



Reimagining the European periphery

The case of Asturias

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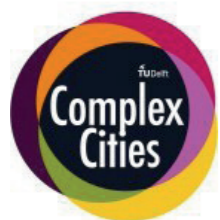
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Brownfield in Langreo, Asturias. Source: author

1 – Introduction

According to the UN, 7 in 10 people will be living in cities by the year 2050. This is a huge challenge for spatial planning and urban design and will certainly keep our profession occupied for decades to come. Considering this fact, one could be forgiven in thinking that the biggest challenge, that faces the planners and designers of the future, is growth. However, in many places in the developed world, the opposite is true.

In the developed world, population decline is becoming more and more prevalent. A significant portion of cities in Europe, the US and Japan can no longer expect growth (Mckinsey, 2016; Schlappa & Neil, 2013). Though population decline is not a new phenomenon, but the pace with which it is happening throughout the developed world is unprecedented (see figure 1.1) (Karina Pallagst, Mulligan, Cunningham-Sabot, & Fol, 2017).

Population decline drives a broad range of mechanisms that have a significant impact on cities and regions. The complex process that accompanies population decline is called shrinkage. The nature of this process is complex and concerns many different dynamics and outcomes (A. Haase, Athanasopoulou, & Rink, 2013).

Shrinkage poses a challenge for spatial planners to keep cities and regions functional and liveable. In the coming age, many developed regions will undergo deep and far reaching transformations.

With the population of the western world receding, the question arises: what happens to the places and people that will be hit by decline?

Though decline has been on the research radar for some years now, it is still given a limited amount of attention by planners and politicians. Shrinkage is a structural issue for much of the developed world, which has an uneven impact on populations. Almost by definition those regions that are shrinking represent the least liveable and economically healthy parts of our societies. Attending to the needs of these parts of the population should be high on the agenda of local, national and even international authorities. Even though shrinkage might reduce the resources that are available to drive sustainable planning, it does by no means abolish the need for it.

Many planners have regarded shrinkage from a pessimistic perspective (K. Pallagst, Fleschurz, & Said, 2017). However, as Hollander, Pallagst, Schwarz, and Popper (2009) argue “planners are in a unique position to reframe decline as an opportunity”. Shrinkage relieves regions and cities from the kind of pressures that complicate sustainable transitions in growing regions. Shrinkage can create more space for the development of natural systems, greener public space, or renewable energy (Mckinsey, 2016; Power, Plöger, & Winkler, 2008).

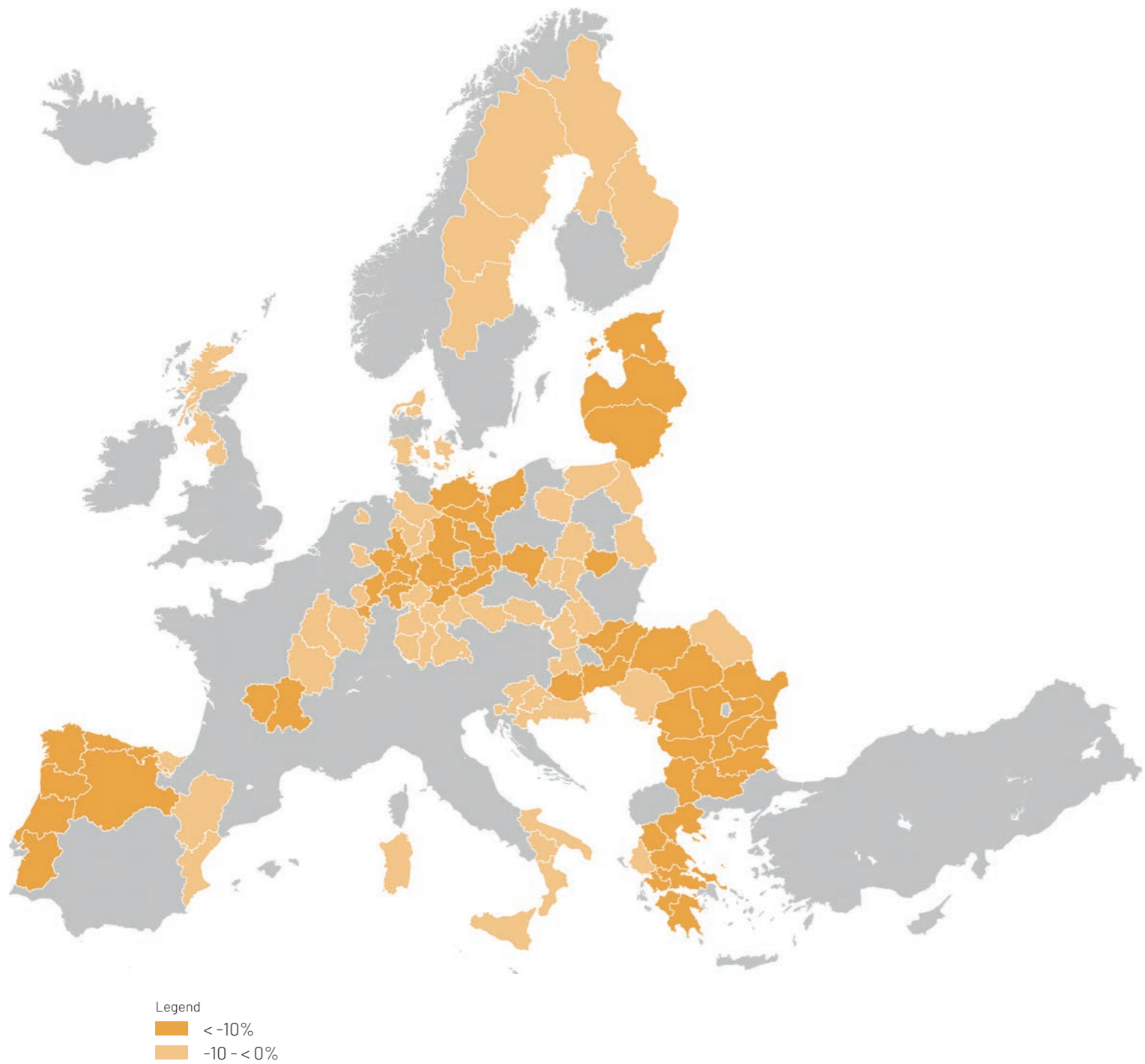


FIG. 1.1 Demographic decline for 2050 (%). Source: adapted from Eurostat, 2017

If the European society wants to transition towards a more sustainable future, it needs to exploit these opportunities. Europe needs to exploit its territories' potential for renewable energy to secure a safe and sustainable supply of energy for years to come. What is more, it needs to restore the ecosystems which have been destroyed over decades of over intensive land use. These changes are desperately needed, and they will have substantial impact on the way we organise our regions spatially.

The fact that there is a huge part of the European territory where space is available in abundance provides an enormous opportunity to make these transitions a reality. However, this does not mean that the needs of the populations of these shrinking regions can be ignored. Rather, synergies must be found between what is needed from a European perspective and what is needed at the local level.

1.1 – Literature discussion

This section will give a broad outline on the literature field that touches on the concept of shrinkage its consequences, impacts and opportunities.

Defining shrinking cities and regions

In recent years shrinking cities have received much attention from researchers. According to Hollander et al. (2009) "[a]'shrinking city' usually describes a densely populated urban area that has on the one hand faced a population loss in large parts and is on the other hand undergoing economic transformations with some symptoms of a structural crisis". Wiechmann is more specific in stating that a shrinking city is defined as a city of a minimum of 10.000 residents, which has faced sustained population losses over a minimum period of two years, and is undergoing structural transformation (Wiechmann, 2008). Martinez-Fernandez, Kubo, Noya, and Weyman (2012) define shrinkage as a structural crisis characterised by population loss, economic downturn, employment decline and social problems. Finally, Hollander et al. (2009) underline the prevalence of a downward spiral in which the drivers and the consequences of urban shrinkage reinforce one another.

Though there is much consensus concerning the importance of the region, both as level for research and a level for action, the literature has yet to put forward a clear definition of what a shrinking region entails. Undoubtedly this has to do with the conceptual difficulty of the term region, which does not always offer a clear demarcation. The lack of attention for the regional scale is one of the most important research gaps in the field of shrinkage. The gap obscures the dynamic that occurs between cities and the countryside.

In this thesis the definition of a shrinking region will be defined in this thesis as: a region that has experienced sustained population loss and economic transformations and is showing signs of a structural crisis.



FIG. 1.2 The impact of abandonment in Asturias, Spain: Source: author

Geography of shrinkage

As said in the above, shrinkage is a structural phenomenon throughout the developed world. According to Karina Pallagst et al. (2017) 350 large cities have lost significant proportions of their population, since 1950. Though many regions within Europe can be expected to shrink, the phenomenon does not occur evenly throughout Europe (see figure 1.1).

According to Wiechmann (2008) there are four types of shrinking regions within the European context;

- Western European industrial agglomerations in economic decline (e.g. Ruhr, Mersey Side, Pays Noir)
- Peripheral, sparsely populated depopulation areas (primarily Northern Sweden, Eastern Finland and Scotland)
- Transformation regions with serious industrial regression (large parts of Russia and the Central and Eastern European states)
- Rural emigration areas with a rapid decrease of births (e.g. parts of Spain and Italy).

Recognising these typologies is crucial to constructing comprehensive strategies to deal with the effects of shrinkage. Figure 1.1 shows a European map concerning the previous and expected population growth in what are called the European NUTS regions.

Governments facing shrinkage

Comprehensive governmental action is required in shrinking circumstances but is not always there. In many cases, local and regional governments are lacking the tools and the expertise to respond to shrinkage adequately. What is more, local governments

are not always prepared to accept the reality of shrinkage. In many cases this has led to local governments hammering down on fruitless growth strategies. In other cases, governments and local actors have gotten stuck in a planning deadlock, wherein the growth-paradigm has prevented planners to identify new development opportunities (K. Pallagst et al., 2017; Schlappa & Ferber, 2013).

Also, on a national and European, strategies fail to address opportunities and challenges of shrinkage. As Schlappa and Neil (2013) conclude in an URBACTII report; “many national and regional funding programmes [are] supporting urban development and also national tax systems which reward growth – and punish shrinkage. This context, as the consultations during the capitalisation process brought out, is one of the causes of the ‘spiral of decline’ shrinking cities are caught up in”. Few studies have been done to assess how this problem might be addressed.

The role of region planning and collaboration

Much of the literature that is concerned with shrinkage is focused on the scale of the city. However, according to Muller and Siedentop (2004) the region is the leading scale of action to tackle shrinkage. Cities cannot address shrinkage alone, regardless of whether they are large or small (Schlappa & William, 2013). Inter-municipal and regional collaboration are of great importance to ensure that local strategies are not neutralised out due to conflicting approaches within the region (Schlappa & William, 2013). Currently, this aspect of the shrinkage dilemma remains greatly understudied.

The consequences of shrinkage

Shrinkage has numerous consequences in the social, economic and environmental domain. It can cause the isolation and segregation of social groups. For instance, when younger members of the community move out to find better fortunes elsewhere. A reduced population also puts greater strains on the provision of social services. Local governments must manage increasingly oversized service systems, while their tax-base diminishes. Shrinkage also drives a dramatic land use transformation. As cities and regions decline, entire neighbourhoods and even villages become abandoned. Companies also abandon these regions, in search for other regions with a stronger labour market, leaving behind numerous brownfields and industrial infrastructure.

These effects are not only a problem in and of themselves, they also contribute to the decline in liveability of cities and regions. Thus, creating the ‘downward spiral’ (Schlappa & Neil, 2013).

Opportunities in Shrinkage

There have been many academics that have identified the opportunities that stem from shrinkage. As Hollander et al. (2009) argue “the lack of strong market demand and an abundance of vacant land create unprecedented opportunities to improve green space networks and natural systems in shrinking cities. Capitalizing on decline to set aside land for recreation, agriculture, green infrastructure, and other non-traditional land uses will

benefit existing residents and attract future development and enable shrinking cities to reinvent themselves as more productive, sustainable, and ecologically sound places". The next paragraph features a brief overview of all the various interventions and projects that have been carried out to capitalize on the opportunities in shrinkage.

One opportunity that has received attention in literature is related to urban greening and ecology (see Burkholder (2012); Dagmar Haase (2013); Dagmar Haase, Haase, and Rink (2014)). Others have highlighted the prevalence of vacant land as an chance temporal uses such as urban agriculture and events (Hollander et al., 2009; Németh & Langhorst, 2014). Yet, more others have pointed to the use of vacant land to alleviate environmental threats such as storm water runoff (Desimini, 2013; Keeley et al., 2013). In some cases, prevailing vacancy has been regarded as an opportunity to resize and densify cities towards a more compact model (Bernt et al., 2012). Vacant buildings have also been labelled as an opportunity, either to facilitate temporal uses (Lydon & Garcia, 2015) or as for adaptive transformations to provide services such as workspace and new housing types, or even to revalorize and reuse cultural heritage (A. & E.D., 2011). From some perspectives the reduced power of local administrations can be an opportunity (and a need) to empower local communities (Hospers, 2012). On a larger scale, Navarro and Pereira (2015) and others (Kuemmerle et al., 2008; KUEMMERLE et al., 2011; Queiroz, Beilin, Folke, & Lindborg, 2014) argue for the benefits of rewilding in areas that are affected by agricultural abandonment. Others point to the ability of ecologic agriculture to alleviate the problems of polluted soils in mining regions (Fu-ping & Dong, 2010; Li Fuping, 2012). Finally, the exploitation of vacant land and vacant structures such as mines for renewable energy purposes such as biomass cultivation, solar energy or wind turbines seems promising as well (Adelaja, Shaw, Beyea, & Charles McKeown, 2010; Ferber & Schlappa, 2016; Lord, Atkinson, Lane, Scurlock, & Street; Milbrandt, Heimiller, Perry, & Field, 2014).

Thus, shrinkage harbours opportunities to develop many sustainable land use transitions. Both concerning the transformation of urban environments into more healthy and liveable environments as well as facilitating more sustainable land-uses in the regions. Successfully utilising this potential requires great care concerning the spatial manifestation of these transitions. Though there are many examples of interventions that exploit these opportunities, few attempts have been made to formulated comprehensive and integral strategies that look beyond piecemeal interventions.

It is important to note that these transitions can cater to the interests beyond those of the city or region. Especially new land-uses that facilitate things such as renewable energies, ecosystems and more efficient agricultural systems, attribute to national and even European needs. The interests of national and international actors can be of crucial importance to unlock much needed resources fuel these transitions as well as build strong supportive coalitions that are able to successfully carry them out.

In recent years, many papers have been written on the topic of planning in shrinking cities and regions, many principles and strategies for shrinkage have been proposed and refuted. However, there is a certain consensus on some issues. The first point of consensus being the need for (regional) collaboration to share the burdens of decline (Bernt et al., 2012; Schlappa & Neil, 2013). The second point of consensus is that shrinkage should be regarded as an opportunity to qualitative improvements (Dagmar Haase et al., 2014; Hollander et al., 2009; Sousa & Pinho, 2015). The third point is the



FIG. 1.3 The impact of abandonment in Asturias, Spain: Source: author



FIG. 1.4 The vacancy in Detroit is exploited to provide the local population with opportunity to grow their own food. Source: detroit.curbed.com

need for a regional scope, given that shrinkage is rarely limited to a single city (Muller & Siedentop, 2004; Schlappa & Neil, 2013). The final point of consensus is the need to build partnerships between public, private and civic parties in order to make up for the reducing power of local authorities (Bernt et al., 2012; Hospers, 2012).

1.2 – Knowledge gaps

Though there has been much research into the processes and consequences of shrinking cities, academic research has left several important gaps. One of these gaps is, the failure to further conceptualise the issue of shrinkage on the scale of the region, both as a crucial concept for understanding the process of shrinkage as well as a level for action. Another gap concerns collaboration between local and national governments. Most important is

the lack of integral design principles and planning strategies which practitioners could use to aid sustainable development in shrinking regions and cities.

1.3 – Problem statement

Throughout Europe, shrinkage drives a dramatic process of land use change, resulting in under-utilisation, vacancy, demolition, emerging brown- and greyfields, and general deprivation (Dagmar Haase et al., 2014). These changes carry negative social, economic and environmental consequences (Branas et al., 2011; Garvin, Branas, Keddem, Sellman, & Cannuscio, 2013; Megan & Jeremy, 2012).

In many cases, planners and decision makers are slow to acknowledge the reality of shrinkage. This leads them to pursue growth-oriented strategies and policies long after the prospect of growth has wilted away. This is problematic for two reasons. Firstly, valuable resources are spent on projects that have a low chance of success. Subsequently, these resources are not spent on non-growth projects that could improve the quality of life of the local inhabitants.

Secondly, the growth fallacy lead governments and private parties to hold on to undeveloped assets, such as brownfields, greyfields and abandoned buildings, in the hope that these assets will eventually be picked up by the market. Thus, eliminating the opportunity for these assets to be used for other alternative uses (e.g. energy landscapes, reforestation, ecosystem restoration, agroforestry, etc.).

Not exploiting the opportunities to implement such new land-uses is not merely a loss for the local population, who might stand to gain from it. The implementation of these uses is important for the European society.

1.4 – Goal and research questions

The aim of this thesis is to advance the knowledge basis for planning and design within the context of shrinking regions, with an emphasis on the exploitation of the opportunities that stem from shrinkage. The goal of this thesis is not to reverse shrinkage. Given the overwhelming amount of cities and regions that will decline in the coming decades, it is far more useful to study how cities and regions might make the best out of shrinkage.

The thesis has two sub-goals, which are a) to investigate the use of planning and design principles at the regional scale, and b) to investigate the process by which these planning and design principles can be integrate in to the regional planning system.

The thesis will identify the opportunities based on the diagnosis of a case study and demonstrate how to best exploit them, with an emphasis on finding a synergy between the problems caused by shrinkage and opportunities for new forms of land use. The aim is to uncover new principles and strategies for spatial planning that can be transferred to other shrinking regions. Furthermore, the study will discuss what would be the main obstacles for the implementation these principles and strategies through the planning system.

Based on the described problem field and the literature review the following research and sub-research questions have been defined:

Main research question: How can regional spatial development be directed to exploit the opportunities that stem from shrinkage?

Sub research questions:

1. What are the manifestations of shrinkage in the territory and planning system of Asturias?
2. What are principles and strategies for design and planning that can be used to exploit the opportunities in shrinkage?
3. How can these principles and strategies be integrated in to a regional design that guides regional spatial development?



FIG. 1.5 A 4.75-MW solar farm on Brownfield in Massachusetts. Source: Greg M. Cooper / Soltage LLC

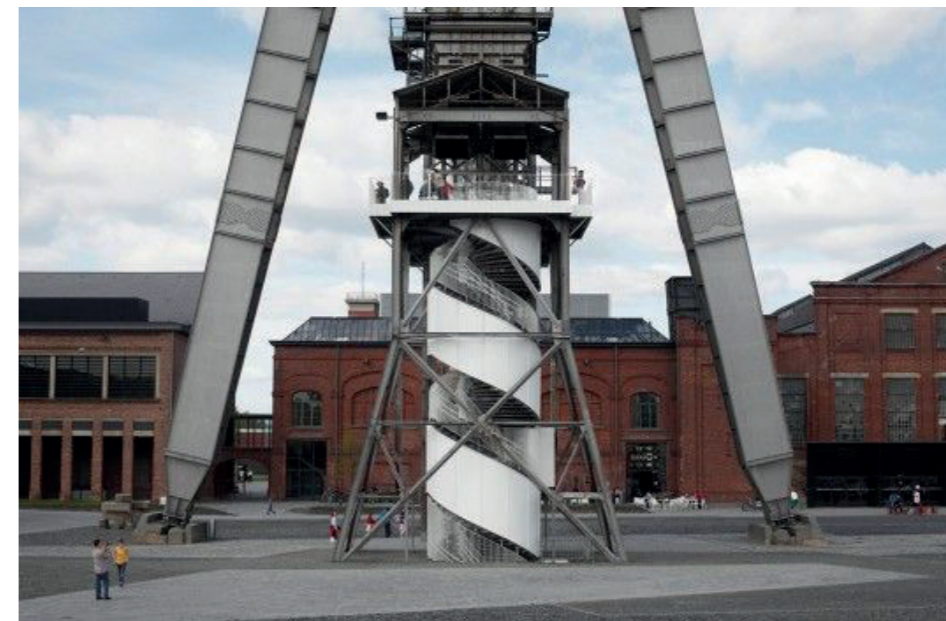


FIG. 1.6 Emscher park in Duisburg, Germany. An example of how abandoned industrial buildings can be repurposed to facilitate cultural activities. Source: Beyond plan b



Abandoned house in Langreo, Asturias. Source: author

2 – Research design

This chapter offers an overview of the theories, methodology and research methods that have been used during this thesis. This chapter is divided into three parts; the theoretical framework, the research design, and the methods which will be used to answer the research questions.

2.1 – Theoretical framework

The thesis draws on three theoretical bodies, namely; shrinkage, regional planning and governance, and regional design (see figure 2.1). Additionally, the thesis draws on several bodies of literature that are related to alternative land-uses. This section explains which concepts this thesis will draw from these bodies, and how these theories are connected.

Shrinkage

There are two important aspects of shrinkage that need to be understood in this thesis. The first are the basic mechanisms of shrinkage. Without which it is impossible to make long-term visions and plans. The second are the implications of shrinkage.

Shrinkage is a complex multifaceted issue with a simple indicator, namely population decline. Haase, Bernt, Großmann, Mykhnenko, and Rink (2013) provide one of the most comprehensive explanations of the issue. They argue that shrinkage is driven by an interplay of macroregional trends, local urban development, government policies and local agents. Their framework demonstrates how the direct and indirect consequences of shrinkage drive a vicious circle of decline (see figure 2.2). Haase et al. (2013) shed light on the limits of the ability of local actors to confront the problem. The feedback loops that have been included into the model help explain why shrinkage is a structural process that ties into social, economic, political and physical aspects.

Four different drivers of decline can be identified. All drivers have varying degrees of impact upon a given context (Thorsten Wiechmann, 2008; Thorsten Wiechmann & Bontje, 2015; T. Wiechmann & Pallagst, 2012):

1. **Economic restructuring** - as economies transform, infrastructures and clusters become obsolete. This has a dramatic effect upon those regions or cities that have devoted a disproportionate amount of development to a single economic sector (Schlappa & Neil, 2013; T. Wiechmann & Pallagst, 2012).
2. **Natural demographic change** - as society develops fundamental aspects change, such as household typology, fertility, and aging.
3. **(Sub)urbanisation** - as urban structures develop, the type of development has a huge influence on the demographic outlook of regions and cities.

- Political and environmental events; movement of people is often triggered or catalysed by specific events in politics and our environment.

The explanatory power of these drivers is limited. The process of decline – and of growth – is so complex that it is hard to make a quantitative statement as to the impact of one driver on the demographic outlook of a city or region.

Shrinkage can damage virtually every domain of urban planning and governance. According to Rink et al. (2012) the effects of shrinkage can be organized in the following impacts categories:

- social cohesion (selective out-migration leaves groups behind in isolation, socio-spatial segregation)
- business climate (low investment, dwindling of commercial economy)
- social infrastructure (educational institutions and other social services are struggling to provide for an increasingly small population)
- housing (imbalance between supply and demand leads to vacancy and deprivation)
- technical infrastructure (underuse and low maintenance)
- land use and environment (brownfields, abandoned factories and agriculture lands)
- municipal budget (declining tax base leaves governments with fewer resources to cope)

Abandonment and vacancy in the city are more than a matter of wasted space. Research has shown that it has negative impacts on persons physical and mental health (Garvin, Branas, Keddem, Sellman, & Cannuscio, 2013). It also carries with it social implications such as induced crime-rate of neighbourhoods with high vacancy rates, and stigmatization (Branas et al., 2011). It also has noticeable impact on surrounding real-estate value (Megan & Jeremy, 2012).

In the countryside problems are much the same. Abandonment of villages in rural regions is much witnessed phenomenon in many European regions. Besides the vacancy within rural villages the abandonment of the agricultural landscape has its own impact. Abandonment of agricultural land has a deteriorating effect on the soil, in some areas in the Mediterranean agricultural abandonment is one of the prime drivers of desertification, the longer an area is abandoned the less useful the soil becomes. Furthermore, in some contexts agricultural abandonment can cause increases in wild-fire risk due to the increase of dry shrub landscapes. In certain contexts, rural landscapes also uphold their own biodiversity, counterintuitively the rise of shrubs and woodlands on agricultural lands can have a negative impact on the overall biodiversity (Benayas, Martins, Nicolau, & Schulz, 2007).

Strategic spatial planning in shrinkage contexts

Strategic spatial planning is the transformations of the physical spatial organisation of a city or region to meet the needs of the society (van der Valk & van Dijk, 2009). Despite

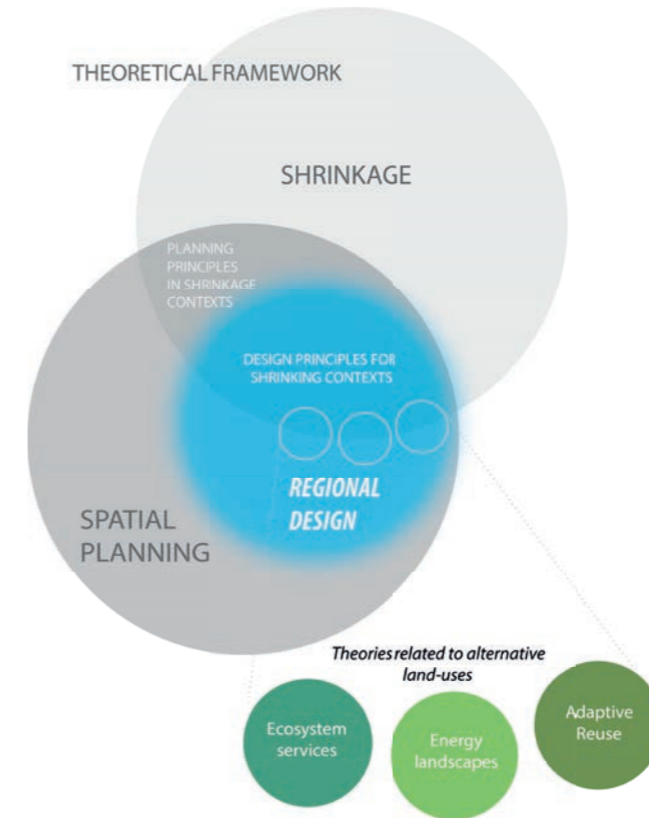


FIG. 2.1 Theoretical framework. Source: author

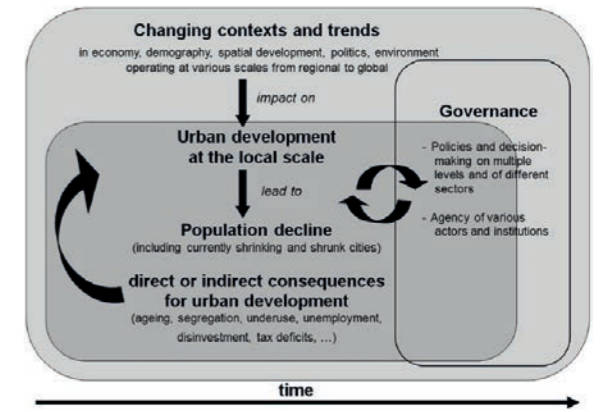


FIG. 2.2 The conceptual diagram of shrinkage. Source: A. Haase, Matthias Bernt, Katrin Großmann, Vlad Mykhnenko, and D. Rink (2013).

the fact that many spatial planning initiatives have been specifically aimed at the issue of shrinkage, the majority of the imposed strategies is still oriented towards attracting growth (Kempenaar, 2017). However, the demographic outlook of many European regions calls for a different focus.

The way a city or region responds to shrinkage is dependent on the context and on the nature of the process of shrinkage. Short periods of shrinkage could drive governments to try and reverse the trend, while long extended periods of decline, like in Detroit, can force city governments to accept the situation and try to capitalize on the opportunities of shrinkage (van Dam, Salverda, & During, 2014). In contemporary practice the responses of governments can be ordered into two categories; reaction-responses and adaptation responses (Sousa & Pinho, 2015).

Reaction-responses are responses that seek to reverse the shrinkage processes (Sousa & Pinho, 2015). This is typified by strategies and policies that are aimed at attracting new companies and inhabitants (Power, Plöger, & Winkler, 2008). There are some examples of successful reactionary responses. However, there is a significant risk involved, since such responses can lead to wasted resources when the growth does not come (Schlappa & Neil, 2013). Adaptive responses seek to adapt or optimize to the consequences of

shrinkage. This requires a more realistic attitude towards shrinkage, where by the best possible future in a shrinking context is pursued (Sousa & Pinho, 2015).

The second response is most supported by the academic literature. Arguably, in the western context where shrinkage seems to be a trend for many decades to come (Eurostat, 2017), the later of the two approaches is the sanest. Regaining growth seems to have been possible for some cities, but even they were not able to bounce back to their former population levels (Power et al., 2008). A no-growth mindset seems to be the most realistic attitude to have (Schatz, 2010).

Regional design

Regional design received a modest amount of attention from academics in recent decades (Balz & Zonneveld, 2015; Kempenaar, 2017; Neuman & Zonneveld, 2018; Nijhuis, 2017). The definition of the concept is still up for discussion. There is a consensus among authors in as far that regional design is a method for casting desirable future perspectives on a regional scale through design. Regional design draws heavily on the disciplines of urbanism, urban design, landscape architecture and spatial planning. And used those disciplines to create maps, physical plans and design to argue for changes in the regional territory. A regional design is not the same as a classic regional plan. Its intention is not to determine spatial planning, but rather to explore potential directions of spatial planning and subsequently argue for policy actions and governance arrangements (Balz & Zonneveld, 2015).

It addresses future trends such as demographic growth, climate change, and energy transitions, and seeks to understand how these processes might impact a region, and consequently what might be done about it (Neuman, 2000). It shapes regions by integrating the systems of cities with infrastructure (roads, transit) and natural landscapes (rivers, farmlands and parks) (Neuman, 2000). Regional design is multiscale. Its purpose is to envision a future and identify potential pathways that can lead to that future (Kempenaar, 2017). It must be able to make the leap between what is now, and what shall be in the future this means mitigating between the long-term vision and the short-term actions (Kempenaar, 2017).

All authors define regional design as collaborative effort between regional decision makers, planners, designers and other stakeholders (Balz & Zonneveld, 2015; Kempenaar, 2017; Nijhuis, 2017). How a regional design incorporates the agendas of the various stakeholders dictates the designs general acceptance, legitimacy and influence. It is therefore necessary for the regional designer to create a platform or arena wherein all these stakeholders can engage with the design process (Kempenaar, 2017). This requires more work than merely mapping the interests of the stakeholders. The regional design should also uncover interests that where hitherto unknown to the stakeholders. By identifying new interests, the regional design can “stimulate debate on sharing responsibilities and resources for planning tasks among planning actors” (Balz & Zonneveld, 2015).

However, opinions differ with regards to the emphasis on aspects of the regional design method. Regional design is defined by Kempenaar (2017) as an act of “collaborative envisioning of the future physical form and arrangement of settlements, infrastructures,

water features, nature reserves and other land uses in a region, including the relationships between them, their aesthetic appearances, and how this future could come about.” Her work is mainly concerned with the way the regional design process can alter the interests of stakeholders and come to a shared perspective.

Nijhuis (2017) positions regional design closer to the landscape architecture tradition by adding the adjective ‘landscape’ to his definition. He emphasises that “landscape-based regional design is considered an important strategy that shapes the physical form of regions using the landscape as the basic condition”. The starting point of a regional design is rooted in the physical characteristics of the region and the challenges and opportunities that lay therein (Nijhuis, 2017).

Neuman and Zonneveld (2018) devote more attention to the way in which regional design can “address institutional matters in addition to spatial issues”. They argue that institutional design and regional design are “two sides of the same coin”, and that the regional design is cross-cutting over different jurisdictions and territories and therefore always entails a certain amount of institutional revision. Where regional design is accompanied by institutional design it can fill the gaps in the planning and governance system. As Balz and Zonneveld (2015) argue it “is a distinctive method of policy argumentation that makes use of spatial representations of the plausible future of regions”.

These differing definitions are not really at odds with one another. Rather they display the broad spectrum wherein the regional design approach functions.

Regional design and spatial planning

Regional design is strongly related to strategic spatial planning and has many similarities (Van der Valk and Van Dijk 2009). Both address similar trends and issues and employ similar tools and methods. They differ in the intended results. According to De Jonge (2009, p. 16) “we can make a distinction between the regional design activities focusing on creating, visualising and concretising concepts and proposals that play a role in a (public) decision-making process, whereas the regional planning activities chiefly focus on the organisation of the process of decision-making by defining the choice situations”. Thus, regional design is not distinct from the planning process, rather it is a useful tool

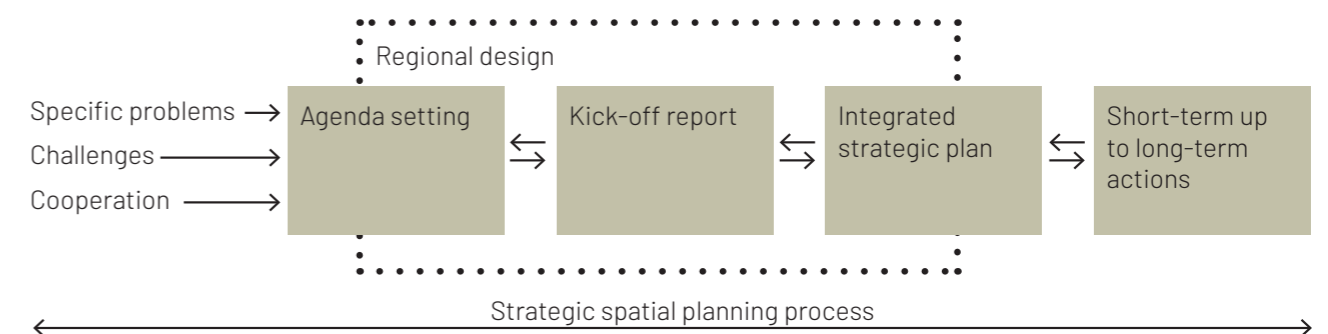


FIG. 2.3 The position of regional designing in strategic spatial planning processes. Source: (Kempenaar, 2017)

embedded in the planning process. Its main purpose is not to come up with a spatial plan that can be implemented directly, rather its purpose is to influence formal decision making by demonstrating alternative possibilities. Regional design is a tool to integrate new visions, ideas and concepts into the planning process (Rauws and Van Dijk, 2013). It is a form of planning and designing that aims to instigate more planning and designing. It envisions pathways for regional change but does not directly make the decisions for implementation.

Kempenaar (2017) provides a useful adaptation of a diagram that Albrechts (2010) used in his famous paper; 'Spatial planning revisited'. According to her, regional design(ing) is mainly of influence in the early stages of spatial planning, where agreements and connections are made, and ambitions are formulated (see figure 2.3). A regional design can be said to be effective when "it produces effects that support and enable strategic spatial planning to initiate developments towards the envisioned desirable future" (Kempenaar, 2017).

Theories for alternative land uses

The theories of shrinkage, regional design and spatial planning form the backbone of this thesis. They provide the why and the how. However, they do not provide the what. This thesis is concerned with the opportunities for alternative land-uses that stem from shrinkage, such as renewable energy, ecosystem restoration or recreational space (see figures 2.4, 2.5, 2.6). To assess whether something is indeed an opportunity for alternative land-use this thesis draws on a body of additional literature.

These are; ecosystem service planning, energy landscapes, and adaptive reuse. These literatures give and demonstrate the benefits of alternative land-uses such as ecosystems, urban-agriculture, renewable energy, and the reuse of vacant property. They also provide insight into the implementation of these land uses and the potential trade-offs and synergies that these land uses can bring about. Chapter 4 will present an elaborate explanation of these theories and the design principles that can follow from them.



FIG. 2.4 Renewable energy park in Morbach, GE. Source: timbre-project.eu



FIG. 2.5 Emscherpark, an example of reuse industrial buildings. Source: beyondplanb.eu



FIG. 2.6 Eco-farming in Altiplano Estepario, Spain. Source: Commonland

2.2 – Methodology

The chosen methodology for this thesis is a case study approach. Case studies permit researchers to make the bridge between abstract theory and practical knowledge (Yin, 2009). It also allows the researcher to study a phenomenon in a real-life context, this provides insight in to the role of the context. This thesis is concerned with providing tools and strategies for planners and designers in shrinking regions, contextual particularities that influence the suitability of strategies and tools are therefore very relevant. The issue studied in this thesis concerns the role of regional design and strategic spatial planning in relation to shrinking contexts.

The case that is selected for this thesis is the Northern Spanish region of Asturias. The case of Asturias is particularly interesting because it shares characteristics with all three of Wiechmann's (2008) types of shrinking regions. It shares commonalities with western industrial clusters such as the Ruhr areas, the sparsely populated mountain areas in the north of Scandinavia and depopulating agricultural landscapes in Italy and Portugal.

During the last five decades the region has undergone severe shrinkage through several different mechanisms. At first the rural hinterland became depopulated, next the industrial clusters decline, and currently the region has one of the quickest aging populations in Europe (Eurostat, 2017). This allows the research to study multiple mechanisms of shrinkage and their interaction within the scope of one context. What is more, because the region has multiple mechanisms of shrinkage it shares similarities with so many regions across Europe, the results of the study will be more widely applicable.

The region is independently governed by a parliamentary government, comparable to the German federal system. As stated above, the regional level is one of the main research gaps in the shrinkage literature. The presence of a regional government not only provides the necessary statistical data that is needed to study shrinkage on a regional scale, it also creates a practical framework through which regional action can be imagined.

The Principality of Asturias

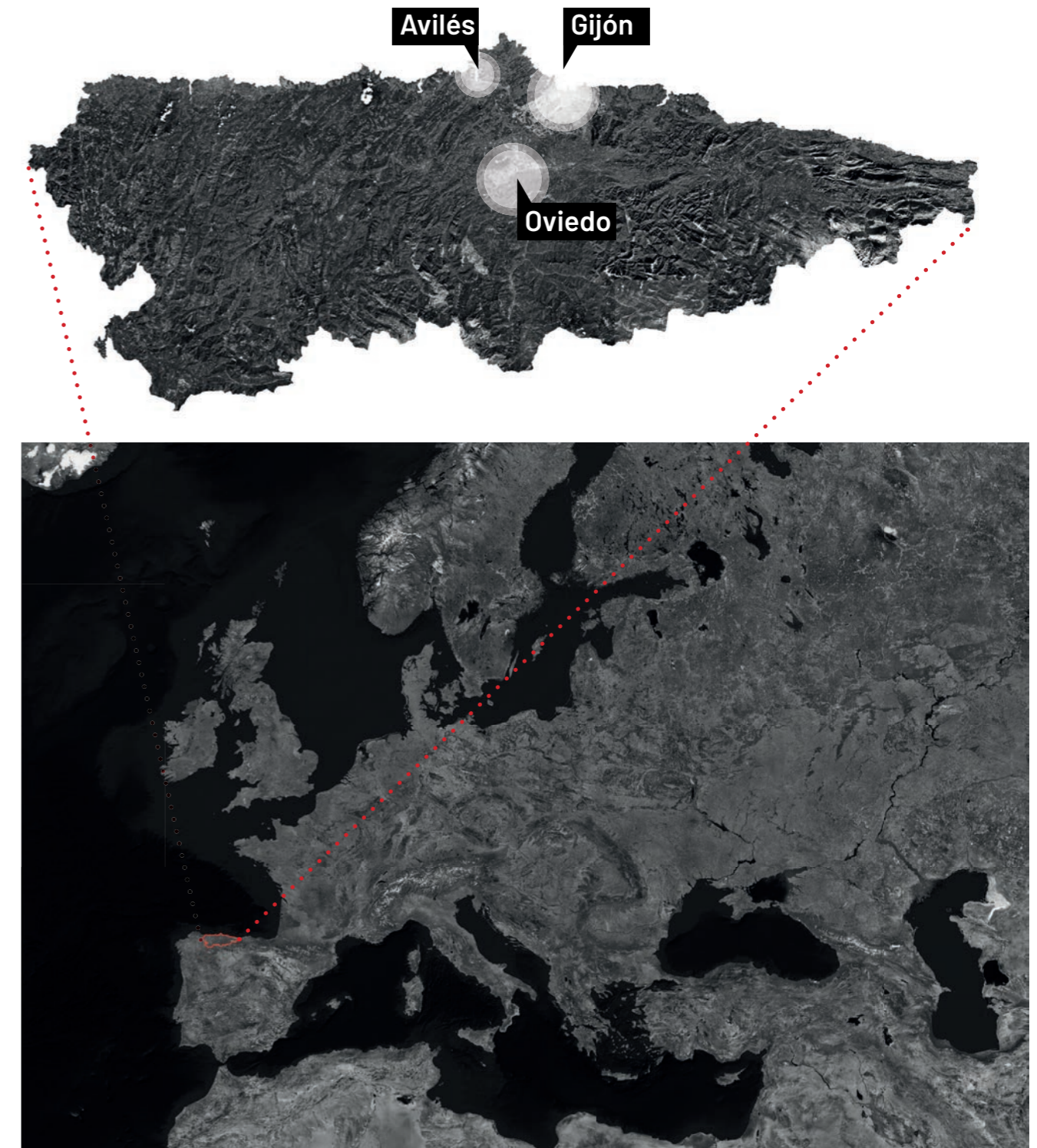


FIG. 2.7 The case study of Asturias located in on the northern coast of Spain. Source: author



FIG. 2.9 Signs of industrial decline in Asturias
Source: author



FIG. 2.10 Signs of farmland abandonment in Asturias
Source: author



FIG. 2.11 Aging in Asturias Source:
mujerescampesinasasturias.wordpress.com

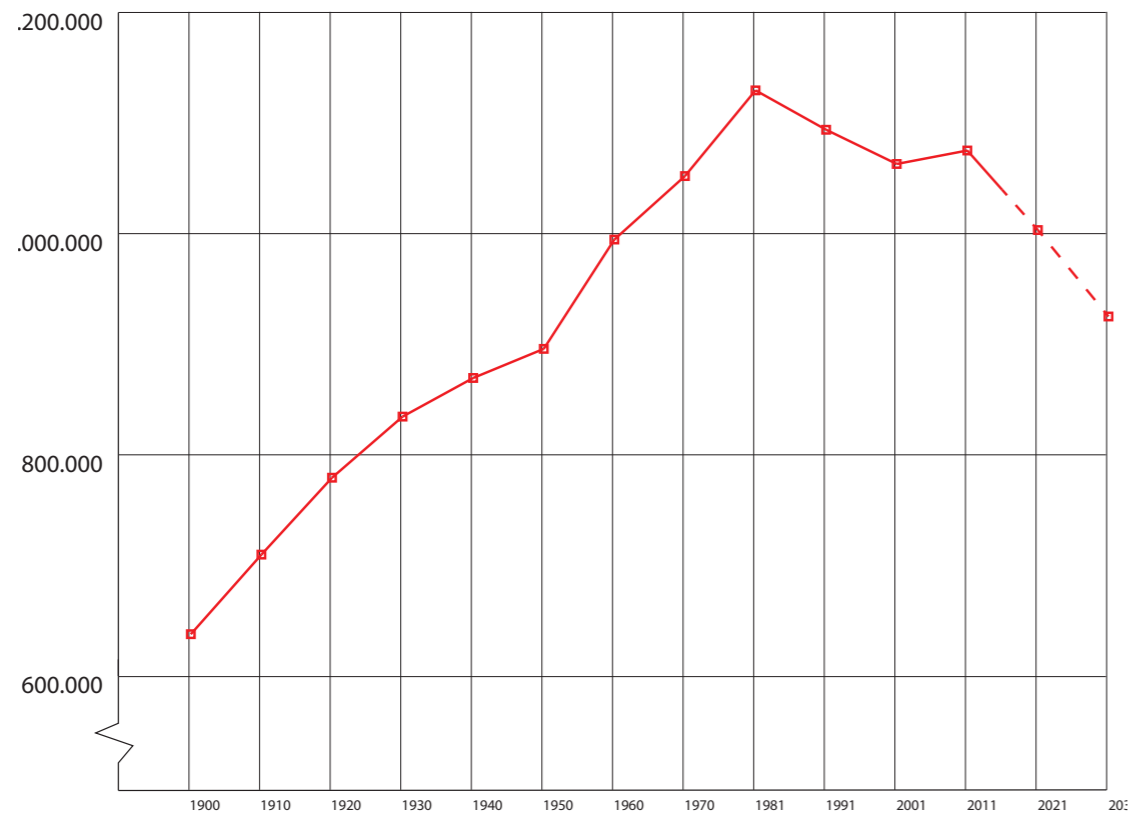


FIG. 2.8 The demographic change from 1900-2017 combined with the projection for 2031 Source: based on data from the SADEI

Answering the research questions

The following section will explain which methods will be used to answer the questions. First, the thesis analyses the impact of shrinkage on the physical and planning system and concludes what strengths, weaknesses, opportunities and threats can be derived from it. Subsequently, the thesis collects the potential principles and strategies that could be used to exploit these opportunities from literature. Next, it explores the extent to which these principles and strategies can be integrated into a regional design that fits in the regional planning system. Finally, the thesis considers the transferability of the principles and strategies used in the case region and gives recommendations towards the relevant governments. Figure 2.12 gives an overview of the relation between the theoretical background, the methods and the research questions.

