders in such a way, WP2 has aimed to gain a deeper understanding of the historical trajectories of land use change over the last century. This has been achievable because local narratives have provided valuable qualitative context to spatio-temporal phenomena, enriching the institutional historical knowledge and the official quantitative data available on them as land use change processes.

The recognition that landscapes are as much social constructs as biophysical entities allows for the **integration of local and non-academic perspectives**. Local knowledge can in fact illuminate important local issues, events or dynamics that may be diluted or overlooked in broader-scale analyses or when analysing just single, specific time periods. Furthermore, when local perspectives are compared across the diverse Practice Cases and within the broader European context, they offer valuable insights into both unique characteristics of each geographical region under study and more general historical trends of land use change at the European scale.

Within the context of PLUS Change, such an approach is furthermore grounded in the idea that a transdisciplinary approach involving local communities is primarily aimed at community **empowerment** (Moore et al. 2019). In the specific case of WP2, which deals with the historical dimension of land use, such empowerment takes the form of eliciting reflections and awareness of the spatial legacies that the past has left on current local conditions and how this new knowledge may help better design local planning and management.

At the same time, it needs to be recognised that diverging views, memories and interpretations of change processes may exist within a local community, particularly in relation to long-term and relatively slow change dynamics and trends. Consequently, while acknowledging the value of local knowledge in documenting land use changes and empowering local communities as agents in the research process, we realise and acknowledge that evidence coming from local knowledge sources must be treated in the same ways as any other type of evidence, with their own inherent limitations (Duncan et al. 2010).

To reconstruct land use change trajectories over the last century in the 12 Practice Cases and understand their potential drivers of change, WP2 adopted a three-step methodological approach:

**Step 1: Data Collection**

Data in the form of land use change narratives were collected through a co-creative process with the Practice Cases. This has been done in participatory mapping workshops (Workshop 2, Figure 1) organised by each Practice Case project partner with the involvement of local stakeholders and practitioners.

Figure 1. Participatory mapping activity during Workshop 2 (Image source: Nitra City Practice Case Workshop 2 report).

While a common protocol specifying basic requirements was provided by the WP leaders, each Practice Case had the freedom to organize the workshop in the most suitable way for their specific context.

Each workshop began with a brief introduction to the project's scope and objectives. Participants then worked in self-organised groups to: (1) draw a timeline of major land use changes happening in the study area from 1950 until today (Figure 2); and (2) locate the spatial patterns resulting from these changes on maps and satellite images provided by the Practice Case partners (Figure 3).

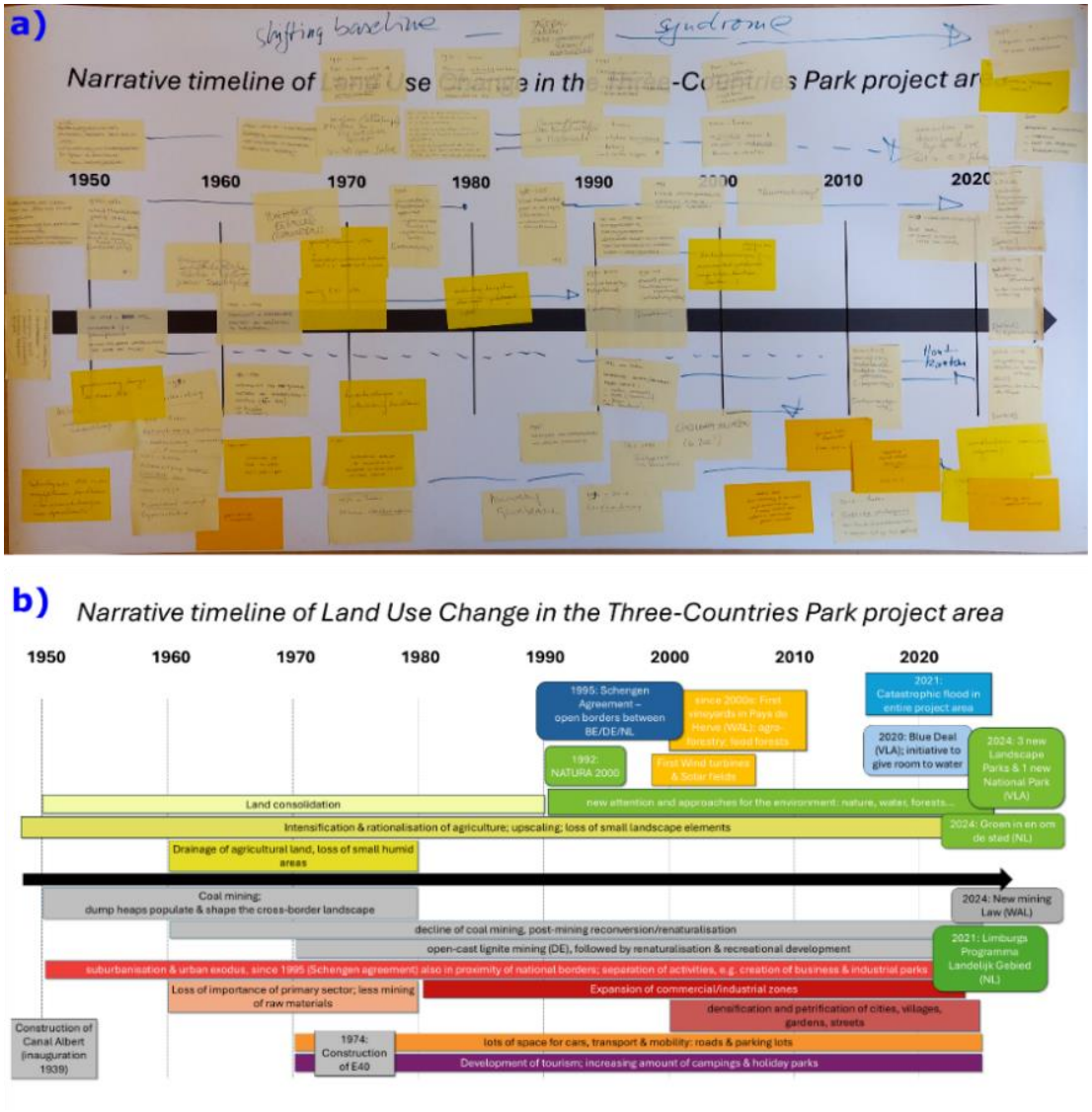


**Figure 2. Example of narrative timelines of land use changes produced during Workshop 2 by the Practice Cases. a) Timeline creation during the workshop; b) same timeline as re-arranged and published in the Practice Case workshop report (Image source: Three Country Park Practice Case Workshop 2 report).**

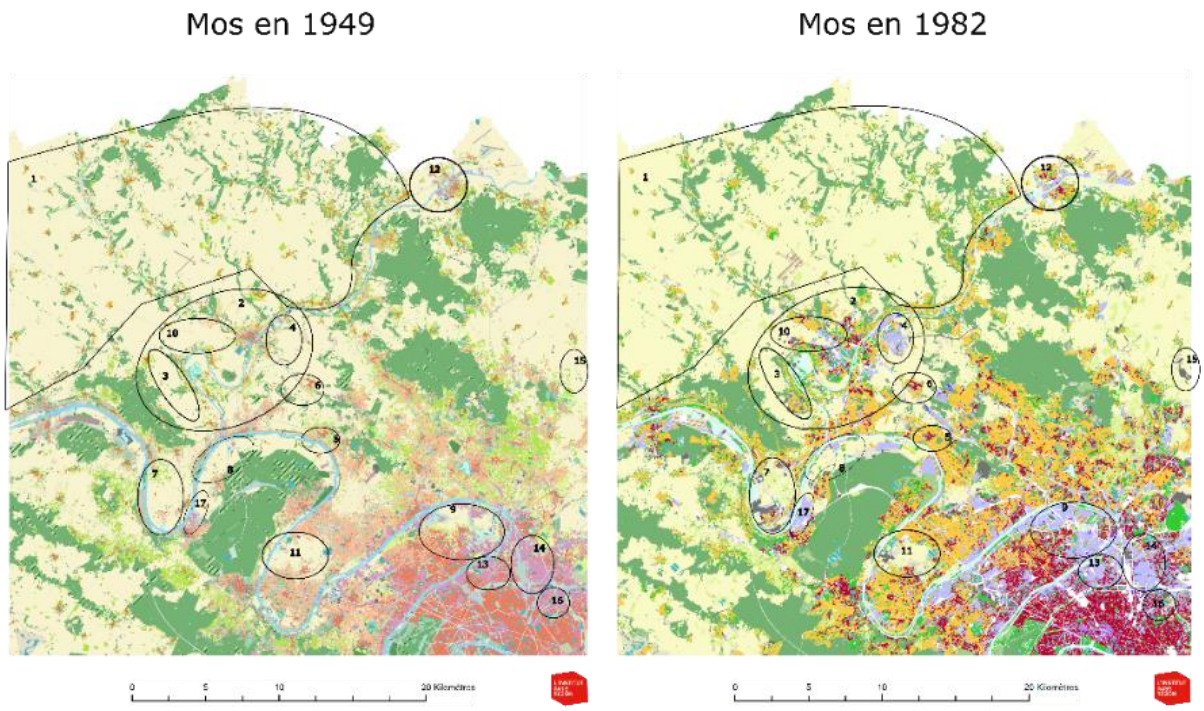


**Figure 3. Example of land use spatial changes happened between 1949 and 1982, mapped by the Practice Case Île-de-France in the North-West side of their study area (Image source: Île-de-France Practice Case Workshop 2 report).**

Workshop discussions focused on identifying the drivers of land use change, distinguishing between policies, long-term trends as opposed to one-time events, new land uses and other relevant factors. These discussions involved the entire group of participants, aiming to capture a consensus view. After the workshops, each Practice Case project partner compiled a comprehensive report documenting the narratives of land use change in their area, including timelines, maps, supporting documentation, and relevant references. The choice of participatory mapping as methodological approach responds to the idea that mapping and visualisation is a process in itself, shaping discourses, while helping foster the research process. By identifying key spatial changes of land use associated with historical events or trends, this approach can trace their trajectories and patterns, thus providing a richer and more nuanced context to understand the multiple drivers at work simultaneously within a study area (Moore et al. 2019).

**Step 2 – Analysis**

This step involved the analysis of the materials created by the Practice Cases (cartographic materials, timelines, and written reports), together with the evidence from the other WP tasks (Deliverable 2.1; Milestones 2 and 8). Two analytical methods were employed; (1) intertextual discourse analysis within a comparative history framework; and (2) spatial analysis.