RQ1. What are the spatial manifestations of

shrinkage in the case region of Asturias?

This section analyses the territorial characteristics, the drivers of shrinkage, the spatial implications of shrinkage and the regional spatial planning system.

- Semi-structured interviews
- Study of primary literature
- Study of secondary literature (reports, statistics, maps...)
- Observation
- Mapping

This question is concluded in a SWOT-analysis.

RQ2. What are the planning and design principles strategies that can

be used to exploit the opportunities that stem from shrinkage?

By analysing contemporary practice and literature on issues such as brownfield revitalisation, the thesis will build-up a catalogue of principles and strategies for planning and design.

- Study of primary literature

This question is concluded in a list of planning and design principles strategies.

3. How can such strategies and principles be integrated in a regional design?

By combining the information from the first two questions, a regional design will be drafted to demonstrate how the opportunities of shrinkage can be used to support sustainable development.

- Regional designing¹

¹ In a regular regional design process, stakeholders are consulted multiple times and are even involved in the designing process. Within the scope of this thesis extensive

- Stakeholder analysis

This question will be concluded in a regional design proposal that features a vision and a set of concrete actions for spatial development and implementation strategy that envisions the necessary partnerships, instruments and organisational transformations.

4. What are the benefits of the proposed regional design

strategy, and what lessons can be drawn for other regions?

The main goal of this question is to reflect on the proposed regional design and discuss whether it would be a valuable contribution to the regional planning of Asturias, and to other shrinking regions. Based on the reflection the thesis will draft recommendations with regards to the planning and designing of shrinking regions.

process is too ambitious. Therefore, the researcher has consulted the interviewees regarding some of the earlier design ideas, but has not included them in the design process.

Triangulation

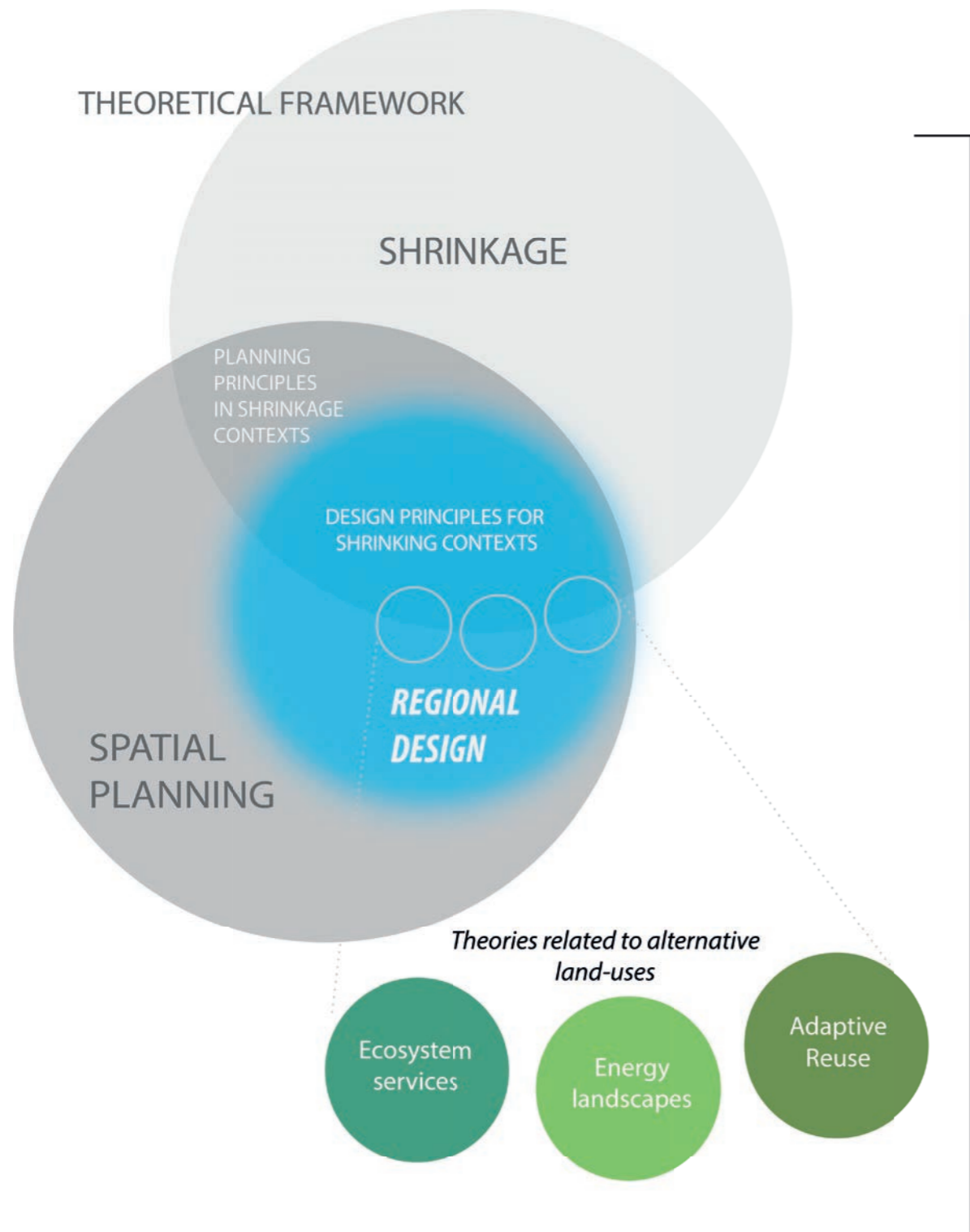
This thesis draws on several data sources (see figure X). The verification of the gathered data is done through the methods of triangulation. Whereby the data of one source is cross referenced with that of another. Through triangulation a more complete and accurate picture is formed of the case study.

The semi-structured interviews were conducted during a five-day field visit. The snowballing technique was used to reach a sufficient number of interviewees from governmental and academic institutions (see appendix for a list of the interviewees and the interview guide).

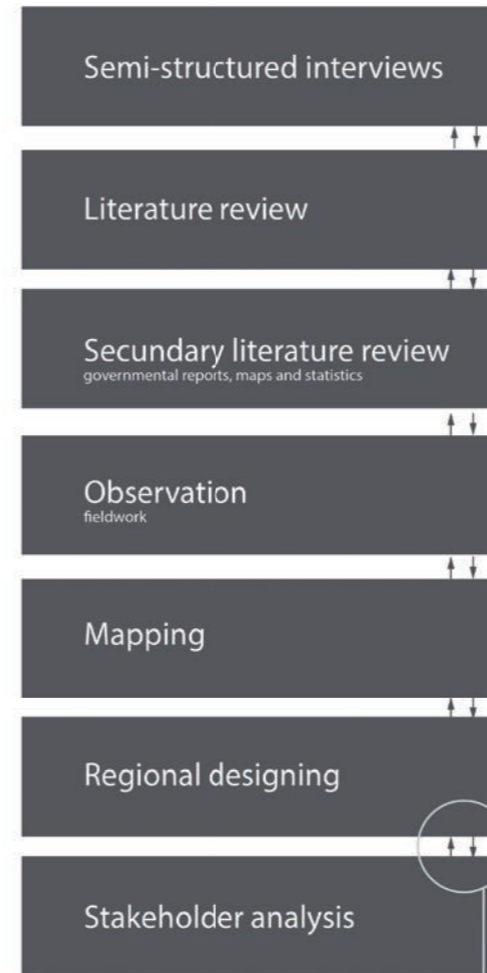
The literature study was mostly concerned with academic literature on regional planning, shrinkage and regional design. The literature study also featured several examples of cases where an implication of shrinkage was exploited as an opportunity.

Governmental documents and statistical data were obtained through the regional government of Asturias. Among the documents were territorial analysis and plans regarding the demographic and spatial development of the region.

Observation took place during the field visit. In addition, a careful study of satellite imagery was used to fill the gaps in the data of the regional government.



METHODS



triangulation

RESEARCH QUESTIONS



FIG. 2.12 Research structure of the thesis. Source: author



A reused industrial building in Mieres, Asturias. Source: author

3 – Diagnosis

This chapter addresses the analysis of the Asturian territory and spatial planning system in relation to shrinkage. It seeks to answer the research question: **What are the manifestations of shrinkage in the territory and planning system of Asturias?** The data for this section is obtained through the study of statistical data, governmental documents and semi-structured interviews with experts in the region.

This chapter starts with a brief description of the territorial characteristics of Asturias. Next the chapter gives an overview of the main drivers of shrinkage. Subsequently, the chapter explains how the process of shrinkage has manifested itself throughout this territory. Finally, this chapter provides an analysis of the regional spatial planning system. It identifies the basic hierarchy within the planning system, the main actors and discusses several emblematic plans and policies.

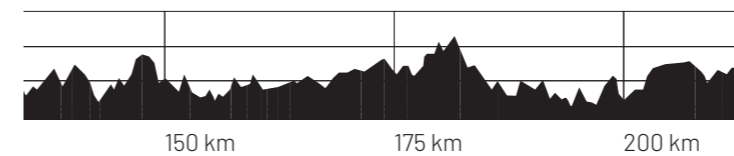
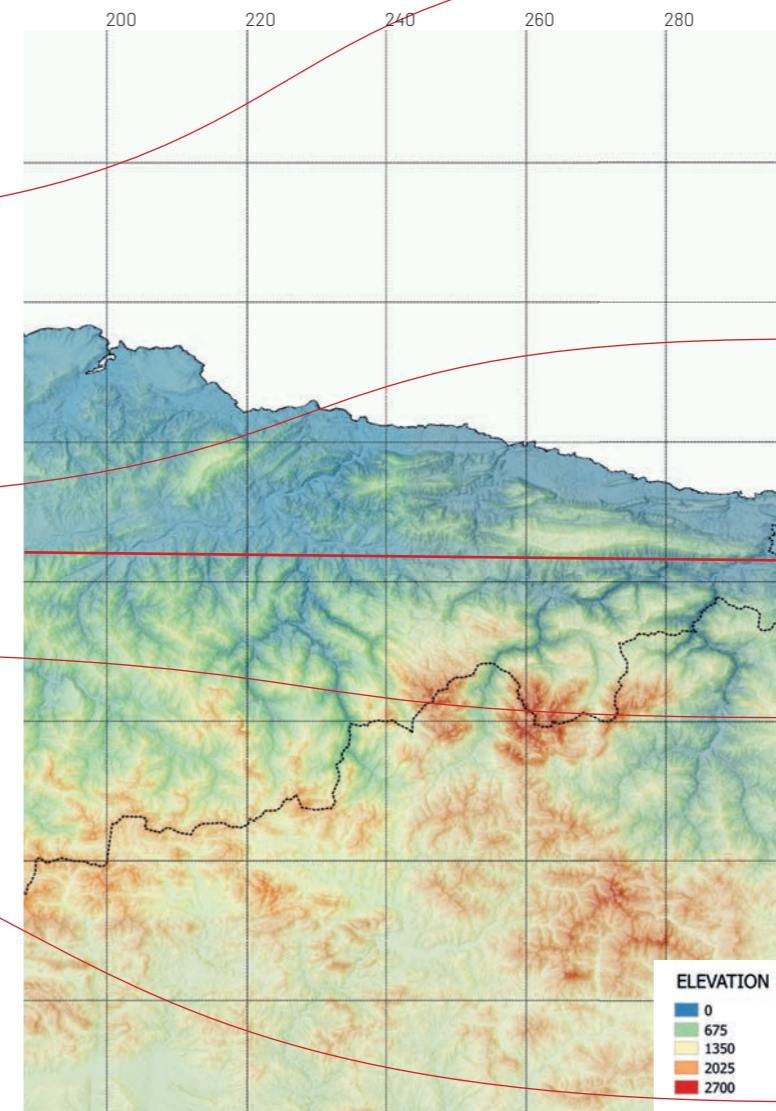
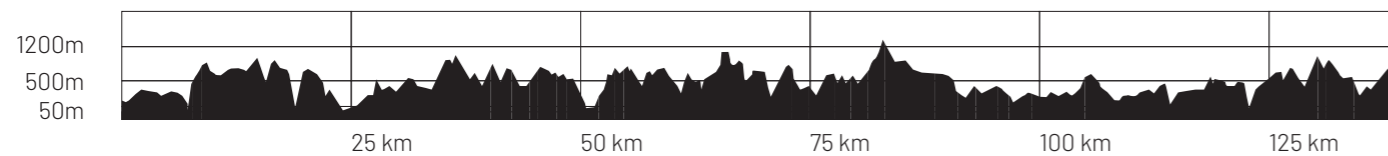
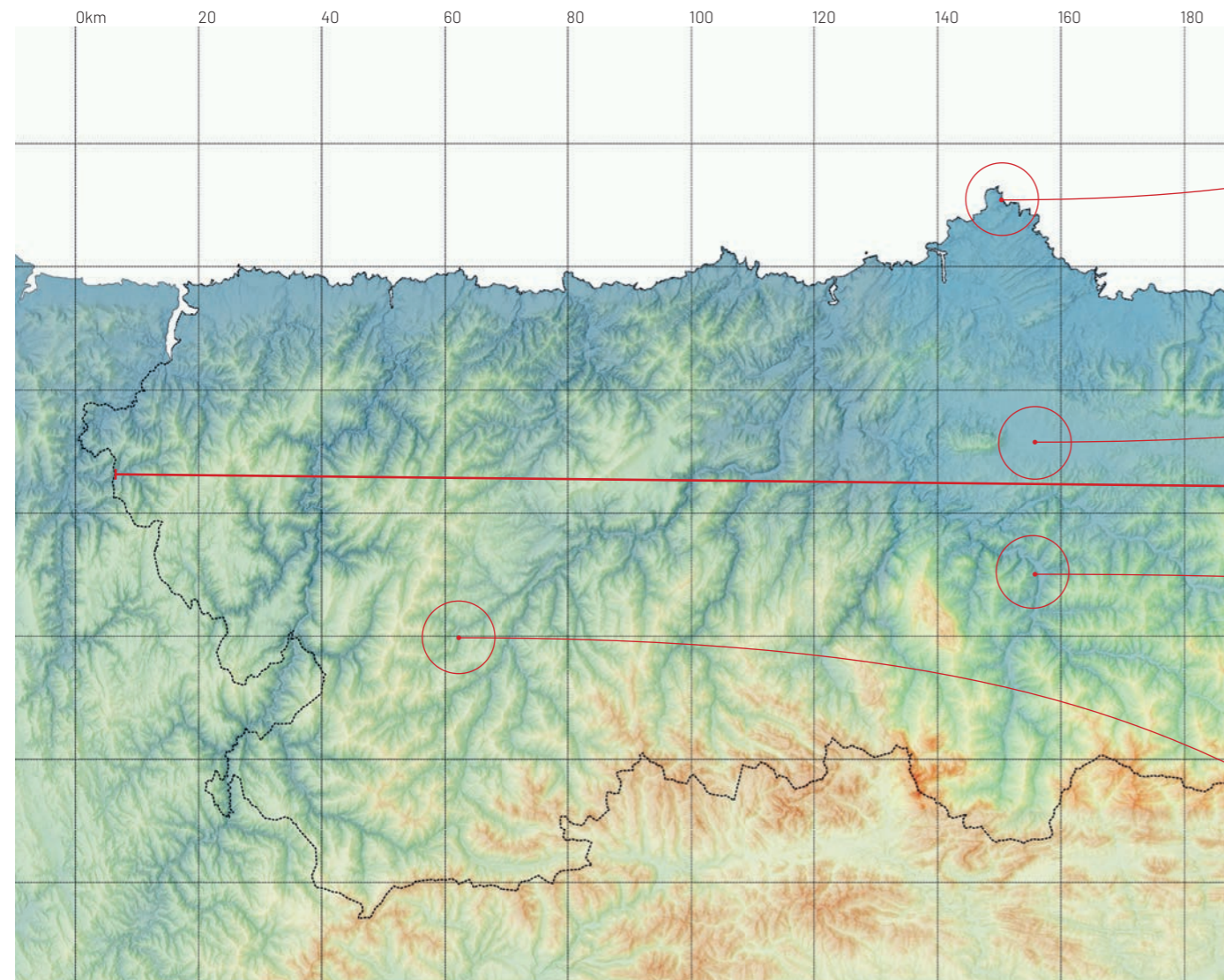
3.1 – Introduction to Asturias

The Principality of Asturias is a mountainous region on the Northern coast of the Iberian Peninsula. Asturias is a mountainous region on the Northern coast of the Iberian Peninsula. The region has a population of approximately one million people (Prada Trigo, 2014; *Principality of Asturias*, 2017), accounting for 2.2% of the Spanish population.

The region is called a Principality because of its historical connection to the Spanish crown. It borders on the regions of Galicia, Castilla y Leon and Cantabria. Asturias is famed for its rugged mountainous landscape. The landscape has been a strong factor in the development of the region. The following pages give an overview of the spatial characteristics of the region.

Topography

The can be characterized by three different landscape types the coast, the valleys and the mountainous (Roa, 2008), see figure 5.1. Asturias has a cliffy coast line which stretches along almost the entire width of the region, only seldomly is the rocky coastline intermitted by sandy beaches. The land directly behind the cliffs is relatively flat, this goes to explain why the majority of cites and infrastructure can be found along the coastline. In the centre of Asturias lies the region's largest valley which accommodates the region's capital city of Oviedo. Behind the valley the Cantabrian mountains begin and roll out to the south of the region. The mountains have greatly limited the amount of urbanization to only a few narrow valleys. The mountains in the south eastern part of the region rise to a maximum altitude of 2.650 meters, which has earned them the name the peaks of Europe.



The famous cliff landscape of Asturias. Source: wikipedia.org



The regional capital city is positioned in the middle of one of the largest valleys in the region. Source: uploads.knightlab.com



The narrow Caudal valley has created a dense urbanization pattern where housing, industry and infrastructure are tightly packed together. Source: Ayuntamiento de Mieres



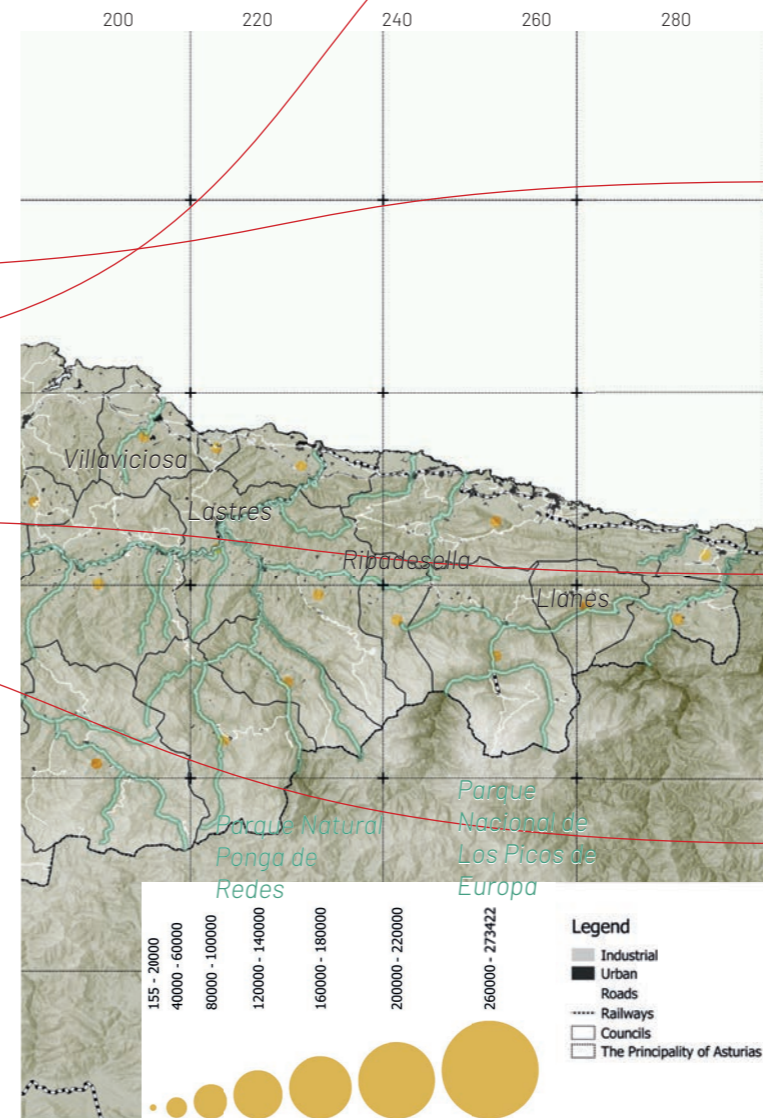
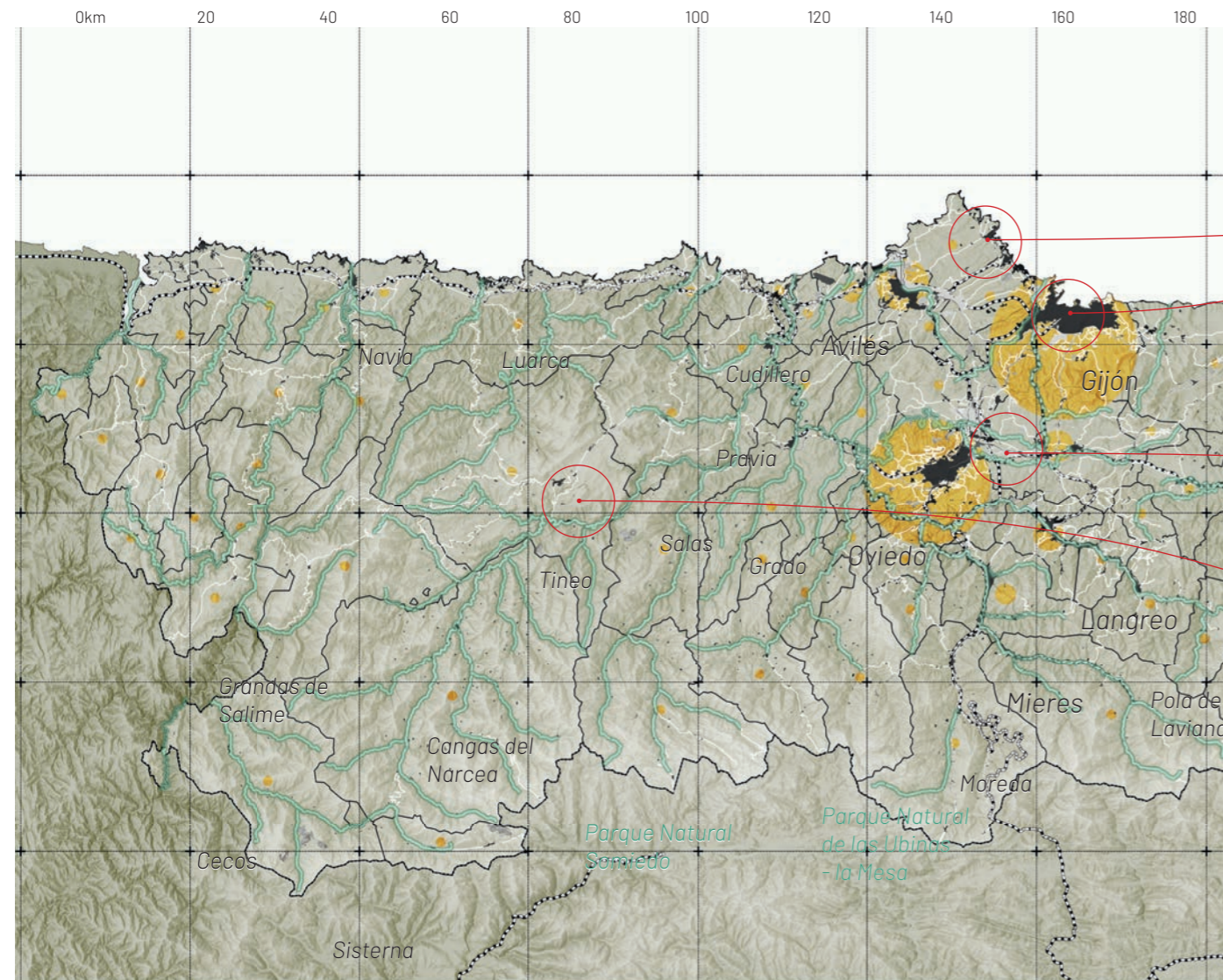
The mountainous landscape of the south-western wing. Source: eyeonspain.com

Occupation

The majority of the Asturian population is situated in the central area within a radius of 30km. The area is dominated by the three main cities Gijón (272.000), Avilés (79.500) and Oviedo (220.000) (SADEI, 2017), which are connected through an extensively developed infrastructure system. The three cities form the backbone of the polycentric-urban system of Asturias and are the main drivers of the regional economy (Roa, 2008). Besides the bigger cities there are several smaller cities and villages that clustered in the centre.

More to the south are the narrow valleys called 'Caudal' and 'Nalón'. Where the topography has forced the urbanisation in to a dense linear pattern. Cities, towns and infrastructure are all tightly packed in the floodplains of the Nalón river system. The valleys are the second largest area in terms of population, containing 14% of the Asturian population.

The low density of the countryside can be accounted to the sparse settlement patterns of the traditional Asturian villages (F. P. R. Rubiera Morollón, José Luis 2013). Each hamlet or village consisted of not more than a handful of houses and was owned by one or two families (interview 4, 9).



Aerial view of Gijón the largest city in Asturias. The city has a compact historic centre, but on its edges are many suburban neighbourhoods. Source: sosclubiertas.com



Luanco, one of dozens of traditional fishing towns on the coast of Asturias. The original shape of these settlements has been altered by the rise in demand for holiday villas and apartments. As a result, many of these historic villages are surrounded by a ring of newly built villas and apartments blocks. Source: Google Earth, 2018



Pola de Siero, one of the smaller councils at the heart of the metropolitan centre. The buildings in these municipalities are not clustered around historic centres, which gives a particularly sprawled impression. Source: Google Earth, 2018

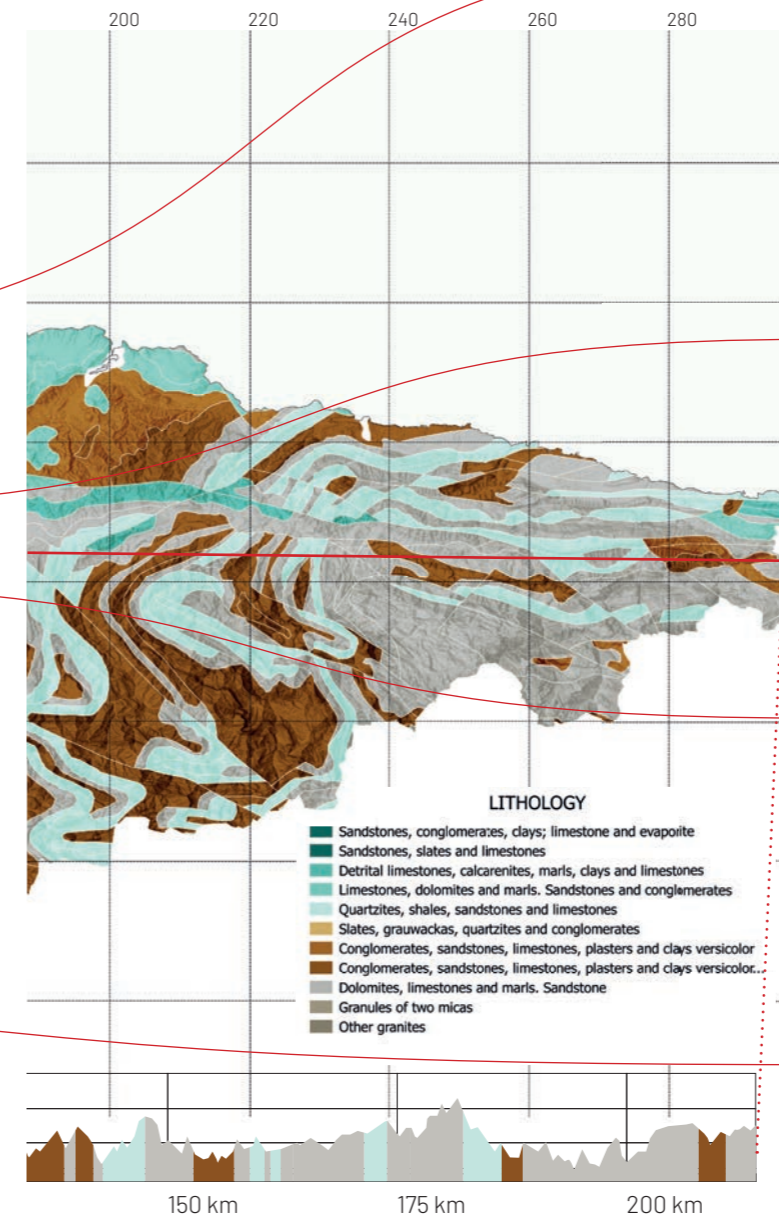
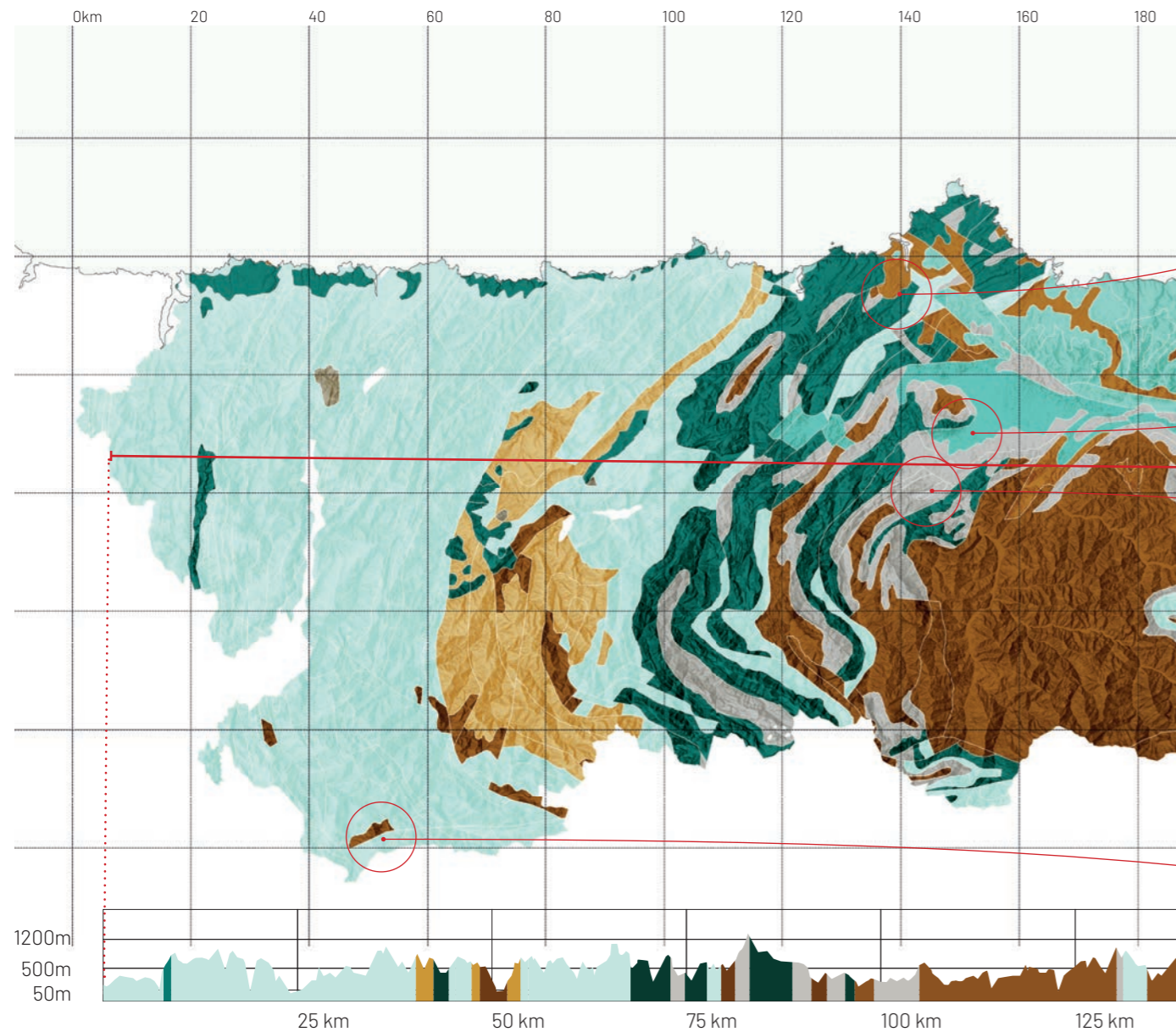


The countryside in Asturias is typified by small villages and hamlets which sometimes do not include more than five houses. Source: wikipedia.org

Geology

The undersoil has been, and still is, a crucial to the Asturian economy. The large coalfield in the centre of the region was one of the largest in Spain. During the '60s and '70s the valleys of the Nalón and Caudal were dominated by large open pit mines and factories. Currently the mining sector of Asturias has moved away from coal mining towards other minerals such as fluorite, zinc, and copper.

The region of Asturias has been greatly affected by sectorial specialization, particularly in the mining sector (*Principality of Asturias, 2017*). The region became one of Spain's main hotspots for heavy engineering and industry. This made the region vulnerable to the economic transitions of the past decades and has triggered a severe decline. Despite the decline the tertiary sector is still of fundamental importance to the regional economy, contributing more than 70% of the GVA (Gross added value) (*Principality of Asturias, 2017*). The prevalence of the industrial sector goes some way to explain why central area of Asturias is one of the most polluted areas in Europe (Noack, 2015).



One of the many fluorite mines in Asturias. Aside from coal the soil in Asturias contains several valuable minerals. Source: mindat.org



One of the several coke-fired thermal plants that can be found on the banks of the Nalón basin. Source: author



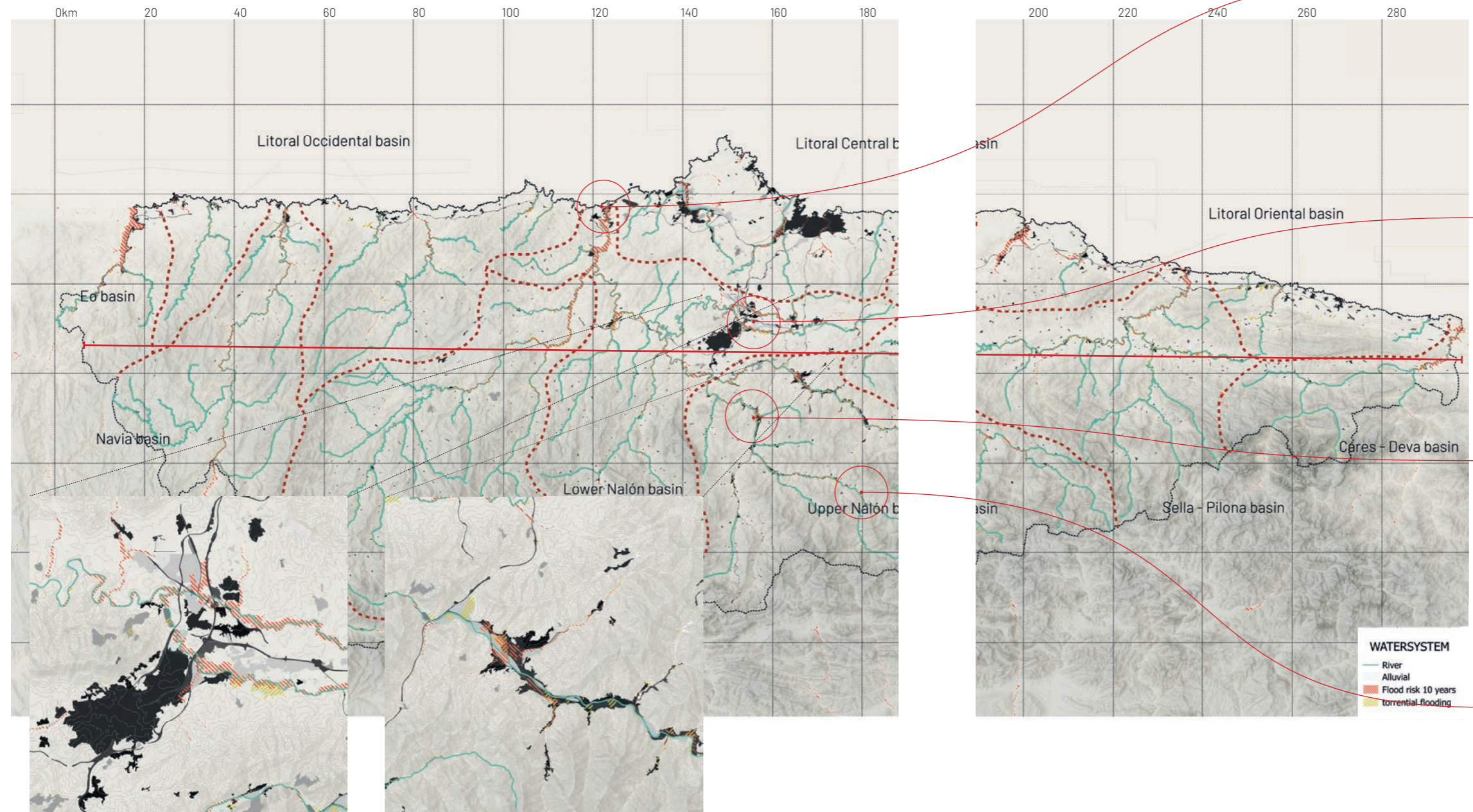
Castilletes, structure to extract coal from the mining shafts. Dozens of these structures can still be seen in the mining valleys. Source: author



Landslides caused by mining activity Source: Ecoticias

Watersystem

The water system of Asturias consists of 6 river basins, of which the Nalón system is by far the largest. Due to the proximity of the Cantabrian mountains the rivers are extremely short, and the water flow is high. Throughout the Nalón water basin there are various cities and villages that are under threat of flooding. Two factors play an important role in the flood problem. The first is the dense urbanization in the narrow river valleys, which has left little room for the river to swell in moments of heavy precipitation. The second factor is the deforestation of the mountain sides. In former times the mountainsides were littered with small orchards, nowadays these have disappeared leaving the mountain slopes barren and unsecured from landslides and torrential flooding.



The estuary of the river Nalón is a protected natural reserve. Source: wikipedia



The river Nora meanders along the northern borders of Oviedo and offers a great opportunity for recreation. Source: conhidra.com



The narrow Caudal valley has created a dense urbanization pattern where housing, industry and infrastructure are tightly packed together. Source: Mapio.net

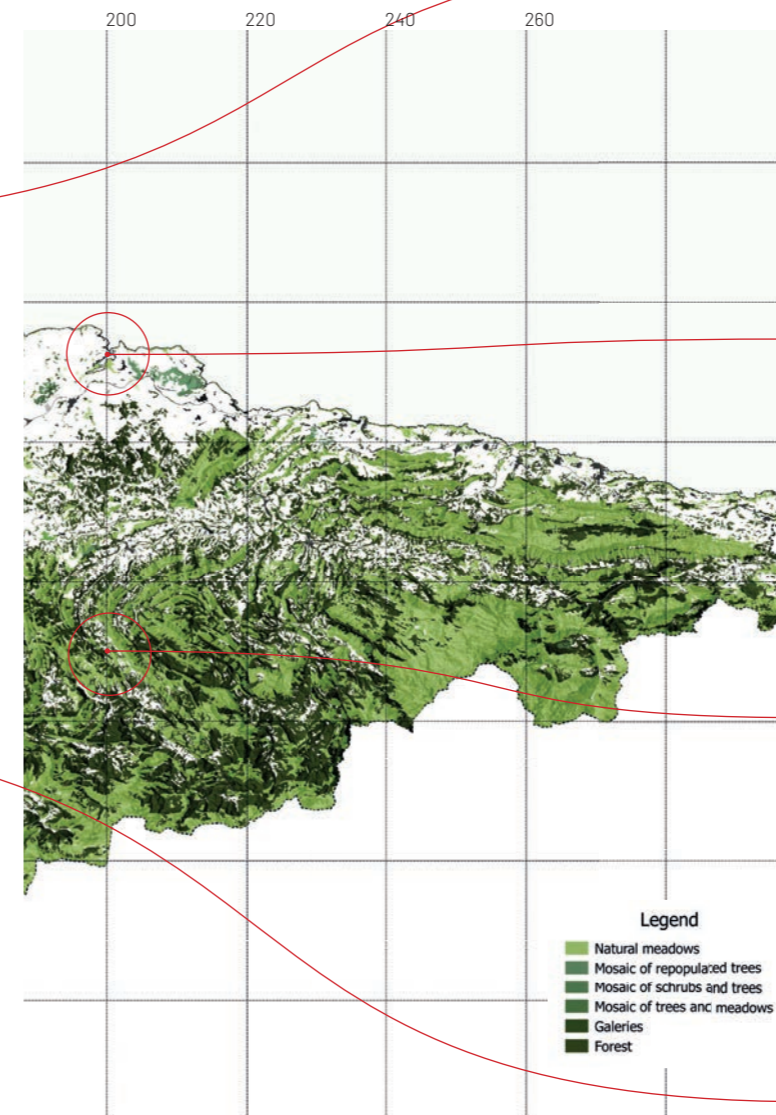
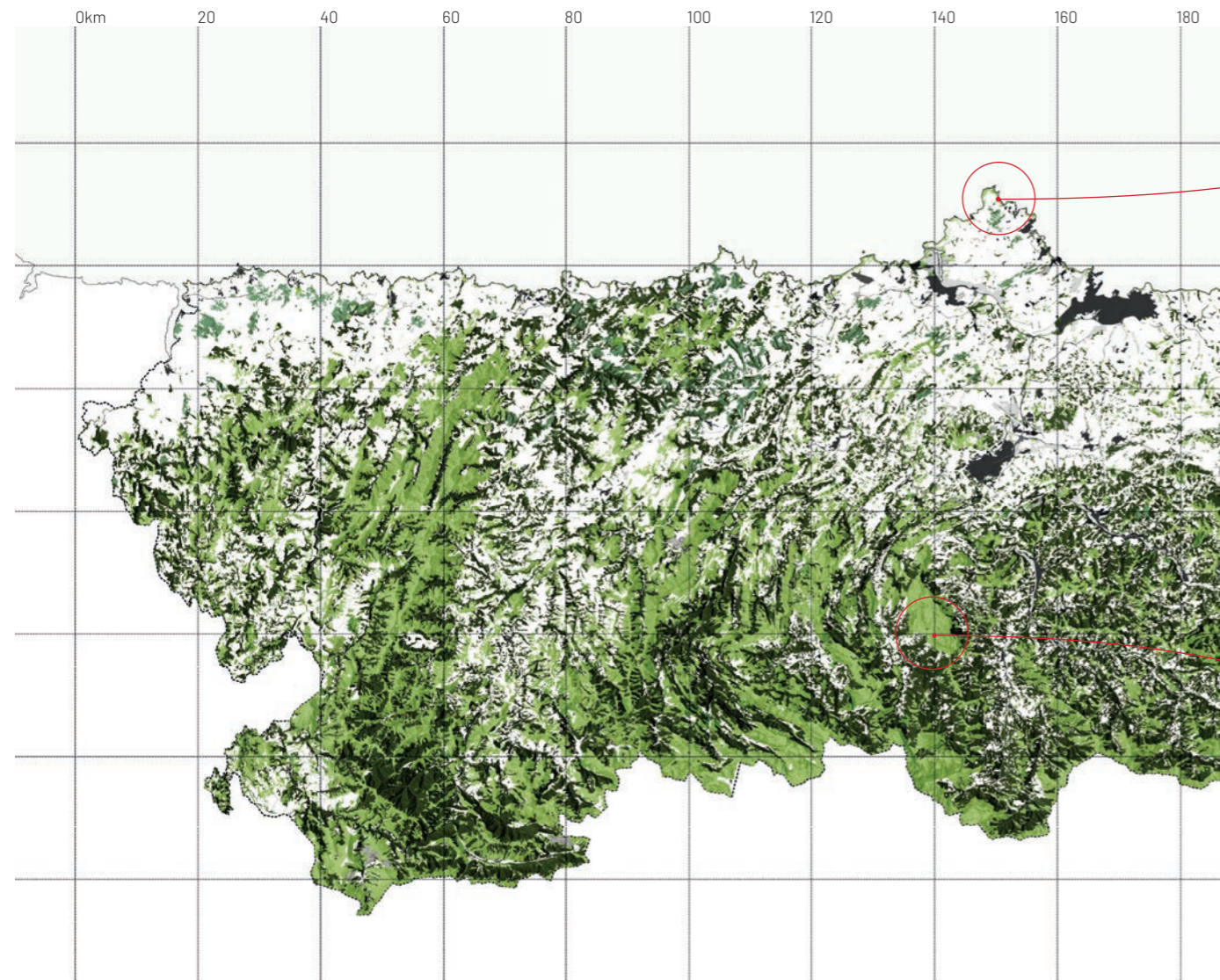


Higher up in the mountains the Nalón river has maintained its original profile of soft edges with light patches of forests on the banks. Source: elandarríos.com

Natural systems

The vegetation in the Asturian landscape is created by two substrates, limestone and acidic rocks (sandstones, clays, siltstones). The other determining factor is the dramatic differences in altitude. According to Martínez (1983) the landscape can be divided into 4 climatic floors. The Colino (0-600m), the Montano (600-1600), the subalpine floor (1600-1700) and finally the alpine floor.

The deciduous forests which can mainly be found on the Montano floor have experienced significant growth in recent years. Due to a lack of forest maintenance and conservation this has led to an increase in forest fires (see below).



Coastal vegetation. Mainly marine fern, marine lavender, heather and various lichens. Source: wikipedia.org



Marshes and wetlands, mainly clovers, Lolium perenne, Holcus lanatus, Anthoxanthum odoratum. Source: wikipedia.org



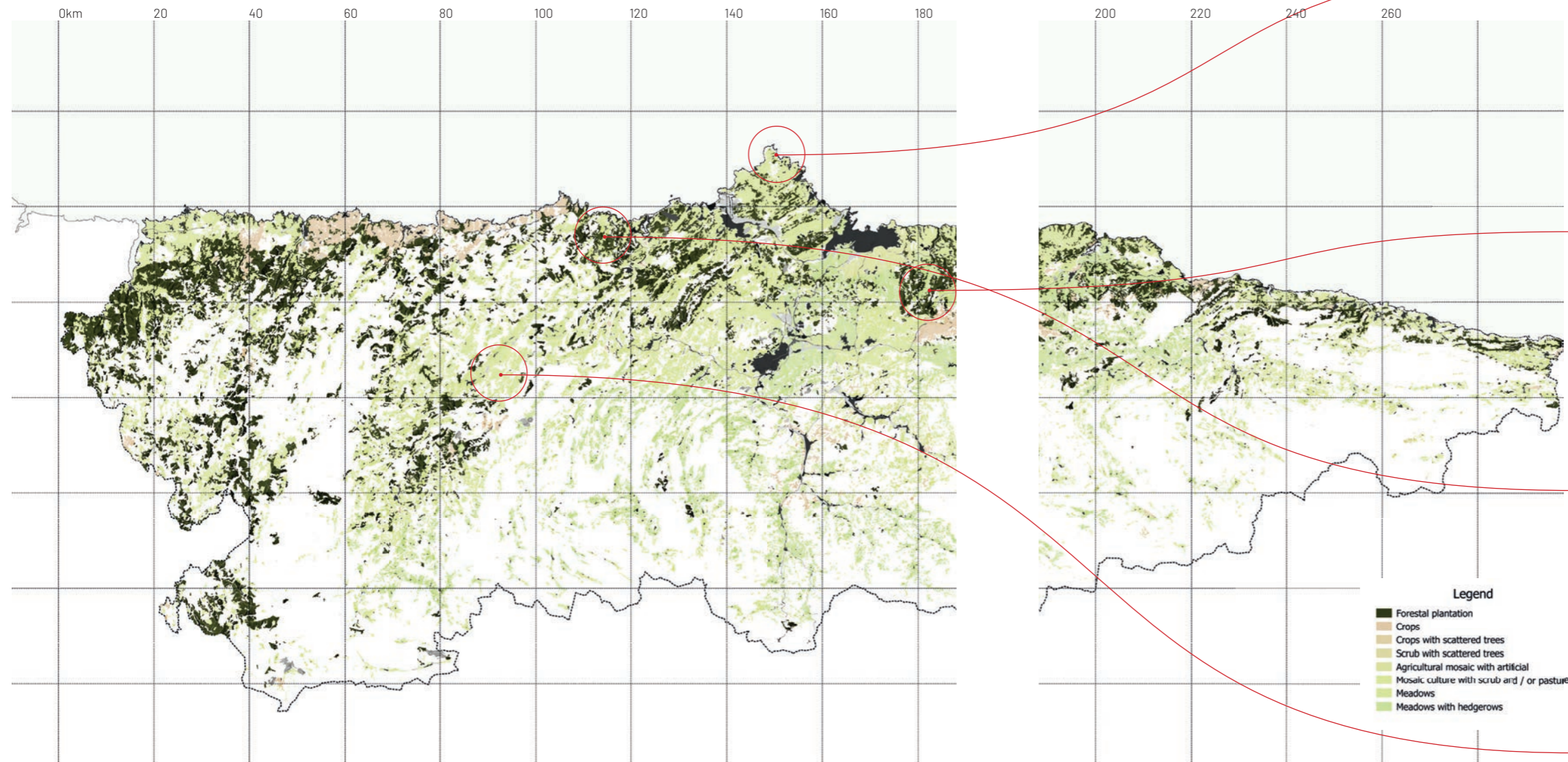
Deciduous forests of oak, birch, ash, maple, linden, and chestnut. Source: wikipedia.org



Forest fire near the city of Oviedo. Forest fires are increasingly common in the region and are having a detrimental effect on soil erosion. Source: AAP

Productive landscapes

Asturias is famed for its livestock, traditionally the largest agricultural sector. The dominance of the livestock sectors is due to the abundance of natural meadows and the fact that most of the territory is unsuited for crop cultivation. The second form of agriculture that was very common in the region's history but is less common nowadays is the cultivation of fruit trees, mainly for the purpose of making cider. Aside from agricultural activities there are several forest plantations. These can be found to the east and north of the region.



Behind the rocky coastline the ground is relatively flat and therefore allows for more intensive agriculture. Source: Flexitreks.com



Fruit orchards were once a common sight in Asturias. Source: wikipedia.org

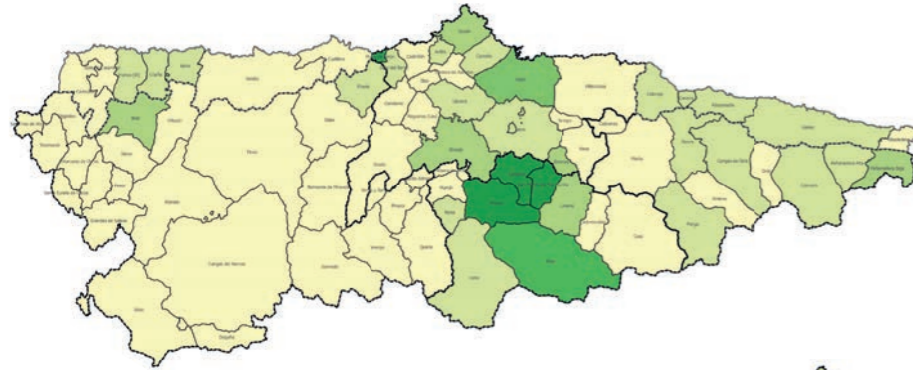


Eucalyptus trees have become more and more common in Northern Spain. Their popularity is tied to the rise in demand for bio-based fuels. However, this invasive species has been quite successful outside the designated forestry zones. Source: wikipedia.org

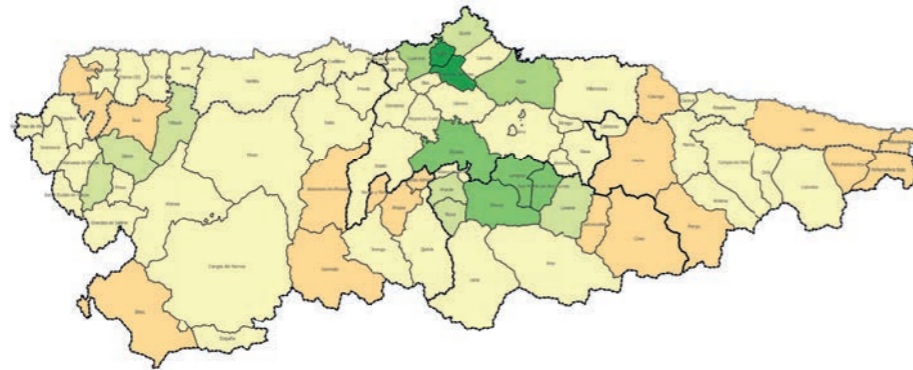


A Hórreo. A typical asturian granary that can be found all over the region. Source: wikipedia.org

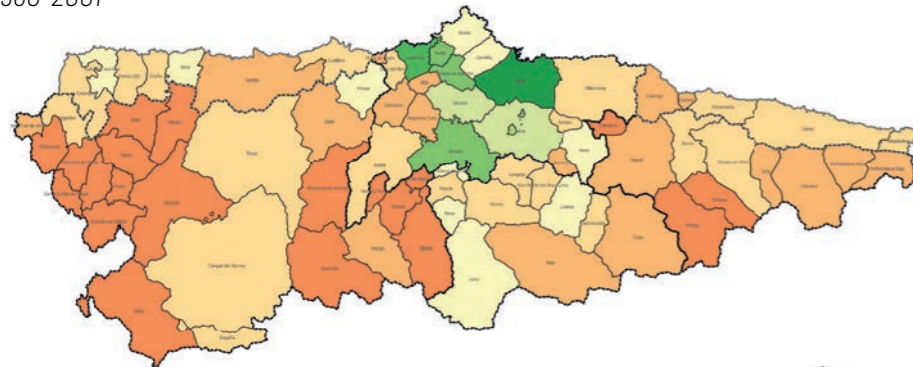
1900 -1930



1930-1960



1960-2001



2001-2017



Legend



FIG. 3.1 Showing the demographic development across the region from 1900-2017. Source: based on data from the SADEI

3.2 – Patterns of shrinkage

Drivers of decline

Asturias has been losing population over the last five decades (see table 2 & 3), and according to the INE (the Spanish national institute for statistics) is likely to lose approximately 100.000 inhabitants in the coming ten to fifteen years (INE, 2016) (see table 3.2). According to Wiechmann (2008) five drivers of shrinkage can generally be found; economic restructuring, natural demographic change, (sub)urbanisation and political or environmental events. In Asturias it is possible to discern at least three of such drivers.

The first driver of shrinkage in the region concerns agricultural decline, this driver falls under the category of economic restructuring. Asturias has suffered rural depopulation in the decades after the second world war (see figure 3.1). Rural depopulation was a trend for many rural regions throughout Europe (MacDonald et al., 2000)2000 and is still an issue for south and east European countries. There are several aspects to Asturias that have contributed to this trend. The mountainous topography has been limiting with regards to the implementation of new farm techniques¹ and accessibility and the traditionally small farm size, these aspects have severely reduced the competitiveness of the agriculture and livestock industry (Rey Benayas, Martins, Nicolau, & Schulz, 2007). In recent years the agricultural industry has seen a slight growth due to the increasing demand for natural and ecologically friendly products (E. D. A. o. t. P. o. Asturias).

The second driver of shrinkage is the industrial decline and restructuring. This driver also belongs to the category of economic restructuring. Political events in the 70s also had an influence on the demographic developments of the region. In the beginning of the 20th century, the Asturian mining industry experienced a large boom, due to the discovery of a large concentration of stone coal under the valleys of the Caudal and the Nalón. The success in the mining industry created a large economic boom in the beginning of the 20th century, attracting many immigrants from adjoining regions (Prada Trigo, 2012, 2014) (see figure 3.1).This boom reached its peak in the 60's, after which the mining sector underwent a process of liberalization which resulted in the collapse of the Asturias mining industry (Prada Trigo, 2012). From 1955 to 1985 Asturias lost more than 15% of its jobs. The mining basins of Caudal and Nalón lost over 30% of their population (Edwards & Elger, 1999). As a response the Spanish state initiated a program to re-concentrate the industrial activity to the port cities of Avilés and Gijón (Prada Trigo, 2012). This restructuring is clearly visible in the graph and maps (figure 3.1), showing population decline in the mining valleys and growth in the port cities (Moral, Méndez, & Trigo, 2012a). The decline in the mining sector caused severe abandonment in the mining valleys of the region (Prada Trigo, 2014).

¹ In those areas where modernization was possible the reduced labour insensitivity caused still more outmigration from the rural areas (interview 4).

The third driver of shrinkage belongs to the category of natural change. Undoubtedly due to the previous drivers which caused significant out-migration of mainly younger people, Asturias is coping with aging population and an extremely low fertility rate (Eurostat, 2017a). This is the case for many European regions (Eurostat, 2017b), but the trends seem to be extremely strong in Asturias (interview 4, 6, 8). This trend is caused by changes in lifestyle, such as the greater willingness of young people to move to regions or countries, lower fertility rates, and the greater life expectancy caused by healthier living and working environments (Haase, Athanasopoulou, & Rink, 2013; Reckien & Martinez-Fernandez, 2011). According to one interviewee (interview 7), particular to Asturias is the focus of authorities on service provision has prevented investment in job creation for the younger population. This in turn has exacerbated the problems of youth unemployment, which only furthers outmigration.

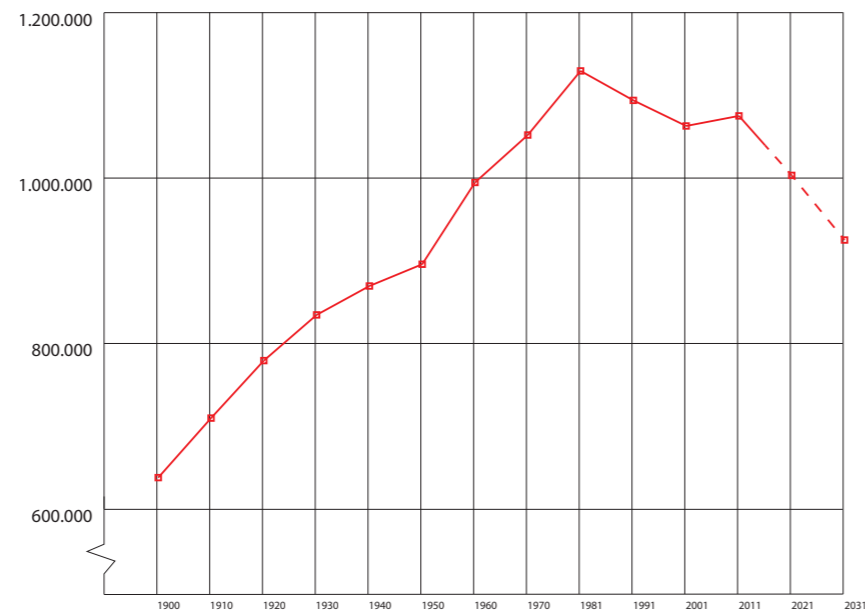


FIG. 3.2 The demographic change from 1900-2017 combined with the projection for 2031 Source: based on data from the SADEI



FIG. 3.3 Images of landscape in the mining valleys. Source: author

Brownfields and abandoned mines

The two valleys of Caudal and Nalón are positioned above a large coalfield, which yielded large quantities of stone coal during the twentieth century. To facilitate the demand for stone coal the Spanish state constructed dozens of coalmines and industrial facilities in the mining regions. After the crash in the 1960s, the Spanish government relocated the industrial facilities and mostly vacated the mining valleys. This restructuring caused a massive wave of abandonment and outmigration. As a result, the area is littered with brownfields and abandoned mines (see figure 3.4)².

The area still carries some industrial capacity, a hand full of industrial facilities is still active in the areas. There are still a few mines functional, but they too face closures since the EU has decided that unprofitable coal mines will no longer receive subsidies (Lne, 2013). The abandonment of the mining sectors has harmed more than the industries, the appearance of the cities and villages in the valleys is one of heavy decay and deprivation (Prada Trigo, 2012) (see figure 3.3).

Due to the heavy urbanization that occurred in the beginning of the 20th century, the densely urbanised valley floor is now experiencing increasing pressure from the river Nalón. Many of the factories were built directly on the floodplain of the rivers, leaving no space for the water in times of heavy rainfall. This has created a dangerous flood prone environment for the remaining population and only increases the problems of liveability (see figure 3.5).

More still, in the event of a flood pollutive waste from the brownfields and the mines is swept up by flooding events, creating a second layer of environmental damage (Álvarez, Ordóñez, De Miguel, & Loredo, 2016). The local councils have had too few resources to address these problems.

Around the port cities of Gijón and Avilés brownfields are less abundant. However, considering the subsidy stop in the mining sector it is reasonable to wonder what is going to happen to the two massive industrial ports that are solely focused on heavy resources.

² The full extent of the brownfields in Asturias is unknown, since no efforts have been made to monitor the number and status of the brownfields (interview 2).

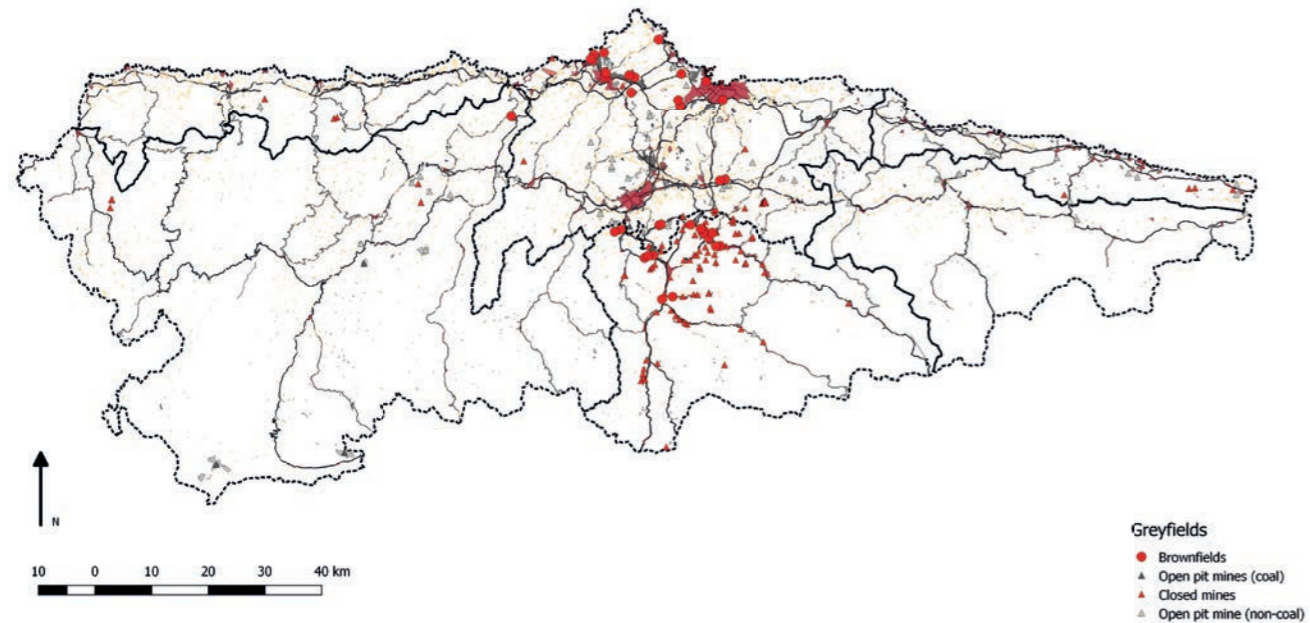


FIG. 3.4 Brownfields and abandoned mines in Asturias. Source: author

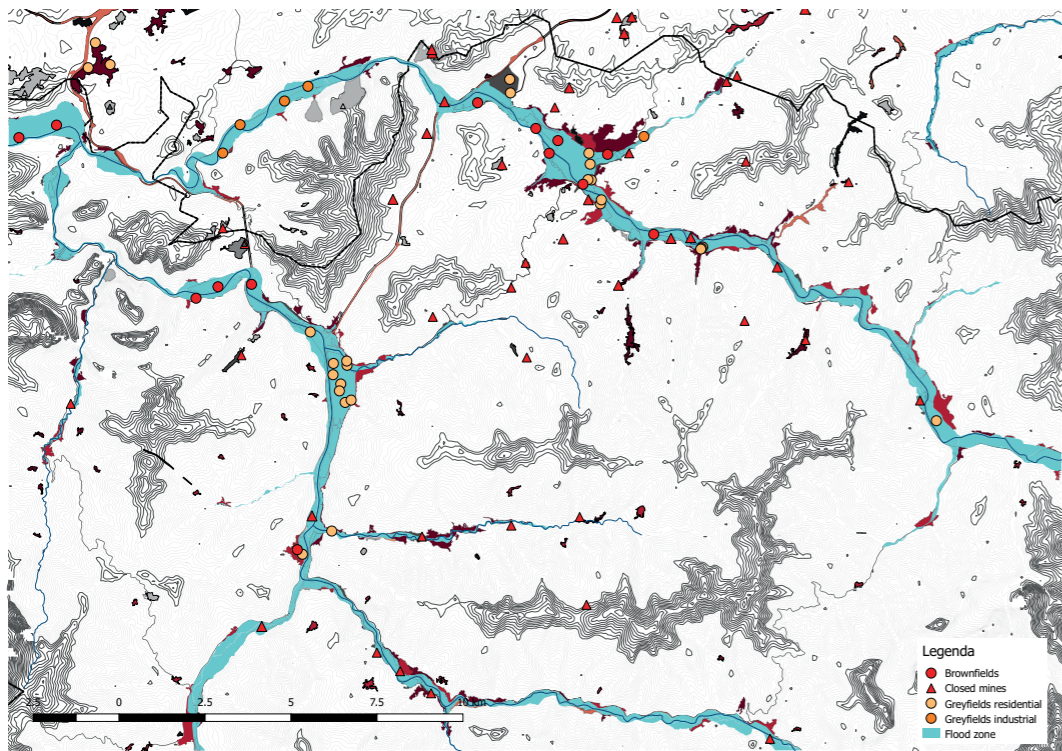


FIG. 3.5 Brownfields and abandoned mines in the mining valleys of Nalón and Caudal. Source: author



FIG. 3.6 Images of periphery of the central cities . Source: GoogleEarth

Greyfields and sprawl

Before 2008, Asturias experienced a large increase in sprawled urbanization (F. Rubiera Morollón & Pérez Rivero, 2013). The sprawl was driven by a wave of speculation that plagued many Europe’s coastal regions. The effects of sprawl were heightened by the liberal policies of local city councils (Salvati & Morelli, 2014)(interview 1). As F. Rubiera Morollón and Pérez Rivero (2013) explain this growth in the urbanization was not paralleled by the growth of the population nor economy. Thus, an oversupply (holiday) housing and public infrastructure was created on the periphery of the central cities the coastal towns (F. P. R. Rubiera Morollón, José Luis 2013). The lack of demand from the market has left dozens of undeveloped plots, greyfields, on the peripheries of the cities. What is more, the apartment buildings and villas that were constructed are mostly left vacant ³ (see figures 3.8). The phenomenon has mostly impacted the central and coastal areas, although in the coastal areas it has been limited by the POLA (Special zone that protects the coast from excessive urbanization).

As similar issue has occurred with industrial land. To attract employers to the shrinking region the regional authorities have initiated several new industrial zones in the Asturias centre. Also, here the demand has not met the supply, and the Asturian countryside is blighted by several unfinished expansions (see figure 3.6).

The sprawled urban model has caused more than merely a waste of resources. The dispersed urban model has enhanced the car-dependency of the region and has obstructed the growth of public transport. This car dependency has contributed to the regions poor environmental performance. What is more, natural and agricultural spaces – especially in the centre of Asturias – have been put under considerable strain by the urbanization (G. d. P. d. Asturias, 2016a). In smaller councils, the cost of service provision has become problematically high, partially due to the sprawled urban form.

Despite the decline in population sprawl is still a concern in Asturias. Especially in the smaller councils surrounding the larger cities, sprawl is a concern (see figure 3.7). These councils are taking advantage of the more restrictive policies in the larger councils by providing developers with a carte blanche (F. Rubiera Morollón & Pérez Rivero, 2013), in the hope to direct development to their council.

In the current planning system of Asturias this type of behaviour is not only unregulated, it is also incentivised by the land-tax. The land-taxes are the largest source of income for the councils and creates an incentive for councils to develop as much land as possible, even if there is no demand for it (interview 1).

This phenomenon of opportunistic behaviour is not unheard off in shrinkage situations (Nuissl & Rink, 2005). With the current projections for the demographic development in Asturias in mind, it seems unlikely that all these vacant lands and buildings will eventually be occupied.

³ Currently the region nor the councils have any idea how high the vacancy is (interview 6).

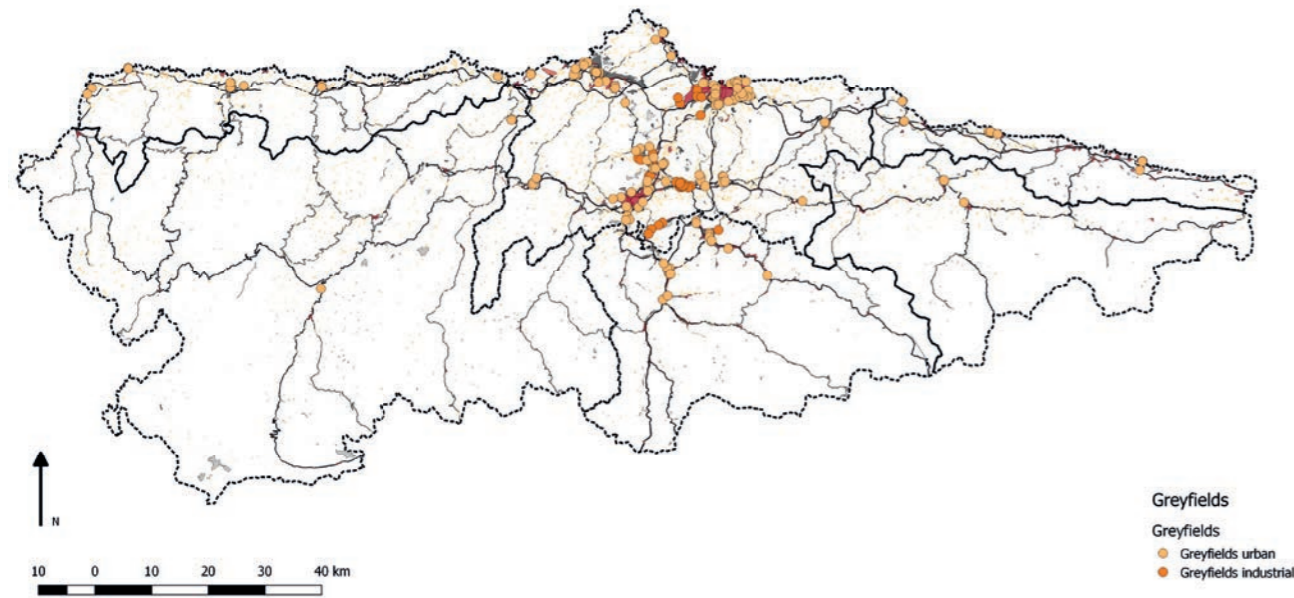


FIG. 3.8 Residential and industrial greyfields in Asturias. Source: author

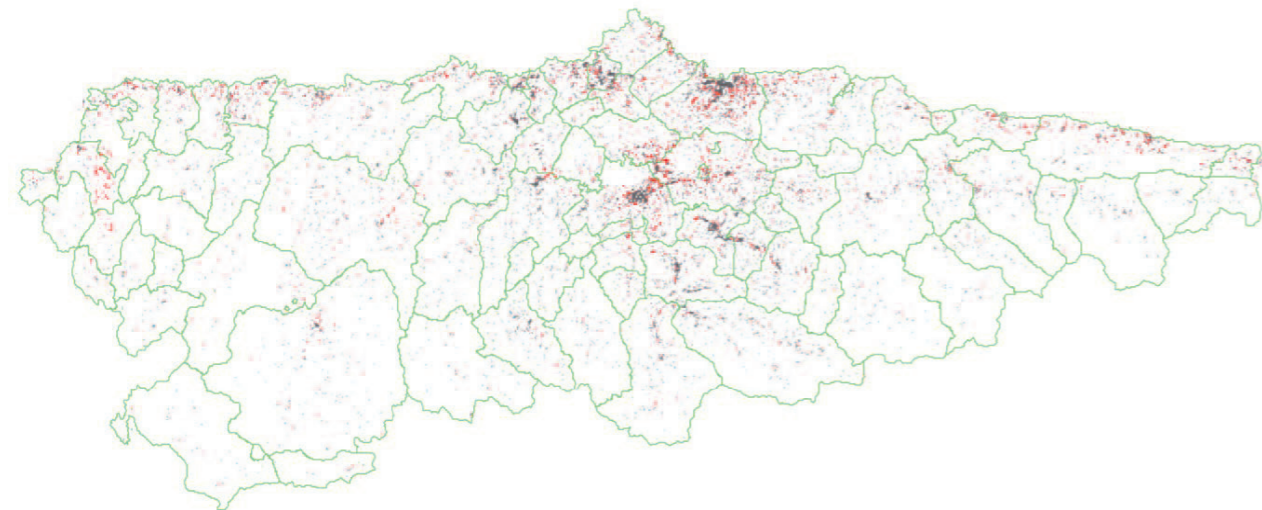


FIG. 3.7 Sprawled urbanization in Asturias, 1996-2006. Source: (Marroquin, Morollon and Rivero, 2013)



FIG. 3.9 Images of vacancy throughout Asturias. Source: author

Housing

A disbalance in the housing provision is a common problem for shrinking regions (Bernt et al., 2012). According to several interviewees, the region does indeed have an excessive amount of vacancy (interview 1, 6, 8). Especially in the periphery neighbourhoods and the smaller rural settlements. Here the younger population has moved out in favour of the central cities and the elderly population has become increasingly isolated. In the rural areas an in the mining areas hundreds of villages have been abandoned (see figure 3.9).

The monitoring of the level of vacancy and abandonment is relatively unnuanced. The region has been able to identify the number of *núcleos de población* (unit by which population is measured) that are abandoned (see figure 3.10), but no records are kept concerning the amount of buildings or square meters that lay vacant. What is more, the level of vacancy in the cities is almost completely unknown.

A quantitative disbalance is not the only issue in the housing market. According to several interviewees (interview 6, 8) the regions aging population is struggling to find adequate housing. Many of the housing in the rural parts of the region are unsuited for elderly people. Yet, in there is no programme to provide better housing.

Service provision, infrastructure and tax base

The provision of basic social services is a big challenge particularly in the rural councils. Due to the out-migration these councils are having to make due with an ever-declining tax-base. As the rural population ages, the need for healthcare and social services increases. What is more, schools are unable to provide for an increasingly small younger population. In some of these council's service provision has become so expensive that the councils are unable to attend to other issues, such as the rising environmental threats. Some rural councils are so low on resources that mayors can't even be paid for their work (interview 1).

The rural population is responding to this problem by concentrating in the most central villages. Currently this process of village regrouping is unsupported by policy. However, by aiding this the clustering of rural population in central villages the region and councils could reduce the cost of service provision.

The regional government shares many of these problems. As the population declines the region receives less revenue from the state government, this revenue is inadequate to maintain the over-capacity of the basic service systems. At the same time no funds are made available to address the issue of over-capacity.

The maintenance of infrastructure and public transport are special concern in Asturias. In the rural areas councils are struggling to maintain public transport connections to the centre. At the same time, the public transport system in the centre is struggling to keep providing to a smaller public. The reduced public transport connections have had the effect increasing the car-dependency of the region, which has contributed to the overall poor air-quality. The reduced public transport connections are a special concern for the aging population who are more dependent on it (Ahrens, 2005).

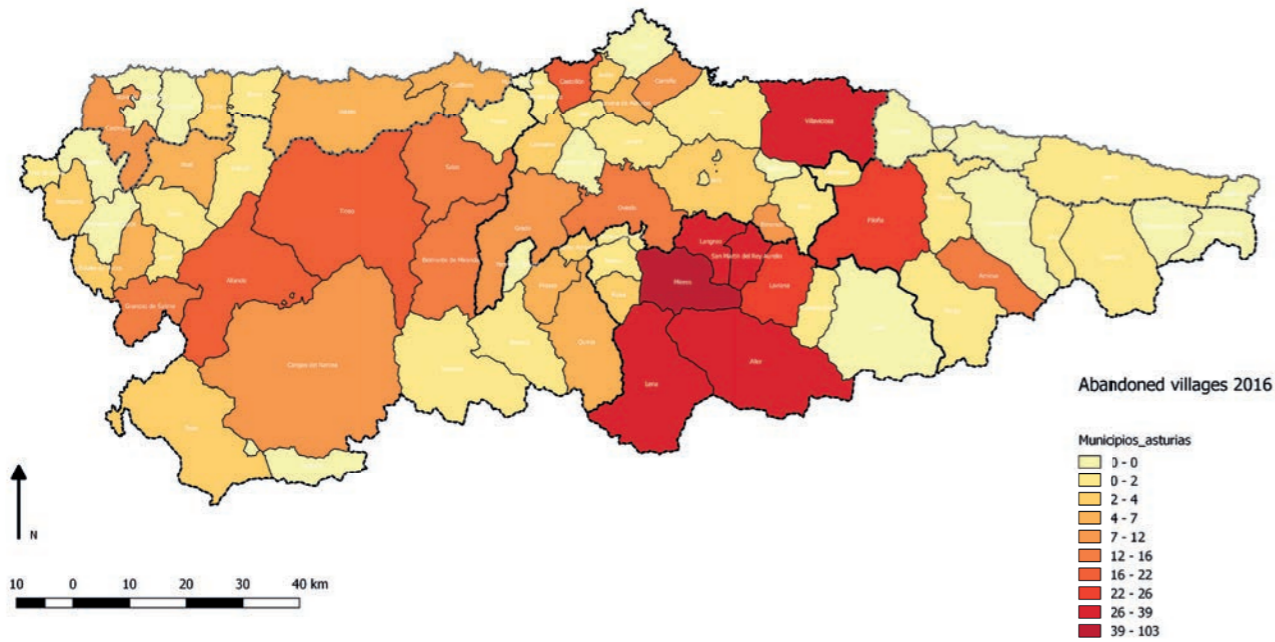


FIG. 3.10 Abandoned villages in Asturias. Source: SADEI

Even the international infrastructure that connects Asturias to Europe has been affected by the decline. Once Asturias was relatively well connected to international airports, these connections have mostly been discontinued due to the region's declining economic activity. The same has been true for the ferry connections that once connected Asturias to England and France (interview 1, 3, 6).

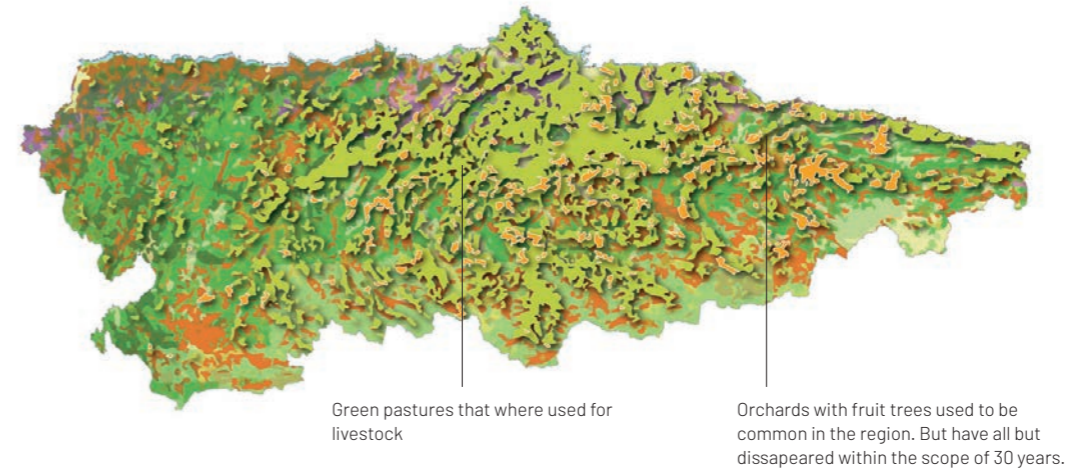
Farmland abandonment

The Asturian agricultural landscape has changed dramatically over the last 30 years. According to a study done by the EU 15.000 ha of agricultural land has been abandoned between 1997 and 2007 (eurostat), and 20% is likely to be abandoned in the coming years (Renwick et al., 2013).

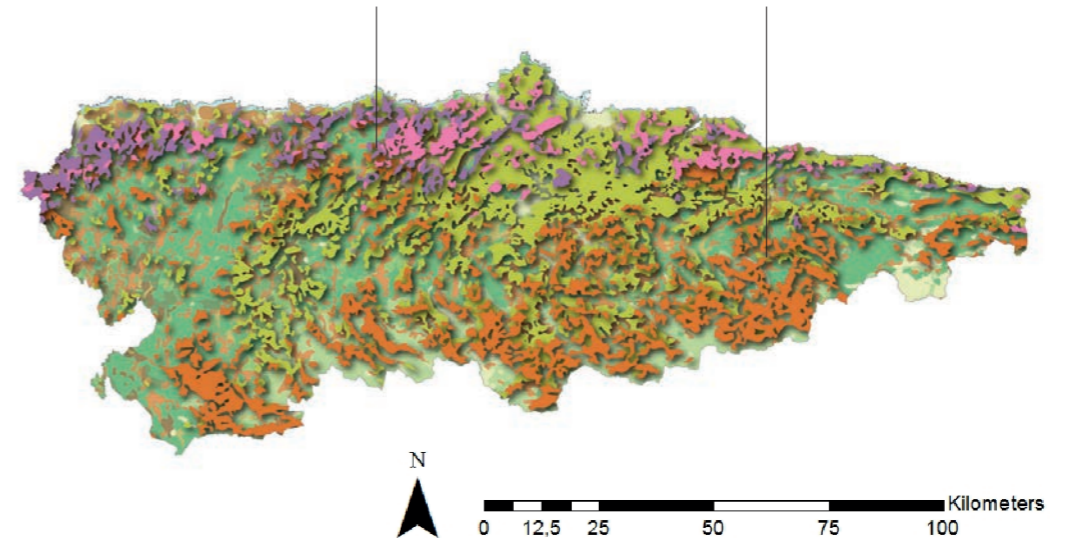
Traditional agricultural practices such as orchards and beekeeping have all but completely disappeared. The once small ranches have either been abandoned or been converted into large scale livestock farms. The hedgerows that formerly divided the irregular patches of farm land have been removed in favour of modern agriculture techniques and larger farms. In the coastal areas, low-labour intensive Eucalyptus plantations have replaced crop agriculture (see figure 3.11).