Places are socially and culturally constructed, thus discourses and narratives are connected to spatial reality, by giving order and imposing a causality upon it. As discourses then, spatial

narratives are useful to understand the diverse mechanisms at play in a given place. The narratives of land use change emerging from the WP Tasks have been analysed using intertextual discourse analysis. In intertextuality analysis, the meaning of a text emerges from its relationships with other texts (cf. Allen 2011). Therefore, interpreting a text requires tracing its connections within a network of related texts, which in our case have been the materials produced by the 12 Practice Cases. Such intertextual analysis has been done following a comparative history approach (Skocpol and Somers 1980), in which we compared the historical narratives of land use change across the Practice Cases, identifying patterns of repetition and variation along their local spatio-temporal reconstructions of the last century. This comparison was conducted by referring to "ideal-type" concepts pertinent to the Practice Cases, such as the urban-rural continuum, geographic scales and population density of the study areas, and geopolitical divides.

The cartographic materials created by the Practice Cases in Workshop 2 are the visual representations of their land use change narratives. Spatial analysis of these narratives allows for the exploration of qualitative dimensions of spatial processes. Methodologically, this spatial analysis has been performed using simple descriptive techniques, such as overlay analysis (combining multiple data layers about different historical times to generate new information, cf. Figure 4) and correlation analysis (examining how the same spaces have been mapped differently according to the different narratives, cf. Figure 5).

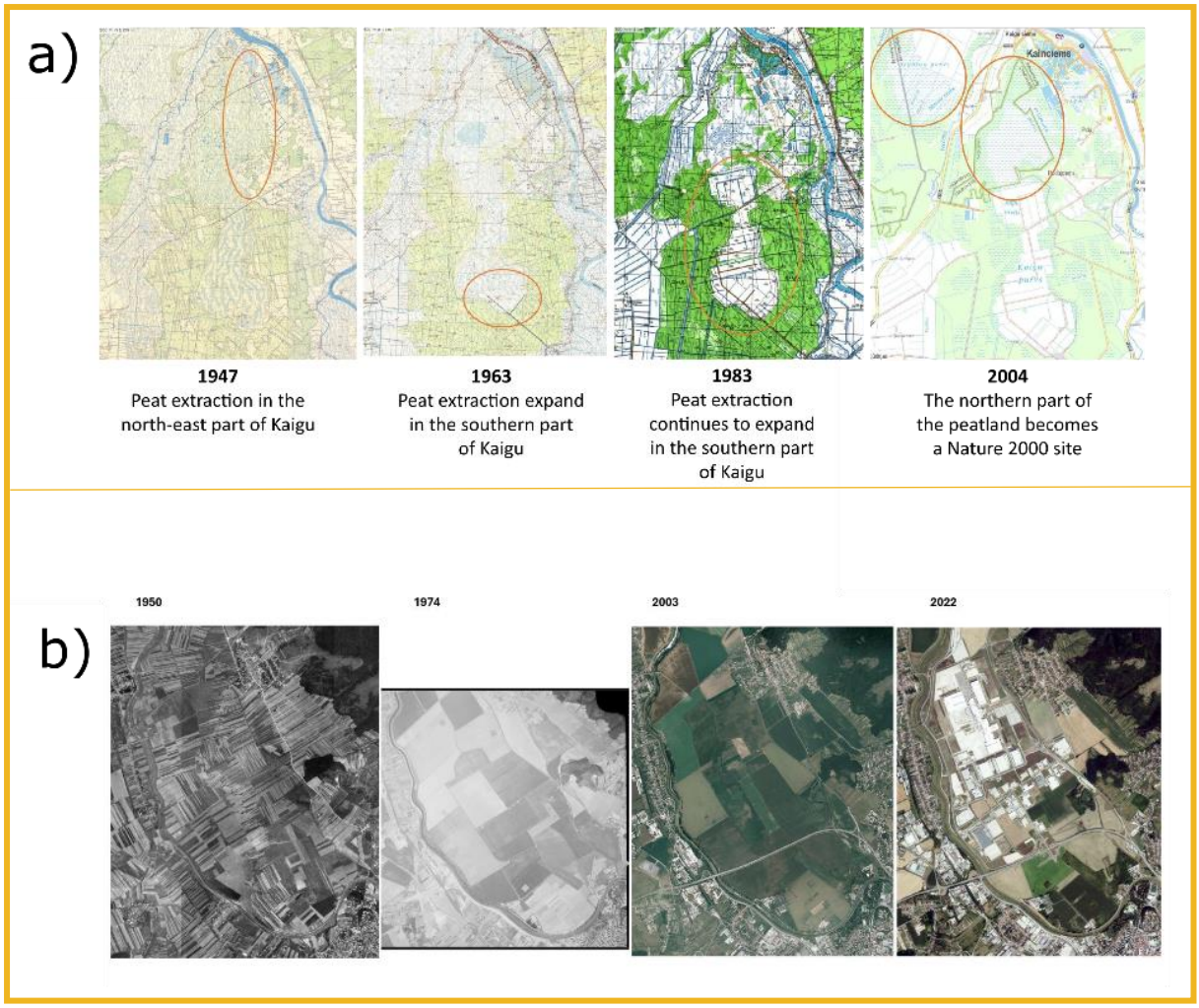


**Figure 4. Examples of overlay analysis combining multiple data layers from different historical times. a) The expansion of Kaigu peatlands and their partial transition into Natura 2000 areas, as mapped with historical and topographic maps (Image source: Kaigu peatland Practice Case Workshop 2 report); b) Diverse land use changes in the same place, from small-scale agriculture (1953) to first large scale and intensive agriculture (1970-2003) and then industrialisation (2022), as mapped by overlaying historical aerial images and orthophotos in the northern part of Nitra city (Nitra City Practice Case Workshop 2 report).**

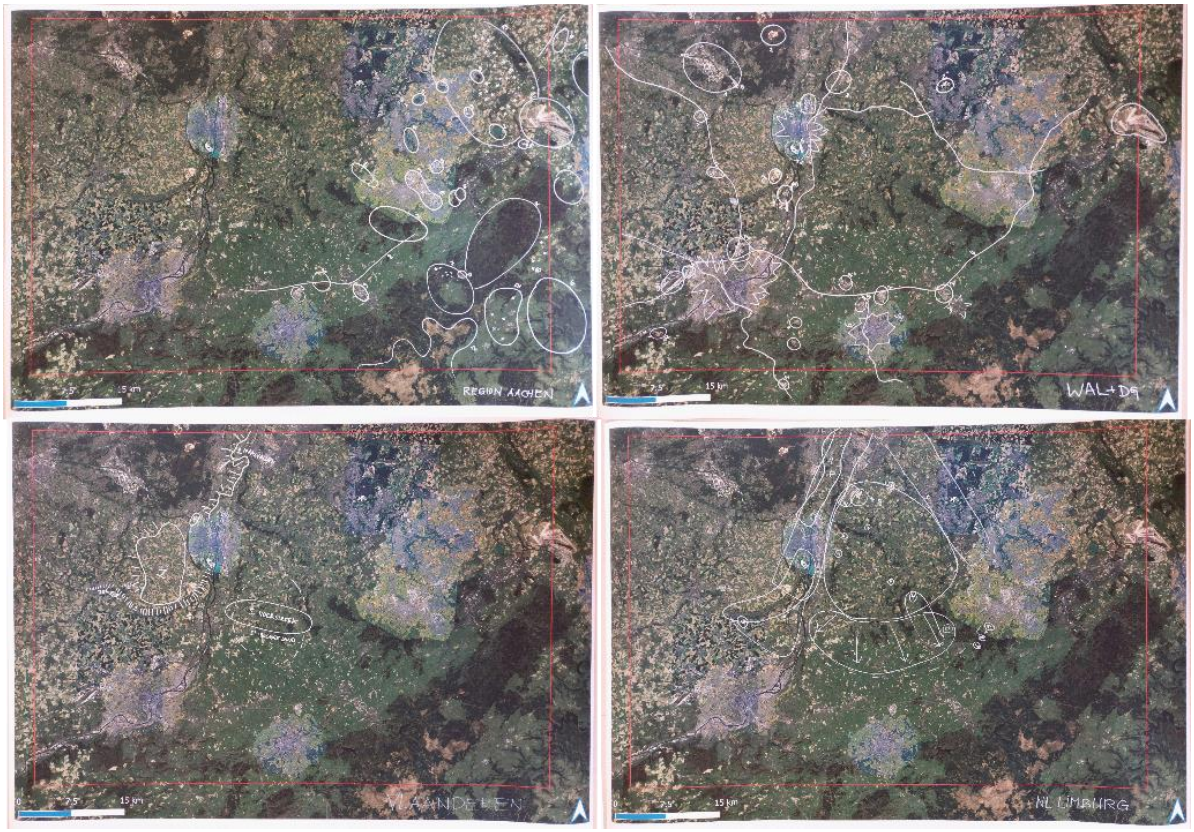


**Figure 5. Example of the same space mapped with diverse narratives of land use change. Correlation analysis has then been done to understand how these diverse narratives are interlinked to each other and to the places they refer to (Image source: Three Country Park Practice Case Workshop 2 report).**

Moreover, we investigated the intensity of land use transitions, focusing on the scales and length of change processes within each scale (*sensu* Aldwaik and Gilmore 2012), by exploring key questions:

- In which time intervals was the rate of diverse land use changes relatively slow or fast?
- Which land use categories exhibit relatively slow or fast rates of change within specific time intervals? Have these patterns of change been stable across time intervals, or do they exhibit variations?
- Are there any transitions in land use that have been "avoided" or, instead, intentionally pursued in a given land use category and within particular time intervals? Have these patterns been stable across time or do they exhibit significant variations?

**Step 3 – Synthesis and visual representation of results**

The results of these analyses, presented in Section 3, are visualised through a graphical representation of the 12 Practice Cases narratives of land use change over the last century (Figure 6). In WP2, this graphical representation has been used as a research tool: it has allowed tracing the land use change trajectories within and across the Practice Cases study areas, unpacking the diversity of spatio-temporal unfolding in local land use. Similarly, this serves to

deepen our understanding of how the histories of these places reflect and are connected to broader global and European historical processes.

**Europe(an) *divides*?**

Since the governance and geopolitical dimensions have been key elements in the narratives of land use change emerging from WP2, we believe it is important to close the methodological section by dedicating some space to clarify how we have critically engaged with current debates on the "East-West" divide in Europe.

Some scholars argue for a re-conceptualisation of the East-West divide, moving beyond the legacy of communism and emphasizing instead interconnectedness, structural dependencies and diffusion processes not historically biased by analysis of short-term events (UACES 2024).[1] Alternative re-evaluations of the nature of the East-West divide are centred instead on the interplay between political variation and cross border economic inequalities. While acknowledging the importance of economic factors, these perspectives suggest that the primary divide may lie within the broader context of democratic backsliding and new geopolitical developments (i.e. European Union). Bârgăoanu et al. (2019) argue, for instance, that the East-West divide within the European Union is not purely an economic matter, but it is (again) a geopolitical crisis. In addition, Janos (2001) proposes the idea that Eastern Europe has transitioned not from authoritarian communist regimes to democracy, but rather from one form of international regime to another.