The transformation of the traditional Asturian landscape is felt as a loss to the rural communities (interview 4). What is more, the Asturian landscape plays an important role in the region's tourism industry. Therefore, its decay represents more than merely a reduction in food production.

Cultivation Map 1980-1990



Cultivation Map 2000-2010



Legend

- | | |
|---|---|
| Not Rated | Pasture-thicket |
| Irrigation | Coniferous |
| Dry work | Poplar and poplar |
| Fruit trees in dry land | Eucalyptus |
| Olive grove in dry | Other hardwoods |
| Dry land vineyard | Association of conifers and eucalyptus |
| Association of vineyard and olive grove | Association of conifers and other broadleaves |
| Natural meadows | Unproductive |
| Pastureland | Association of vineyards and fruit trees |
| Scrub | |

FIG. 3.11 Cultivation patterns 1990-2010. Source: based on GIS data provided by the ministry of agriculture of Spain

The agricultural abandonment has fuelled an increase forest and shrublands. Though the increase in forest and the subsequent flourishing of the wildlife population is something to be celebrated from an environmental point of view, it does pose problems for the rural population. Wildlife is forming an increasing nuisance in the smaller rural communities, and forest fires are increasingly common. Partly caused by a lack of maintenance, and partly caused by the arson committed by local communities try to stop the approach of the forest by lighting fires. In recent years large forest fires have placed the rural communities at a substantial risk (interview 2).

In other parts of the region, abandoned degraded agricultural land on sloped mountainside has created a risk of landslides. The landslides are caused by barren soils and increasing precipitation that is caused by climate change (G. d. P. d. Asturias, 2016b).

One of the difficulties in addressing these issues are the complex and obfuscated property rights in the rural communities. Though many of the rural lands and homes are abandoned, they are still the property of the families that used to live there. Due to the large families that were common in the Asturias agricultural community, a single piece of property can be shared among 15 descendants (interview 9). According to one interviewee, these descendants are often unaware of their property, and have no interest to engage with the local authorities (interview 4). As the abandonment continues the properties – literally and figuratively – become increasingly blurred and it becomes almost impossible to determine who owns what.

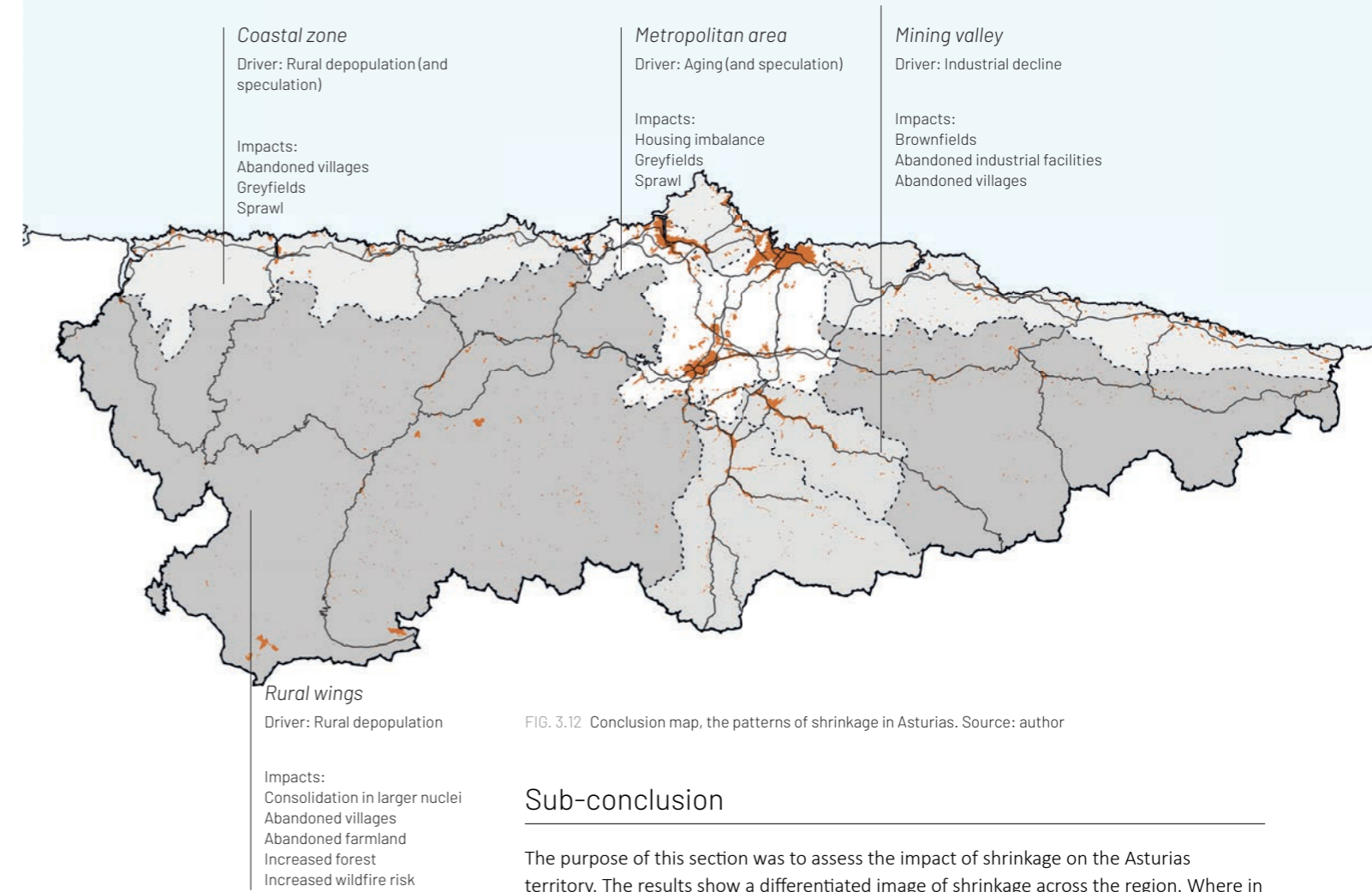


FIG. 3.12 Conclusion map, the patterns of shrinkage in Asturias. Source: author

Sub-conclusion

The purpose of this section was to assess the impact of shrinkage on the Asturias territory. The results show a differentiated image of shrinkage across the region. Where in one area the shrinkage has only just began, in another it has been active for almost 100 years. Based on the analysis it is possible to distinguish the territory in four segments; the centre, the coast, the rural wings and the mining valleys (see figure 3.12).

The liveability of the region, particularly in the mining valleys and the rural wings has been seriously compromised. Abandonment and neglect have left room for the rise of environmental threats which only add to the push-factors in already deprived areas. In the central and coastal areas, the push for growth has resulted in even more vacant land and wasted resources, and the natural systems that are valuable support mechanisms for the liveability of the region are under pressure.

The shrinkage has predominantly had a negative impact on the territory. However, the multitude of vacant land does create opportunities for future development. In the cities there is more space to enhance public and green space. In the rural wings, the environmental performance of the region is improving due to the growing ecosystems in the rural areas. How these opportunities can be exploited will be the focus of the following two chapters.

3.3 – Regional planning system

This section presents the analysis of the regional planning system of Asturias. In chapter 2, several important values for shrinkage planning were mentioned, interregional collaboration, the alignment of policies and programs, the participation of civic and private actors and a realistic non-growth attitude. This part of the analysis shows that Asturias is not adhering to these values.

The first part of this section describes the general organisation of the planning system and explains how the key actors are interacting with it. The second part of the section discusses relevant plans, instruments and developments that have consequences for the spatial development of the region.

The organisation of the planning system

Principality of Asturias and the Spanish state

After the Spanish constitution of 1978, the Spanish planning system was decentralised (González Pérez, 2007). Seventeen Autonomous Communities (AC)—including the principality of Asturias—were created and given the competences to regulate and execute spatial development and management (Vivero, 2011). The system of the ACs is quasi-federal, meaning that although the region has full autonomy to direct development, the nation state still controls the revenue stream for the ACs. In Spain, even the regional development programme of the ERDF is coordinated by the national administration. What is more, the competences of the lower order governments are regulated through national law (González Pérez, 2007). The Spanish state is also involved in the planning process when it concerns national protected parks such as ‘de Picos de Europa’ or national transport networks, such as highspeed rail networks, international ports or international airports (Marshall, 2014).

The principality’s department for spatial planning guides spatial development is the main body for regional spatial planning, its plans can be divided into two types; regional directives that set laws and regulations for the entire territory, and sub-regional plans that are aimed at a specific part of the territory. There are also sectoral plans that are focused on specific aspects related to spatial development, such as infrastructure, sanitation or waste-management (González Pérez, 2007).

The principality does not conduct town planning, its main job is the approval of municipal plans. The approval of municipal plans is grounded in the land use system. The land use classification system is relatively straightforward. In principle, there are three types of land, developed land (Suelo Urbano), developable land (Suelo Urbanizable) and undevelopable land (Suelo No-Urbanizable) (González Pérez, 2007). The councils make proposals for urban development based on these three types, the region can then decide to accept or refute the respective proposal. A vital organ in the decision process on spatial and urban planning is the Spatial and Urban Planning Commission of Asturias (CUOTA), which makes most of the reports and takes the final decision on the passing of local plans.

Though the department of spatial planning is the leading agency when it comes to spatial development there are many departments in the principality that also influence spatial development, such as the Department of Employment, Industry and Tourism, the Department of Rural Development and Natural Resource, and Department of the Presidency and Citizen Participation. According to several interviewees, one of the core weaknesses in the planning system, is that there is relatively little collaboration between these different departments. Policies and programs are developed in isolation and are only brought together in the implementation (interview 8, 9).

Though the Principality is the final authority on spatial planning, its lack of financial resources. Coupled with a history of failed plans, has significantly reduced the authority of the regional government over the lower level authorities.

Councils

The 1978 constitution also laid the foundation for the organization of the local authorities, by recognizing the principle of local autonomy (Garrido, 2007). The constitution delegates competences to the councils based on their size (5.000, 20.000 and 50.000). Councils are free to provide additional services to their population as long as the requirements for the mandatory competences are satisfied (cleaning, street lighting, sanitation, and the likes) (Garrido, 2007).

Spatial planning is also one of the competences carried out by the departments of town planning of the councils. The plans of municipalities can be divided into general zoning plans (General Development Plan (GDP—Plan General de Ordenación) and development plans (Partial Plans (PP—Planes Parciales) or Special Plans (SP—Planes Especiales). Each of these planning instruments should be in line with the regional directives set by the regional government (González Pérez, 2007).

Asturias is separated into 78 *consejeros* (Spanish name for councils or municipalities). In Asturias, as in many other regions of Spain, there is a large disparity between the sizes of the councils (Garrido, 2007). The smallest municipality has no more than 140 inhabitants, whereas the largest has more than 270.000. In total there are 47 municipalities in Asturias with population levels below 5.000 and 18 with population levels below 1.000 (SADEI, 2017) (see figure 3.13).

The small sizes of the Asturian councils create significant problems. Especially rural councils are struggling to provide social services, education and health care, which are all organised on the municipal level. It is no surprise then that most rural councils spend all their resources on service provision and have little left for other investments. According to one interviewee (interview 1) certain councils do not even have the resources to provide mayors with a salary. This discrepancy between responsibility and capacity provides insight into the need for inter-municipal cooperation in Asturias.

On the other side of the spectrum, are the three councils of Gijón, Oviedo, and Avilés (SADEI, 2017). Together they make up more than half of the region’s population. Giving these municipalities a strong political position in the regional planning debate. In the current political system, each of these three councils is governed by a different political party (interview 1). The political conflicts between these groups complicates efforts in the

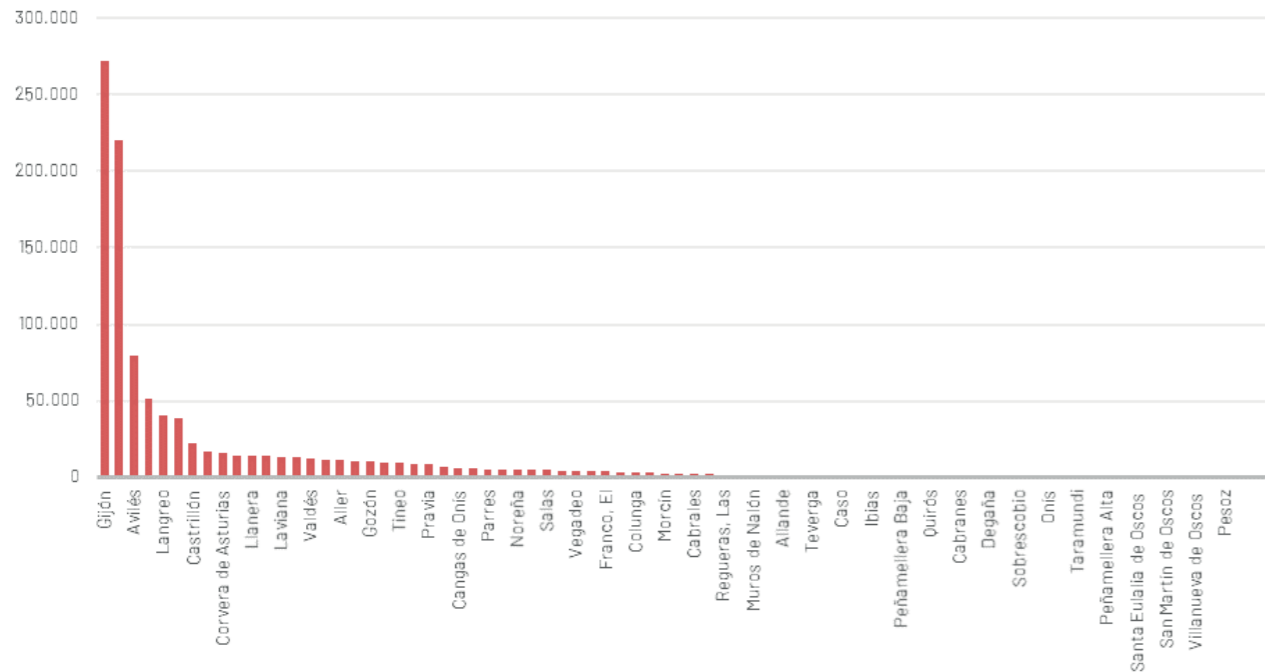


FIG. 3.13 Sizes of the councils in 2017. Source: SADEI, 2017

domain of regional planning, as a result the regional government has not been able to adopt a regional territorial plan since 1991 (G. d. P. d. Asturias, 2016a) (interview 1).

Inter municipal collaboration

Within the Spanish planning system there are three different forms of municipal collaboration, the mancomunidades, the administrative consortia and the metropolitan areas (Garrido, 2007). The following paragraphs outline the specific particularities of these entities and their relation to Asturias.

Mancomunidades

Mancomunidades are a common form of inter-municipal cooperation in Asturias (O’Keeffe, 2011) (see figure 3.14). They are forms of horizontal cooperation mainly aimed to share the costs of service provision between municipalities. Mancomunidades are typically multi-purpose⁴, addressing both service provision as well as the coordination of planning activities. In the planning system councils are allowed to assign any number of competences to a mancomunidades as long as it does not entail the totality of the council’s competences (Garrido, 2007). This ruling reveals an interesting aspect to Spanish planning culture, the undeniable importance of self-governance at the municipal level. This cultural attachment to the local government is one of the reasons why the amalgamation of councils is almost impossible and why there are so many Spanish municipalities with populations below 1000 (Hulst & van Montfort, 2007).

⁴ There are examples of single purpose mancomunidades (Garrido, 2007)

Asturias counts 17 mancomunidades, often defined by the shared topography such as a valley or a coastline (interview 4). These bodies were intended to bridge the distance between the 78 councils and the regional government. The councils would share several competences and organise them on a larger scale, the themes of collaboration are; improvements to physical infrastructure and communications, promotion of tourism, urban and village planning, social service provision, promotion of economic diversification, cultural promotion, and sports and recreation (O’Keeffe, 2011). In Asturias, mancomunidades are most effective in rural areas due to obvious necessity for councils to collaborate (interview 8)(O’Keeffe, 2011).

The multi-purpose nature of the mancomunidades and the lack of hierarchy between participating councils makes for slow decision making. What is more, the mancomunidades mainly rely on solely on the resources of participating councils, given that these resources are generally low to begin with, the benefits of mancomunidades can only be found in economies of scale. In Asturias, several mancomunidades have broken down due to these difficulties (interview 1). Only in the rural areas where collaboration is imperative due to the dire circumstances do the mancomunidades show greater effectiveness (interview 8).

Consortiums

The second form of inter-municipal cooperation is the administrative consortiums. These are vertical as well as horizontal entities that can include public agencies as well as private parties. Contrary to the mancomunidades, consortia are generally single-purpose and focus on themes such as transport, sanitation and waste treatment. Like mancomunidades, consortia can only be organised on the basis of voluntary contractual agreements (Garrido, 2007).

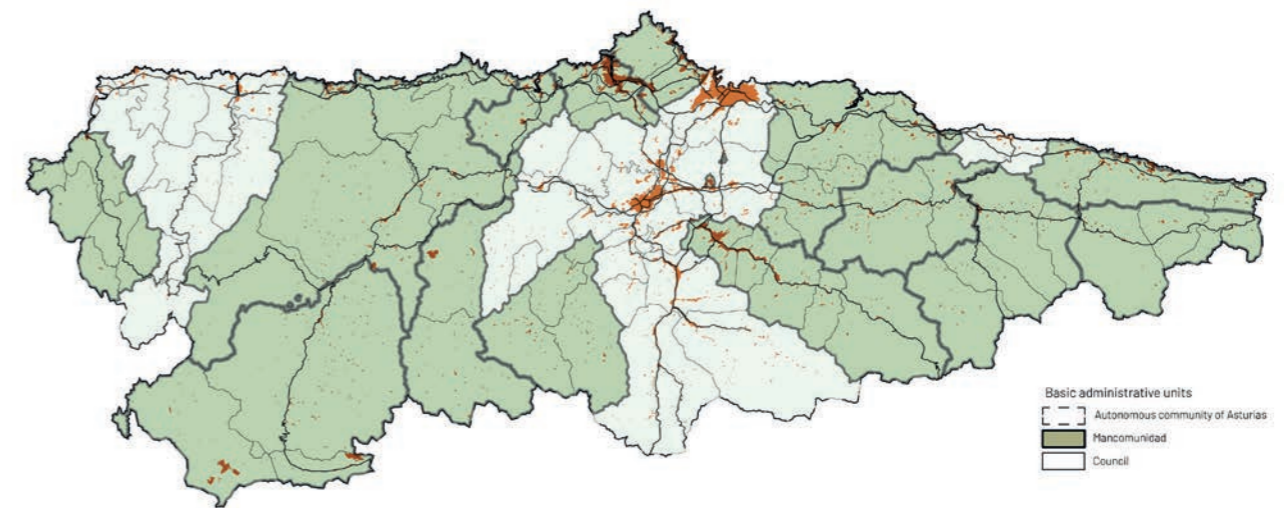


FIG. 3.14 Territory covered by the mancomunidades. Source: author

Consortia have become more a more present in the Spanish planning system, mainly due to their greater effectiveness compared to mancomunidades. This is partially due to their more concrete objectives and due to the greater ease with which higher level funding can be accessed (Garrido, 2007).

Asturias currently counts 11 consortia of varying sizes and function. The three most notable consortia are the CTA (transport), CADASA (sanitation) and the COGERSA (waste management). The remaining consortia are of lower scale and share more similarities with single-purpose mancomunidades than consortia. According to several interviewees the consortia are currently the preferred form of collaboration in the region (interview 1, 7).

Metropolitan area

The main objective of these areas is to coordinate urban planning on a supra-municipal level. The difference with the previous two examples of municipal collaboration is that the metropolitan area is created by Autonomic law (by the region) (Garrido, 2007). Contrary to mancomunidades, this form of cooperation can include both municipal competences as well as regional ones (Garrido, 2007). The metropolitan areas are rarely used in the Spanish planning system, this is mainly because it does not offer any advantages over the other two models for inter-municipal cooperation (Garrido, 2007).

In Asturias, there has been talk about the creation of a metropolitan area since 1966 (Fernández, 1999). However, though the concept is still very much alive in the planning debate, the area has never been formally recognised. Partly due to the resistance of large industrial companies who lobby against restrictive policies and partly because of councils who do not wish to be dictated by the regional government (interview 1).

Public agencies

Aside from inter-municipal bodies there is another important group of public agencies, there are the public private agencies such as the IDEPA (Economic Development Agency), COPAE (Council of Ecological Agrarian Production of the Principality of Asturias), and the FAEN (Asturian Energy Foundation). These are public private agencies initiated by the principality and are tied to departments. Their objective is to mediate between private and public parties. These agencies have little formal power, but they are important actors. For example, the IDEPA is the representative agency for the Department of Employment, Industry and Tourism, it leads the strategy for business promotion in Asturias. Herein, IDEPA plays a pivotal role in the management of industrial land. Most of the departments of the principality are represented by an agency like the IDEPA.

EU operational programs

The EU, in the form of different programs and funds, has been an important supporter of development in Asturias, and has been an investor in both urban and rural development (Prada Trigo, 2014) (see figure 3.15). The two most important operating programs of the EU are the ERDF and the RDP. Both these programs are managed by the national ministries of Ministry of Finance and Public Administration (ERDF) and the Ministry of Agriculture, Food and Environment (RDP).

Regional Operational Program Asturias (ERDF 2014-20) €330 mln	Operational Programme (ESF 2014-20) €108mln
Research and innovation (82 mln)	Promoting sustainability, quality employment and labour mobility (57 mln)
Competitiveness of SME's (99 mln)	Promoting social inclusion, fighting poverty and any form of discrimination (36 mln)
Protection of the environment and the promotion of resource efficiency (66 mln)	Investing in education, training and vocational training, for the acquisition of skills and lifelong learning (12.5 mln)
	Technical assistance (2.5mln)
Rural development program Asturias (EARDF 2014-20) € 561 mln	Interreg Alantic Area
Knowledge transfer and innovation in agriculture, forestry and rural areas	Innovation and competitiveness
Farm viability, competitiveness and sustainable forest management (155 mln)	Resource efficiency
Food chain organisation, including processing and marketing of agricultural products, animal welfare and risk management (66 mln)	Territorial risks
Restoring, preserving and enhancing ecosystems in agriculture and forestry (145 mln)	Biodiversity, natural and cultural assets
Resource efficiency and shift to low carbon and climate resilience economy in agriculture, food and forestry sectors (105 mln)	
Social inclusion, poverty reduction and economic development in rural areas (70 mln)	

FIG. 3.15 An overview of the relevant European programs and investment funds. Source: author

The operational program of the ERDF (European regional development fund) 2014-2020 supports regional development based on 3 priorities: Research and innovation; Competitiveness of SME's, and protection of the environment and the promotion of resource efficiency⁵ (europa.eu, n.d.-a). The program has a budget of 263 million euros.

The operational programme of the RDP (Rural development programme) for same period supports rural development and environmental protection. The programme highlights the following priorities; knowledge and innovation in agriculture, forestry and the rural entrepreneurship; competitiveness of farming and forestry; food chain organisation; restoring ecosystems related to farming and forestry; resources efficiency; social inclusion in rural areas. The programme has a total spending budget of 325 million euros (europa.eu, n.d.-b). One of the most important strategies of the RDP are is the LEADER-program. The LEADER-program (READER in Asturias) is aimed at the support of socio-economic

⁵ The spending of this priority is focused on the improvement of waste water treatment (europa.eu, n.d.-a)

development in the rural areas. The LEADER-network and the accompanying local action groups are an important link to the rural population and businesses (readerasturias, n.d.).

Given that the current 7-year period of the operational programs is coming to an end, the region is presented with an opportunity to adjust the priorities of the programs. Therefore, the current period is an opportune time to reconsider the regional development trajectory.

Cantabrian Hydrographic Confederation

The Cantabrian Hydrographic Confederation (CHC) is an important supra-regional body that governs the water management of most of the river-basins in the Cantabrian mountain range. The scope of this agency is limited to all rivers that cross regional boundaries. Its functions are mainly concerned with the planning of hydraulic infrastructures, the mitigation of environmental risks such as water pollution and flooding (chcantabrico).

University of Oviedo

The university of Oviedo plays an interesting part in the regional planning process. Though it has no formal authority, the principality out sources much of its analysis and planning work to the university, in particular to the departments of Regiolab (specializing in regional economic development), the CeCodet (specializing in geographic analysis) and the Indurot (specializing in natural resources planning) (interview 1). Indurot has even lead a tender for the Life+ program to address the soil pollution in the Nalón valley (interview 2), it did this without coordination of the regional government. Thus, the university has a strong position in the regional planning system.

Public participation

In the city councils of Avilés and Gijón, the local city governments are advised by civic councils. These civic councils consist of representatives from different professional organisations, such as the Colegio Oficial de Arquitectos de Asturias (the college of Asturian architects) (interview 6). Outside these two councils, the citizens and small businesses are represented by unions such as the CCOO and the FADE. Most of the civic action in the regional planning process of Asturias is reactive, there are few signs of civic groups taking the lead in developments (interview 8).

Private companies

The role of the private sector should not be understated in Asturias. Decades of declining employment figures has made the Asturian authorities lenient towards large companies (interview 1). Due to its long industrial history, there are many multinationals in the region (Menendez, Balbona, Pruneda, & Almond, 2018). Even now the Asturian economy is moving away from the secondary sector, the employment that these companies provide keeps them in a strong political position (interview 6). This shows in the way they managed to slow down or avert the adoption of environmental laws and regulations. Leaving them much more leeway to dispose of their waste. As a result, the Asturian authorities have not been able to get the industrial companies to clean up polluted soils

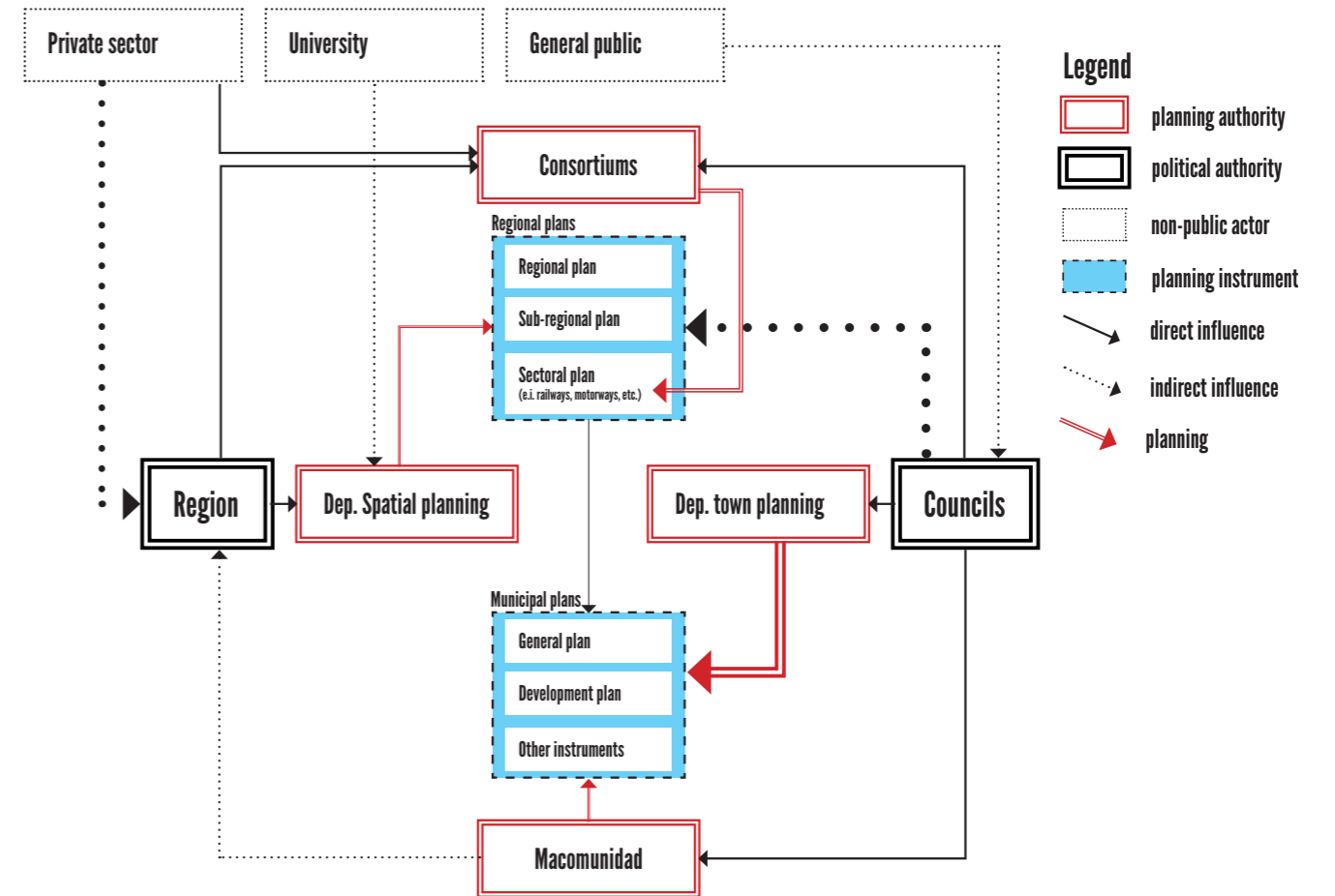


FIG. 3.16 Regional planning system. Source: adapted from Vivero, 2011

(interview 6). The industrials prefer to pay the relatively modest fine and carry on with their business as usual.

The influence of private companies is not restricted to the industrial sector. When the CTA (transport consortium) proposed a plan to construct a railway line to the regional airport, the plan was boycotted by the bus company (ALSA), who up until then had a full monopoly on all the public transport to and from the airport (interview 6).

Sub-conclusion

The analysis of the planning system demonstrates a clear link between shrinkage and some of the problems in the planning system. Multiple political conflicts have created a planning system with an extremely limited ability to collaborate. There is a mismatch between the formal organisation of power and the reality of the system.

This mismatch can be traced back to shrinkage. Firstly, the regional authorities are coping with a reduced revenue stream due to the population decline, which has compromised their authority over the lower level governments. Secondly, the concerns over unemployment have increased the political power of the larger companies in the region (see figure 3.16).

The lack of power at the regional level is a real concern, especially in a shrinking context where regional coordination is essential (Schlappa & Neil, 2013). However, in the current climate of Asturias where decline seems to be a problem for decades to come, the need for regional collaboration is becoming more evident. As one interviewee noted 'this might be the opportune time to instigate new consortiums and mancomunidades.

The limited role of civic participation on the one side and the dominant role of the large companies is another concern for the region. Especially in region where resources are insufficient to fulfil all the competences, active civic groups could be extremely helpful. These issues pose serious obstacles for regional spatial planning. Addressing these issues will play a central role in the following two chapters.



FIG. 3.17 Delimitation of the Metropolitan area of Asturias. Source: (Asturias, 2016)

The plans, projects, instruments, programs

In recent decades the Asturian authorities have developed many plans, programs and instruments. It is illustrative to discuss some of these efforts.

Directrices Regionales De Ordenación Del Territorio De Asturias

The Directrices Regionales De Ordenación Del Territorio De Asturias (DROT) was published in 2016, it is the latest attempt of the regional government to renew the territorial guidelines from 1991. The DROT consists of a region wide territorial directive and a secondary strategic plan for the central metropolitan area (G. d. P. d. Asturias, 2016a).

The DROT is proposes the following guidelines:

- the control of urbanization and the protection of natural and agricultural space
- the development of the Asturian central area as a polycentric metropolis of 1 million people
- the investment into in the densification of urban and industrial land

The DROT reintroduces the concept of the metropolitan central area and proposes a polycentric model for development. It highlights the importance of concentrated development to maximize economic productivity, sprawl control to prevent environmental degradation and local public transport as a remedy for the poor air quality caused by excessive car use (G. d. P. d. Asturias, 2016a).

The plan has since been dropped due to several political issues. According to the councils the plan was too top-down and undermined the authority of the local governments. According to one interviewee, the plan partially failed because the competition between the dominant councils of Oviedo and Gijón. What is more, the plan was criticised heavily by several councils that were excluded from the metropolitan area (interview 1).

Because of the outdated regional plan of 1991, there are few criteria by which the regional government can restrict the planning efforts of local councils. In the words of one of the interviewees; *'as long as it is not totally stupid, we allow them to build it'* (interview 6). This is one of the reasons why the central area of Asturias is so sprawled (F. P. R. Rubiera Morollón, José Luis 2013).

Plan Demográfico del Principado de Asturias 2017-2027

The demographic plan is a recent attempt by the Department of the Presidency and Citizen Participation. It does not concern spatial development directly but nonetheless important to discuss here. In contrast to the DROT, this plan is focused on economic diversification of the rural hinterland. The plan features an extensive analysis of the demographic development of Asturias, and proposes a series of policy guidelines concerned with the themes of:

- innovation and diversification in the rural economy
- collaboration between the rural authorities
- support/empowerment of women, young and elderly people in the rural economy
- consolidation of service provision in rural centres

The plan is heavily met with scepticism by the experts interviewed in this research (interview 1, 8, 9). Though the plan identifies important issues for rural development, it fails to propose concrete actions. What is more, the listed policies and programs are not integrated into one strategy, as one interviewee remarked *'it is more like a list of things that the different departments try to do already'* (interview 9).

Regeneration of the mining areas

In the last decades, several regeneration strategies have been attempted different parts of the region, with differing rates of success. In the mining valleys of Caudal and Nalón much national and European funding has gone into the revitalization of mining facilities. These strategies were mainly concerned with the ecological restoration of some of the opencast mines and the preservation of the industrial heritage through the creation of cultural functions. Several brownfields and former mines were indeed restored into natural or agricultural land and several were opened in industrial buildings (*Recommendations for the environmental regeneration of declining coal mining areas: The central asturian coalfield*, n.d.).

However, the initiative did not have the transformative effect that was desired. It was only able to transform some buildings and brownfields but was not able to change the image of abandonment that plagues the mining towns and villages. Part of the problem was that the local councils had preserved many buildings as industrial heritage but was not only able to find suitable functions for a few. Consequently, many buildings were preserved in a state of deprivation (Prada Trigo, 2012, 2014).

In 2005, HUNOSA, the large mining company that owns many of the brownfields and abandoned facilities, proposed a second revitalization strategy (interview 3). Their objective was to create space new residential and industrial clusters on the brownfields. These plans were never carried out, due to the limited demand for development in this part of the region.

Recently, local research initiatives have attempted to gain funding from the Life+ Program (EU) for another regeneration strategy, this time the core objective was to clean-up the remaining brownfields in the mining valleys (interview 2). This call for funding has been denied by the European Life program. However, parts of the plan might be continued in future proposals.

Revitalization of Avilés

A more successful example of a regeneration strategy has taken place in Avilés. This regeneration strategy was of a more holistic approach, it addressed topics of neighbourhood renewal, innovation, culture, and tourism. It proposed – and partially realised – several flagship projects on the former industrial island that separated the city from the industrial cluster, among which the Oscar Niemeyer centre and an innovation district. Parallel to the flagship projects there were neighbourhood policies aimed at the improvement of social cohesion and better service provision. The project was supported



FIG. 3.18 Efforts to valorize the industrial heritage of the mining valleys. Source: author



FIG. 3.20 Icons to embellish the regeneration strategy of Avilés. Source: author

by various EU-programs, and received substantial funding from the ERDF (Moral, Méndez, & Trigo, 2012b).

The project was able to restore some of the deprived neighbourhoods in the central parts of the city and was able to boost the cultural and innovative sectors in the city (interview 7). The strategy was successful because it was able to integrate physical restoration of brownfields and deprived neighbourhoods with social and economic policies. However, the plan has not been able to reverse the demographic decline of the city. 10 years since the proposal of the plan, not even half of the flagship projects have been realised (see figure 3.19).

Infrastructures

As one interviewee remarked, infrastructure is one of the most prominent topics in the Asturias planning arena (interview 1). Over the past decades the network of highways has been developed extensively, due to the help of many European funds. Despite the heavy investments, the transport system – especially the public transport system – is still seen as a weakness that contributes to the problems of decline, particularly in the rural areas (interview 1). The department of Spatial planning and transport has recently proposed a series of new projects to provide better accessibility to the rural areas (see figure 3.20) (*Plan Director De Infraestructuras Para La Movilidad De Asturias 2015-2030*, 2015).

The discontinuation of several international connections (ferries and flights) is thought to only further the peripheralization of the Asturian region. Therefore, recent proposals and projects are regarded as highly important by the regional planning authorities, the high-speed rail connection that will connect the Asturias centre with Madrid.

This connection is expected to have significant consequences for the Asturian economy (interview 1). Especially for the cities of Mieres and Pola de Lena which are expected to get stations on this line. One interviewee remarked that though the line might bring some

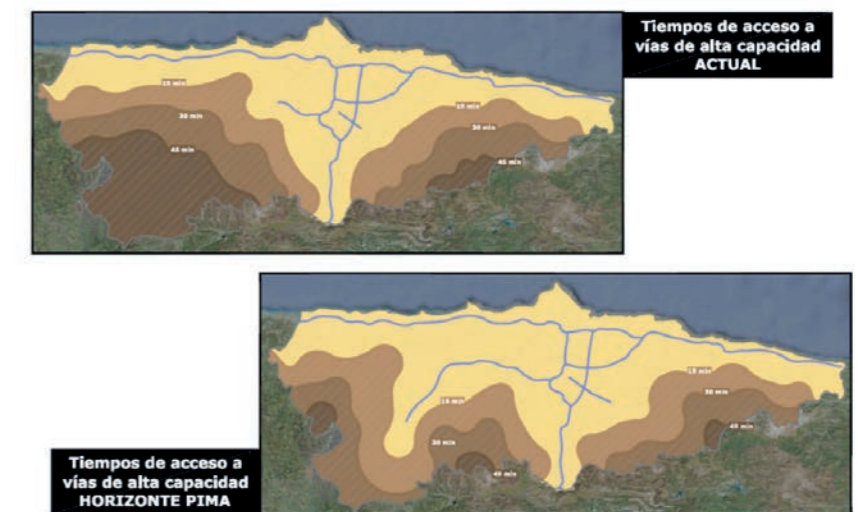


FIG. 3.19 Infrastructural plans proposed by the regional government

economic activity to the mining valleys, it is doubtful whether it would be able to turn the valleys into an attractive living environment (interview 2).

The project is currently stopped due to a lack of funding from the Spanish state. It is unclear how the line will be integrated into the Asturian network (interview 6).

Protective instruments

The natural landscape of Asturias is prized as one of the regions greatest assets. In order to protect this landscape, the region – in collaboration with various higher-level governments – has created several protected zones (see figure 3.21). Almost 30% of the region is covered by such zones (Roa, 2008). Most of these natural zones are concentrated on the southern border with Leon and Galicia. These areas are integrated into the Natura 2000 network and are protected accordingly. The coastal fringe is protected by a special zone called the POLA (Territorial Special Plan for the Management of the Asturian coast). This plan has been especially helpful in the limiting of sprawl on the coast, and has helped to create a recreative network of parks, natural reserves and cycling and walking routes (G. d. P. d. Asturias, n.d.). Another relevant zone is the ‘Cuencas Mineras’ (mining valleys), this zone is dedicated to the protection of the mining valley of the Nalón. It is mainly aimed at the preservation of industrial heritage and the related tourism (G. d. P. d. Asturias, 2017).

Research programs

Asturias, supported by several European funds, has invested heavily in innovation. This has created several interesting developments with regards to renewable energy. Several researches have been supported with regards to the use of former mine shafts for thermal energy, but the program was discontinued due to a lack of funding. Innovation in the biomass industry has also been supported by the regional government. Biomass is already developed in the region through the many eucalyptus plantations. Currently, research is being done into the use of indigenous trees such as chestnut and pine. Research has been halted in recent years, and the implementation of pilot projects has failed because most of the mines are in councils that lack the resources to invest in such technologies.

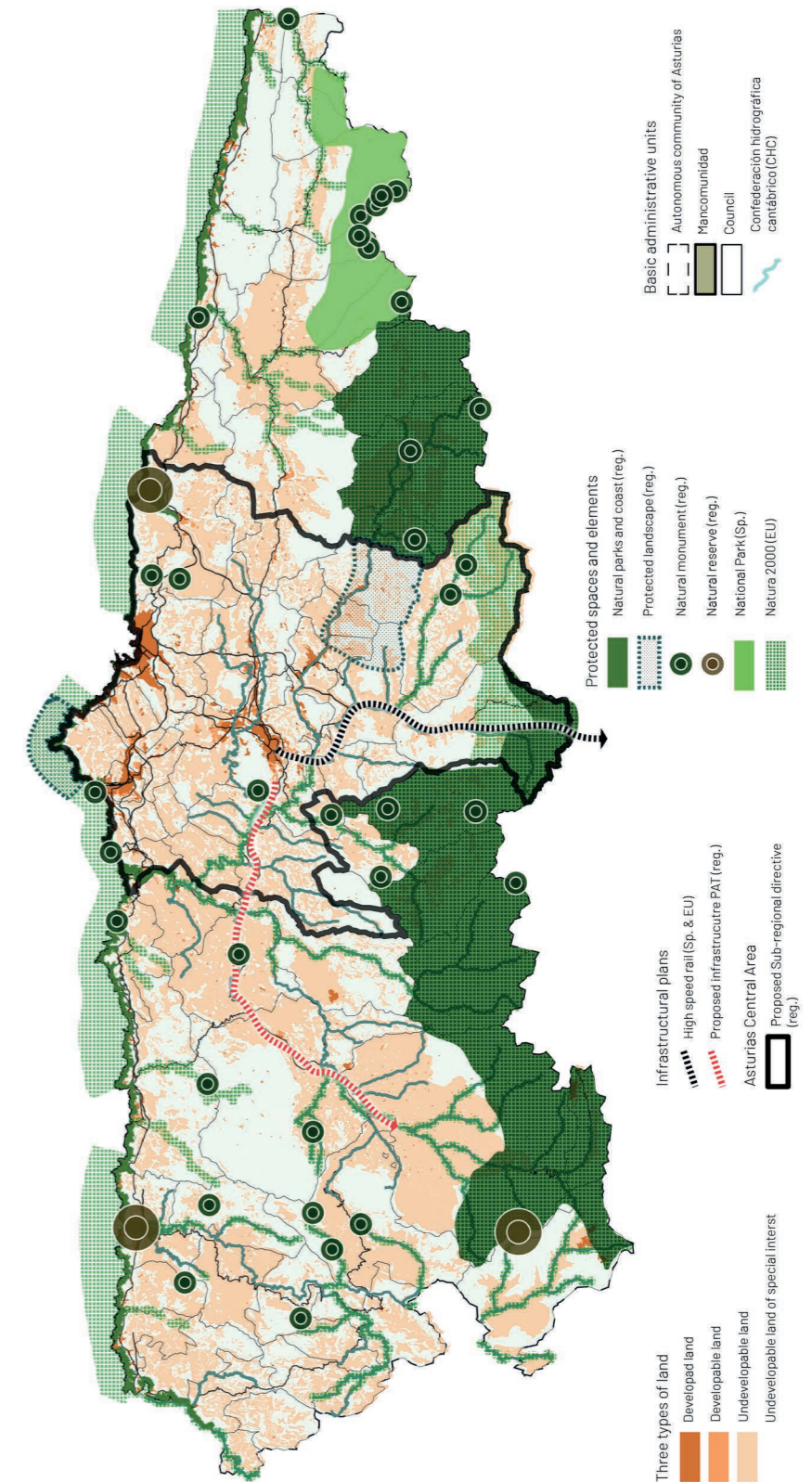


FIG. 3.21 Mosaic of jurisdictions, special zones and planned projects. Source: author

Sub-conclusion

An overview of the governmental authorities in Asturias uncovers a colour mosaic of overlapping jurisdictions and various protected zones (see figure 3.22). The complexity of this mosaic highlights the necessity for intergovernmental collaboration. However, the region is lacking a framework through which the different authorities can collaborate effectively.

The recent history of Asturian planning efforts shows a limited amount of success, as several plans have failed to reach completion, and others have had little impact. The plans have failed due to a combination of mismatched expectations and a lack of resources. One of the main problems of the regional planning system is the lack of a mutually shared perspective. Up until now, several attempts have been made to graft a regional territorial plan, but to no avail.

Regional development has guided through local and sectoral plans, this has obscured the general trajectory of the region. As a result, there is little recognition for the regions shared challenges and opportunities. Hence the need for a regional vision as a first step towards coherent regional development.

As several interviewees remarked many of the plans project a narrative of balance between social, environmental and economic values (interview 1, 3). But in real life the value that counts is the extent to which a plan can produce (economic) growth. Plans that do not directly strive towards this goal find little support in the region. Consequently, these plans are easily dropped in times of political conflict, under the premise that they are 2nd order concerns. This is one of the reasons why the principality is failing to address the various environmental threats in the region.

Combined with the amount of failed and unsuccessful plans has created an attitude of pessimism among the regional population (interview 1).

3.4 – Conclusion

This chapter has looked at the territorial characteristics and regional planning system of Asturias, in relation to shrinkage. The various impacts of shrinkage pose serious threats to the sustainable development of Asturias, but they also create opportunities. However, integrating these opportunities in the regional planning system will be difficult as the defects in the planning system are not addressed.

SWOT in table 5.1 gives an overview of the various strengths, weaknesses, opportunities and threats that are relevant to the spatial development of Asturias. This SWOT will provide the basic underpinning of the regional design chapter. Highlighted in the SWOT are issues that are relevant to the physical development of the region (regional design) and issues that are relevant to the organisational structure of the region (implementation strategy). Additionally, the SWOT highlights those aspects that are a direct or indirect cause of shrinkage and aspects that are unrelated to shrinkage but are relevant to the regional design in chapter 5.

Strength	Weakness
<p>A. READER as strong network for collaboration in the rural areas.</p> <p>C. Polycentric urban system as opportunity for economic development</p> <p>C. Natural and cultural landscapes as carriers of the regional identity and quality of life</p> <p>C. Strong protective instruments</p> <p>C. Relatively strong mancomunidades in the rural areas</p> <p>C. Consortiums as platforms for inter-regional collaboration</p>	<p>A. Vacancy and greyfields in the central cities</p> <p>A. Abandoned villages and deprivation in the rural and mining areas</p> <p>A. Brownfields and abandoned mines</p> <p>A. Isolation of elderly population in rural villages and peripheral neighbourhoods</p> <p>A. Limited municipal and regional budget</p> <p>A. Limited support for non-growth-based projects, growth thinking</p> <p>A. Lack of instruments to address vacant land</p> <p>B. Weak regional and international transport connections</p> <p>B. Qualitative and quantitative housing mismatch</p> <p>B. Fragmented natural and agricultural systems in the metropolitan area</p> <p>B. Power disbalance between lower and higher authorities</p> <p>B. Power disbalance between the public and private sector</p> <p>B. Lack of public participation</p> <p>B. Lacking monitoring system regarding the impact of shrinkage on a regional level</p>
Opportunity	Threat
<p>A. Vacant land as opportunities for new development</p> <p>A. Strengthened ecological systems due to farmland abandonment</p> <p>A. Space for the diversification of the rural economy (eco-farming, sustainable forestry, nature conservation, tourism, and renewable energy)</p> <p>A. Consolidation of rural population</p> <p>A. EU and Spain as supra-regional supporters</p> <p>A. Greater preparedness to collaborate between councils and region due to dire circumstances</p> <p>A. Large companies as supporters of brownfield and mine restoration</p> <p>B. Proposed (inter)national transportation links to improve the accessibility and competitiveness of the region.</p> <p>C. Polycentric urban system as a tool to proliferate Asturias in the international arena</p> <p>C. Innovation in renewable energy as opportunity to tap into new resources</p>	<p>A. Loss of cultural landscape through the abandonment of the countryside</p> <p>B. Sprawl and speculation in the central and coastal areas as a waste of resources</p> <p>B. Environmental risks (soil and water pollution, flood risk, air pollution, forest fires, landslides, soil degradation, wildlife nuisance, invasive plant species)</p>

TABLE 3.1 SWOT. A>direct relation to shrinkage B> indirect relation to shrinkage C>no relation to shrinkage. Source: author

4 – Principles and strategies

This chapter addresses the planning and design principles in shrinkage situations. It provides an extensive explanation for the principles and supports these with case examples. The purpose of this chapter is to build up a catalogue of planning and design principles for shrinking contexts. The following chapter will draw from this catalogue to create the regional design.

Planning and design principles are here defined as the basic rules, laws or concepts that underlie actions taken in the field of spatial development. A strategy is a compilation of planned actions that together make up a spatial plan, planning and design strategies are based on principles.

The scope of this chapter is focused on principles and strategies that relate directly to spatial planning and design. There are many strategies that address shrinkage in the social and economic domain, for instance skills training of unemployed residents (Power, Plöger, & Winkler, 2008). Though this thesis does not dispute the relevance of such strategies, they are not considered central in this thesis.

This chapter is divided in two parts; 1) planning principles and strategies; 2) design principles and strategies.



Holes in the urban pattern through neglect and abandonment in Mieres, Asturias. Source: author

4.1 – Planning principles

Relatively few papers have discussed planning principles in shrinking cities or regions, fewer still have been based on empirical data (Sousa & Pinho, 2015). Therefore, the planning principles in this chapter should be regarded with a healthy amount of scepticism.

Principle 1: realism

To make the best out of a shrinking context, first it is necessary to acknowledge decline and base future actions upon an realistic projection of the future demographic development (Schatz, 2010). Considering the macro-regional trends that drive decline in the Europe, planners and decision-makers need to adopt a modest attitude towards their ability to influence demographic change. Schatz (2010) calls for planners and decisionmakers to leave assumptions of growth behind and strive to make use of the opportunity to create smaller and more liveable cities (Schatz, 2010).

If this is not done, the planner risks leading valuable resources away from communities where they are most needed. What is more, the act of planning for growth in a shrinking region will only enhance regional competition and thereby risk wasting resources (Schlappa & Neil, 2013). Though this principle might sound relatively straightforward, many cities and regions invest heavily in developments that do not attract population growth (Pallagst, Fleschurz, & Said, 2017; Sousa & Pinho, 2015), especially in the earlier stages of decline. The paradigm shift away from growth is not easily made. As Pallagst et al. (2017) explains, only after several years or even decades of decline have city governments shown willingness to revise their ambitions for growth.

Herein lies an important task for national and European governments. As Schlappa and Neil (2013) argue, the way these governments distribute their resources across regions is still based on the stimulation of growth. This incentivises regional authorities to plan for growth, even when this is an unlikely scenario (Schlappa & Neil, 2013). Creating reward mechanisms for shrinkage planning could be a good way to speed up this process.

This is not to say that growth should be whole disregarded in a shrinking context. Opportunities to improve economic performance should still be pursued. Governments will still find it worthwhile to invest in economic programs, like innovation and industrial clusters. However, they must do so with modesty, focussing first on the reuse and optimization of existing structures and systems before any expansions are made.

Admittedly, aligning plans to realistic projections of growth is essential for any city or region, whether it is shrinking or not. However, the waste of resources that accompanies growth thinking in shrinking contexts poses a larger threat to regions that already suffer from a lack of resources.

Youngstown: Youngstown 2010 official plan

The Youngstown 2010 official plan shows a diffuse narrative of a government struggling to come to terms with shrinkage. Youngstown has been one of the cities that is hit hardest

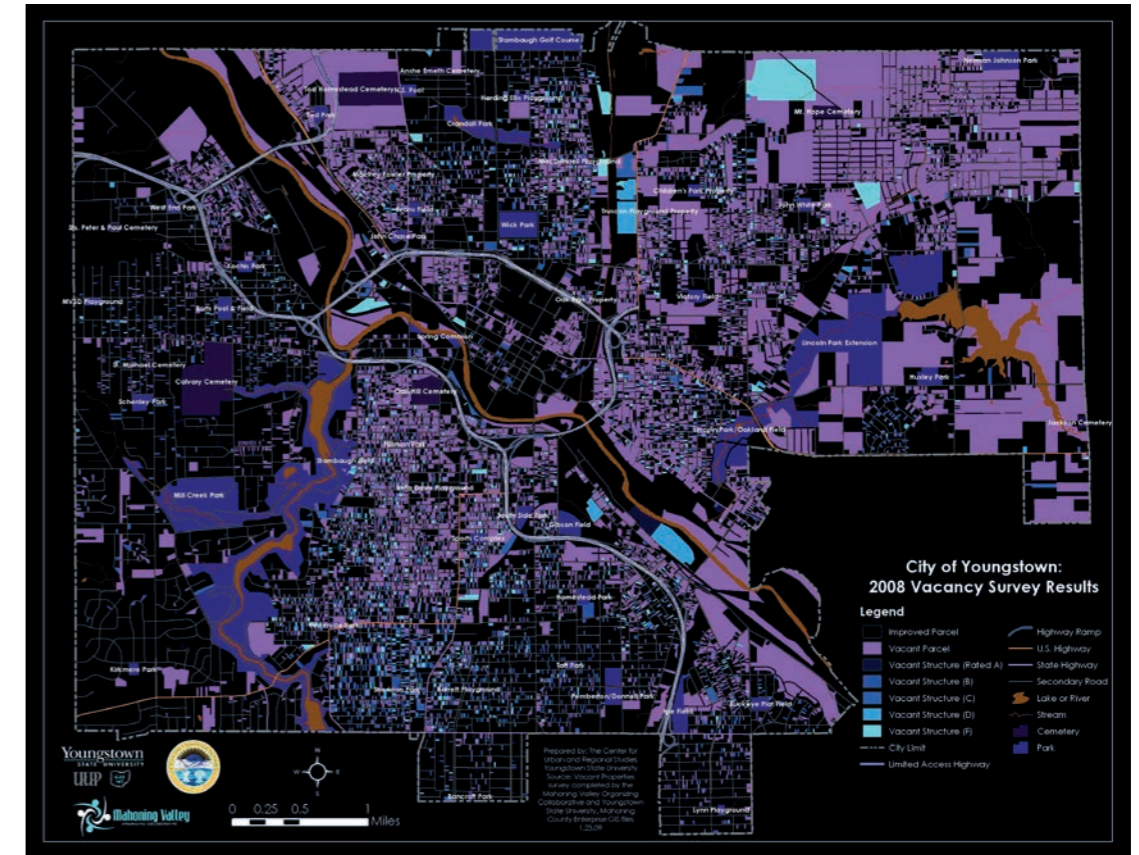


FIG. 4.1 Vacant space map of the Youngstown 2010 official plan that was used to demonstrate the potential for alternative development. Source: freeassociationdesign.wordpress.com

by the decline in the American Rust-belt, and has been dealing with decline for the last 40 years (Youngstown, 2005). Its city government – after many years of decline – has finally propagated a strategy for ‘controlled shrinkage’ (Schatz, 2010). The plan advocated for the improvement of the city through the guidance of the shrinkage process. The plan concerned as set of actions that were aimed to downsize Youngstown and transform it to a greener more sustainable mid-sized American city.

The Youngstown 2010 official plan consisted of two parts a vision and an implementation plan. The vision was based on the following principles: 1) accepting shrinkage 2) redefining the role and nature of the regional economy 3) improving the image and quality of life of the city 4) actionable interventions to make things happen (Schatz, 2010). The implementation plan consisted of a long list of interventions based on the said principles. The plan was paralleled by a successful campaign that created awareness among the general public and local private parties for the need to shrink smartly.

However, a closer look at the narrative that is presented in the plan reveals the underlying paradigm of growth. The plan highlights the importance of creating more public space for recreation and green, in order to create a more attractive urban environment for new businesses and residents (Youngstown, 2005). The plan reduced developable land for



FIG. 4.2 Stadtumbau-Öst in Dresden-Niedersedlitz. Source: commons.wikimedia.org

residential use, still 70% of that land has remained to facilitate potential growth (Schatz, 2010).

This plan and others like it show the reluctance of the growth narrative. It leaves questions as to the extent to which governments could ever adopted a full shrinkage narrative.

Principle 2: Consolidate and reuse

One of the core problems in shrinking regions is overcapacity. Oversized technical infrastructure and mismatch housing stocks are a drain on resources for many shrinking regions (Dagmar Haase, 2013). What is more, an oversized housing stock can create neighbourhoods of deprivation and segregation. Therefore, it is crucial that planners aim to consolidate and concentrate services and systems.

Out of this principle follow two lines of action. The first follows the concept of the compact city (Kotharkar, Bahadure, & Vyas) and is concerned with concentrating of developable land within the footprint of the city. The development of brownfields

and consolidated land should be a prerogative for spatial development. Similarly, the development of greenfields should be discouraged as much as possible. This prevents unnecessary expansions of infrastructure and housing which only draws more resources from the municipal budget. It also protects the natural and agricultural systems from degradation and fragmentation which helps to secure quality of life and ecosystem services. Furthermore, the act of reducing the amount of developable land on the urban periphery heightens the value of inner city land. Thus, helping to direct investment into the cores of the cities and villages.

The second line of action concerns the active resizing of the existing technical infrastructure and housing stock, whereby the excessive elements are demolished or disconnected. The act of demolishing redundant infrastructure and housing lowers the costs for authorities and service providers, it also creates the opportunity to develop other land uses, such as urban farming, city greening and renewable energy production (Hollander, Pallagst, Schwarz, & Popper, 2009).

There is significant disagreement concerning the benefits of such a strategy. Concerns for destroying assets and systems that could be needed in the future holds planners back (Hoorbeek & Schwarz, 2009). Moreover, unless this line of action is supported by national or supra national governments the cost of demolishing housing and infrastructure on a large scale is too high for lower level governments (Rink et al., 2012).

Liverpool: Housing policies and greenbelts

In Liverpool, this line of action has been carried out by the Regional Spatial Strategy of 2004-2010. The policies pushed forward by this document complemented the national planning policy against greenfield development. It enhanced the green belts around the cities and directed any investment into the older neighbourhoods in the older city (Bernt et al., 2012).

The strategy proved successful in redirecting investment towards the inner cities. What is more, an intensive process of public consultation allowed the city to make accurate assessments on the state of the housing stock (Bernt et al., 2012).

East-Germany: Stadtumbau-Öst

Eastern-Germany is one of the few examples where the principle of resizing is applied on a regional scale. Stadtumbau-Öst was a federal funding program established in 2002 (Kühn & Liebmann, 2007). The core aim of this strategy was to demolish vacant residential housing to stabilise the housing market. The program was government-led and involved a lot of interdepartmental collaboration between higher and lower level governments. Over a period of eleven years more than 2.7 billion euros was spent on the plan by the federal government (Kühn & Liebmann, 2007). In the first phase of the programme approximately 350,000 vacant residences were demolished in over 300 villages and towns (Bernt, 2017).

The plan has been criticised for its one-sided focus on the large housing estates on the peripheries of the cities, and not on the qualitative improvement of the existing housing stocks in the core cities, nor on the recycling of the land that was cleared (Kühn & Liebmann, 2007). What is more, the plan said to be an attempt of the federal governments to save the large housing companies rather than to address the problem of

shrinkage (Bernt, 2017). In later phases, the plan was directed towards the upgrading of the existing housing stock in the core cities.

Stadtumbau-Öst is a good example of how supra-regional funding have supported local governments to address the problem of shrinkage. However, it also highlights the importance of a more strategic holistic approach.

Principle 3: public and private participation

The importance of participation has been identified by several authors (Hospers, 2012; Kempenaar, 2017; Schatz, 2010). As tax-bases of local governments decline, the participation of residents and private parties in the implementation of plans becomes increasingly attractive.

As Hospers (2012) argues, the need for participation goes beyond the sharing of costs. Firstly, the experience of residents is an effective way to get a better understanding of the impacts that shrinkage has on daily life. Secondly, engaged residents would be less likely to abandon their respective communities. Finally, the act of engaging the residents in the planning process also creates a better understanding between residents and the public actors. This is crucial given that in many shrinking contexts conflicts arise as residents feel deprived by unpopular – but sometimes unavoidable – governmental policies. Engaging citizens in the policy-process could create more acceptance towards policies and strategies (Hospers, 2012).

The need for participation is not exclusive to the shrinking context, academics have also argued for citizens participation to prevent some of the ills caused by growth planning (Arnstein, 1969).

Wächterhäuser

A good example of citizens participation in a shrinking context are the Wächterhäuser (guardian houses) in Leipzig. The project was a response to the federal program Stadtumbau-Öst (see above). The historic centre of Leipzig was littered with vacant and heavily deprived buildings. To save some of these historic buildings from demolition civic associations decided to intervene. Agreements were made with the local authorities to preserve the buildings provided that the local community would maintain and occupy the buildings.

The results of this program have been successful, if relatively modest. Several buildings have been successfully restored by the residents. And some of the buildings have even been recycled into the housing market.

This example shows how by engaging with the civic groups, the public actors modified their strategies and were able to preserve several assets that were highly valued by the local population. The renovation of these old buildings was not only valuable from a heritage perspective, but also added to the quality of the urban environment and managed to bind residents to the area (A. Haase & Rink, 2012).



FIG. 4.3 Wächterhaus in Leipzig. Source:commons.wikimedia.org



FIG. 4.4 IBA parkstad. Source: iba-parkstad.nl

IBA Parkstad

IBA Parkstad is based on an (Internationale Bauausstellung) is based on a German concept made famous in though the IBA Emscherpark, which renovated and transformed parts of the Ruhr-area. IBA-aims to use the program to make a similar transformation in the region of Southern Limburg (Parkstad; Shaw, 2002).

The program is led by a consortium of the regional government and several local authorities. The program is basically an invitation to the private and civic sector to come up with innovative projects that would support the region in terms of social, economic and spatial value. The consortium has outlined several themes, and people can propose projects based on those themes. Subsequently, the consortium decides which of the project are potentially important to the region and makes funding available (Parkstad).

The implementation strategy of the IBA contained 50 projects, ranging from new natural parks to cultural festivals and innovative building projects. Though the impact of the IBA is still uncertain given that most of the projects have been initiated in 2016, it provides a promising example of how to engage citizens and private parties into the planning process.

Principle 4: regional and inter-municipal cooperation

The fourth principle is mainly concerned with the improvement of local and regional governments. Shrinkage is only one of the many issues that has put pressures on the effective functioning of local governments (Hulst & van Montfort, 2007). Improving the performance of local governments boils down to two aspects; more efficient service provision and better coordination and alignment of policies and projects. This involves horizontal cooperation between municipalities but also vertical cooperation between the municipality, the region and the state.

Several authors have indicated the necessity for local and regional governments to work together on multiple scales and across multiple disciplines, this is crucial to streamline policies and to prevent unnecessary competition (Prada Trigo, 2014; Schlappa & Neil, 2013; Wiechmann & Pallagst, 2012). Bernt et al. (2012) and others (Mckinsey, 2016; Power et al., 2008) have argued for planning agencies with more flexible, less bureaucratic tools at their disposal.

According to Hulst and van Montfort (2007) there are four strategies that governments have attempted to address the pressures on lower level governments; 1) amalgamation of two or more municipalities into a new municipal body 2) the redistribution of responsibilities between the local and higher level governments 3) the outsourcing of responsibilities to public or private companies 4) and finally the creation of inter-municipal collaboration bodies.

The suitability of these strategies is depended on the local planning culture. There are significant differences between the institutional contexts within Europe. As an example, the first two strategies might seem very suitable for the Spanish context with its multitude of microscopic municipalities, but the planning culture has put such value on local self-



FIG. 4.5 Hotel Meliá Bilbao and Torre Iberdrola on of the succesful project of Bolbao Ria. Source: commons.wikimedia.org

government that any loss of competences is met with fierce opposition (Garrido, 2007; Hulst & van Montfort, 2007).

Bilbao Ria 2000

Bilbao Ria 2000 was one of the first brownfield land management agencies in Spain. Its purpose was to redevelop brownfields and industrial sites in the city of Bilbao. It directed the redevelopment of these lands not through public procurement, but by mediating between the various local authorities and the private parties (Ferber & Schlappa, 2016). The agency worked along the lines of a strategic framework that was developed by the municipality of Bilbao. It was effective because it was able to work in between the different public and private actors.

Bilbao Ria shows how a specialised institution can be a useful tool to reactivate vacant land and engage with private actors. However, this example – and others like it – remains on the level of the municipality or city. This leaves questions as to the transferability of this approach to the regional action level.

Sub-conclusion

A look across these planning principles shows remarkable little difference from what is regarded to be good planning in a growing and a shrinking context. The need for regional collaboration and citizens participation has been stressed just as much in shrinking contexts as in growing contexts.

The real difference between shrinkage planning and growth planning lies in the strategies that result from it. Only in the strategies do we see the real difference between a shrinking and a growing context. This emphasises the need for more empirical case studies, that study strategies wherein these principles have been applied. The principles listed in this section do not provide a clear direction to the planning process, rather they create the conditions wherein strategies for shrinkage can be implemented effectively.

4.2 – Design principles

The section addresses the design principles. Whereas the previous section was concerned with the planning principles that apply to the general planning approach in shrinking contexts, this section is more concerned with the design principles that enables planners and designers to exploit the opportunities that stem from shrinkage. This section is focused on alternative land uses. Though it could be said that new office buildings and housing are also an opportunity that stems from shrinkage, this is not the focus of this thesis.

Here, the design principle concerns the underlying idea of a spatial intervention. It is the tool to transform physical structures. A design principle does not dictate how a spatial intervention is manifested into a context, rather it leads to numerous potential design variations. Some of examples of these variations are in this section, others will be demonstrated in the regional design later in the thesis.

The design principles discussed in this section draw on three theoretical bodies; ecosystem services, energy landscapes, and adaptive reuse. Explained below are the basic premises of these categories and some of the design principles that follow from them.



FIG. 4.6 Ecosystem services. Source: TEEB

Ecosystem services (planning)

One opportunity in shrinkage that has received attention in literature is the opportunity to develop ecosystems on vacant land (see Burkholder (2012); Dagmar Haase (2013); Dagmar Haase, Haase, and Rink (2014). Dagmar Haase (2013) calls attention to the ability of ecosystems to improve the quality of the urban environment, both in environmental as well as in ecological sense.

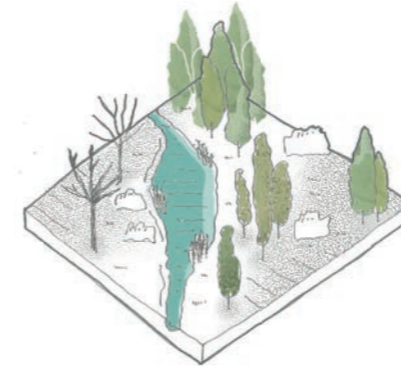
This concept is grounded in the literature concerning ecosystem services. The restoration of ecosystems is a pressing global concern (Foley et al., 2005). Human pressure has impaired our ecosystems' abilities to provide us – and the rest of the natural world- with vital service, such as the regulation of local and global climate, the supply of fresh air and water, and the ability to mediate diseases.

The (re)construction of ecosystems has beneficial impacts on cities and regions. Services provide by ecosystems can be divided in; provisioning, regulating, cultural and habitat supporting services (see figure 4.6 for an overview of ecosystem services).

There are several examples of when vacant land has been used to enhance ecosystem services. In Chicago vacant land has been transformed in to green space on a citywide scale, to provide a more attractive urban environment and to alleviate environmental threats, such as storm water runoff and the urban heat island effect (Desimini, 2013; Keeley et al., 2013). On a larger scale, vacant land could be used to buffer river discharges in flood prone areas.

Abandoned agricultural lands could be used to reconstruct natural ecosystems on a regional scale (Kuemmerle et al., 2008; KUEMMERLE et al., 2011; Navarro & Pereira, 2015; Queiroz, Beilin, Folke, & Lindborg, 2014). In some cases natural reconstruction (or eco-farming) can be used to alleviate the problems of polluted soils in mining regions (Fuping & Dong, 2010; Li Fuping, 2012).

Though the value of ecosystem services is supported by a large body of research (Gómez-Baggethun & Barton, 2013; Gómez-Baggethun et al., 2013; Schröter et al., 2005; Seppelt, Dormann, Eppink, Lautenbach, & Schmidt, 2011), integrating ecosystems services into planning and policy is still a challenge (Goldstein et al., 2012). According to Goldstein et al. (2012) the biggest challenge is to educate decision makers regarding the benefits of ecosystem-services, also with regards to traditional land uses.



DESIGN PRINCIPLES

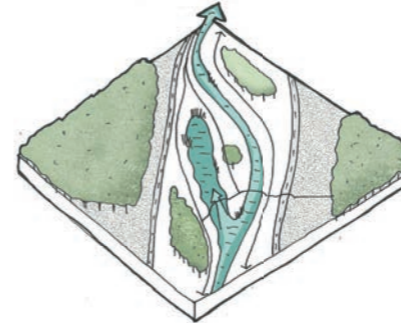
Active rewilding

Renaturize abandoned farmland to reconstruct ecological structures. Bring back or protect endangered flora and fauna. Halt progress of interloping species.

- + provides multiple ecosystem services
- + opportunity to reassert native species
- + attracts eco-tourism
- + provide modest amount of employment in conservation sector
- effects can be limited in nature rich regions
- relatively expensive intervention
- complicated property issues

Scale of action: regional

Stakeholders: Regional gov, Municipalities, environmental & conservation agencies (local and international), nation state, land owners, farmers



River corridor widening

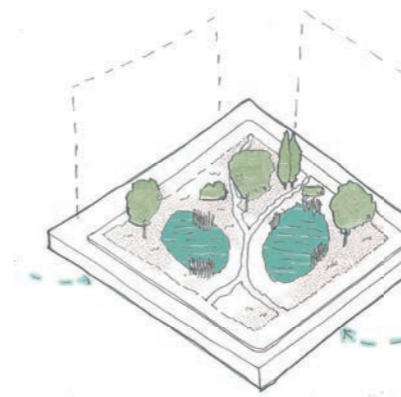
Use vacant land to construct flood plains to build resilience against flooding

- + provides ecosystem services
- + enhances landscape quality
- + mitigated flood risk

- relatively expensive intervention
- complex implementation process with regards to the different authorities involved

Scale of action: River basin

Stakeholders: Regional gov, Municipalities, environmental & conservation agencies (local and international), regional/local water authorities, land owners, farmers



Urban greening & water storage

Transform vacated lots in the city into miro parks.

- + absorption of rain water runoff
- + reduces urban heat island effect
- + enhances urban quality
- + boost market value of surrounding real-estate
- complex process due to ownership issues

Scale of action: city

Stakeholders: Councils, environmental & conservation agencies (local and international), regional/local water authorities, land owners



FIG. 4.7 Example of succesful reuse of a former textile factory in Apolda, Germany. Source: iba-thueringen.de

Adaptive reuse

Other authors have highlighted the prevalence of vacant land and buildings as a chance temporal uses such as urban agriculture and events, or to provide services such as workspace and new housing types (Hollander et al., 2009; Lydon & Garcia, 2015; Németh & Langhorst, 2014). Reuse can also be part of a strategy to revalorize and preserve cultural heritage (A., 2007; A. & E.D., 2011). Adaptive reuse does not have to result in a permanent intervention, urban farming and events can be good ways to put vacant land to use without limiting the possibilities for future development.

This line of thought is based in a body of theory referred to as adaptive reuse. This body argues for the reuse of existing structures over the development of new ones (Bullen & Love, 2010). Adaptive reuse would be more environmentally friendly, cheaper, and more sympathetic to the retention of cultural and social identity (A., 2007; A. & E.D., 2011; Bullen & Love, 2010).

The biggest challenges for the adaptive reuse of buildings and sites are not merely related to the physical structure of the buildings or the land, the legal and financial issues are important issues. Here the role of the local government to provide incentives and align regulations is crucial.



DESIGN PRINCIPLES

Urban farming

- Use vacant land for urban farming
- + supplies several ecosystem services (food, water absorbtion, biodiversity, recreational)
- + cheap way to clean polluted land
- + improves livability in neighbourhoods
- + relatively cheap intervention
- replicability is limited

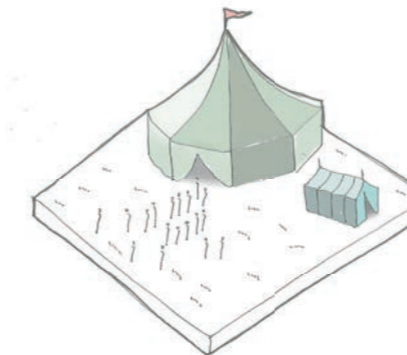
Scale of action: city
Stakeholders: Councils, environmental & conservation agencies (local and international), local communities, land owners



Reuse of (heritage) buildings

- Use vacant buildings for new functions such as shopping centres.
- + can bring modest employment
- + can improve livability
- + can bring permanent future to a building
- complex and uncertain proces

Scale of action: City
Stakeholders: Municipalities, developers, entrepreneurs, building owners



Events

- Use vacant land to facilitate temporary events.
- + improves liveability
- + improves image of the city
- only remove impression of abandonment for a short while
- replicability is limited

Scale of action: city
Stakeholders: Municipalities, local communities, land owners, entrepreneurs



FIG. 4.8 Example of successful reuse of a former military brownfield for renewable energy in Morbach, Germany. Source: energielandschaft.de

Energy landscapes

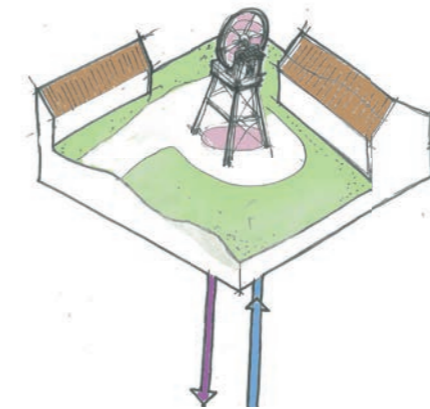
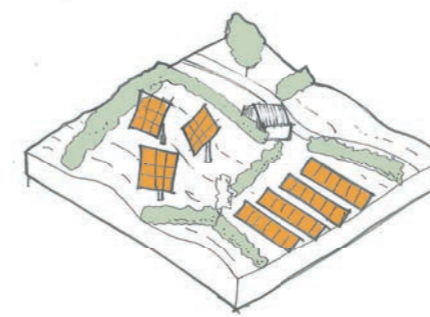
The transformation of vacant land to facilitate renewable energy production, such as biomass cultivation, solar energy or wind turbines seems a promising line of thought (Adelaja, Shaw, Beyea, & Charles McKeown, 2010; Ferber & Schlappa, 2016; Lord, Atkinson, Lane, Scurlock, & Street; Milbrandt, Heimiller, Perry, & Field, 2014).

The intensification of renewable energy production is an important directive for the European union, and should be on the agenda of any regional government, whether shrinking or not (*Energy 2020A strategy for competitive, sustainable and secure energy*, 2010).

A few authors have paid special attention to the role of spatial development and design regarding the energy transition (Sijmons, Hugtenburg, Feddes, & Hoor, 2014; Stremke, 2010; Wolsink, 2007). The potential of renewable energy sources is bound to geographic and spatial characteristics (Sijmons, 2014, p. 46). The planning of renewable energy transitions requires considerable forethought with regards to the spatial allocation of renewable energy infrastructures.

Design plays an important role in the implementation process of renewable energy. According to Wolsink (2007), the biggest hurdle for implementing the energy transition is social acceptance and not technical capacity. Landscape change is the dominant factor in the dynamic of acceptance. Wolsink writes: *'The type of landscape fully overshadows other attitudinal attributes, as well as other visual and scenic factors such as the design of wind turbines and wind farms, and the number and the size of turbines'*. Hence, it is crucial to integrate the local values and needs into design proposals that concern energy transitions (Wolsink, 2007).

There are various examples of when the results of shrinkage have been exploited to produce renewable energy. In Morbach, Germany, a former military barracks was reused as a renewable energy park which featured wind turbines, solar panels and a bio-gas installation (energielandschaft). In Asturias, several researches have pointed to the potential to reuse abandoned mining facilities for the storage of thermal energy (Lara, Colinas, Mallada, Hernández-Battez, & Viesca, 2017; Menéndez & Loredo, 2017).



DESIGN PRINCIPLES

Renewable energy

Use vacant land for renewable energy like solar cells or wind turbines. Carefully designed interventions can mitigate landscape pollution. For instance by integrating traditional landscape elements such as hedgerows to obscure the systems.

- + reliable investment
- + reduces the need for fossil fuels based energy (improve air quality)
- + modest employment
- can be met with resistance from local community because of landscape pollution

Scale of action: site specific
Stakeholders: Regional gov, municipalities, land owners, energy companies/agencies, investors, local communities

Reuse of mining infrastructure for energy storage

Reconvert a closed pit mine into a pumped-storage station. Requires extensive research into the feasibility of this technology and into the extent to which the mines are suitable to this technology

- + reduces the need for fossil fuels based energy (improve air quality)
- + modest employment
- + high cost
- uncertainty about feasibility

Scale of action: regional
Stakeholders: Regional gov, municipalities, owners, energy companies/agencies, investors, research agencies



Vacant housing in the centre of Oviedo, Asturias. Source: author

5 – Regional design

The regional design is a proposal for the Principality of Asturias. It outlines a perspective for future development and paves the way for Asturias; 'from a region preoccupied with shrinkage, to a region that exploits shrinkage to reach a sustainable future beyond shrinkage'.

The goal of this regional design is to outline regional challenges and opportunities and envision pathways that enable the regional authorities to respond to these challenges and opportunities. The design outlines a spatial agenda for inter-regional collaboration and proposes concrete policies and projects. The regional design is intended to guide spatial development for the next 20 years. It is not intended as a blue print, but rather as a first step towards a regional territorial plan that guides Asturias towards a more sustainable future beyond shrinkage.

The regional design is divided in the following sub-sections;

- The vision
- The regional spatial agenda
- The local illustrations
- The implementation strategy

5.1 – Vision: Asturias, a pathway towards a sustainable future beyond shrinkage

Asturias is one of the greenest regions of Spain, it offers its citizens the opportunity to live in relatively compact cities in the middle of a beautiful natural landscape. In their effort to ensure growth, regional planners have trivialised quality of the cultural and natural landscapes as a lower order concern. As a result, several cities have been struck by an image of deprivation, and neglect in the environmental domain has put the Asturian population at risk to environmental threats. This regional design portrays a vision wherein these wrongs are righted.

The regional design addresses four priorities.

1. To accept decline and aim for more compact and smaller cities and settlements throughout the region.
2. To aim for the improvement of the image and liveability of Asturias' cities and villages for the residing population
3. To protect and enhance the natural systems and cultural heritage
4. To aim for partnerships with private and civic groups

The regional design recognizes the diversity in landscape types that characterise the different area in Asturias. The different landscapes have created different conditions that bare relevance for future developments. Based on the analysis in chapter 3, the region can be sub-divided into four areas; the centre, the mining valleys, the rural hinterland and the coast.

In the central area, the urbanization has put pressures on the natural and agricultural landscapes. The area is characterised by a conflict between sprawled urban and industrial landscape mixed with the remaining natural and agricultural landscape. The regional design recognises the natural, recreational and cultural value that these spaces provide. It proposes the consolidation and in some places the reversal of urbanization.

In the mining valleys, the legacy of the industrial heydays still scars the landscape. The abandoned industrial lands and the environmental threats that accompany it, create a thoroughly unattractive environment. Here the regional design places its emphasis on the restoration of the river corridors of the Nalón basin. Through the restoration of the corridors as a natural recreation zone the regional design seeks to reassert the cities in the mining valleys as the compact green cities which they once were. Additionally, the former role of the mining valleys as resource providers for the rest of the region is mirrored through exploiting the potential for new renewable resources.

The rural hinterland has been hit hardest by shrinkage. The sparsely populated valleys provide one of the greatest challenges for the spatial development of the region. Here it is essential to strengthen the existing urban cores and infrastructures to optimize the service provision to the rural population. The diversification of the rural economy

should be clustered around these cores. In the least accessible area of the region natural reserves should be extended. Finally, renewable energy sources should be deployed to reduce the cost of service provision and provide an additional source of revenue for rural communities and councils.

The coastal areas have suffered similar pressures of sprawl and speculation. Here the expansion of the protective coastal zones (POLA) should be a priority to protect the natural systems from further depletion. The greyfields on the peripheries of the coastal towns should be recycled to serve new purposes such as renewable energy, recreation and agriculture.

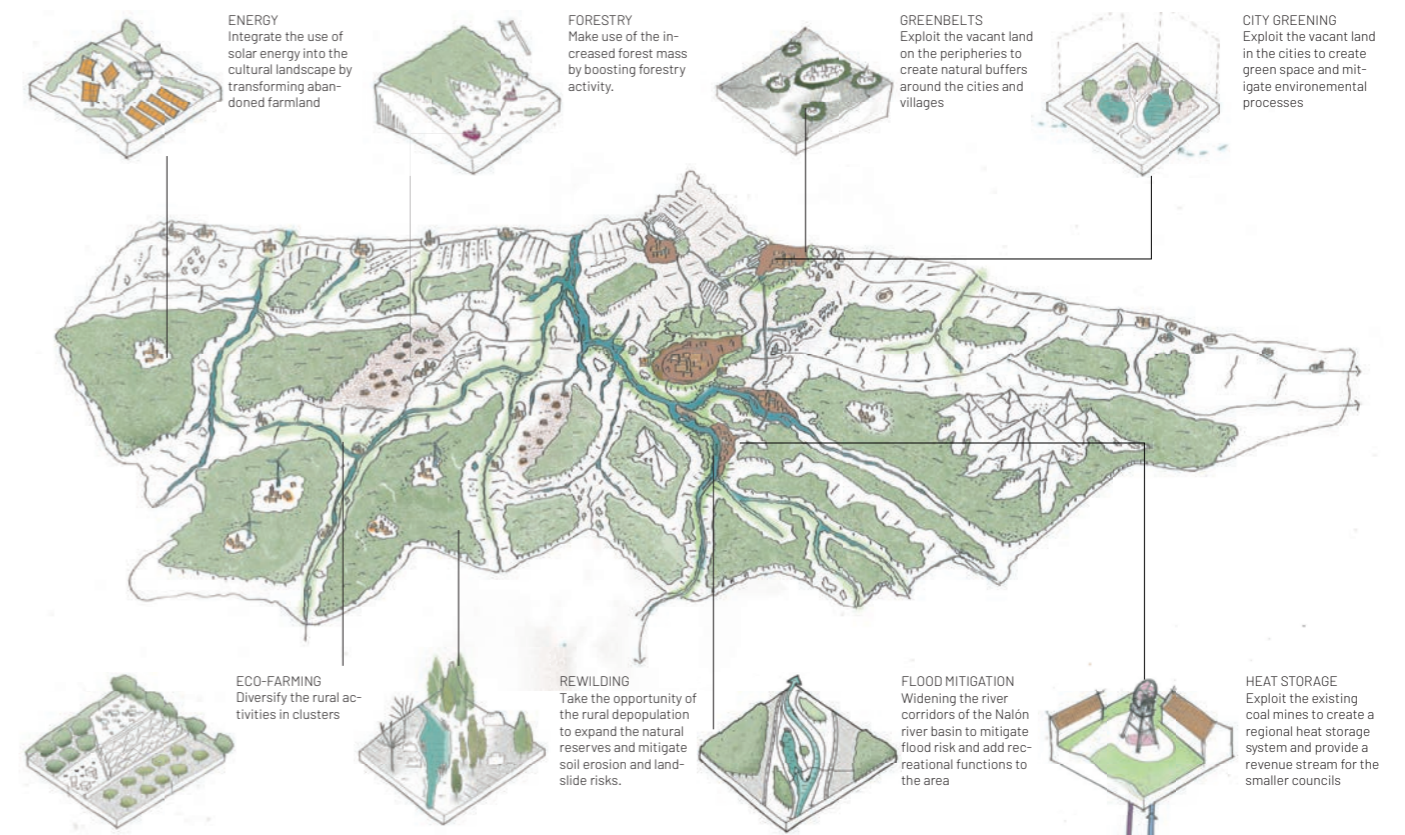


FIG. 5.1 Vision map for Asturias. Source: author

5.2 – Regional spatial agenda

The regional design provides an agenda for spatial that recognizes the unique aspects of the different parts of the region. The agenda can be divided in the following themes; Opportunities for the advancement of the regional energy transition; Enhancement and protection of the natural landscape; improvement of liveability and the urban environment; the allocation of economic activity; development of public transport and infrastructure. Each theme leads to a set of regional actions that together shape the regional spatial agenda.