Following Volintiru et al. (2024), in our methodological approach we consider East and West as fluid *geospatial* categories, previously transformed by scholars into *geopolitical* categories of analysis as the outcomes of historical circumstances. Therefore, methodologically, in our analysis East and West are distinct geopolitical-spatial categories until the 1990s, and as a unified geopolitical- spatial category after the EU enlargement. However, if an East-West divide has persisted after the 90s onwards, WP2 results may contribute to reflect upon it.

[1] "Rethinking Europe's East-West Divide - A UACES Research Network (2024-2025). https://www.uaces.org/networks/rethinking-europes-east-west-divide (last accessed 26 February 2025).

# 3 Results

Section 3 presents the results of our analysis as visualised graphically by combining the 12 Practice Cases narratives of land use change within the same space-time continuum covering the last century (Figure 6).

Working with this graphical representation has allowed further insights into the dynamics of land use change to emerge in and within the Practice Cases areas. It allowed us to trace the land use change trajectories as narrated in the coming section (Section 3.1), analyse their diverse spatial and temporal unfolding (as detailed in Section 3.2), and to better understand how local histories offer a lens through which we can view the unfolding of global history and gain insights for planning the future (Section 3.3. and Discussion in Section 4).

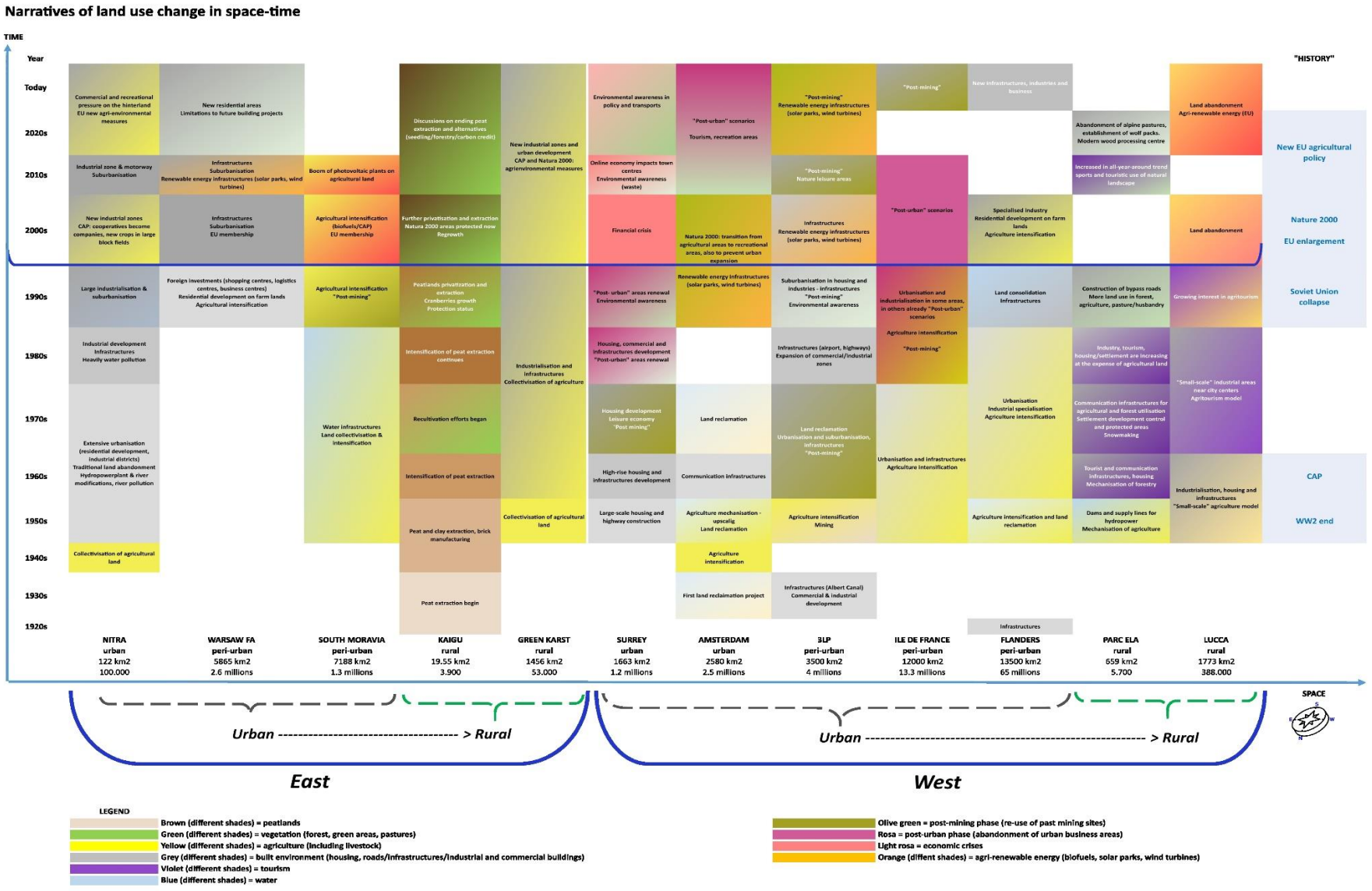


Figure 6. Space-time continuum of land use change narratives compiled in WP2 (Image source: Vincenza Ferrara)

Figure 6 represents these narratives of land use change as organised in **a space-time continuum** that combines the 12 timelines of the Practice Cases within multiple spatial dimensions (Urban - Peri-urban - Rural gradient; spatial scales of the PC areas, from smaller to larger; demographic scale; geopolitical gradient, from East to West). In the graph, all these multiple spatial dimensions are also framed within the "History" timeline, in other words within the context of significant broader historical events at global and European scale, reported as significant in the 12 PC narratives.

In each Practice Case timeline, land use changes are shown in their respective temporal lengths (longer VS shorter). Different colours (clarified in a legend) distinguish the different land use types and, moreover, typologise them further through the use of diverse combination of colour shading indicating both the varying intensity of such changes (more-or-less intense processes) AND their combination with other land use changes happening simultaneously (Figure 7). Thus, for instance, a land use coloured by blue transitioning into yellow means that we have a transition from a land use mainly characterised by the presence of water to a land use where agriculture has been introduced. This is the case, for instance, of the land reclamation process in Flanders, north of Amsterdam and South Moravia in the 1950s and 1960s (Figure 8).

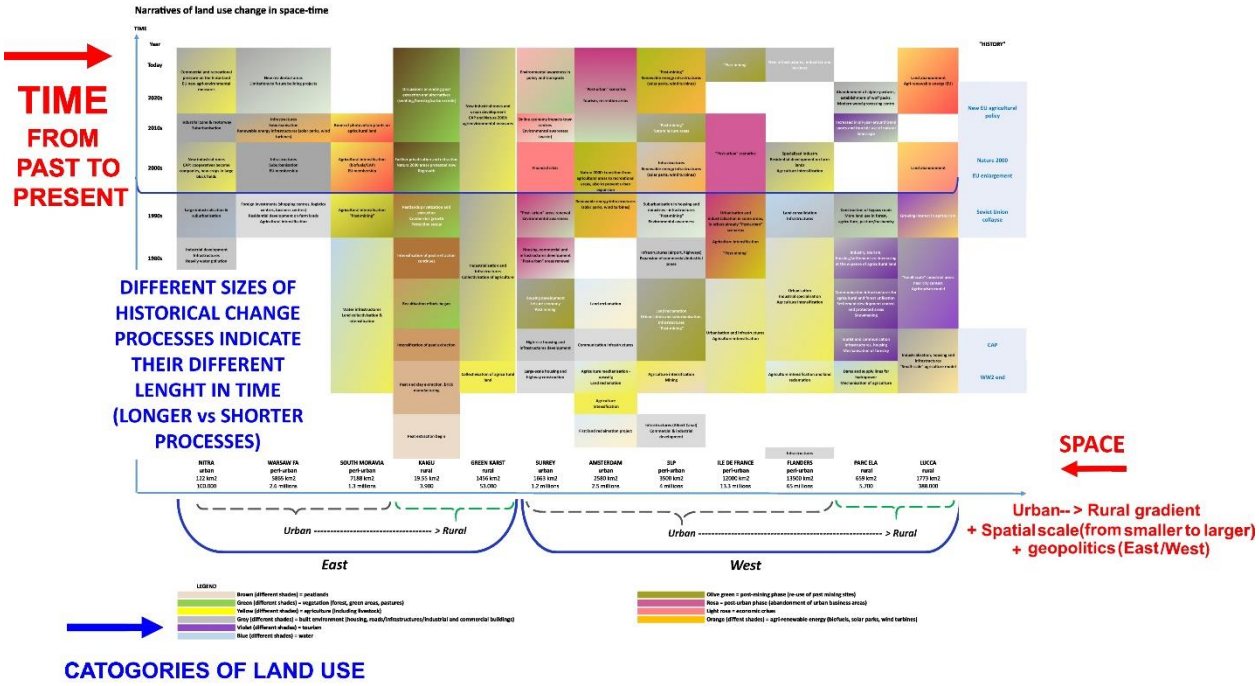


**Figure 7. How to read the graph representing the space-time continuum of land use change narratives compiled in WP2: timeline (from past to present) and space dimension (according to which the Practice Case timelines are arranged in the space-time continuum: Urban – Rural gradient, spatial scale, geopolitics). Figure 7 includes also a legend that clarifies the categories of land use present in the graph and how their different lengths are represented.**

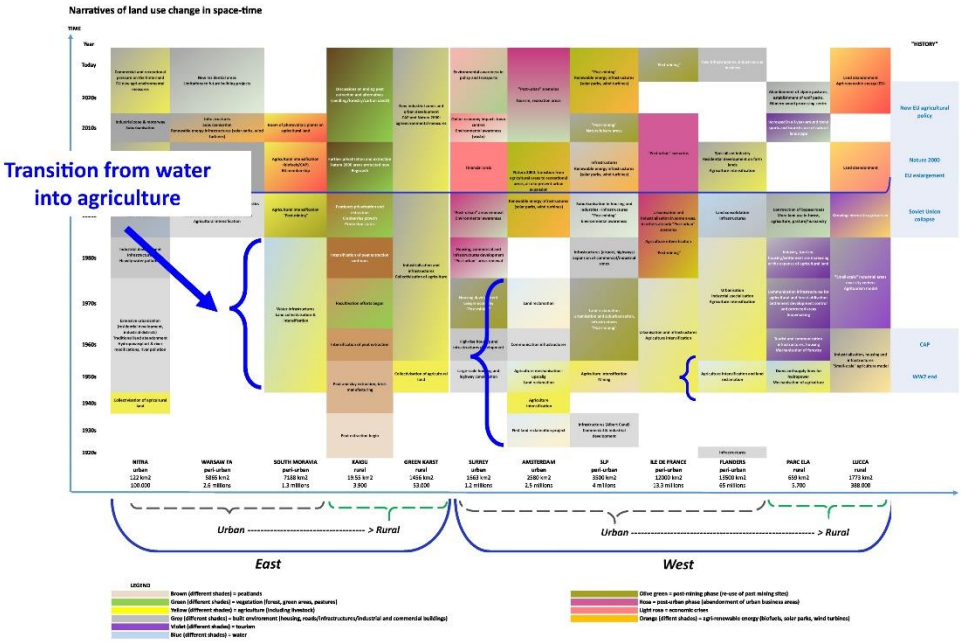


**Figure 8. How to read the graph representing the space-time continuum of land use change narratives compiled in WP2. Example of colour shading combination to indicate transitions between diverse land use categories. In Figure 8, the transition shown is from water to agriculture (Image source: Vincenza Ferrara).**

By combining all these 12 land use timelines within a single graph, it is possible to first trace the trajectories of land use change over the last century in the case study areas, and then unpack their diverse spatial and temporal unfolding of land use change.