Agenda point 1: Opportunities for the advancement of the regional energy transition

The regional design pursues high ambitions for sustainable energy production. The legacy of shrinkage has created opportunities to tap into new resources. The abandoned mining infrastructure plays a crucial role in this respect. Renewable energy production is more than an environmental objective, it can be a helpful tool to address revenue deficits for (rural) councils and communities.

A. The former coal mines as new energy infrastructure

The storage of energy is one of the greatest challenges for the renewable energy transition (Stremke, 2010). One of the biggest untapped resources in the Asturian region is the network of underground mining shafts that are dug under the mining valleys of the Caudal and the Nalón. Conventional solutions to this issue, such as hydro-electric dams, have had tremendous negative impacts on the natural environment. Thanks to the mining industry, Asturias can side step the negative consequences of hydro-electric dams and use the dozens of mining shafts as underground-PHS, thermal storage plants, or even small-scale hydro-electric dams in former mining pits. These technologies are still in development, and implementation on a large scale is still some years away. However, the region has several research institutes and companies at its disposal that have experience in this very field.

The role of the region: the region as a lead actor in implementation and regulations, lobbyist for higher level funds

Key stakeholders: FAEN; Reg. Dep. of Employment, Industry and Tourism; Mining companies (HUNOSA), Energy companies (TSK); University of Oviedo (Indurot); Horizon 2020 Energy Efficiency; Councils; Mancomunidades

B. Enhancement of biomass cultivation

In Spain- and in Asturias in particular- the growth of forests has been unprecedented. It poses a potential resource for renewable energy in the form of biomass. In recent years, Asturias has invested heavily in the cultivation of energy crops, mostly in Eucalyptus-trees. Considering negative environmental influence of this invasive species, the regional design proposes to advance to the next generation of biomass cultivation, using indigenous

trees that support the natural environment, such as pine and chestnut. The region should support research in this fields and allocate forests land for cultivation.

The role of the region: implementation and regulations, lobbyist for higher level funds

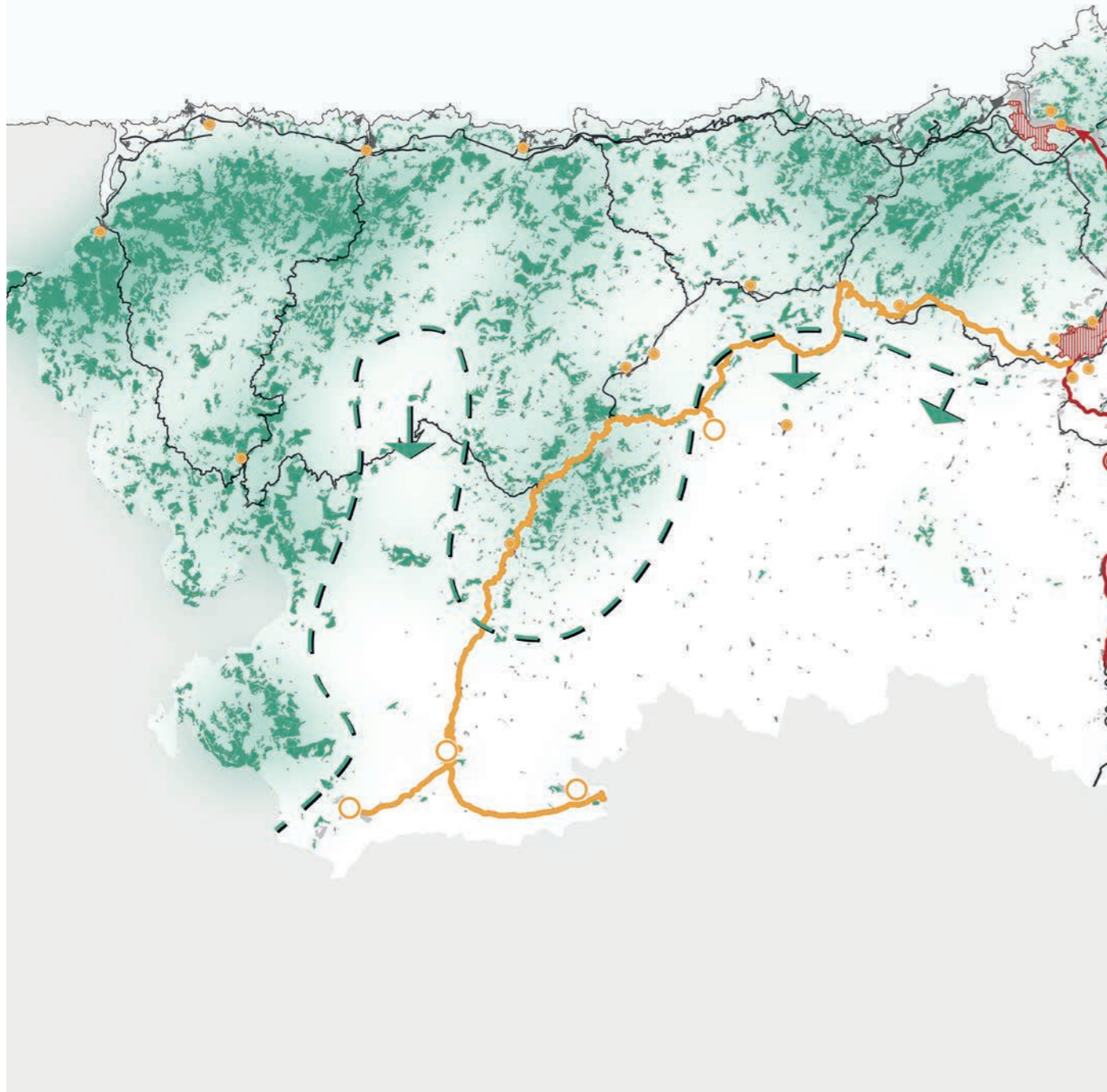
Key stakeholders: FAEN; Reg. Dep. of Employment, Industry and Tourism; Reg. Dep. Of natural resources and rural development; Energy companies (TSK, ENCE); Horizon 2020 Energy Efficiency, farmers; forestry-sector; Councils; Mancomunidades

C. Activating vacant land through solar power

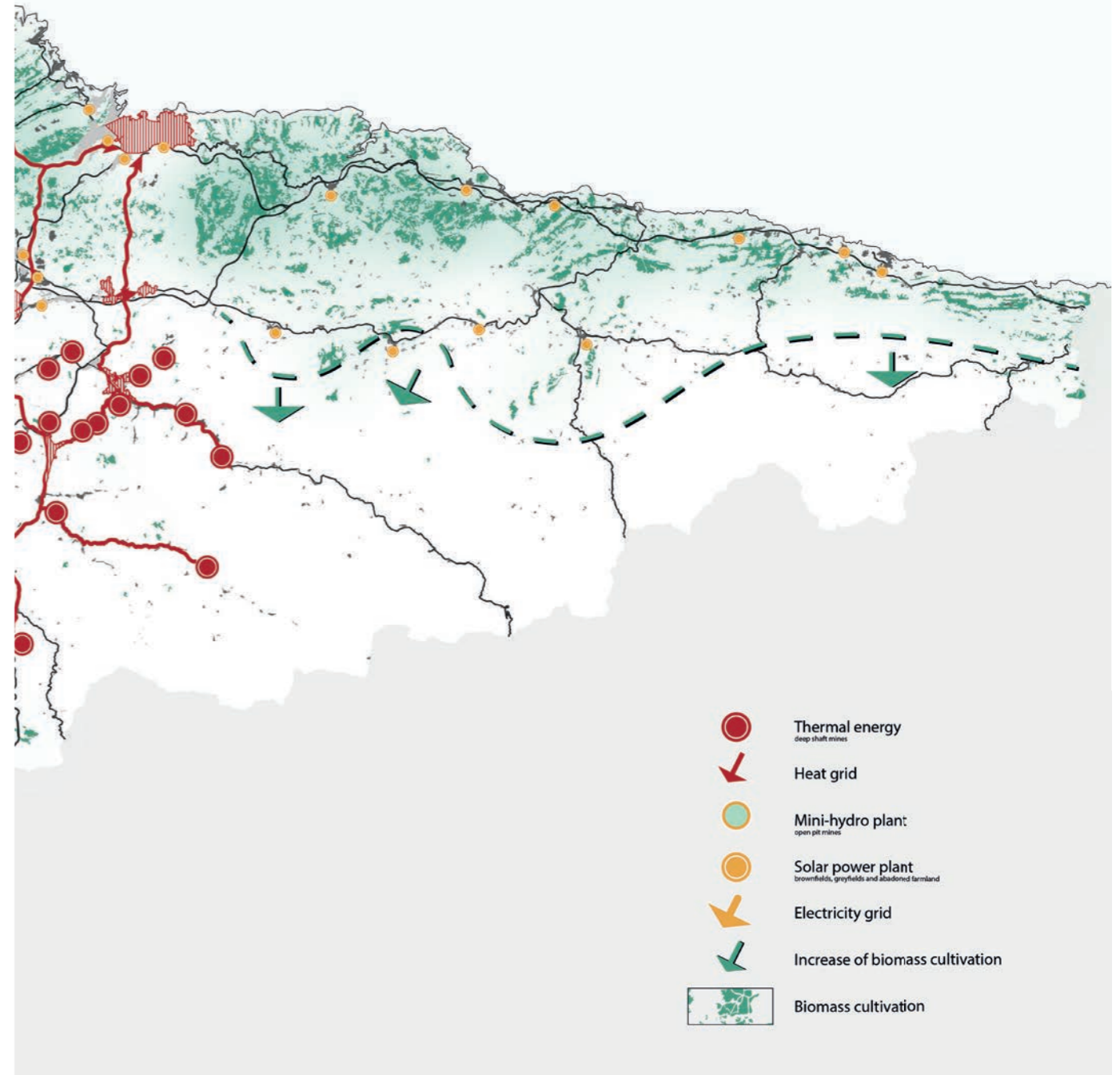
Solar power is one of the most versatile renewable energy sources. It provides and attractive investment opportunity for public, private and civic groups. In the region of Asturias there are numerous vacant plots that could be easily activated using solar power. Especially greyfields in the central area are an excellent location for solar energy, since the required technical infrastructure is already provided. In rural areas the use of solar power would be a good way to support rural activity by providing an extra revenue stream. The region in collaboration with the local councils should support the installation of solar panels on vacant land through subsidies and grants. In some cases when large plots of land are concerned it would be necessary for the region to take the lead in the implementation and exploitation, when smaller land is concerned it is better left to private parties and community cooperatives. Especially in the rural settings, the solar fields should not distort the image of the cultural landscape. This can be done by surrounding the solar fields with hedgerows and trees to embed them in the landscape. In certain cases, it might even be possible to combine solar panels with pasture land for livestock.

The role of the region: facilitator and regulator, lobbyist for higher level funds

Key stakeholders: FAEN; IDEPA; Reg. Dep. of Employment, Industry and Tourism; Councils; Mancomunidades; Horizon 2020 Energy Efficiency; Energy companies (TSK, ENCE); farmers; real-estate sector



Agenda point 1: Opportunities for the advancement of the regional energy transition



Agenda point 2: Enhancement and protection of the natural landscape

The natural landscapes of Asturias are essential to the regional identity. Moreover, these natural landscapes provide vital ecosystem services which add to the quality of life and the productivity of the region, making the natural landscape a valuable resource and a corner stone to any sustainable development. The protection and enhancement of the natural landscape will not only add to the quality of life of the inhabitants, it will also enable the mitigation of various environmental risks and create a modest amount of employment for the rural economy.

A. Ensuring concentrated development and sprawl containment

Restricting the ability of towns and cities to further expand, while their demographic growth rates are negative, is one of the easiest way to prevent the waste of precious resources and land for unnecessary or unreachable objectives. One of the first actions of the regional government should be to restrict all further urban development to within the limits of existing urban footprint. This means a radical reduction of the land that is classified as developable (suelo urbanizable).

The role of the region: implementation and regulations

Key stakeholders: Councils, Mancomunidades, Reg. Dep. of Employment, Industry and Tourism; Reg. Dep. of Infrastructures, Territorial Planning and the Environment; Real-estate sector; Industrial companies

B. Safeguarding of the natural, cultural and agricultural landscapes

The natural and agricultural space in the central councils of Asturias is one of the regions core qualities, in terms of recreation but also for agricultural activity.

The central space

In recent decades the central space has become increasingly fragmented and degraded by residential and industrial development. Therefore, the space between the main cities has been designated as special landscape zone (like the 'Cuencas mineras' landscape zone).

River corridors

The river corridors in the Nalón corridor have seen substantial urbanization in the past. This has led to overly pressurized river system that is prone to flooding. Here, the regional design proposes a second special landscape zone that would be aimed at the protection of the remaining floodplains in the basins. Both these special zones should be developed to support natural land uses, traditional agriculture and recreation.

The role of the region: implementation and regulations

Key stakeholders: Councils; Reg. Dep. of Rural Development and Natural Resource; Livestock & agriculture-sector, forestry-sector

C. Transformation of brownfields

The clean-up of industrial land is an imperative for mining regions all over Europe. However, clean-up alone provides too little incentive. Therefore, the regional design proposes a strategic approach for brownfields restoration, where in the restoration of the brownfields serves multiple functions such as recreation, agriculture and flood mitigation.

The development and protection of the Nalón river corridor

In the mining valleys of the Caudal and the Nalón, many brownfields and former mines are in precarious flood prone areas. The regional design proposes to transform these brownfields in to floodplains, which would ease the pressure of the rivers. What is more, the regional design proposes to combine this transformation with the creation of recreative space on these floodplains, which would improve the deprived urban environment in these valleys.

The development and protection of the five peripheral parks in the central area

In the central areas, several of the natural areas are intermitted by excavations. Many of these areas are designated as potential peripheral parks. The regional design proposes to couple the restoration of these excavation areas with the valorisation of these peripheral parks as metropolitan recreation facilities.

Role of the region: implementation and regulations, lobbyist for higher level funds

Key stakeholders: Reg. Dep. of Rural Development and Natural Resource; Reg. Department of Infrastructures, Territorial Planning and the Environment; Councils; Confederación Hidrográfica Cantábrico; Mining and excavation companies (HUNOSA and others); EU-regional development funds (ERDF, EAFRD); EU Life+

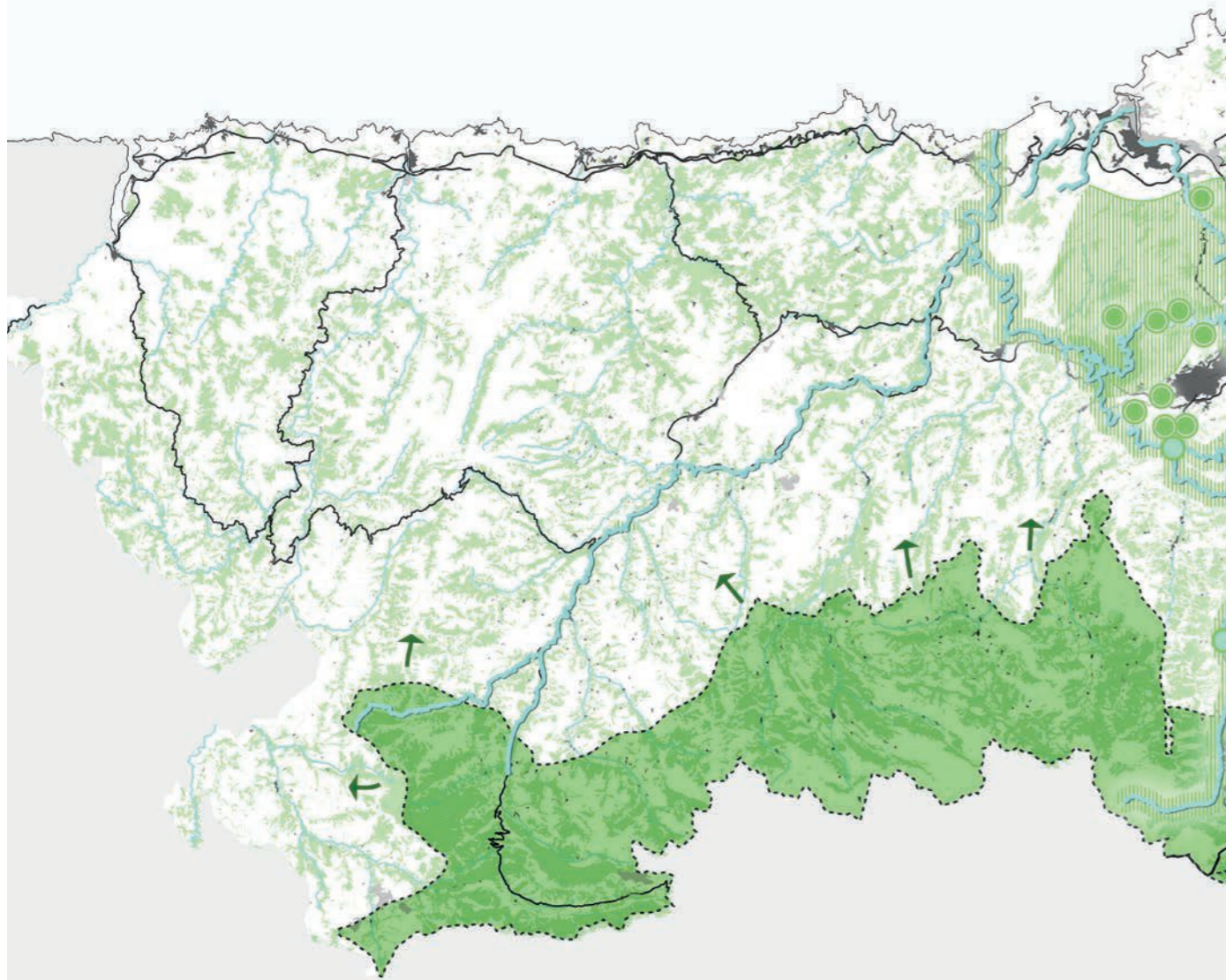
D. Development of natural reserves

The maintenance of service provision in the rural areas is a priority of the regional design. However, the provision of services to the entire territory is inefficient and will not lead to a more sustainable system. Therefore, it is essential to identify those parts of the region where service provision is the most difficult. Subsequently, resources should be lead away from those areas.

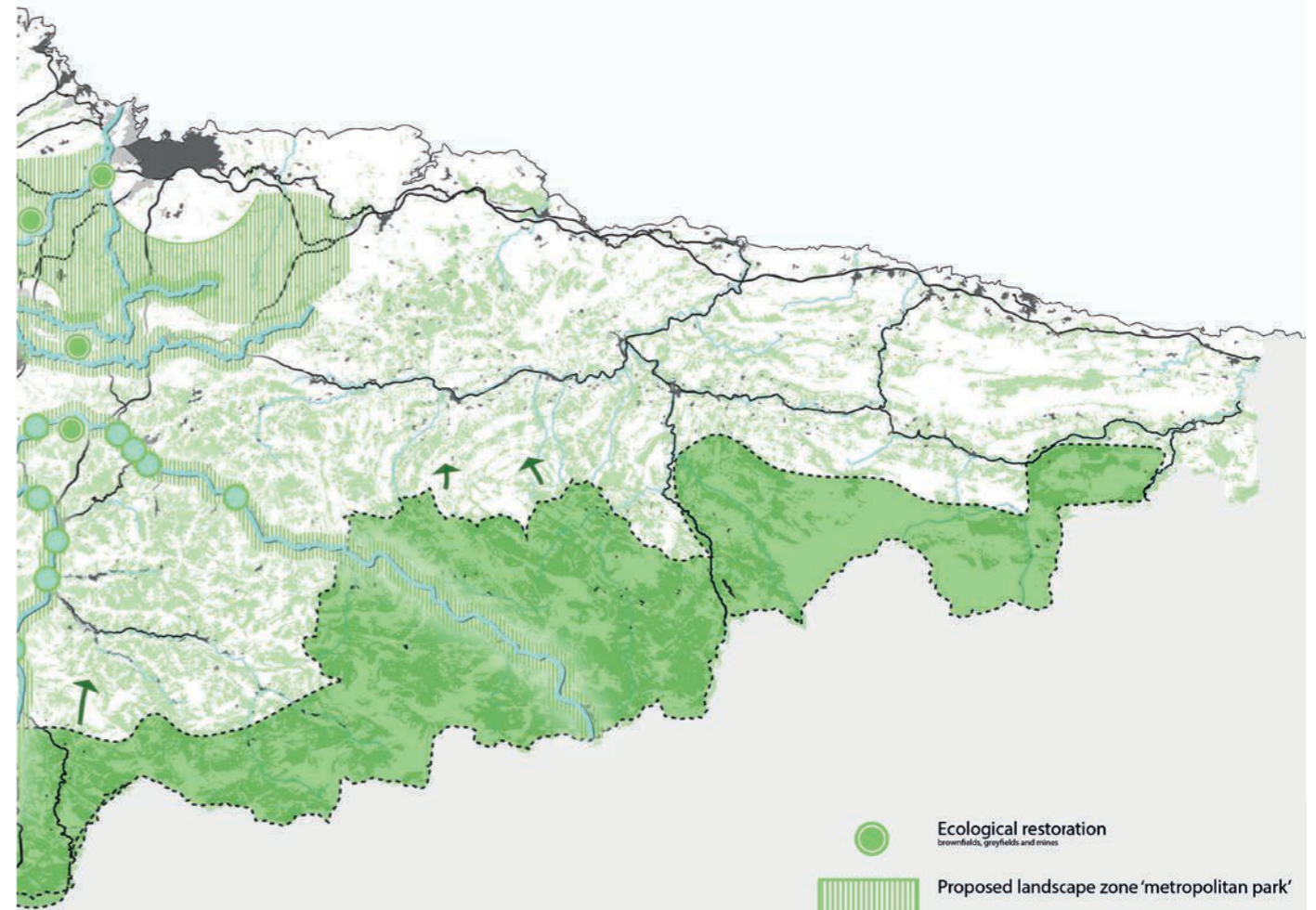
The regional design proposes to integrate these parts of the region into the existing natural reserves in the south. Connecting to these national and European zones can help to unlock higher level resources that would be needed for the sustainable management of these areas.

Role of the region: implementation and regulations, lobbying for higher level funds

Key stakeholders: councils, Reg. Dep. of Rural Development and Natural Resource; EU Natura 2000; Communities; farmers; EU Life +



Agenda point 2: the natural landscape



-  Ecological restoration
brownfields, greyfields and mines
-  Proposed landscape zone 'metropolitan park'
-  Existing landscape zones
Cuencas mineras, Coast
-  Expansion of protected parks
-  Existing protected parks
Natura 2000, regional protected parks, national park
-  Proposed special zone 'corridor Nalón'
-  River corridor project
brownfields on the river banks

Agenda point 3: Improvement of liveability and the urban environment

The regional design anticipates on the declining population and recognizes the need to transform cities and villages to preserve the liveability of the region. Improving the liveability of the existing villages and towns is vital to the retention of the current population. This does not only include the eradication of deprived buildings and lands, it also includes the effective supply of services and infrastructure.

A. Consolidation of the (rural) population

In the rural areas of Asturias, the population is already concentrating in the few villages and towns that are most accessible. Thus, the demographic development in the rural areas is already moving towards a more sustainable model. Currently this process is unguided by policy, leading to an uneven pattern, where by the elderly population is left behind in smaller more remote towns and hamlets.

To address this the region would need to put in place subsidies and policies that support village regrouping in the most central rural cores. What is more, it should ensure that these cores provide adequate services, infrastructure and suitable housing for the elderly population.

A similar action should be carried out in the central cities, to support the relocation of the population to the cores and prevent the isolation of groups in the peripheries.

Role of the region: implementation and regulations, lobbyist for higher level funds

Key stakeholders: councils; mancomunidades; Rural development program; Reg. Dep. of Infrastructures, Territorial Planning and the Environment; Reg. Department of the Presidency and Citizen Participation; Reg. Dep. of Rural Development and Natural Resource; communities

B. Quantitative and qualitative transformation of the housing stock

The regional design highlights the need to monitor the housing stock on a regional scale. Several accounts have indicated persistent vacancy in the cities and in the countryside, but clear data that enables the region to locate these vacancies is missing. This data would be needed to judge whether a demolition program, such as Stadtumbau-Öst, would be needed to stabilise the housing market.

The regional design argues for more than just a quantitative monitor. The aging of the population will be accompanied by a shift in the qualitative demand for housing. It is likely that much of the current housing stock is unsuited to accommodate the elderly population. A better picture of the state of the housing stock will help to see if there are potential synergies between the vacancies in the central cities and the need for elderly housing.

Based on an accurate housing monitor it will be possible to judge whether a demolition strategy could be helpful to stabilize the housing stock.

Role of the region: implementation and regulations, lobbyist for higher level funds

Key stakeholders: councils; mancomunidades; EU-Urbact; Reg. Dep. of Infrastructures, Territorial Planning and the Environment; Real-estate sector

C. City greening

The regional design addresses the need for a change in the urban environment, especially in the most blighted cities in the mining valleys. The vacant spaces that perforate the cities are valuable opportunities to improve the public space and with it the general appearance of the cities. What is more, city greening can provide helpful ecosystem services such as floodwater mitigation and heat stress reduction.

Regeneration of these vacant spaces is not a task for the regional government. Rather it should be executed by the councils, if possible in collaboration with the population. Herein, lies and opportunity to create more space for the communities to make use of these vacant spaces, for instance through urban agriculture or local festivals.

Where possible, the greening of these lands should be connected to ecosystem services. This will not only bring added benefits to the urban environment, it will also make various European funds for urban regeneration more accessible.

Role of the region: facilitator and regulator, lobbyist for higher level funds

Key stakeholders: councils; EU-Urbact; Reg. Dep. of Infrastructures, Territorial Planning and the Environment; Real-estate sector; community

D. Greenbelt development

In the central and coastal cities, the vacant lands prevail mostly on the periphery in the shape of industrial and residential greyfields. These undeveloped lands on the periphery offer a unique opportunity to develop greenbelts around the cities. This would add to the recreational space which is lacking in many cities.

Role of the region: facilitator and regulator, lobbyist for higher level funds

Key stakeholders: councils; EU-Urbact; Reg. Dep. of Infrastructures, Territorial Planning and the Environment; Real-estate sector; local community

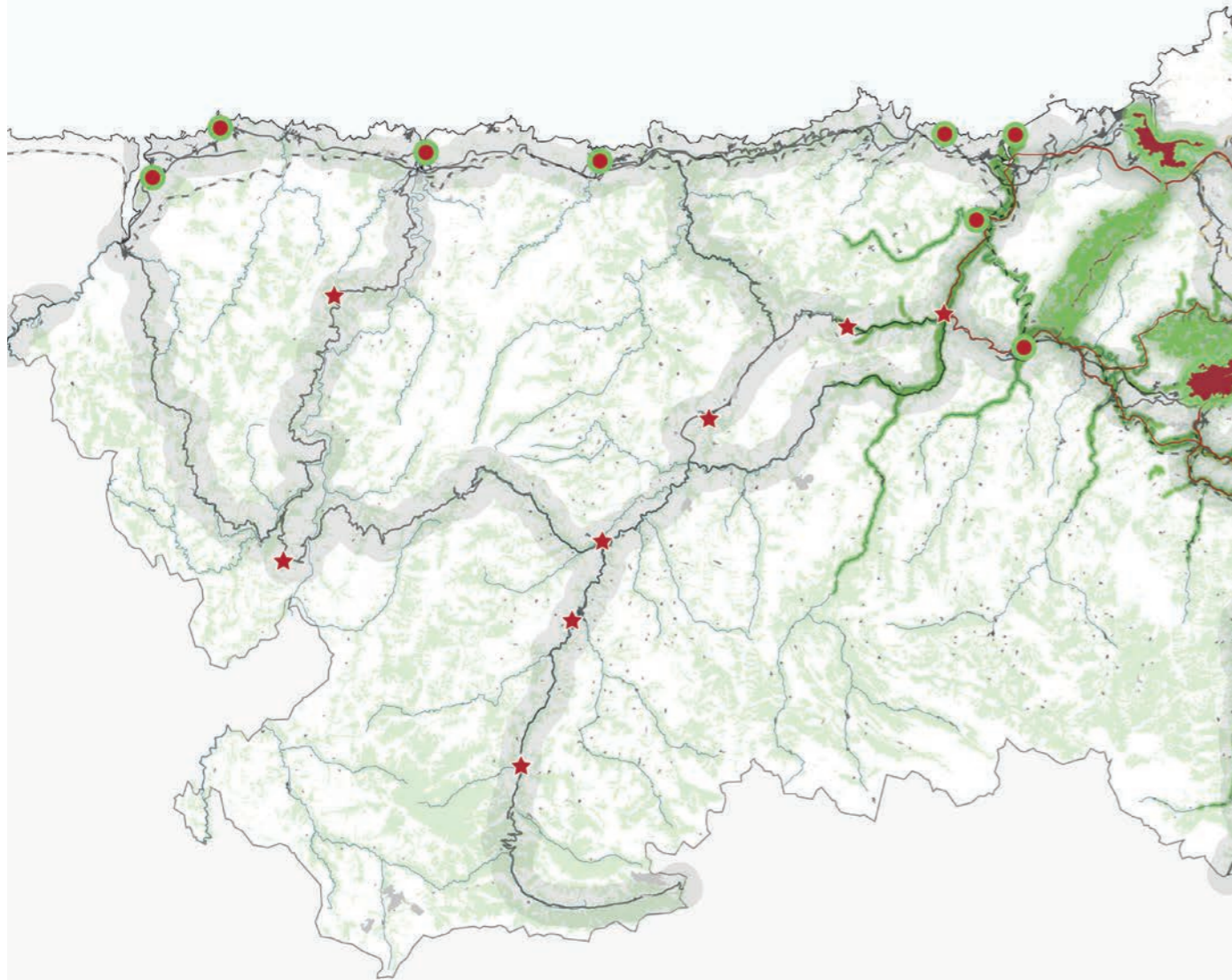
E. Adaptive reuse (of heritage)

The preservation of historical architecture from the industrial and preceding periods is already well established in the regional planning system. However, the reuse of heritage buildings is less developed.

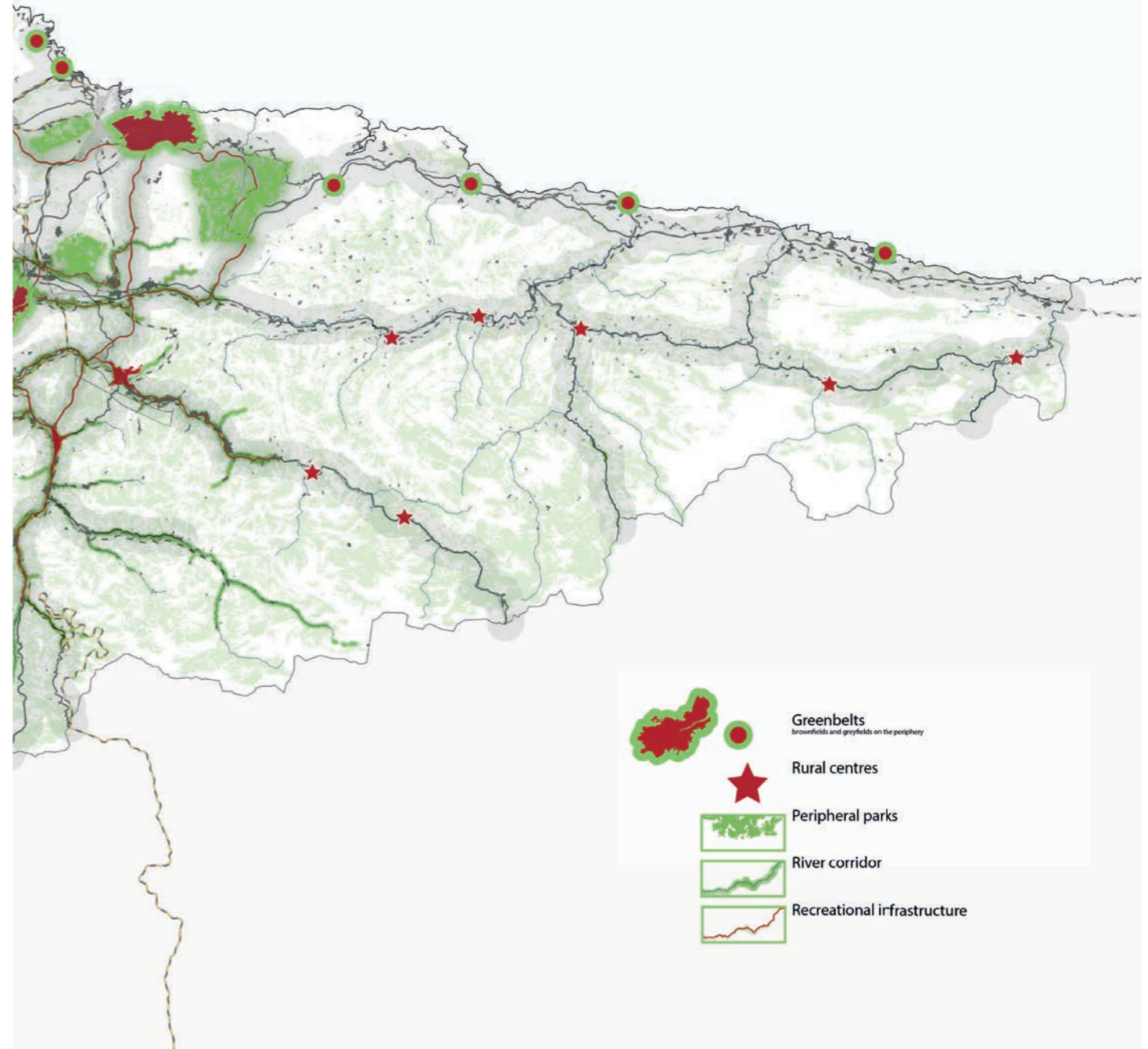
Herein, lies a role for the communities and entrepreneurs. In other shrinking regions, heritage and non-heritage buildings have been successfully reused through the involvement of the community. The regional government and the local councils should support community-led regeneration as much as possible through legislation and funding. Various European institutions such as URBACT III could be valuable partners in this process.

Role of the region: facilitator and regulator, lobbyist for higher level funds

Key stakeholders: councils; EU-Urbact; Reg. Dep. of Infrastructures, Territorial Planning and the Environment; Real-estate sector; community



Agenda point 3: liveability and the urban environment



Agenda point 4: the allocation of economic activity

The regional design advocates a no-growth approach, wherein and the natural environment is prioritised over the attraction of new businesses or inhabitants. At the same time, regional design recognises the need to invest in innovation and diversification of the economy which are essentially part of the growth attitude. It advises an investment policy that aims at the optimization of existing clusters and systems.

A. Clustering of industrial land

The land that is currently attributed to industrial use is far larger than that which is required from the perspective of the market. With regards to the need for sustainable land use, the regional design proposes to concentrate the industrial land around the three main clusters of Oviedo, Avilés and Gijón.

This clustering need not restrict the growth of the industrial sector. In both Avilés and Gijón large areas of industrial land are currently in use by the fossil-fuel based companies. Bearing in mind the further decline that is expected in the mining sector and the transition towards renewable energy sources, plenty of land will become available in due time for any future industrial development.

The industrial lands outside these clusters should be phased-out or relocated towards these three clusters, especially in precarious zones around the rivers. These lands can later be used for new functions such as agriculture or renewable energy.

The role of the region: the region as a lead actor in implementation and regulations

Key stakeholders: Councils, IDEPA, Reg. Dep. of Employment, Industry and Tourism; Industrial companies (ArcelorMittal and others); CCOO

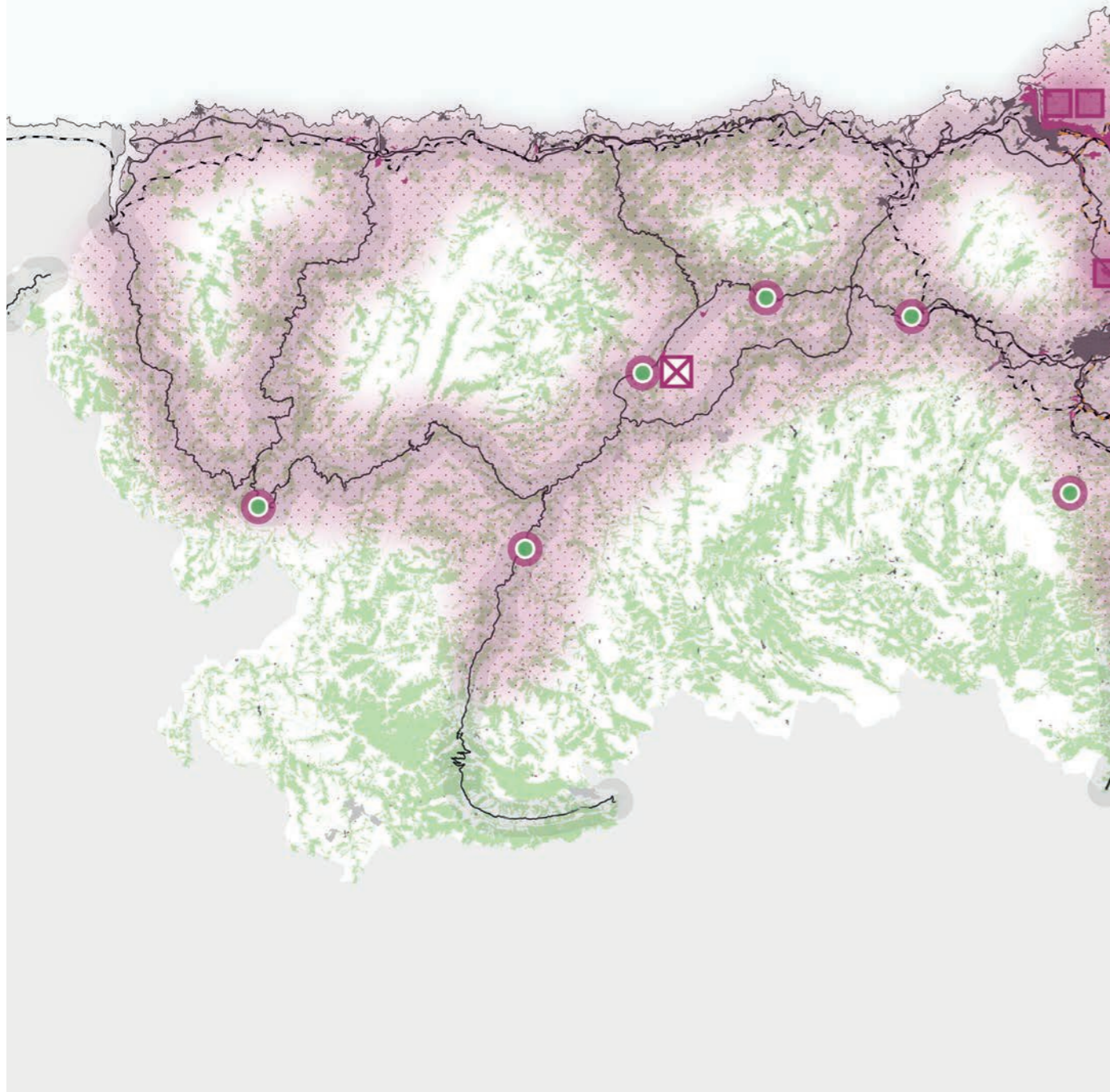
B. Diversification of the rural economy

Eco-framing, forestry and other rural-entrepreneurial practices are already supported by the regional government and various European funds. However, this support can be improved by directing the support towards specifically designated zones. Within these zones rural activity should be supported as much as possible by the regional and local authorities, outside these zones activities should be discouraged. By clustering the rural activity, it will be easier to support rural activities with services. It will also incentivise the rural population to regroup in the designated rural cores.

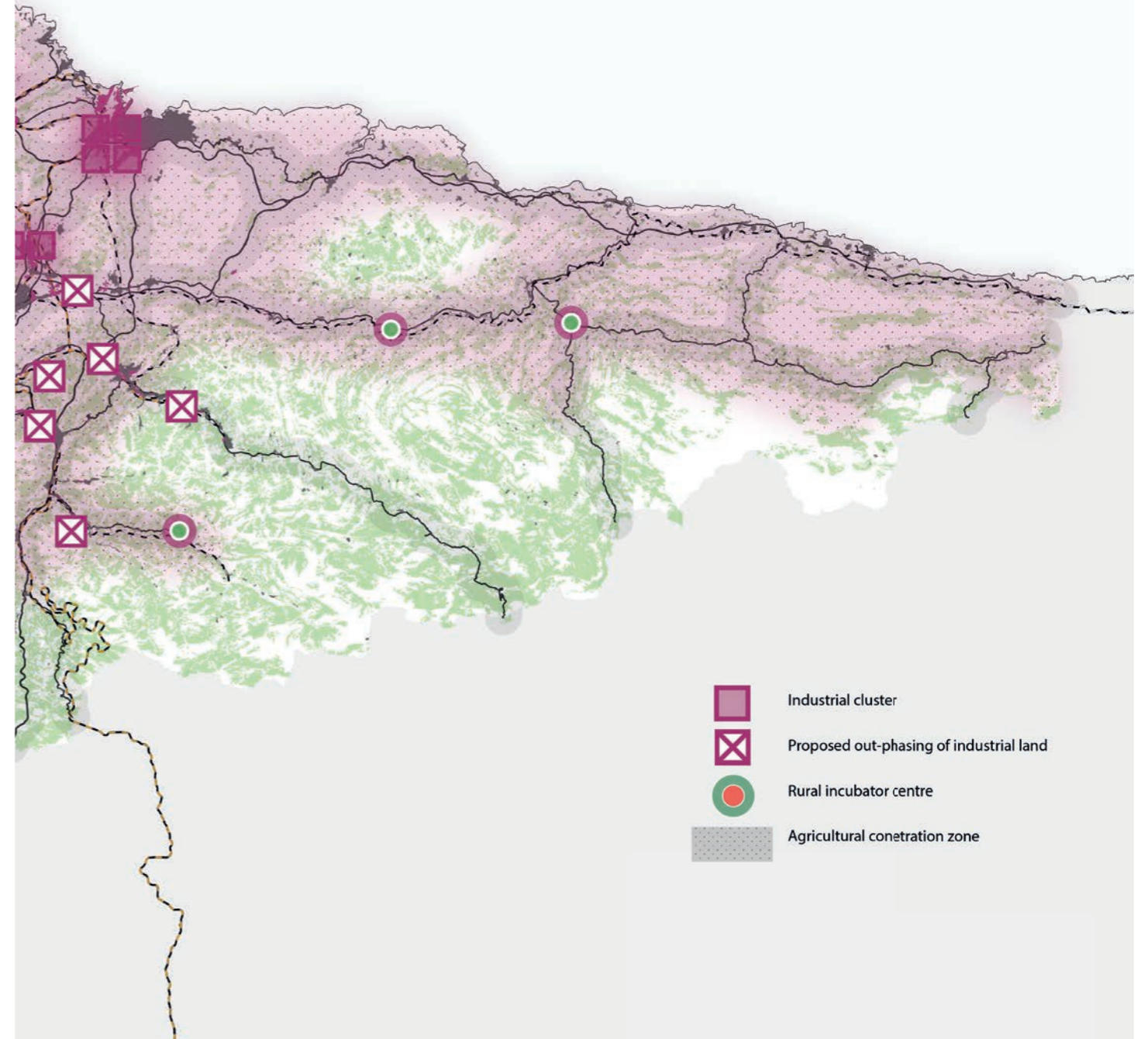
Here it is important to aim for potential synergies. For instance, the rise in forest is an opportunity to expand the modest forestry sector in the region. By reorganizing the protected land in the region, more lands could be made available for this sector. What is more, by strategically allocating land to the forestry sector and through the support of sustainable forest management it might be possible to reduce the exposure of rural communities to the risks of wild fires.

The role of the region: the region as a lead actor in implementation and regulations

Key stakeholders: farmers; forestry-sector; rural entrepreneurs, councils; mancomunidades; Eu-lif+, EU-EAFRD; COPEA; Reg. Dep. of Infrastructures, Territorial Planning and the Environment; Reg. Dep. of Rural Development and Natural Resource; Reg. dep. of Employment, Industry and Tourism; Councils; Reg. Department of the Presidency and Citizen Participation; FADE



Agenda point 4: the allocation of economic activity



Agenda point 5: development of public transport and infrastructure

Accessibility is a vital corner stone to the preservation of liveability and economic vitality. The regional design recognizes an effective transport system as a prerogative for a sustainable development. In the context of Asturias special attention should be given to the optimization of the public transport system, which an important service for the elderly population in the region.

The regional design links into the existing infrastructural plans that have been proposed by the regional and national governments. What is more the regional highlights the most important public transport connections that should be optimized. Due to its long period of decline, Asturias currently has infrastructure whose capacity is bigger than required. According to the planned trajectory of demographic growth, this over-capacity is only going to increase.

A. Optimize the existing road network

The first step should be to make a thorough assessment of its existing road network and determine which areas are least effective. Subsequently, the region should lead resources away from those areas, and invest them in a smaller but more effective road network. The infrastructure that is left behind should eventually be demolished and the formerly occupied land should be transformed to suite other purposes, such as re-naturalisation, parks or renewable energy.

The regional planning department has already made plans to maintain and renovate several roads in the rural hinterland.

The role of the region: coordination and implementation

Key stakeholders: Reg. Dep. of Infrastructures, Territorial Planning and the Environment, Reg. Dep. of Rural Development and Natural Resource; Councils; CTA; public transport companies (ALSA, RENFE, FEFE)

B. Strengthening of public transport network

Public transport is crucial to retain the liveability in the region. The existing network is of a too low frequency to compete with the car infrastructure. Investments should be made to improve the public transport systems, primarily the train and bus lines, both in between the mayor cities as well as to the rural areas.

The role of the region: coordination and implementation

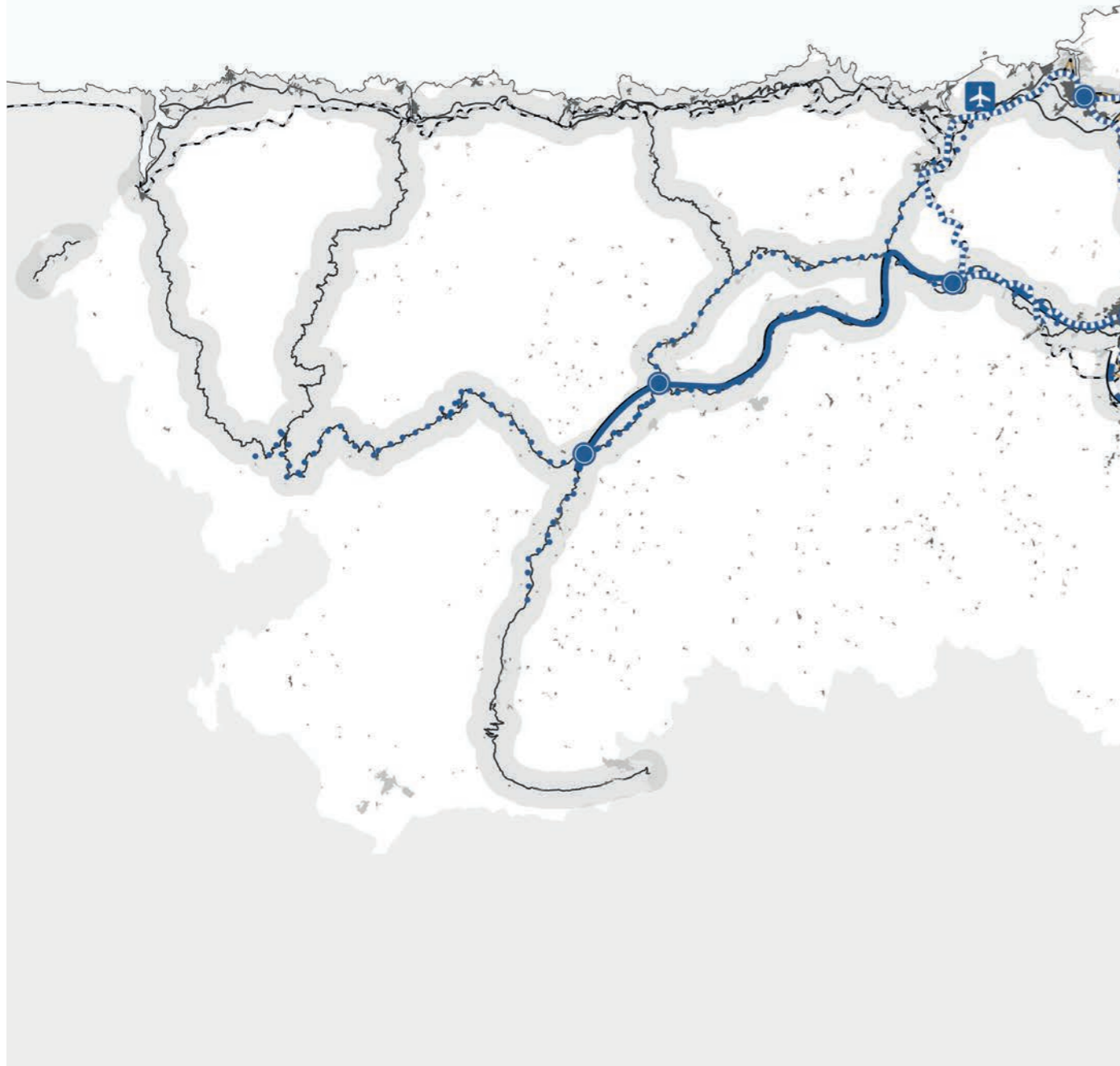
Key stakeholders: Reg. Dep. of Infrastructures, Territorial Planning and the Environment, Reg. Dep. of Rural Development and Natural Resource; Councils; CTA; public transport companies (ALSA, RENFE, FEFE)

C. Enhance international connections

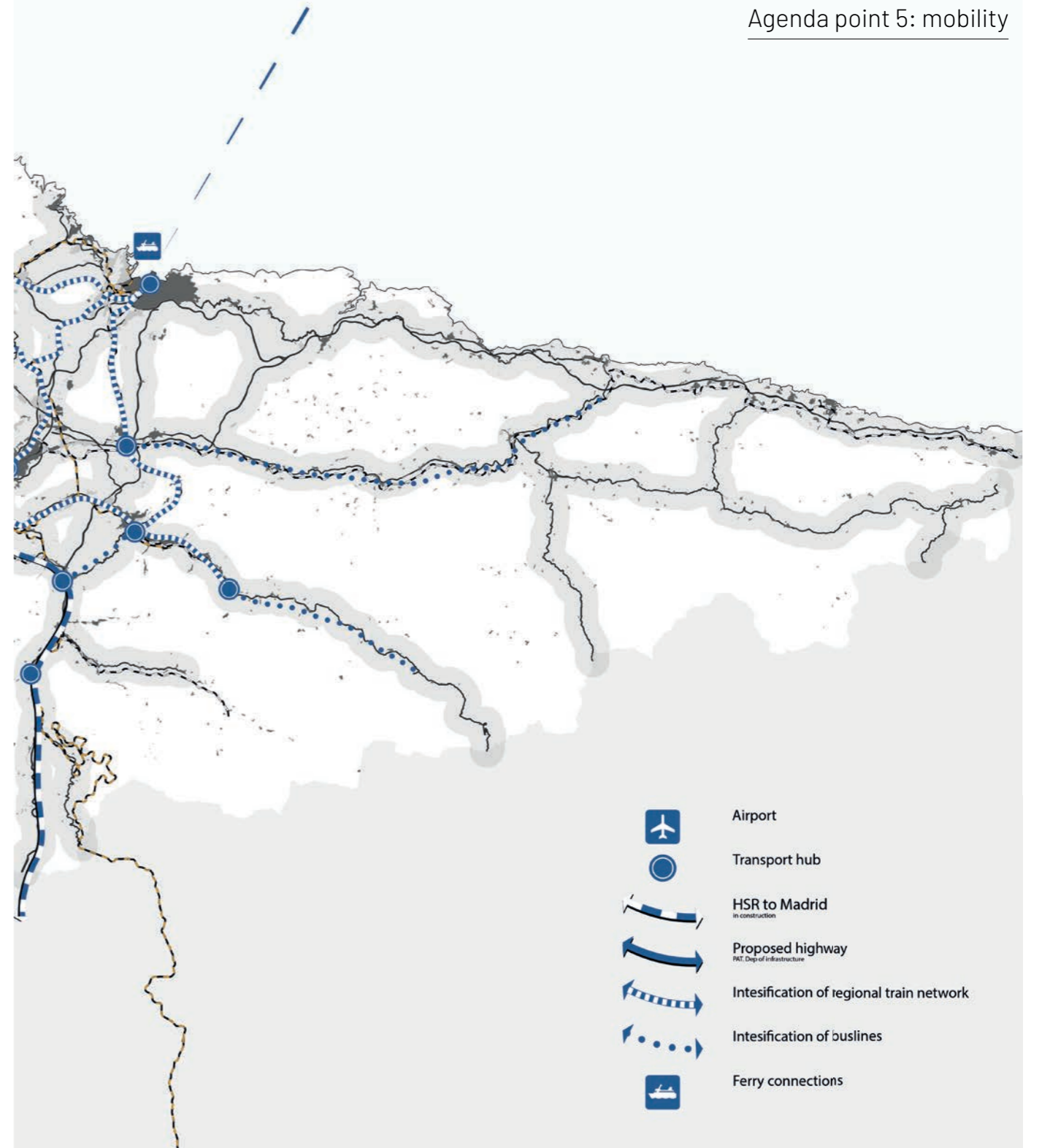
The region's international connections have been decreasing for some time. However, the national government has been working on the construction of a high-speed rail line. The development of this line has been halted due to a shortage of money. The region stands to gain a lot of benefits from this HSR to Madrid and should attempt to urge the national government to complete the project.

The role of the region: lobby for higher level funds

Key stakeholders: Reg. Dep. of Infrastructures, Territorial Planning and the Environment, Spanish ministry of public works



Agenda point 5: mobility



5.3 – Illustrations of the regional design

The biggest challenge for the implementation of the design is convincing decision makers and other stakeholders of the potential benefits that might be achieved. This section demonstrates the regional spatial agenda can help to identify the stakeholders and potential new partnerships. What is more, by analysing the criteria of these stakeholders it is possible to identify the necessary changes to the regional planning system.

The following section concerns a series of illustrations of how the regional design might alter the physical space of the region on a lower scale level, and which stakeholders would need to be engaged to bring this about. Three locations are selected: The city of Langreo in the mining valley, the city of Oviedo in the central metropolitan area and the city of Tineo in the Western rural area (see figure 5.2).

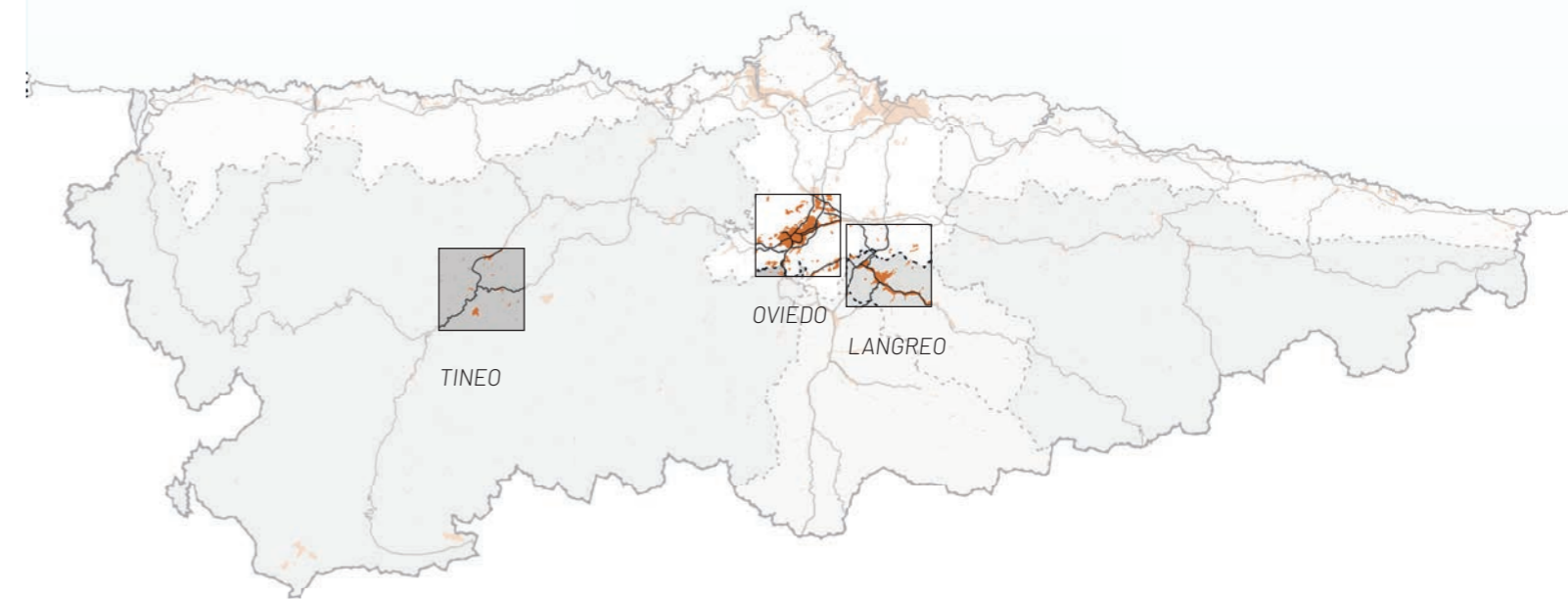


FIG. 5.2 Three locations in three different sub-regions. Source: author



FIG. 5.4 Flooding of the Nalón river. Source: Bomberos de Asturias



FIG. 5.3 The industrial landscape at Langreo. Source: author



FIG. 5.6 A blackfield in Langreo. Source: author



FIG. 5.7 The Nalón river corridor. Source: author

Langreo

Langreo is situated in the former mining valley of the Nalón. The legacy of the industrial past is still clearly visible in the urban environment (see figure 5.3). In and around Langreo, many vacant mines and brownfields can be found. Due to the topography of the

Nalón valley, many of the industrial areas are intertwined with urban areas on the narrow valley floor. Even though many of the abandoned industrial buildings have been labelled as industrial heritage, the local authorities have not been able to make any use of these buildings. This has created a severely deprived urban appearance.

In the north-east of the city, local authorities have attempted to attract new industrial development by investing in the construction of industrial land. Though this strategy has attracted some companies, still many parcels of land lie vacant.

Aside from the abandoned land within the city, much of the land on the valley slopes has been abandoned. This land was formerly occupied by apple orchards. The absence of these cultivation patterns has enhanced soil deprivation on the mountainsides, which in turn has heightened the risk of landslides and torrential flooding.

The Nalón river, which passes through the middle of the city, has been under increased pressure in recent years. Several severe flooding events have taken place in recent years, and most of the city of Langreo is at risk of this threat (see figure 5.4). What is more, the polluted soils left by the industry create a second environmental threat. During flooding events, polluting materials are picked up by flood water and are spread out over the territory, creating more polluted land and exposing the river system to harmful materials.



FIG. 5.5 Langreo analysis Source: author



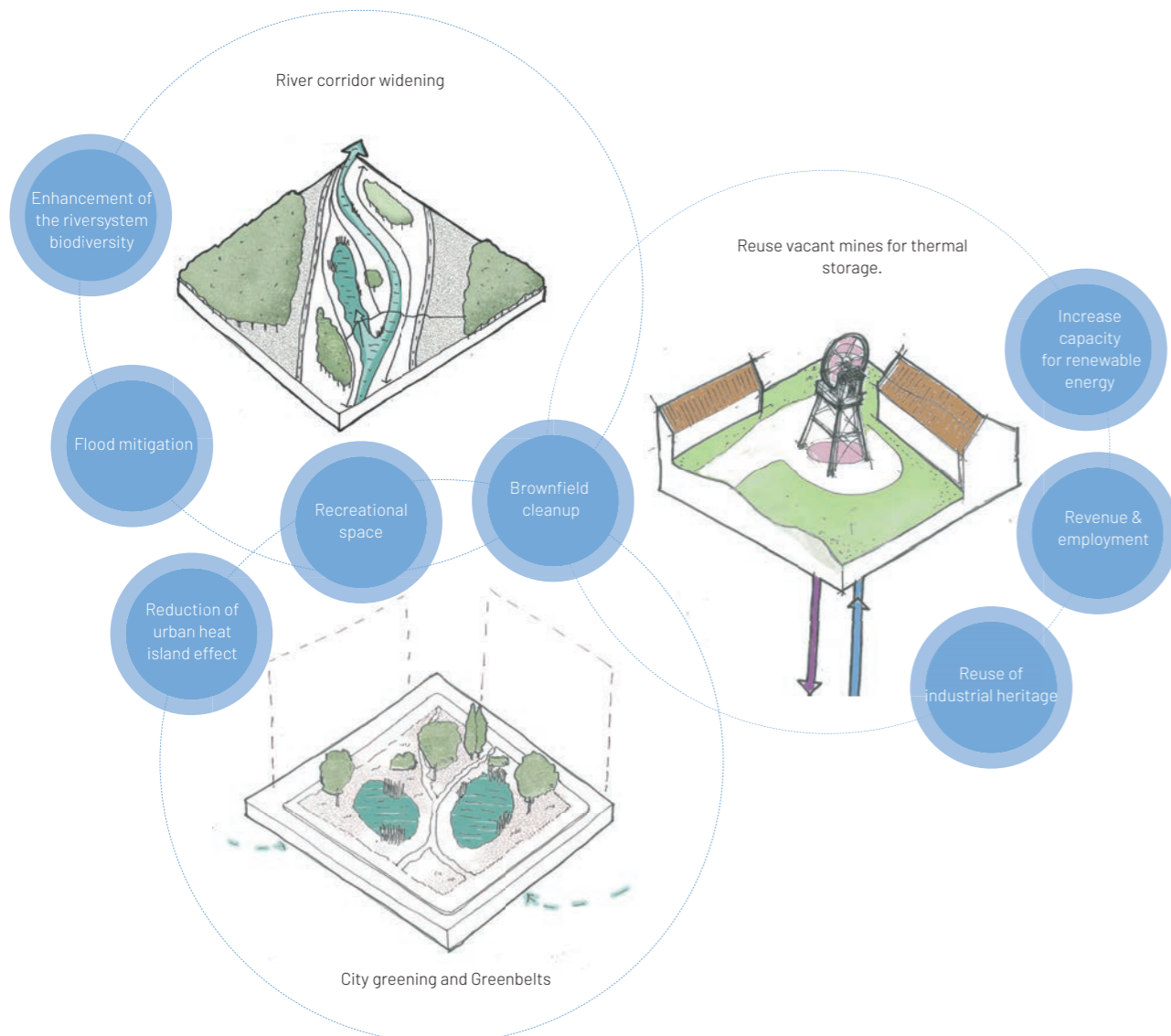


FIG. 5.8 The main interventions and their benefits Source: author

Interventions

The shrinkage process in Langreo has created several opportunities for interventions. Three points of the regional spatial agenda are particularly relevant on Langreo: 1. Opportunities for the advancement of the regional energy transition 2. Enhancement and protection of the natural landscape 3. improvement of liveability and the urban environment. Three interventions are of central importance to implement these three points: the reuse of vacant mines for thermal storage, the widening of the river corridor through the transformation of brownfields and the greening of the city. In figure 5.7 the benefits of these interventions are displayed.

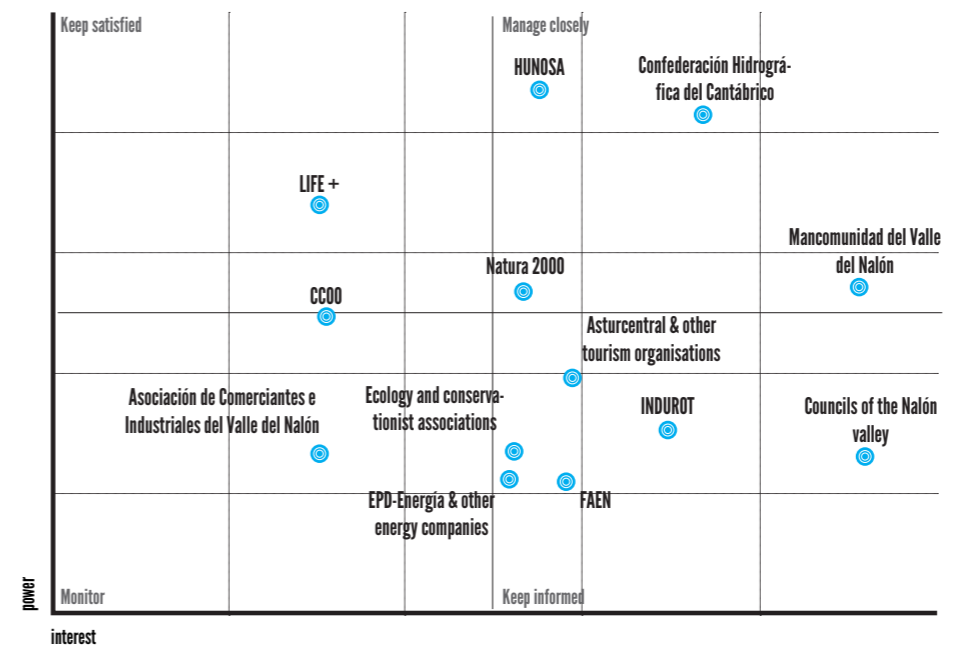


FIG. 5.9 Stakeholdermap of Langreo. Source: author

Local stakeholders

Within the context of Langreo there are several stakeholders who would benefit from these interventions (see appendix for a full overview of the stakeholders). For instance, the Confederación Hidrográfica del Cantábrico (CHC) which takes care of the water management of supra-regional rivers like the Nalón, is concerned with mitigating flood risk and enhancing the environmental quality of the river. The research institute INDUROT has already attempted to start a brownfield clean up program and could therefore be expected to be a partner for this project.

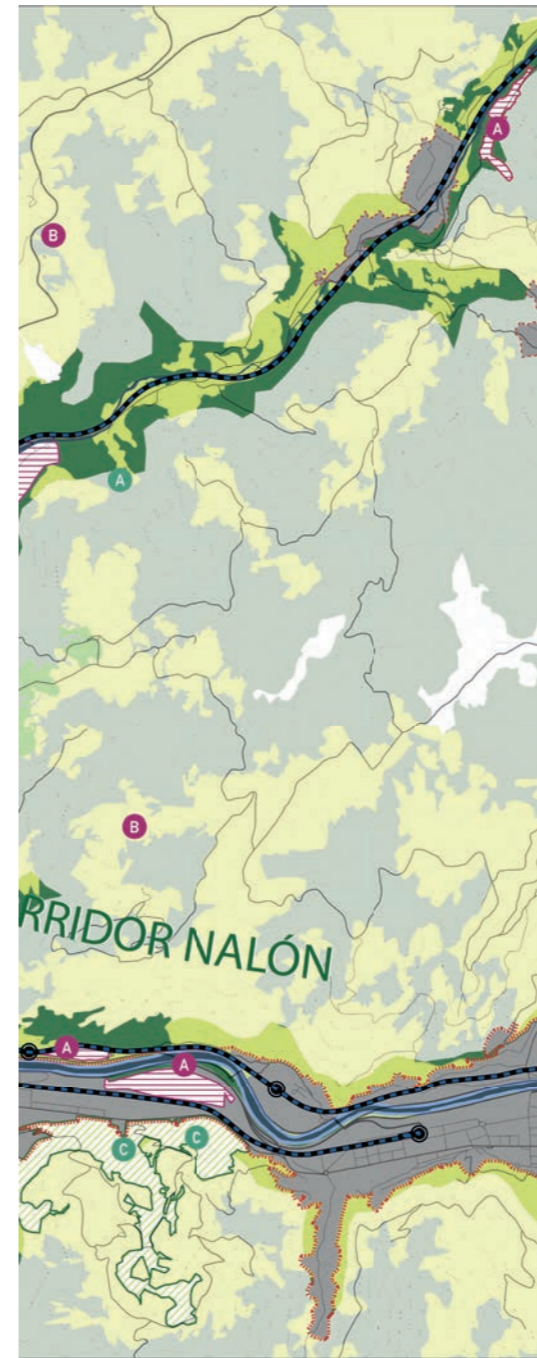
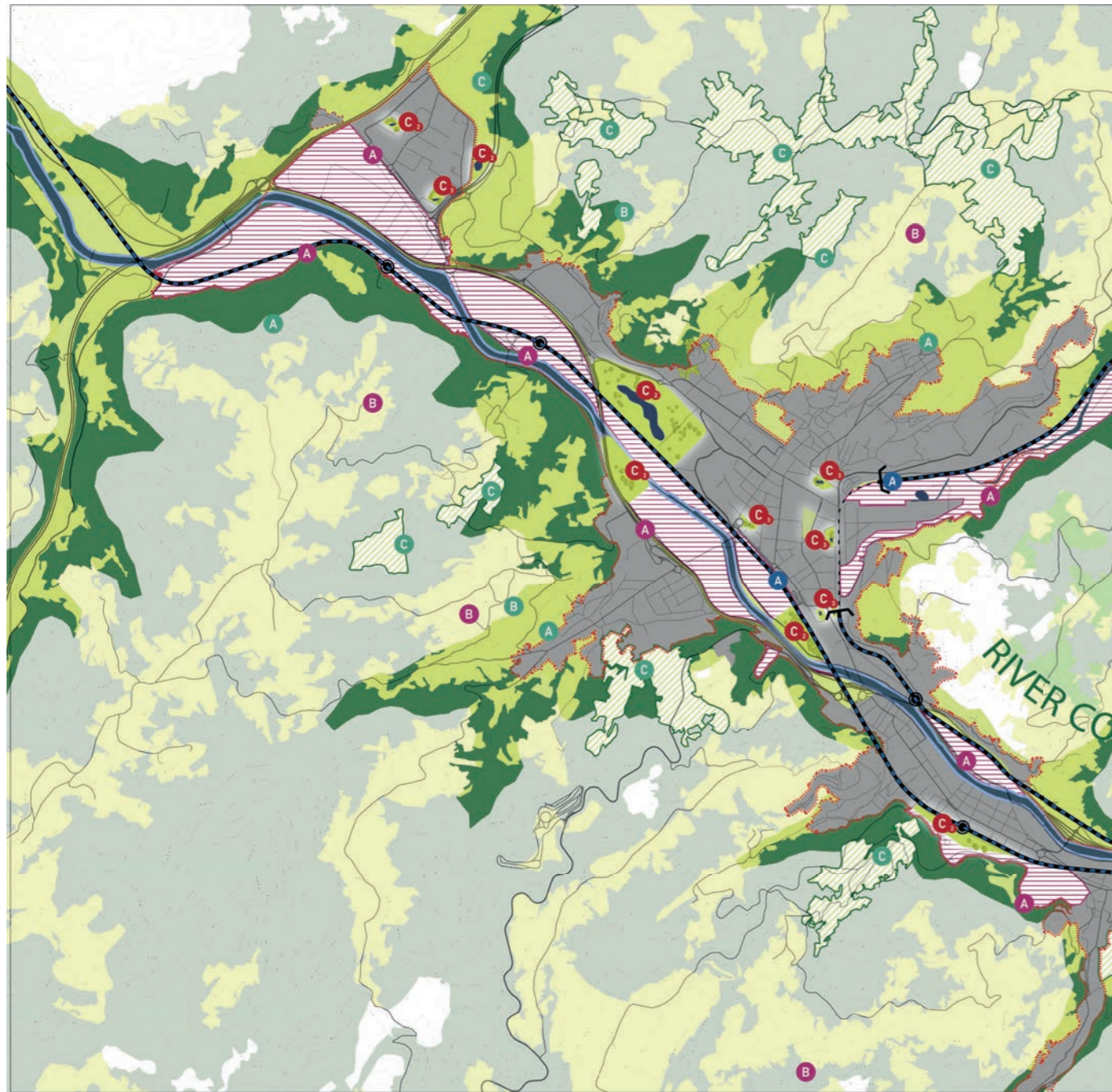
The interest and support of these stakeholders does come with certain criteria. Certain interventions would need to be implemented on a regional level to satisfy the needs of certain stakeholders, such as the CHC. Other interventions, such as the thermals storage plants, can only be implemented with the support of regional funding, from both the region as well as from the Regional Operational programme (ERDF). Other actors, such as the HUNOSA mining company need to be coerced to participate in the strategy through regulations and taxing.

However, there is currently no actor – private or public- that can implement the interventions on its own. The mancomunidad del Valle del Nalón, which is the most logical stakeholder for this scale level, does not have the political strength and is lacking leverage

over the private parties. To implement these interventions a new actor or groups of actors should fill the gap.

For an intervention such as this to be implemented, the project should be coordinated through an (existing) regional body. That can mitigate between the regional flood problems and local planning actions. This requires a body that can navigate between both local and regional competences. For instance, by addressing vacant land by creating negative incentive mechanisms (taxes or fines). Finally, the body should be able to allocate European structural funds.

Langreo: PHASE 1



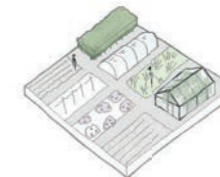
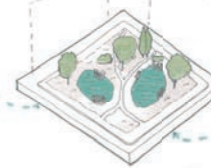
Agenda point 2: Natural landscape

- A** Growth boundary
- B** Nalón protected zone
- C** River corridor widening



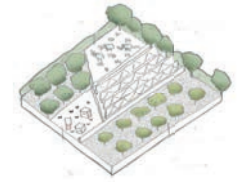
Agenda point 3: Urban environment

- C₂** Vacant lot greening
- C₃** Urban farming



Agenda point 4: Allocation of economic activity

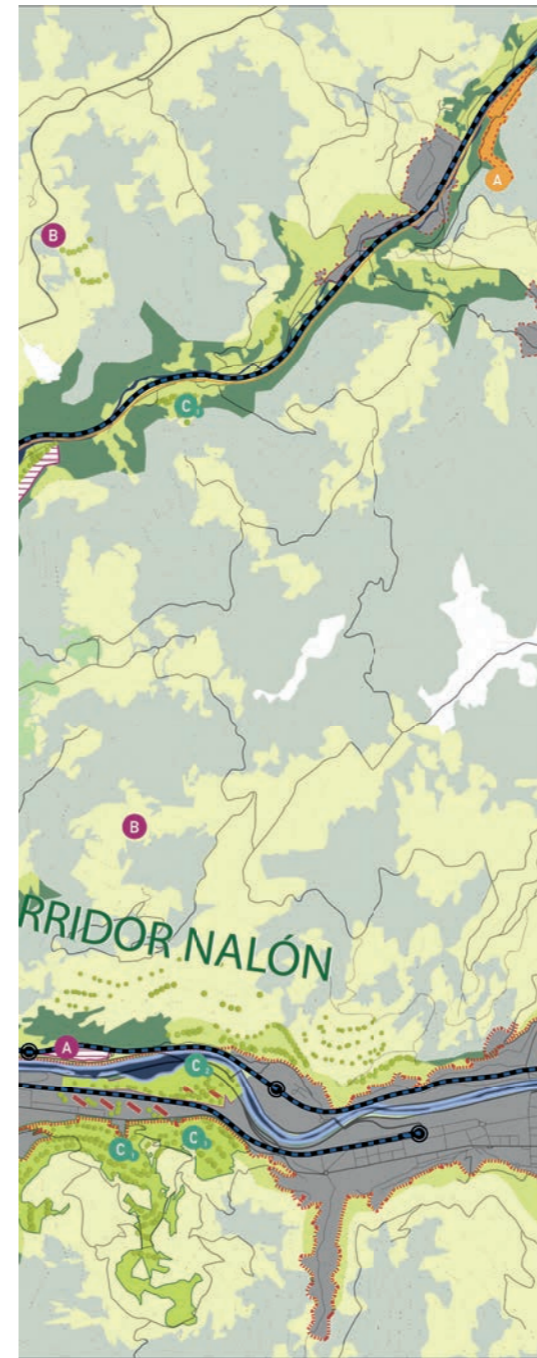
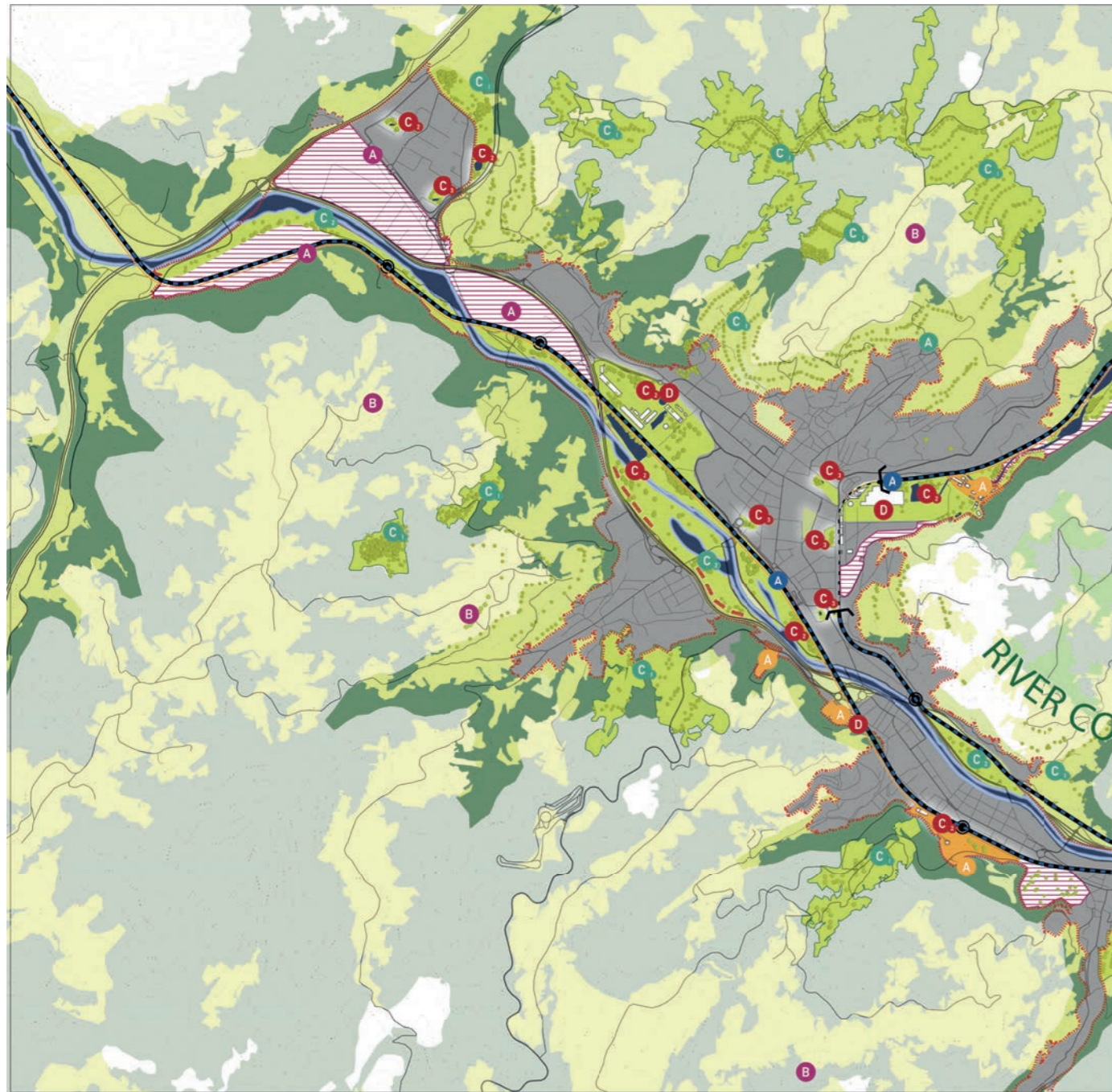
- A** Phase out industrial land in flood zone
- B** Diversification of the rural economy
Facilitate ecofarming initiatives to support rural entrepreneurs and bring back cultural landscape.



Agenda point 5: Mobility

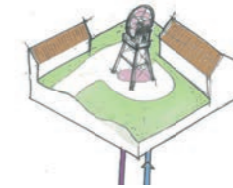
- A** Optimize the transport system
Ensure that running projects are completed (Langreo rail tunnel)

Langreo: PHASE 2



Agenda point 1: Opportunities for the advancement of the regional energy transition

A Thermal energy/ heating grid
Reuse vacant mines for thermal storage. Create a regional heat network.