## 3.1 Trajectories of land use change over the last century

Through the collaborative efforts of the Practice Cases and research partners within WP2, we have been able to trace significant spatiotemporal trajectories and drivers of land use change across Europe over the past century.

Some of these trajectories are relatively well known. Identified through quantitative land use analysis (cf. Deliverable 2.1), these include two major trends: 1) scale enlargement (both in parcel size and overall extent of land use), intensification and rationalisation of agriculture, accompanied by a decrease in complex vegetation patterns and an increase in forest and natural areas; and (2) an increase in complex land use and land cover patterns. These two trajectories must however be seen as neither static nor mutually exclusive from each other. Some Practice Cases, such as the Amsterdam Metropolitan Area and Flanders, have shown a shift from the intensification trajectory towards a trajectory of increasing diversification and complexity, driven by both increased environmental awareness and the exploration of alternative land management regimes beyond industrialisation, scale enlargement and intensification. This shift was also present in the newspaper articles reporting land use change in the region and showing

the values underlying such changes. Such transition appears to have been supported by national policies and increasing economic prosperity (cf. Deliverable 2.1). Other drivers of land use change common across the Practice Cases include the interplay of economic growth, technological advancements, and innovation, leading to population growth, urbanisation, and intensification of both industrial and agricultural activities (cf. Deliverable 3.2 for case-specific details).

However, WP2 has also uncovered lesser-known and underrepresented interactions that have significantly shaped land use change trajectories over the last century in the Practice Cases study areas. These are narrated in detail below and can be visible from Figure 6, if the reader approaches the graph following the timeline from past to present and comparing, horizontally, the land use change happening in each period per single Practice Case. In such a way, it will be possible for the reader not only gain knowledge on land use change trajectories per individual Practice Case, but also have a broader comparative view, as detailed in this section. For an optimum experience, we advise the reader to print Figure 6 in A3 colour format and have it side-by-side while reading the coming sections.

The Practice Cases´ narratives of land use change begin at the end of World War II. The 1950s saw a period of economic development across all Practice Cases regions, characterized by the intensification of agricultural and industrial activities, including extraction activities such as mineral and peat extraction. Practice Cases located within former communist countries experienced agricultural intensification through collectivisation, transitioning from small-scale to more intensive and mechanised agricultural production (e.g., Nitra City, Green Karst, South Moravia) and expanding extraction activities (e.g., Kaigu peatland, South Moravia). In contrast, Western Practice Cases exhibited more complex development trajectories, characterised by a combination of agricultural intensification and mechanisation (e.g., Parc Ela, Province of Lucca, Flanders, Amsterdam Metropolitan Area), urban development (e.g., Île-de-France, Surrey, Three Countries Park), mineral extraction already transitioning into a “post-mining” phase (e.g. Surrey, Three Countries Park), and industrialisation (all of them, except from Parc Ela). However, while both Eastern and Western regions experienced industrialisation, agricultural intensification and mechanisation, the driving forces of these processes were different, with government-led initiatives responsible in the East and market-driven forces steering these processes in the West.

The 1960s and 1970s were characterised by a further intensification of economic development, mainly driven by technological advancements. Practice Cases within former communist regimes experienced increased extraction activities (e.g., Kaigu peatland), further mechanisation in agriculture (e.g., South Moravia, Green Karst), and increased urbanisation (e.g., Nitra City). Western Practice Cases experienced similar dynamics, even though more rapidly. These decades saw increased mechanisation in agriculture and forestry sectors across many of them (e.g., Parc Ela, Amsterdam Metropolitan Area, Île-de-France), driven by technological innovations. Urbanisation processes also continued. Furthermore, tourism emerged as a relevant new economic sector in some Western Practice Cases (e.g., Parc Ela). At the same time, the construction and/or improvement of transportation infrastructures, such as

airports (e.g. Surrey and Île-de-France) and highways (e.g. Three Countries Park, Île-de-France), became now the major drivers of local economies. Furthermore, when mining and other extraction activities began to decline in some Western regions (e.g., Three Countries Park), they continued to intensify in Eastern Europe (e.g., Kaigu peatland). As such, despite some similarities, significant variations in the speed and nature of land use change are evident across the Practice Cases in this period.

In the 1980s, we can see contrasting historical phenomena. While economic intensification continued, concerns about environmental degradation (e.g. water pollution in Nitra City) caused by previous decades of uncontrolled industrial and agricultural expansion began to emerge, leading to increased environmental awareness (e.g., Surrey). Nonetheless, these years remain characterised by a further increase in economic intensification. Practice Cases within formerly communist-run countries experienced continued growth in extraction activities (e.g., Kaigu peatland), urbanisation processes (e.g., Nitra City), and agricultural intensification (e.g., South Moravia). In Western Practice Cases, this decade witnessed the rise of specialized industries and commercial activities, including tourism and forestry in Parc Ela, agritourism in Lucca province, and vegetable growing in Flanders. Moreover, the development of key infrastructures and services continued to shape the development of cities and their peri urban areas in Western Europe (e.g., Surrey, Amsterdam Metropolitan Area). The increase in diversity of economic activities and associated land use patterns, observed during these years in the Practice Cases from Western Europe, can be attributed to the presence of a market economy and advances in communication and technology, which fostered competition and encouraged specialisation within different economic sectors.

The 1990s represents certainly an extremely important historical period that shapes the trajectories of land use of the following years. The fall of communism in Eastern Europe marked a significant breaking point in history, which had direct impacts on land use changes. However, what emerges from our work is the awareness/knowledge that the 1990s acted as a sort of historical trigger for temporal divides and variations in the speed and nature of certain land use change processes of interest to the Practice Cases. An emblematic example is the fact that, while some Eastern Practice Cases experienced suburbanisation driven by new industrial and commercial development (e.g., Nitra City, Warsaw Functional Area), Western European Practice Cases were already experiencing a "post-urban" phase, characterised by the disuse and abandonment of former industrial sites (e.g., Île-de-France) and suburbanisation towards further outskirts and countryside (e.g., Three Countries Park). In Western Europe, these dynamics were driven by physical factors such as improved transportation connections (e.g., Liège Airport, new motorways) and policy developments such as the opening of the Schengen Area in 1995.
In the agricultural sector, we can also see two different speeds of change. While Eastern Practice Cases experienced significant intensification of agriculture (e.g., Green Karst, South Moravia), the Western Practice Cases started a phase that we can define as "post-productivistic/multifunctional landscapes intensification", characterised by a growing awareness of the negative environmental impacts of large-scale agriculture (e.g., Surrey, Three

Countries Park) and the adoption of new and more sustainable agricultural management practices (e.g., agritourism in Province of Lucca). However, what these processes tell us at a deeper level is that the diverse speeds of change we observe may have been the consequence of similar past policies (i.e. fostering growth and development) being overlaid onto very heterogeneous local contexts of land use, land tenure and governance. Such awareness has important implications for thinking forward and planning interventions, since we can directly see how policies for land use produce very different outcomes based on current and historical trends and drivers.
Furthermore, if historically we talk about a divide – probably we need to be aware that such a divide was already there and that the events soon after the 1990s just "unpacked" it and allowed differences to emerge more clearly.

During the 2000s, the land use change trajectories of the Practice Cases diverged even further, as exhibiting a sort of "legacy" effect from the previous decades. The Eastern Practice Cases that now joined the EU have been significantly impacted by this major governance process. The EU integration facilitated new economic collaborations. Moreover, it opened the possibility for farmers to benefit from the Common Agricultural Policy (CAP) funding mechanisms and the adoption of the Natura 2000 directive. The news reported during the early 2000s show values centred on the importance of economic development and resource utilization. Such policy shifts significantly affected these geographical areas, particularly regarding increased intensive urban sprawl (e.g., Warsaw Functional Area), agricultural intensification (e.g., Kaigu peatland, Nitra City), and the emergence of new, EU-promoted energy-related land uses (e.g., South Moravia; but also visible in Amsterdam Metropolitan Area, Three Countries Park).
If the 2000s represent a period of growth and economic development for some of the Practice Cases, some others were experiencing an overall period of crisis, characterised by severe land abandonment (e.g. Province of Lucca) and decline in specific economic sectors (e.g. retail in Surrey; Flanders´ decline of the textile industry). As a response to this decline, further specialisation emerged during this period, above all in agriculture (e.g., Flanders with greenhouses, others with vineyards). Again, here we can observe at least two diverse temporalities of land use changes and their speeds: one of abrupt and uncontrolled growth, one of relatively less quick crisis and "post-growth" following adaptation.

This divergence in speeds of land use changes intensifies even further during the last fifteen years (2010s-2020s), which is also visible in the media reports discussing land use change in various regions. Western Practice Cases have been experiencing phenomena in land use that the Practice Cases in the Eastern regions of Europe had yet to encounter. Furthermore, what we notice from this historical period is that identical land use changes generated different impacts in the two previously divided geopolitical blocks, shaping in a different way the land use that was to come.

The 2010s were marked by intense investments in transportation infrastructure (e.g., highways, railways) across most of the Practice Cases. However, this development manifested differently in local land uses. In Eastern Practice Cases, infrastructure development fuelled further

industrial intensification (e.g., Nitra City) and uncontrolled urban expansion (e.g., Warsaw Functional Area), thus resembling a phase of accelerated development. On the contrary, in Western Practice Cases, similar big infrastructure projects contributed to consolidate "post-urban" scenarios: previously utilised urban spaces now abandoned, vacant and degraded (e.g. due to uncontrolled accumulation of waste), while the enhanced connectivity to peripheral areas has facilitated the flourishing of new business and commercial development outside the cities (e.g., Île-de-France). It is clear how there is a sort of time lag between the land use change trajectories experienced by Western and Eastern regions. In these years, we see also a further increase in environmental awareness. Newspapers articles increase in reporting the tension between economic growth and values in line with nature conservation and protection of cultural landscapes. Some of the Eastern Practice Cases tell also the story of a transition towards an EU-promoted green energy economy (e.g. South Moravia, cf. Figure 9 showing maps of energy crops and production sites distribution), while in Western Practice Cases environmental consciousness become more and more incorporated into policy and planning.

The 2020s are characterised by the effects of Natura 2000 and the 2014-2020 EU Green Deal policy implementation. Several Practice Cases tell the story of negative environmental consequences arising from measures designed to mitigate intensive agriculture. For instance, the expansion of forested areas as a result of land abandonment (e.g., Nitra City) and increase in wildlife populations (e.g., Parc Ela). Furthermore, the 2014-2020 European Green Deal policy has incentivised the conversion of agricultural land for sustainable energy production (e.g., Province of Lucca, Amsterdam Metropolitan Area, and South Moravia). However, while this sector is experiencing rapid growth and appears to be promising from an economic perspective, it raises several concerns when it comes to its environmental sustainability, as discussed further in the Section 4.2.

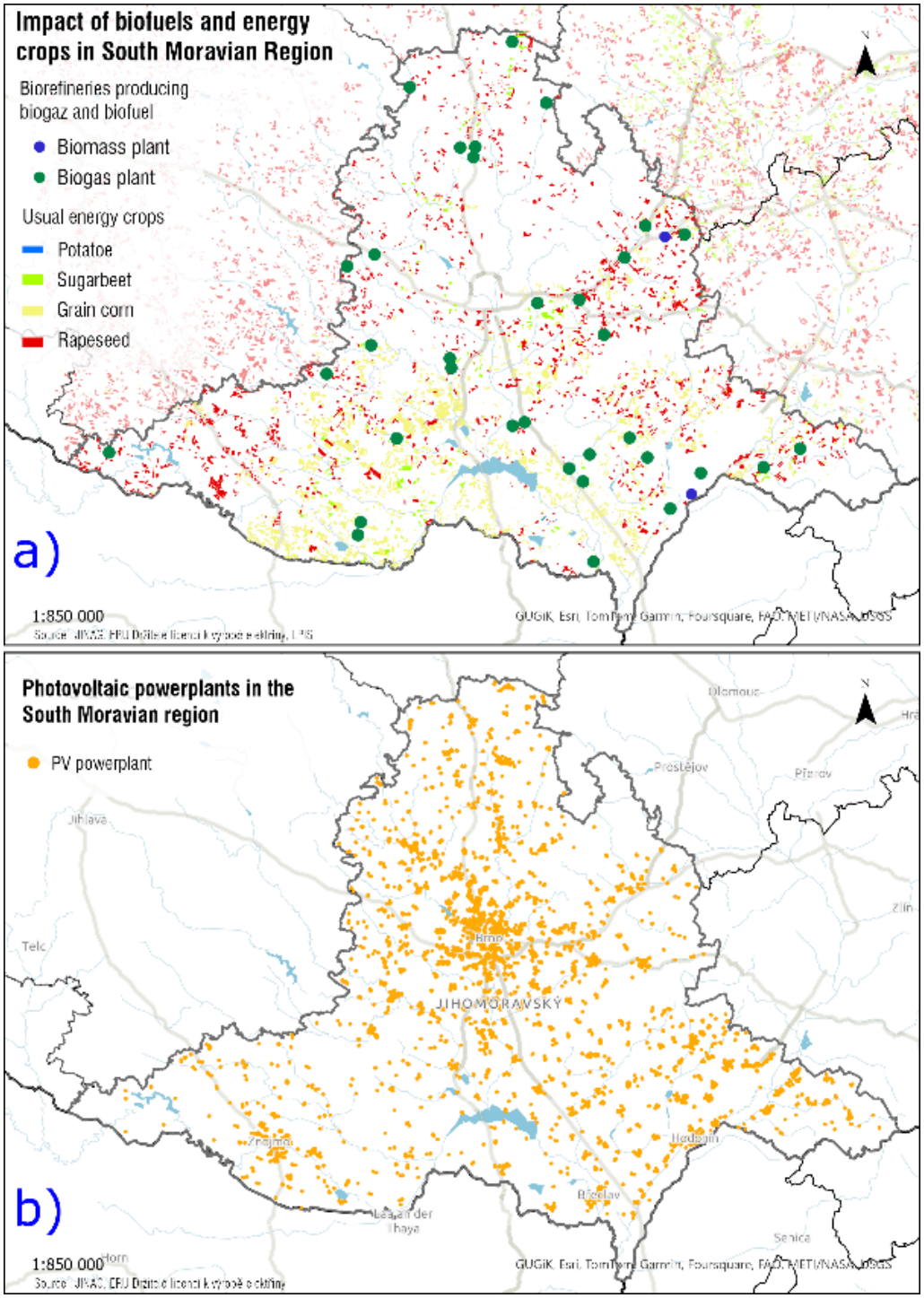


**Figure 9. South Moravia distribution of biofuels and energy crops in correlation with biomass and biogas production sites (Figure 9a) and location of photovoltaic powerplants (Figure 9b) (Image source: South Moravia Practice Case Workshop 2 report).**

## 3.2 Unpacking the diversity of spatio-temporal unfoldings in land use change

The results from our analysis can provide relevant insights into the diverse spatial and temporal unfolding of land use change in and between the Practice Cases. This evidence contributes to advance our understanding at the broader pan-European level as well.

A first observation reveals a difference in the heterogeneity of land use categories and their changes between Eastern and Western Practice cases. Figure 10 illustrates this difference: the right side of the graph, representing Western Practice Cases, exhibits a greater diversity and complexity of colour patterns compared to the left side, corresponding to the Practice Cases located in East Europe. The greater heterogeneity of the colour patterns on the right side of the graph suggests a wider range of land use typologies and their changes in the Western cases, with typologies and related changes being more similar one to another in Eastern PC examples.

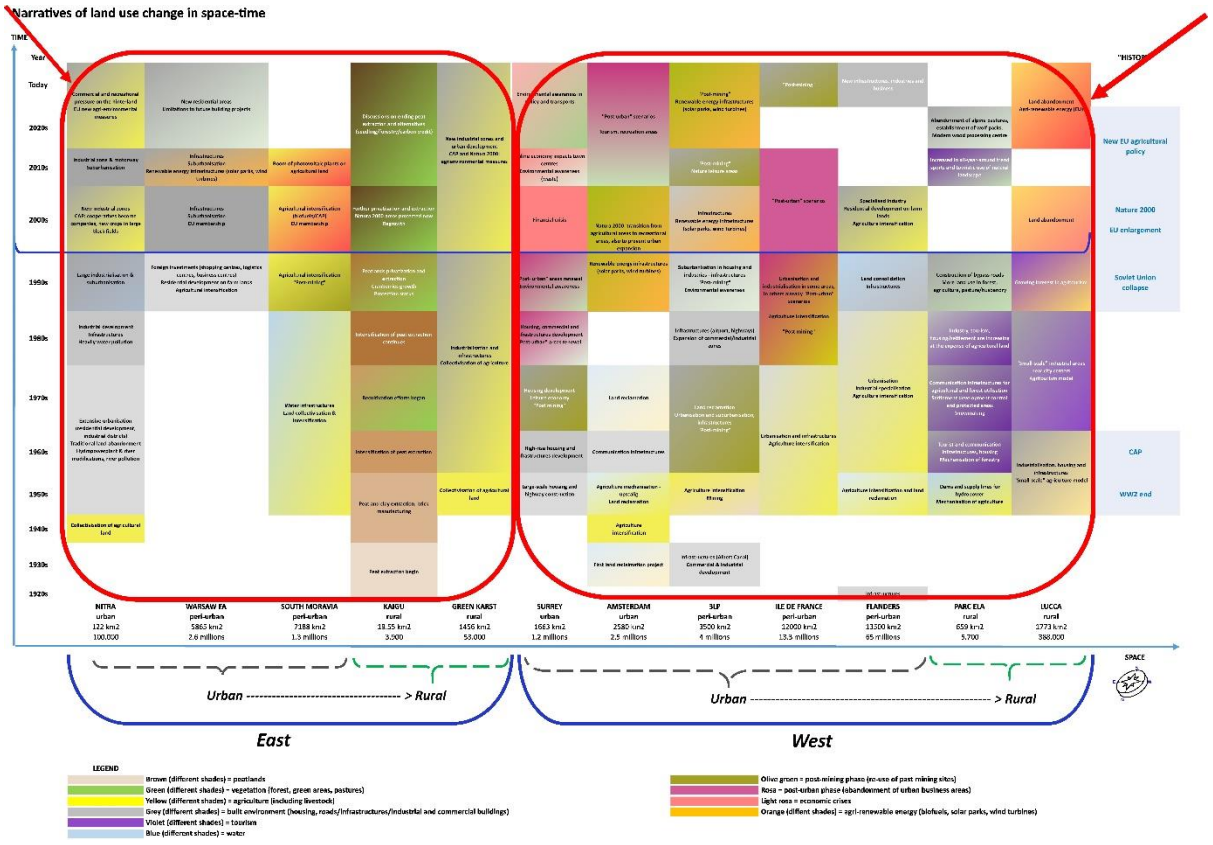


**Figure 10. Diversity in heterogeneity of land use categories between the Eastern and Western Practice Cases (Image source: Vincenza Ferrara).**

Our analysis indicates that the difference observed above between the two European zones correlates with different evolutions patterns of their land use processes. While most of the

Practice Cases initially shared similar land use phases, these processes diverged into distinct trajectories during more recent times.

A clear example is urbanisation, which was an evident land use change process in both Nitra and Surrey for example until the 1960s and 1970s. However, from the 1980s onwards, their urban development patterns diverged. While Nitra experienced progressive urban expansion, Surrey had already entered into a “post-urban phase” characterized by heavy abandonment of previously urbanised areas and a shift towards new peripheral locations (Figure 11).

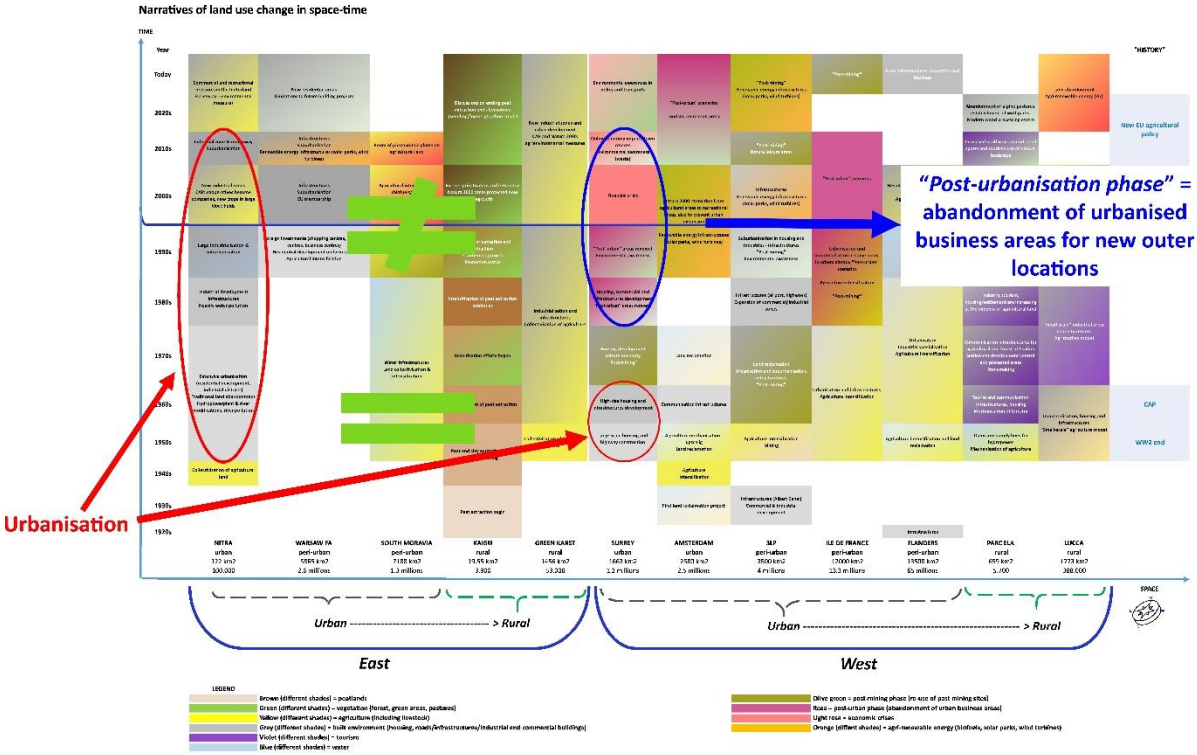


**Figure 11. Different evolution in time of initial similar land use processes, as exemplified by urbanisation and post-urbanisation trends (Image source: Vincenza Ferrara).**

A similar historical trend is observed in the evolution of extraction activities as a land use category. When some Practice Cases tell the story of a land use dominated by mining and peatland extraction (e.g., South Moravia and Kaigu peatland), from the narratives of other Practice Cases we learn how these had already transitioned into a "post-mining phase," characterised by the renewal and repurposing of closed sites, now re-used mainly for leisure activities. The narratives of Amsterdam Metropolitan Area, Three Countries Park and Île-de-France exemplify this trend (Figure 12).

What is more interesting, the different timings when extraction activities as land use category transitioned into a “post-mining” phase reveals insights into the underlying driving processes and values. We notice in fact that these historical transitions are linked to temporally distinct factors. In some cases, they seem to be correlated with major geopolitical events, where, for example, the South Moravia transition to the “post-mining” phase in the 1990s was linked to the

collapse of the Soviet Union, and where there were similar transitions in Three Countries Park and Île-de-France in the 2010s and 2020s linked to the implementation of EU green policies (Figure 13, dark blue). By contrast, the "post-mining"/"post-extraction" phases, observed in Surrey and Three Countries Park for instance during the 1960s and 1970s, can be associated with market economy development trends of that period (Figure 13, light blue).

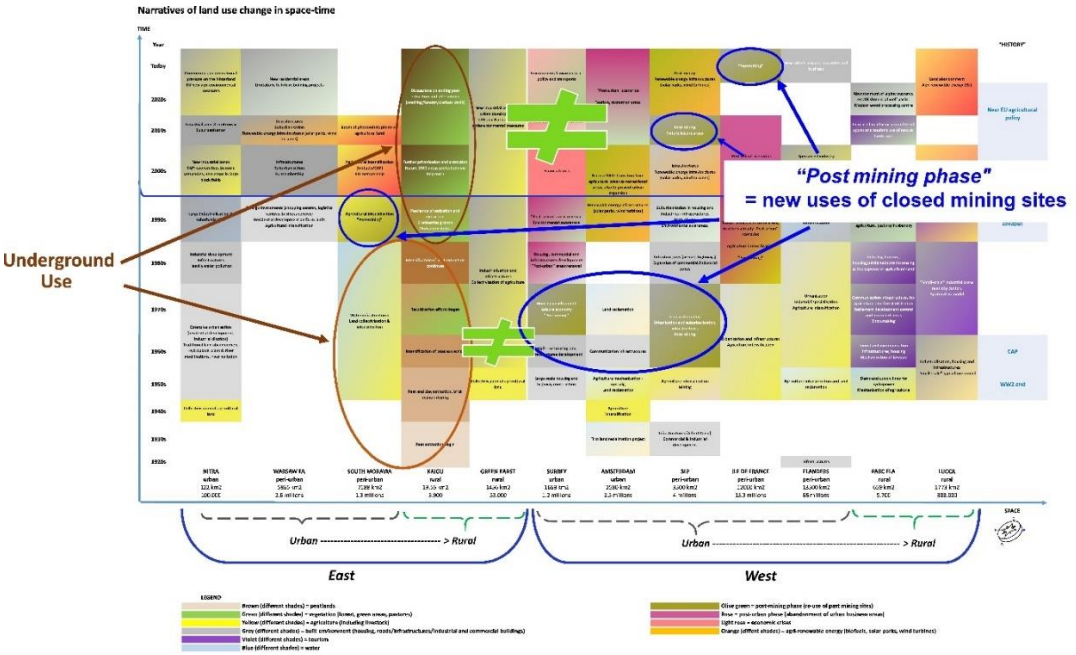


**Figure 12. Different evolution in time of initially similar land use processes, as exemplified by extraction activities and post-mining phases (Image source: Vincenza Ferrara).**

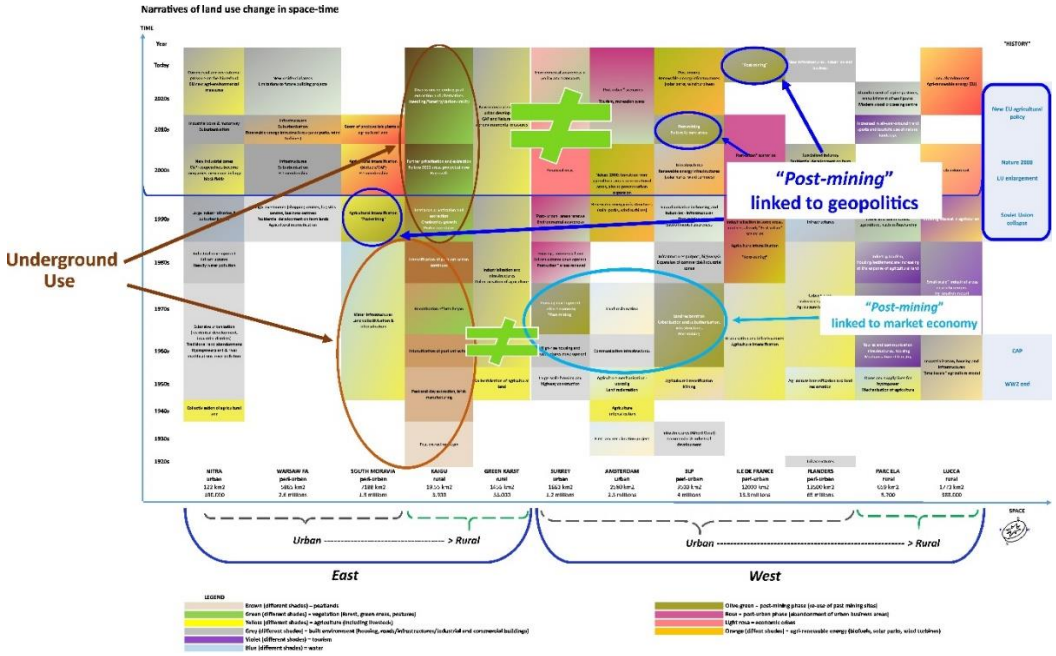


**Figure 13. Correlation between different evolution trends of similar land use categories (extraction activities and post-mining phases exemplified in the graph) and their historical drivers at different points in time (market economy and geopolitics) (Image source: Vincenza Ferrara).**

Examples like the ones presented so far, showing the diversity and asynchronicity in the spatio-temporal unfolding of similar land use change processes, would have remained invisible without

integrating the various types of evidence (both quantitative and qualitative) produced in WP2 and, above all, without a comparative analysis of the Practice Cases historical narratives.
Moreover, this observed diversity in land use change trends happening at the same time offers a valuable perspective into the future because, by tracing it, we can gain insights into the potential future trajectories of certain land use states. Put simply, due to the temporal mismatch (asynchronicity) between different trends of the same land use, we can observe today in certain geographical areas the advanced stages of land use processes that are still in earlier phases of development elsewhere. This is invaluable knowledge because it demonstrates that we can anticipate potential future scenarios, if political-economic and social drivers remain somehow similar, and it provides us with enhanced tools for designing present-day interventions. The value of historical analysis lies precisely in this seeming paradox that from the past we gain a glimpse into the future.

The results from WP2 demonstrate that land use changes in the 12 Practice Cases and at broader European level have varied significantly in duration, rate, and intensity. Over the period under scrutiny, agriculture, for example, exhibits two main distinct phases of change, happening at different speeds. A first wave of intensification and mechanisation, beginning in the 1940s, proceeded at a slower pace and lasted over a longer period of time, when compared to a second wave of land use change in agriculture, occurring in the last twenty years or so) and characterised by the transformation of agriculture into a renewable energy production sector. This is a land use change pattern observed across several Practice Cases (Figure 14).
In Eastern countries, land use diversification accelerated soon after the collapse of the Soviet Union and subsequent integration into the European Union. The South Moravia Practice Case exemplifies this trend, demonstrating an abrupt transition to green energy production as a replacement for agricultural intensification legacy of collectivism. This shift towards agri-renewable energy production has been rapid and concentrated within the last 20 years, across all the Practice Cases that have experienced this phenomenon (Warsaw Functional Area, South Moravia, Three Countries Park, Province of Lucca). Moreover, such abrupt land use change contrasts sharply with the historical transition from traditional to more intensified and mechanised agriculture, which unfolded from the 1940s until the late 1990s in those Practice Cases. An exception in this land use dynamics is represented by Green Karst Practice Case, which shows a comparatively slower rate of change (Figure 14).
In Western Practice Cases, similar rapid transitions are associated with the implementation of Natura 2000 and the new EU agricultural policies. While market forces, supported by national policies and manifested through industrialisation and infrastructure development, seem to be the primary drivers of rapid land use changes in Western countries up to the 2000s, the following land use transitions have been driven primarily by EU-level policies and their local implementations. The narratives of the Practice Cases suggest also that these policy-driven changes often represented adaptation and mitigation strategies in response to the economic crises that they experienced during this historical period (e.g. Surrey, Province of Lucca).

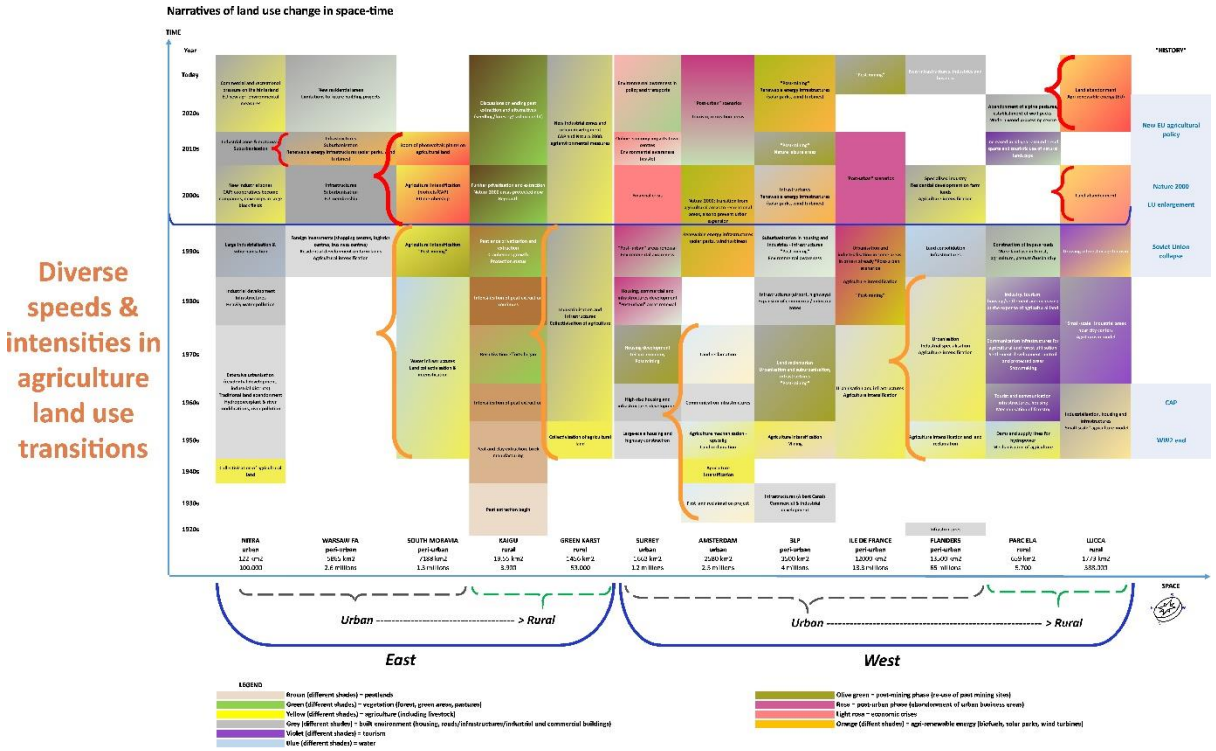


**Figure 14. Diverse speeds and intensities of transitions in agricultural land use in different historical periods (Image source: Vincenza Ferrara).**

Land reclamation from water, and the construction of water-retaining infrastructures to facilitate agricultural land use, represents a relatively slow land use change compared to more abrupt shifts. This process, ongoing for approximately 40-50 years (until the 1990s) in some Practice Cases (e.g., Amsterdam Metropolitan Area, Three Countries Park, Flanders, South Moravia), played a crucial role in facilitating other land uses, such as agricultural intensification (Figure 15).

The construction of transport and communication infrastructure, while occurring within relatively short timeframes, has significantly affected key, longer-term land use changes in certain Practice Case locations. For instance, the construction of the Albert Canal in Three Countries Park in the 1930s enabled the area's development into a commercial and industrial hub, subsequently influencing the development of its agricultural sector. Similarly, the transformation of Heathrow into a commercial and civilian airport after World War II completely drove the evolution of land use changes in the area. A second wave of major infrastructure projects started in the 1980s, intensifying and continuing in some Practice Cases until the 2010s (Nitra City, Warsaw Functional Area, Flanders, Parc Ela) (Figure 15).

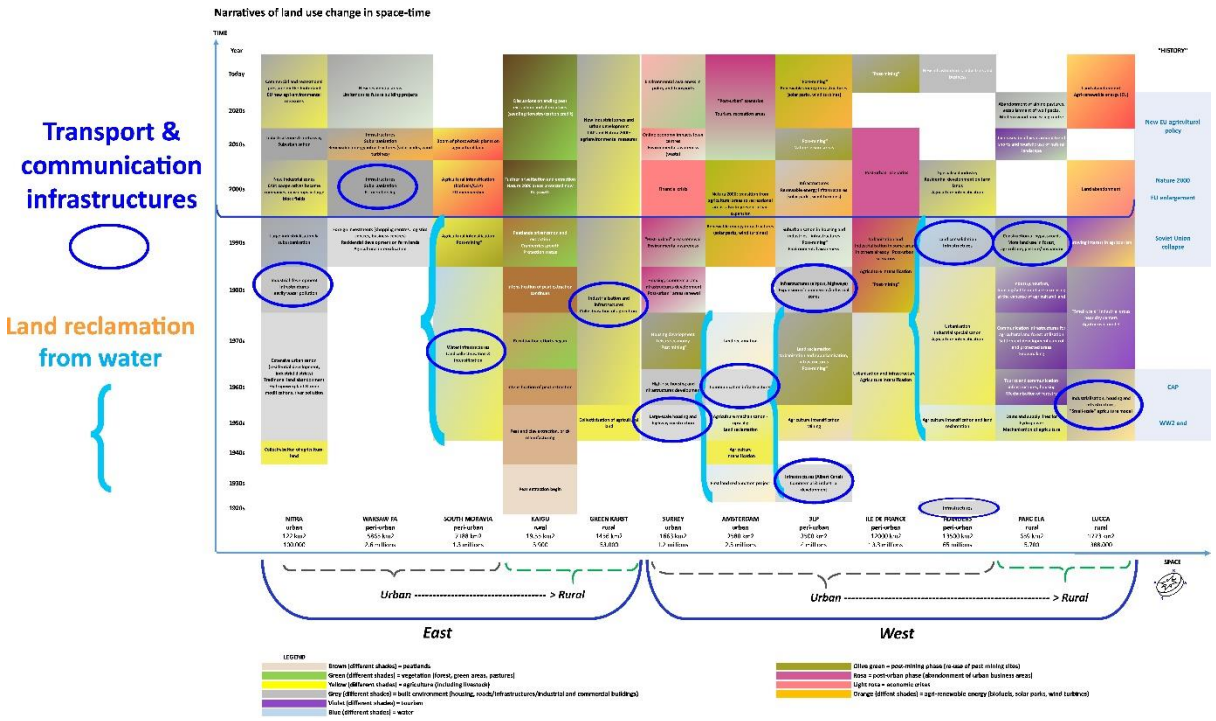


**Figure 15. Land reclamation from water (including water-retaining infrastructures) and transport & communication infrastructure as key historical drivers of land use changes at different points in time (Image source: Vincenza Ferrara).**

Specialised tourism (winter tourism and agrotourism) as a key local economic driver influencing land use dynamics appears to be primarily a Western phenomenon and concentrated in small-scale rural Practice Cases. This is evident when comparing the narratives of Parc Ela and the Province of Lucca with the timelines of the other Practice Cases (Figure 16). In the other Practice Cases´ narratives, tourism is not identified as a primary driver of local urbanization, growth, or land use intensification. This may be because such a niche economic sector is more visible when analysing land use trends at smaller scales than the large geographical area some of the Practice Cases represent.

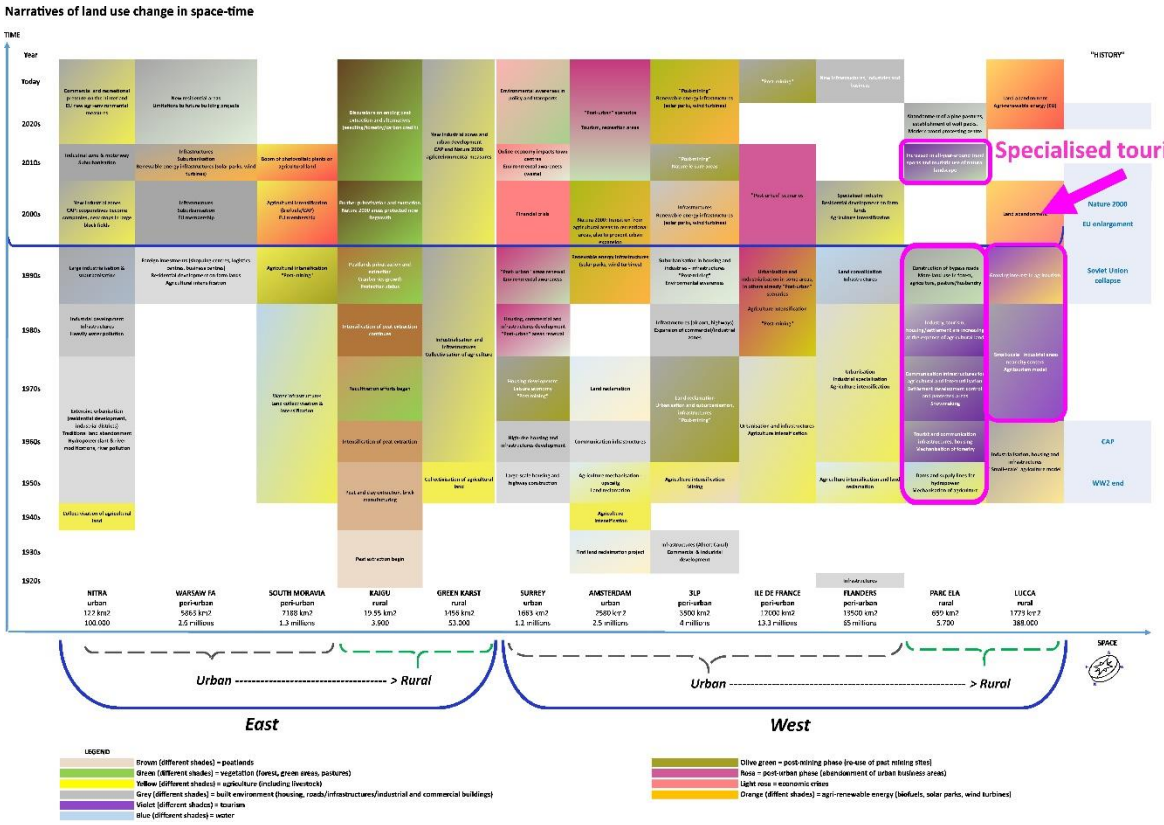


**Figure 16. Specialised tourism (winter tourism and agritourism) as a key local economic driver influencing land use dynamics in two rural Practice Cases of Western Europe (Image source: Vincenza Ferrara).**

"*Communism may have contributed to a faster adaptation to new technologies. However, it is likely that in a free market and democratic setup, it would also have happened very quickly*" (cit. South Moravia Practice Case Workshop 2 report, p. 4). An interesting finding from WP2 is that, despite having diverse governance regimes and drivers in the first half of the 20th century (collectivisation versus market economy), the Practice Cases in both regions of Europe (East and West) experienced similar land use processes and underlying values, characterised mainly by agricultural intensification, industrialisation and urbanisation. However, with most of the PCs becoming EU members (i.e. only two of the PCs are not EU members), disparities between East and West in the rates of these land use processes became increasingly pronounced. This temporal mismatch/asynchronicity is manifested as a Western progression into "post-phases" of certain land uses (see the example above of urbanization), while Eastern regions appear to be late in similar developmental trends.

## 3.3 The power of a limited but rich sample

One of the main contributions of the work described in Section 3 is the identification of how trajectories and drivers of change (3.1) have displayed themselves into asynchronous spatio-temporal unfolding of similar local land uses that provide new useful knowledge on path dependency and past analogues (3.2).

We have been able to detect this asynchronicity because it is the combined result of how overall trends in land use change, identified at broader pan-European scale, are intertwined at a more local scale, with the heterogeneous group of Practice Cases for spatial and demographic scale, position within the urban- rural gradient and, more importantly, each one representing diverse and complex histories of land use.
As such, each Practice Case brings to the table a multitude of drivers (regional and national policies; market-driven forces; population growth and urbanisation dynamics; local biocultural heritage and values; geomorphology) that, when observed in a comparative setting, explain the more general land use trends we have seen over the last century. Key examples, as shown in Sections 3.1 and 3.2, are scale enlargement, intensification and rationalisation of agriculture, accompanied by decrease in complex vegetation patterns and increase in overgrown areas; increase in complex land use and land cover patterns; loss of local traditional ecological knowledge; urbanisation.

Nevertheless, what is more important is that these trends would have remained invisible without integrating the various types of evidence (both quantitative and qualitative) produced in WP2 and, above all, without a comparative analysis of each Practice Case historical narratives. It has been only thanks to this comparative approach that WP2 has been able to show the path dependency and "legacy" effects from previous decades at different points along the timeline, with diverse lengths of land use changes and their multiple speeds.

Furthermore, what the limited but rich sample represented by the Practice Cases allowed us to grapple is how similar land use change trajectories have generated diverse impacts locally, shaping in different ways the land use to come (as the case, for instance, of EU CAP and green policies). Similarly, we gain new knowledge about how these asynchronous historical transitions were highly correlated to distinct local factors (e.g. major geopolitical events, as in the case, for instance, of the South Moravia transition to the "post-mining" phase in the 1990s, linked to the collapse of the Soviet Union).

# 4 Concluding discussion

From the analysis done in WP2, it has been possible to trace the trajectories of land use change over the last century in the 12 Practice Case locations, while drawing broader reflections at pan-European level as well.
By integrating the different forms of evidence generated within WP2, our results link socioeconomic, geopolitical, and environmental factors of land use change directly from combined local knowledge, quantitative spatial data and qualitative evidence. Furthermore, our results have made it possible to unpack several spatial and temporal variations in the unfolding of these land use changes, previously undocumented. These findings raise new lines of inquiry into land use dynamics and shine light on the determinants, drivers and underlying values that may have shaped the historical evolution of land use in the geographical areas represented by the Practice Cases.

## 4.1 Histories of places, places of history

Several crosscutting themes have emerged from our work, providing insights into the drivers of land use dynamics of the Practice Cases. The following list presents some of these themes; however, it is not exhaustive, as further themes may be identified through continued critical reflection on the results and materials from WP2.

The first theme highlights how the Practice Cases´ narratives are **histories of places**, while at the same time those geographical areas are also places where history unfolds (Kemp 2011). In other words, while these narratives provide highly specific and detailed local histories, they simultaneously represent locations where broader historical events and processes have played out. This is evident if we observe the various local impacts of wider historical events and trends that have been highlighted by multiple Practice Cases (e.g., the end of World War II, EU governance measures implementation). Consequently, the land use change narratives developed by the Practice Cases can be viewed as histories of places that emphasise the unique and peculiar forms that broader historical events and trends have taken locally. However, as we have shown in the previous section, different geopolitical circumstances in history for instance (e.g. communism versus capitalism) have influenced similar land use dynamics at a local level (e.g. agriculture intensification, industrialisation, urbanisation). Thus, the Practice Case locations can also claim to be “places of history”, as - regardless of specific historical circumstances - key land use change trajectories have unfolded across them, contributing to the cause-and-effect relationships of the following historical events at broader geographical and temporal scales (what we call “History”).

This pattern is translated spatially in the diverse local outcomes of the same policy and governance actions. The comparison of the 12 Practice Cases reveals the complexity and, often, contradictory, nature of these outcomes. In the PCs narratives, EU environmental policy is a

perfect exemplification of this contradiction. While implemented at "global/European" level with the same aim (environmental sustainability), it has nonetheless generated local ecological outcomes different from what originally expected. For instance, the protection of forest re-growth as result of EU greening measures is viewed positively in the Warsaw Functional Area, negatively in Green Karst and in Parc Ela as a sign of land abandonment and habitat degradation, and with contrasting feelings in Latvia due to the local livelihood historically heavily relying on peatlands but now aiming at their alternative sustainable uses.
An analogue can be made with regards to land use for transport and communication infrastructure: its impact has been perceived as positive in some cases (e.g., reduction of traffic and urban pollution in the Warsaw Functional Area) and negative in others (e.g. Nitra City).

Following this, a second emergent theme from the WP2 land use change narratives is what we call **counternarratives**. By this term, we mean narratives that, by giving voice to the perspectives and experiences of those excluded from official histories, offer alternative, sometimes contradictory, accounts of historical events and trends.
One example is EU agricultural and environmental policies, which are the subject of counternarratives across several Practice Cases. These narratives question the environmental sustainability and real socio-ecological efficacy of many EU "green" policies, citing negative local environmental, social and cultural outcomes. Together with the earlier example of forest regrowth, the transition of agricultural land to renewable energy production sites is another key illustration. Some Practice Cases (e.g. Green Karst) directly question the environmental sustainability of these shifts, highlighting the negative impacts of these transitions on the local environment (loss of local ecosystems biological diversity and traditional ecological knowledge owned by local land users).
Another example of counternarratives is questioning the environmental sustainability of the European integration process. This is the case of the uncontrolled urbanisation and the consequent environmental degradation experienced by the Warsaw Functional Area following EU membership. While EU accession brought new contacts, investments, and collaboration opportunities to the area, the Practice Case narrative questions the authentic sustainability of such process.

Last but not least, the compiled land use change narratives in WP2 reveal that water has been a historical driver of land use change as significant as other, more commonly recognised factors (e.g., market economy, governance, geopolitical events). The presence of water in the geographies and narratives of the Practice Case partners and its influence on subsequent land use changes is evident not only in those Practice Cases where water is a prominent feature of the landscape (e.g., Flanders, Amsterdam Metropolitan Area, Three Countries Park), but also in others where the presence of water is not directly evident as a historical driver of change. For example, in South Moravia, the construction of major water infrastructure in the 1960s and 1970s to improve soil quality drove agricultural intensification. The connection between water and the Kaigu peatland is self-evident. Further examples include Nitra City and Parc Ela, where the construction of hydropower plants (and river modification in Nitra City) in the 1950s and 1960s were crucial drivers of subsequent land use changes and economic trajectories of the

areas (this is the case, especially, of Parc Ela, whose tourism development was largely dependent upon artificial snowmaking capability). In these examples, clearly the geomorphological features of a place and the ways in which they have been managed, have contributed to write the history of their land use.

## 4.2 Outstanding questions, from the past for the future

In light of what has been discussed so far, we now wish to consider several outstanding questions that emerged during our reconstruction of past land use change trajectories in and between the Practice Cases, as well as at a broader pan-European level. While these questions originate from key features observed in past trends, they are intended to be addressed with a focus on the future of local and global land use.

**Can we really plan a future without comparing our pasts?**

The insights we have been able to gain in WP2 on past land use trajectories are the results of a methodological approach that has combined diverse sources of information, enriched moreover by comparing the various Practice Case partners' narratives of land use change. While each Practice Case narrative of the past possesses inherent value, it is through comparison that a new level of understanding can be achieved, generating insights not only at a broader European scale, but also to bring further illumination to the individual histories of the Practice Cases themselves. Put simply, the 20th-century history of the European locations represented by the project's Practice Cases is a history that goes beyond the simple aggregation of individual histories. It is instead in their combination that new historical knowledge emerges.

Reflecting on this novel dimension of knowledge of the past is equally important for planning future land use interventions, since the Practice Cases can learn from each other´s past experiences. Moreover, recognising that a more nuanced understanding of land use change trajectories arises from comparative and collaborative approaches gives further credibility to transdisciplinary research as a means of addressing pressing societal issues.

**What if we revisit past governance by looking at their spatio-temporal context, within a multiscale view of sustainability?**

The PCs narratives of land use change show that new insights into governance interventions can be gained by examining which interventions have been effective in which contexts to achieve more sustainable land use. The importance of the spatio-temporal context in the understanding of governance impacts on land use changes is key. Such an approach may allow us to identify "ideal types" in governance practices in the past and investigate them further to assess if they can be adapted and/or reconfigured for future planning and management.

Equally important an awareness of the "memory loss" problem, when it comes to historical reconstruction of any past. Governance and sustainability measures are often judged as effective only within short-term temporal scales. We rarely consider the long-term consequences of present-day actions, such as their effects over millennia for instance. Furthermore, we fail to acknowledge that truly sustainable approaches must operate across multiple temporal scales simultaneously (e.g., not only over 100 years but also 100,000

years, as well as 10 years). Examining the past can help train our view on the future, by considering both longer and shorter time scales at once.

## 4.3 Future tasks

As mentioned in the introduction of this deliverable, new knowledge on historical trajectories of land use changes is key to reflect on what the future scenarios of land use would be.

As such, the results produced by WP2 will be operationalised in the coming WPs of PLUS Change, dealing with modelling future land uses and their impacts on biodiversity, climate, well-being (WP3), identify pathways for sustainable land use strategies (WP4) and evidence-based instruments for behaviour and decision-making change (WP5).

The nuances to historical trajectories of land use change that our historical reconstruction can elicit are multiple and still to be entirely explored in all their full potentialities. This will be done in collaboration with the project partners when actively working on the future dimension of land use change, as it will happen in the coming WPs. However, our preliminary conclusion to be further explored for future tasks is that specific aspects of land use change need to be considered in simulations and scenarios dealing with the future. The first aspect to be considered is how specific drivers (e.g. policy measures driven by climate change mitigation goals) may affect the speed of land use transitions and the length of these new states afterward. This is the case, for instance, of the recent (latest decades) transition of agriculture from a sector meant to food production to a sector meant for renewable energy production. The second aspect to be considered is what we would like to call “empty spaces”. While some land use transitions implied a change of use of the same space (as said above, in the case of agricultural fields previously used for crop production and then as solar panels installations plots), other land use transitions have historically created empty spaces. This has happened in urbanisation and mining change trajectories. We believe that, among our coming tasks, there must be a reflection on how we can design sustainable land use transitions that do not leave behind empty spaces.

# 5 References


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