Agenda point 2: Enhancement and protection of the natural landscape

C₁ River corridor widening



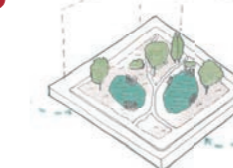
C₂ Ecological resotartion of mountain sides



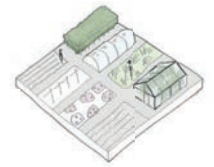
Agenda point 3: improvement of liveability and the urban environment

B Readjust housing stock

C₂ Water parks



C₃ Urban farming



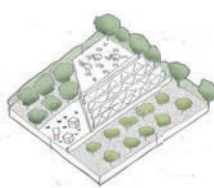
D Adaptive reuse

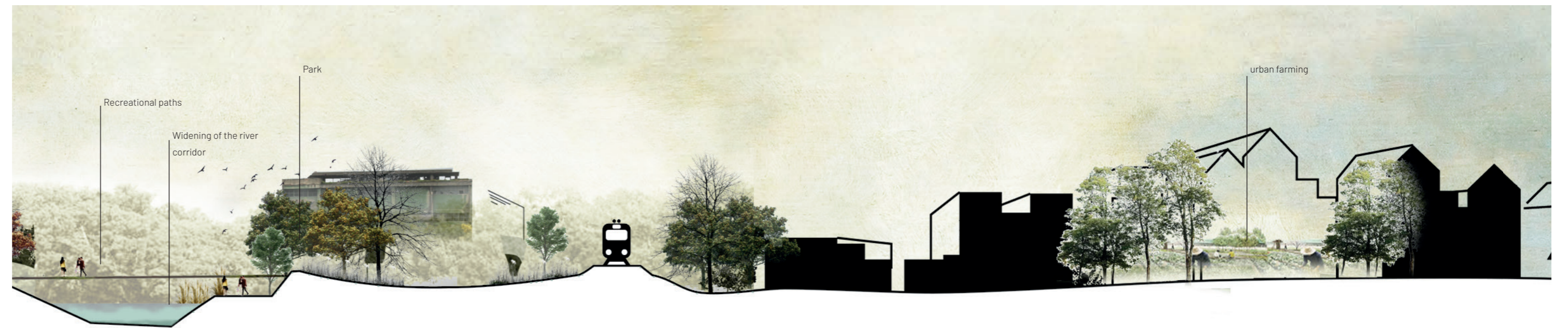
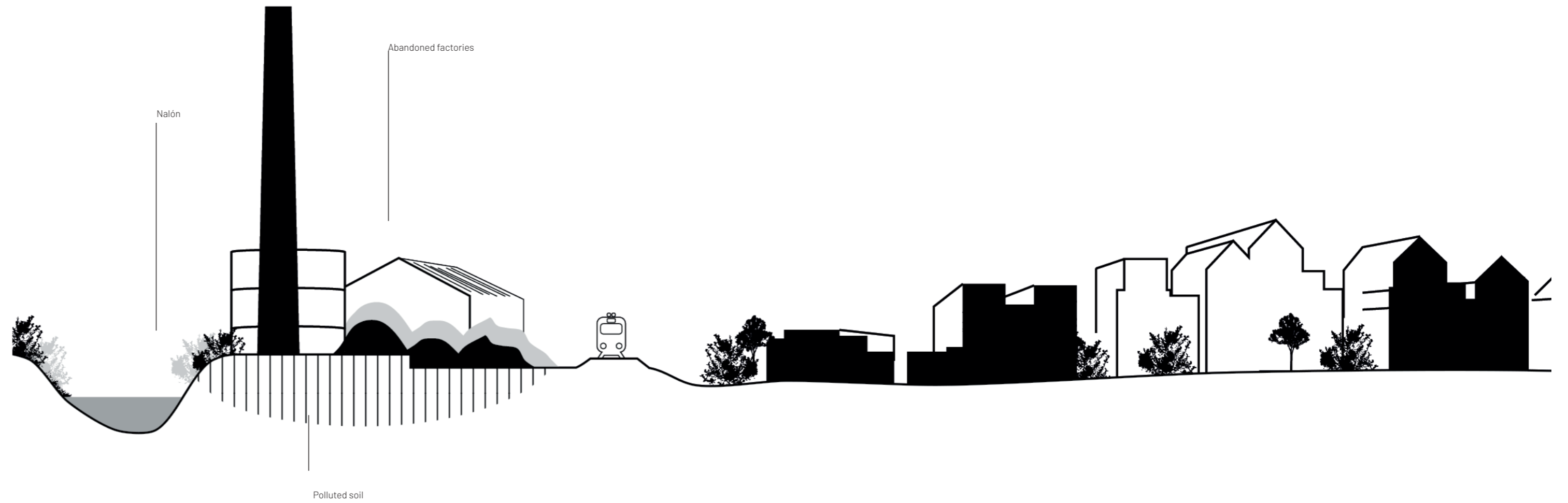
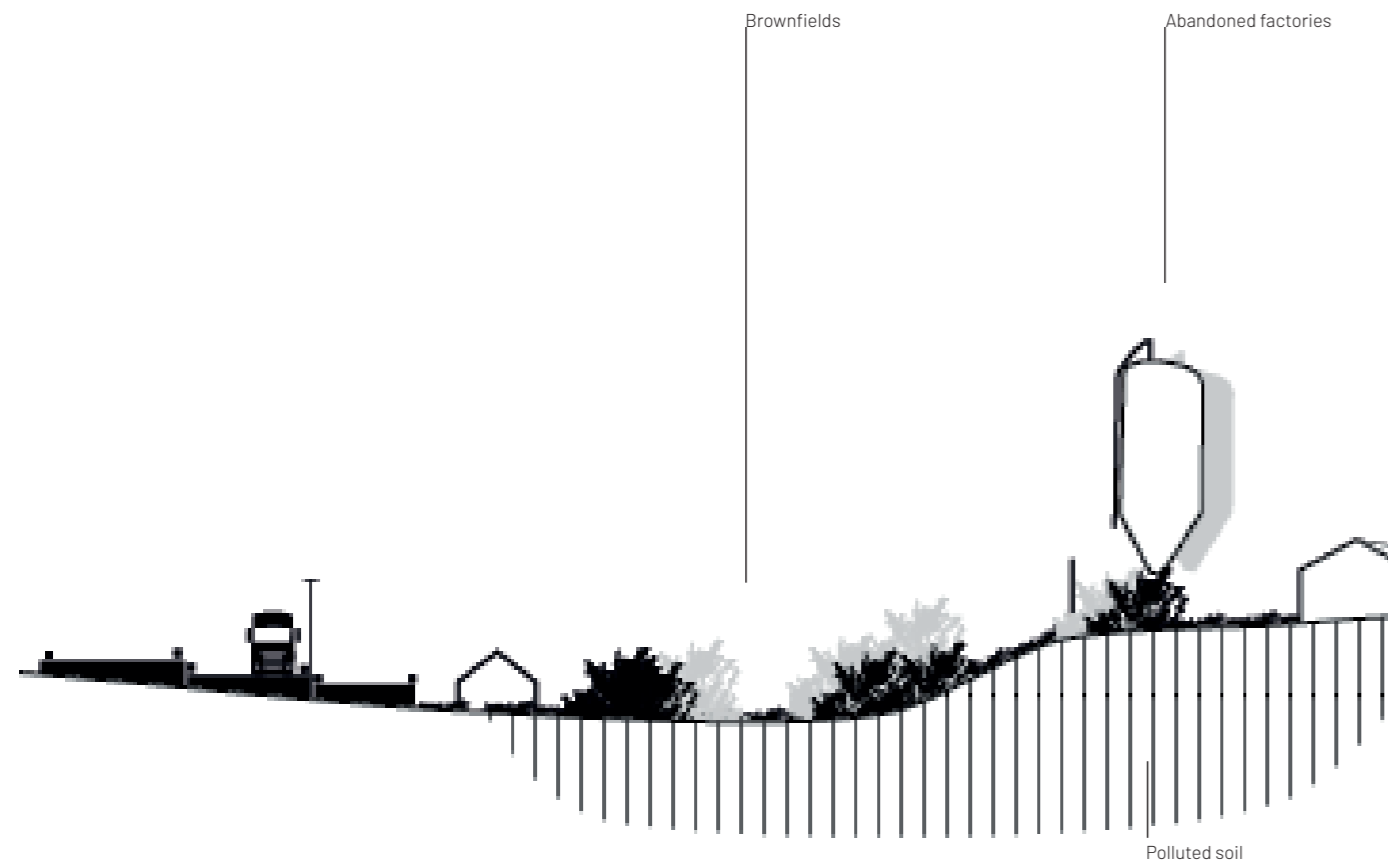


Agenda point 4: the allocation of economic activity

A Readjust industrial land

B Diversification of the rural economy
Policy: Facilitate ecofarming initiatives to support rural entrepreneurs and bring back cultural landscape.





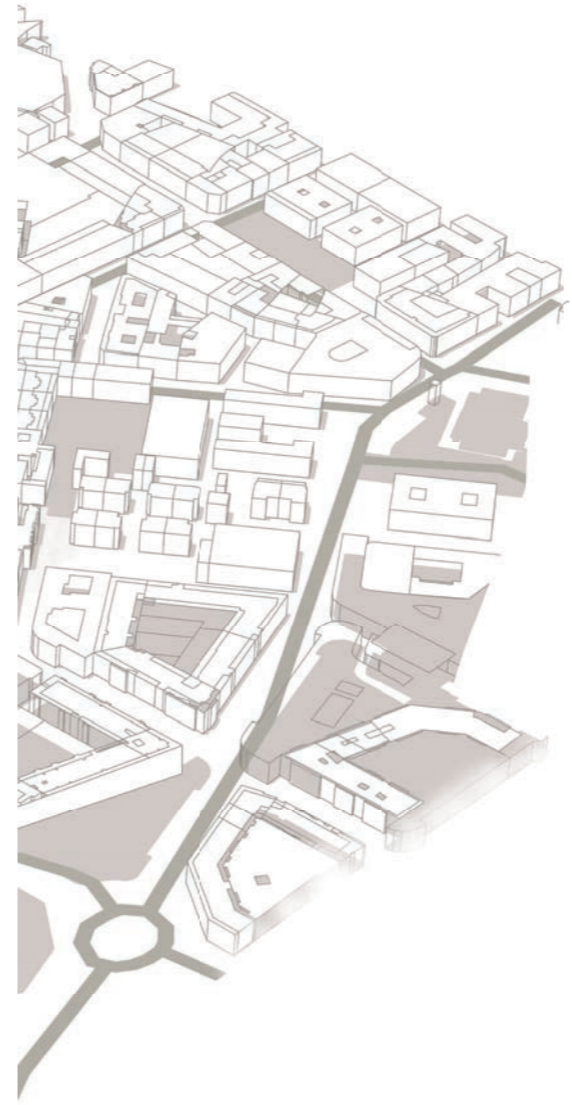
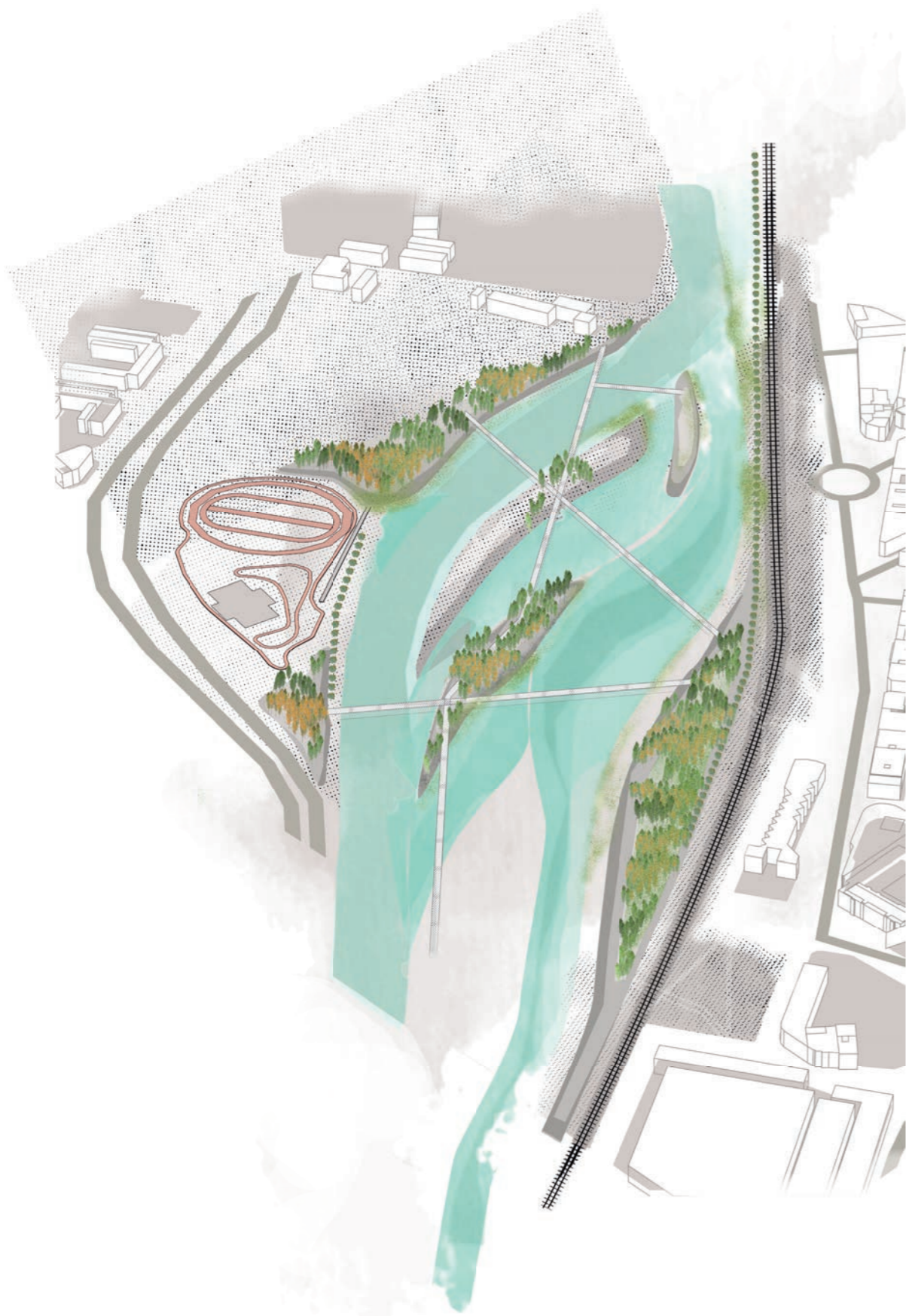




FIG. 5.11 Calatrava's Palacio de Exposiciones y Congresos Ciudad de Oviedo . Source: author



FIG. 5.12 La Fabrique d'Armes d'Oviedo. Source: author



FIG. 5.10 Plaza de la Catedral in Oviedo. Source: author

Oviedo

Oviedo is situated in the heart of Asturias. Contrary to the cities of Gijón and Avilés, Oviedo has relatively little industrial heritage. Only in a few places is the city interrupted by brownfields. A much more distinct consequence of abandonment are the vacant lands and vacant buildings in the newer parts of the city.

Up until the last decade, the city has experienced population growth. However, the crash in the construction market in 2008 has littered its periphery with a substantial amount of greyfields and vacant apartment complexes (see figure 5.14, 5.15).



FIG. 5.14 Greyfields on the periphery of Oviedo. Source: Google Earth



FIG. 5.15 Greyfields on the periphery of Oviedo. Source: Google Earth

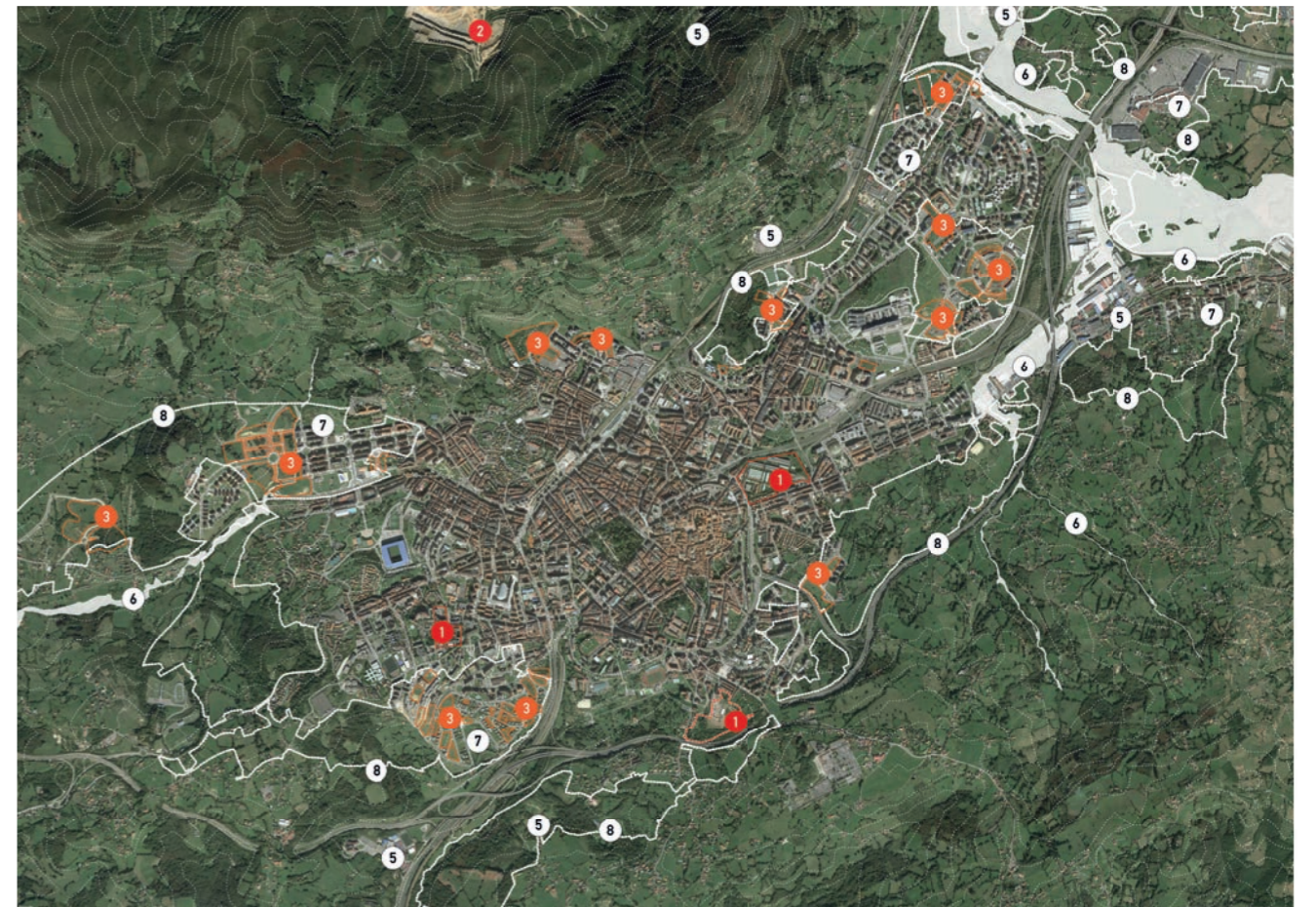


FIG. 5.13 Oviedo analysis Source: author

- | | | | | |
|-----------|---|-------------------|---|-------------------------------|
| SHRINKAGE | 1 | BROWNFIELDS | 5 | REMAINING INDUSTRIAL ACTIVITY |
| | 2 | CLOSED MINES | 6 | FLOODRISK ZONE |
| | 3 | GREYFIELDS | 7 | SPRAWL |
| | 4 | ABANONED FARMLAND | 8 | DEVELOPABLE LAND |

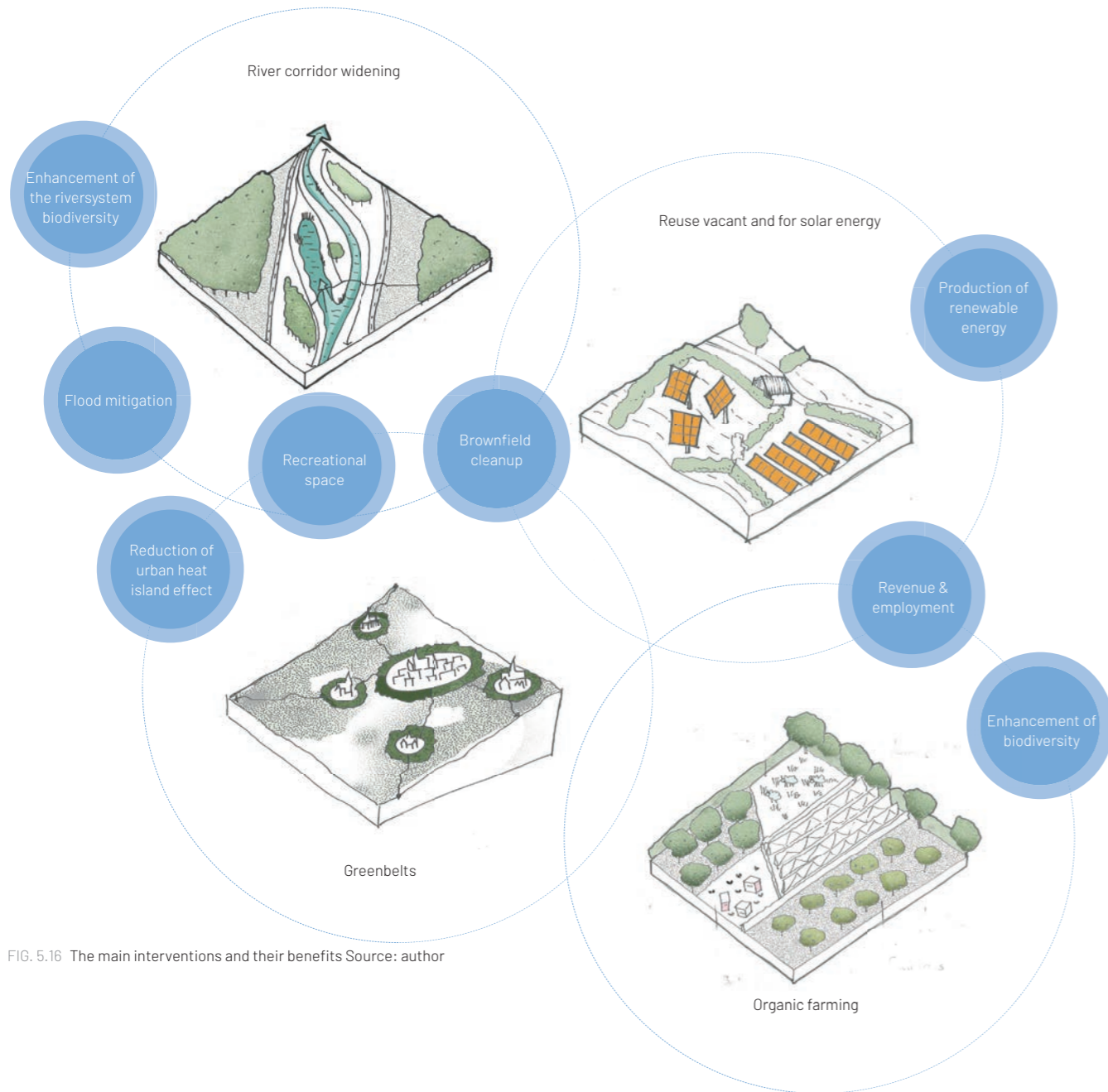


FIG. 5.16 The main interventions and their benefits Source: author

Interventions

Various points on the regional spatial agenda will have an influence on Oviedo. The most notable are the creation of greenbelts on the periphery of the city, the reuse of vacant land for solar energy, the enhancement of sustainable farming outside the edge of the city, and the widening of the river Nora. The main effect of the strategy will be to create more recreational space, protect the surrounding landscape from further urbanization, densify and reuse the existing urban structure and create new revenue streams through the exploitation of renewable energy.

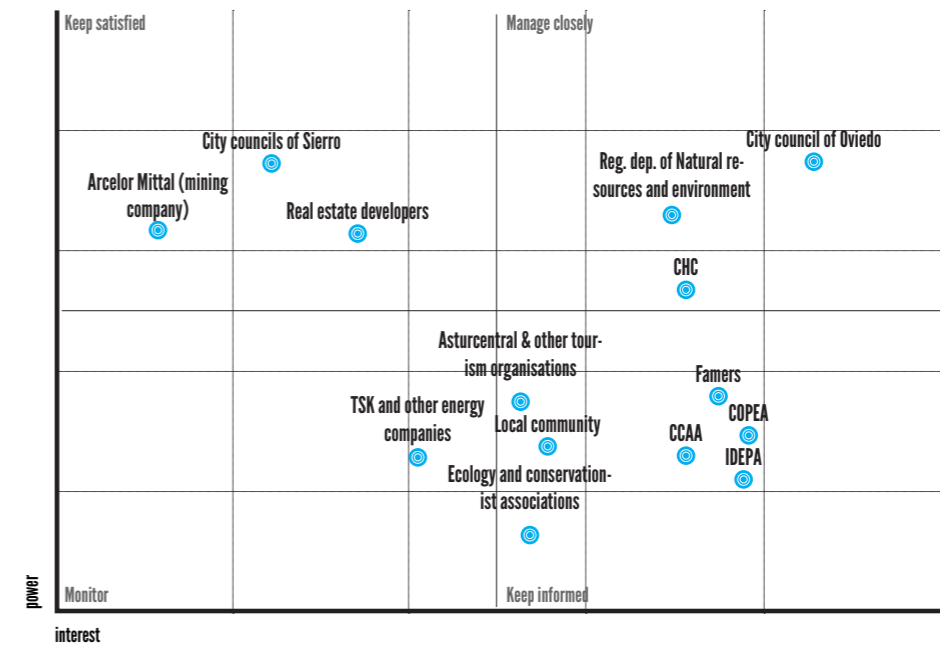


FIG. 5.17 Stakeholdermap. Source: author

Local stakeholders

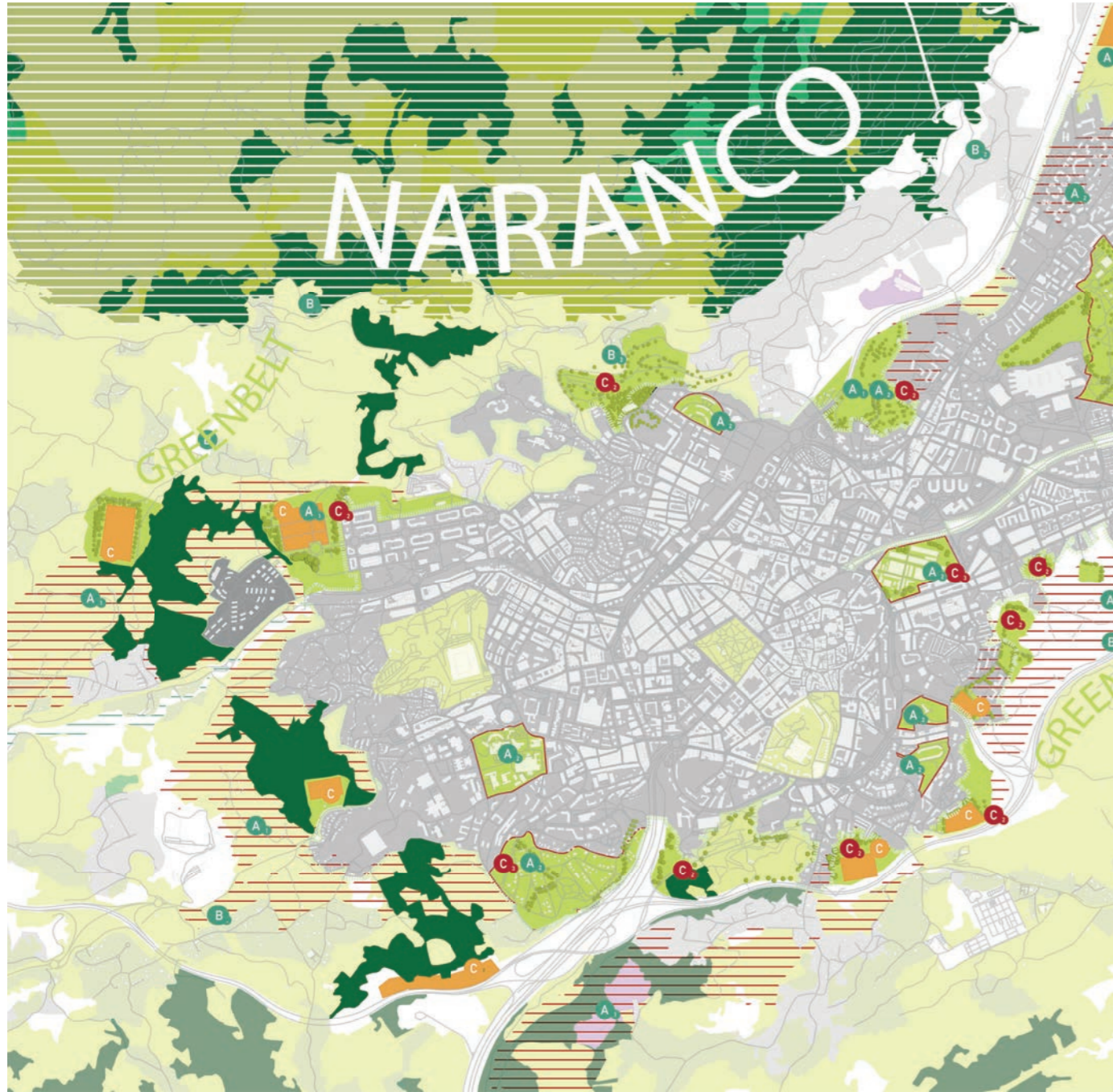
The local manifestation of the regional design would be in line with the goals of the council of Oviedo, which has expressed its ambition to concentrate urban development inside the current city borders and to establish a green belt park around the city. Already the city is handling tighter land use regulations.

In recent years, the eco-farming has experienced significant growth in Asturias. This is an opportunity to bring back the traditional cultural landscape that once typified the hills around Oviedo. There are many rural entrepreneurs looking for opportunities to combine eco-farming with tourism activities.

However, not all stakeholders in this part of the region would be supportive of this strategy. The various real estate companies, which own most of the greyfields on the periphery of Oviedo, are currently under no obligation to stop the land banking and speculation. Similarly, the neighbouring municipality of Siero is currently profiting from the sprawling urbanization that has come their way due to the tighten land use regulations in Oviedo.

In this implementation, collaboration between the central councils is essential. However, in the current planning framework there is no platform for these councils to cooperate since there is no mancomunidad established in this area.

Oviedo: Phase 1



Agenda point 1: Opportunities for the advancement of the regional energy transition

- C** Solar power on vacant land
Integrate opportunities for solar power in to the landscape



Agenda point 2: Enhancement and protection of the natural landscape

- A₁** Reduce Suelo urbanizable
- A₂** Identify infill locations
- B₁** Naranco zone(peripheral park)
- B₂** Green belt zone
- B₃** River corridor zone
- B₄** Agricultural zone

Agenda point 3: improvement of liveability and the urban environment

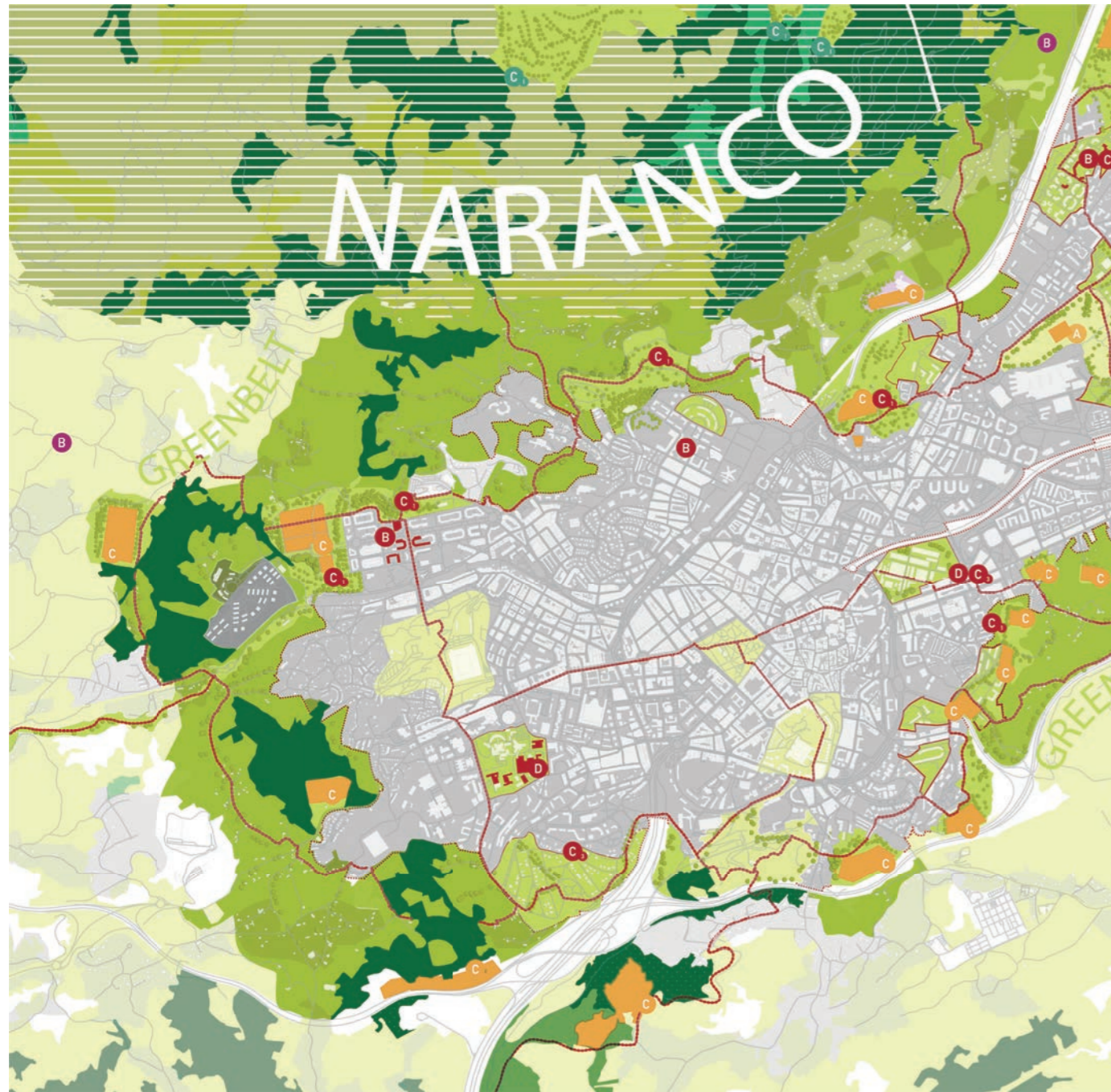
- C₂** Water parks



- C₃** urban farming



Oviedo: Phase 2



Agenda point 1: Opportunities for the advancement of the regional energy transition

C Solar power on vacant land
Integrate opportunities for solar power in to the landscape



Agenda point 2: Enhancement and protection of the natural landscape

C Restor mine land on the Naranco



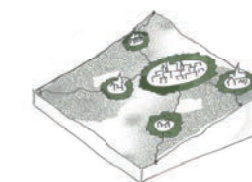
C₂ Widen the river corridors



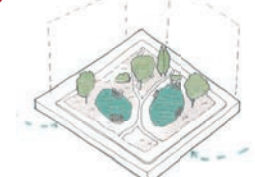
Agenda point 3: Improvement of liveability and the urban environment

B Readjust housing stock

C₁ Green belt projects



C₂ Water parks



C₃ urban farming

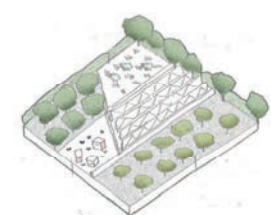


D Adaptive reuse (of heritage)



Agenda point 4: the allocation of economic activity

B Diversify rural activity



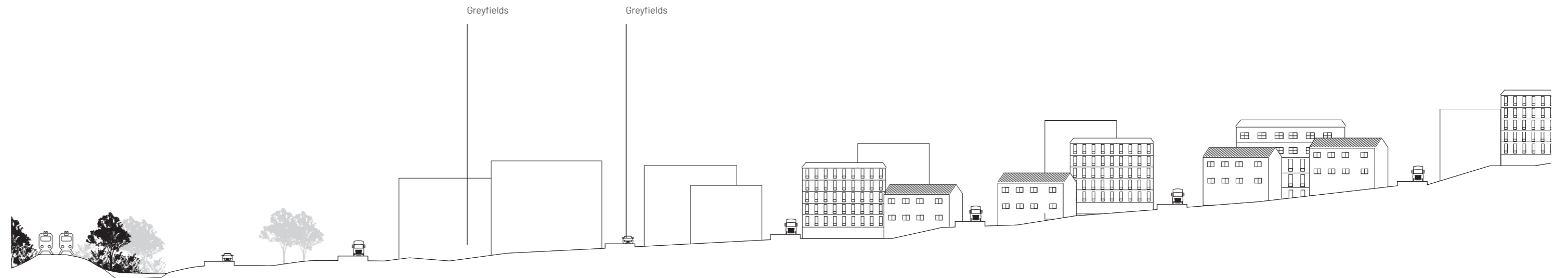






FIG. 5.18 Impressions from Tineo. Source: turismoasturias.es



Tineo

Tineo is situated in the western wing of Asturias. The council's population has dropped by 50% over the last five decades. Ranging has been, and still is, the primary employment sector in this part of the region. However, employment in this sector has severely dropped over the last years (SADEI, 2016).

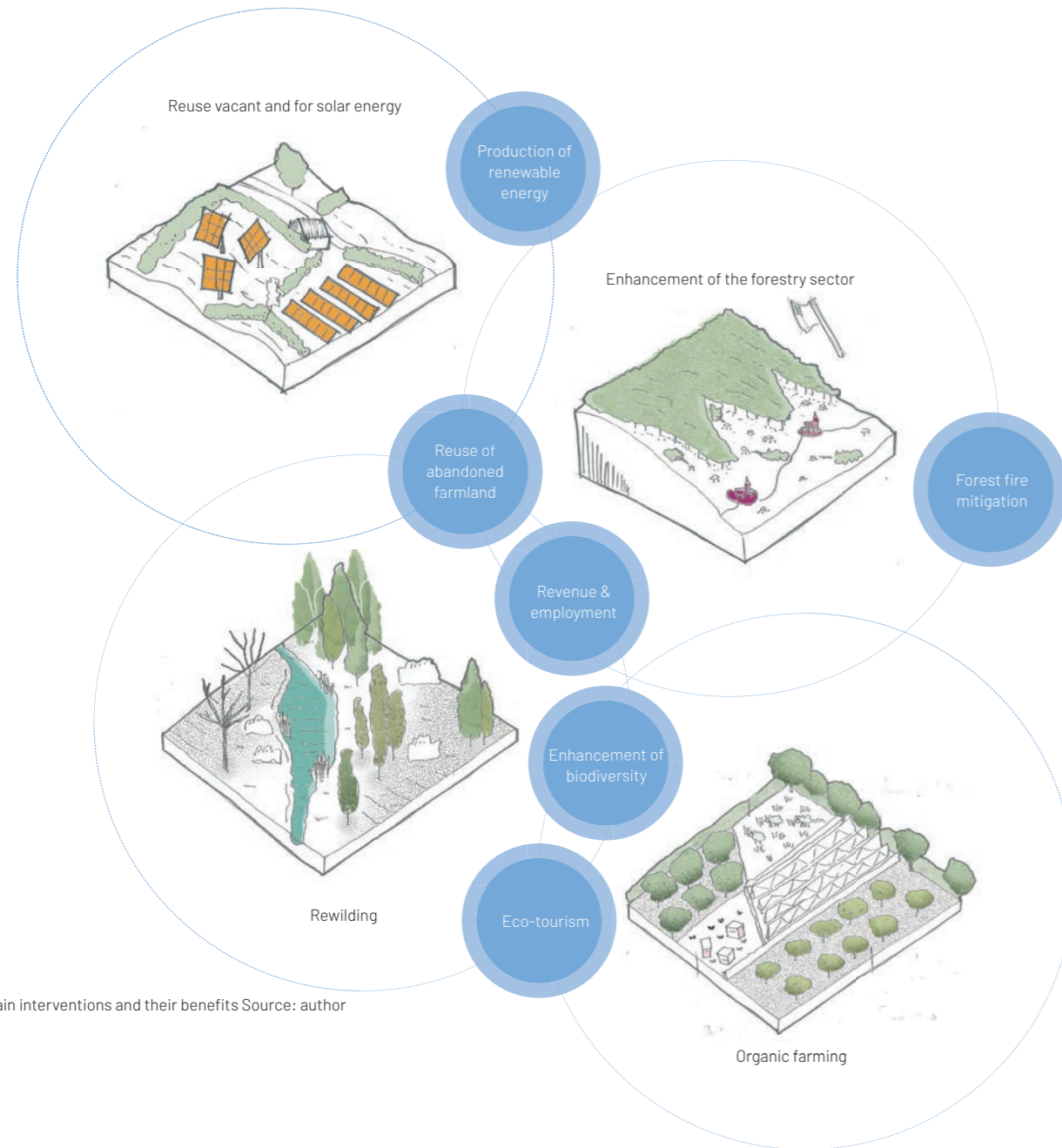
In certain parts of the council the original parcel structure is still recognizable, with the thick hedge rows and unevenly shaped fields. However, in the central valley of the councils, large scale farms have been established aided by modern farming techniques. The bigger farms have two disadvantages. Firstly, they employ fewer people. And secondly, increase the deterioration of the soil through intense grazing and a lack of larger vegetation.

In the transition towards this larger farming type, many parcels that are unsuited for more intense use have become abandoned. As a result, there is a significant rise of shrublands in the region. This has made the councils more vulnerable to forest fires.



Tineo analysis. Source: author

- | | | | | |
|------------------|---|---------------------|---|--------------------------------|
| SHRINKAGE | 1 | GREYFIELDS | 4 | TRADITIONAL CULTURAL LANDSCAPE |
| | 2 | ABANDONED FARMLAND | 5 | DEGRADED FARMLAND |
| | 3 | FORESTRY PLANTACION | 6 | WIND TURBINES |



The main interventions and their benefits Source: author

Interventions

Shrinkage has produced a significant amount of vacant land in the councils of Tineo. In the coming decades, this is likely to increase. If no actions are taken to find new uses for this land, soil deterioration will continue, and forest fires will be increased. What is more, the further decline in employment will exacerbate the process of shrinkage.

The city has become an important service hub for the rural areas. The regional design proposes to enhance this role as much as possible. The city's connection to the metropolitan area is vital and needs to be strengthened as much as possible.

In those areas of the council where vacant land is situated on sloped terrain or in other inaccessible locations, efforts should be made to create new natural reserves and parks. Designating areas as environmental reserves could help to generate more resources from higher policy levels for landscape maintenance. Re-naturizing these spaces will help to reduce the soil deterioration.

In other parts of the council, the role of the forestry sector should be enhanced. The forestry sector in Asturias is still relatively small for such a wooded region. Supporting this sector by designating more land for forestry use could bring new economic activity to the council. What is more, a comprehensive forestry strategy can be a key tool to mitigate wild fire risks.

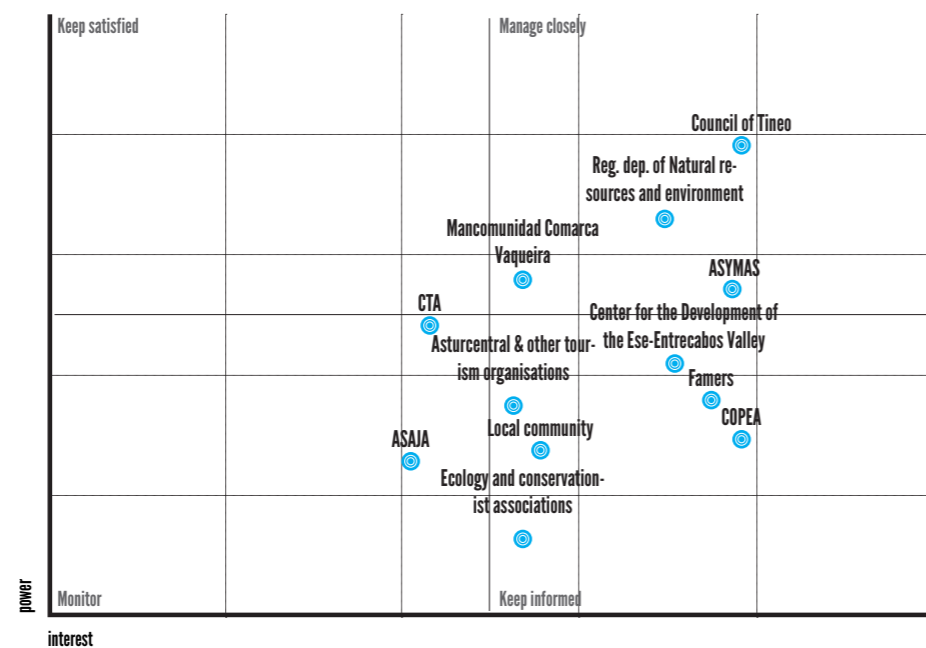
Eco-farming is an economic sector that is growing strongly in Asturias. This sector should be supported as much as possible. Eco-farming carries many benefits, it has a better ecological performance, employs more people, and creates a more attractive landscape for tourism and recreation. What is more, smart use of eco-farming techniques can also reduce environmental threats such as wildfires. For instance, by using grazing animals to remove small grasses in forests and shrubland.

Finally, the vacant industrial lands provide opportunities to produce renewable energy through solar panels, which could be useful in supporting the municipal budget.

Local stakeholder

Within the context of Tineo there are several stakeholders which stand to benefit from these interventions. There are several bottom-up associations which seek to support the enhancements of eco-farming and forestry, such as the Association of Forestry and Environment Companies of Asturias. Or organisations that support the creation of more accessible natural reserves in the region, such as Sendasdeasturias. The council also has experience with the production of renewable energy, which has already proven to be a valuable contribution to the municipal budget.

There are several institutions at work in the area which should form the basis of a good connection to the regional government and higher-level funding organisations. However, according to several interviewees (1 & 2) the regional authorities have not succeeded to facilitate many projects in the areas. A new platform for collaboration and participation could be useful in this regard.

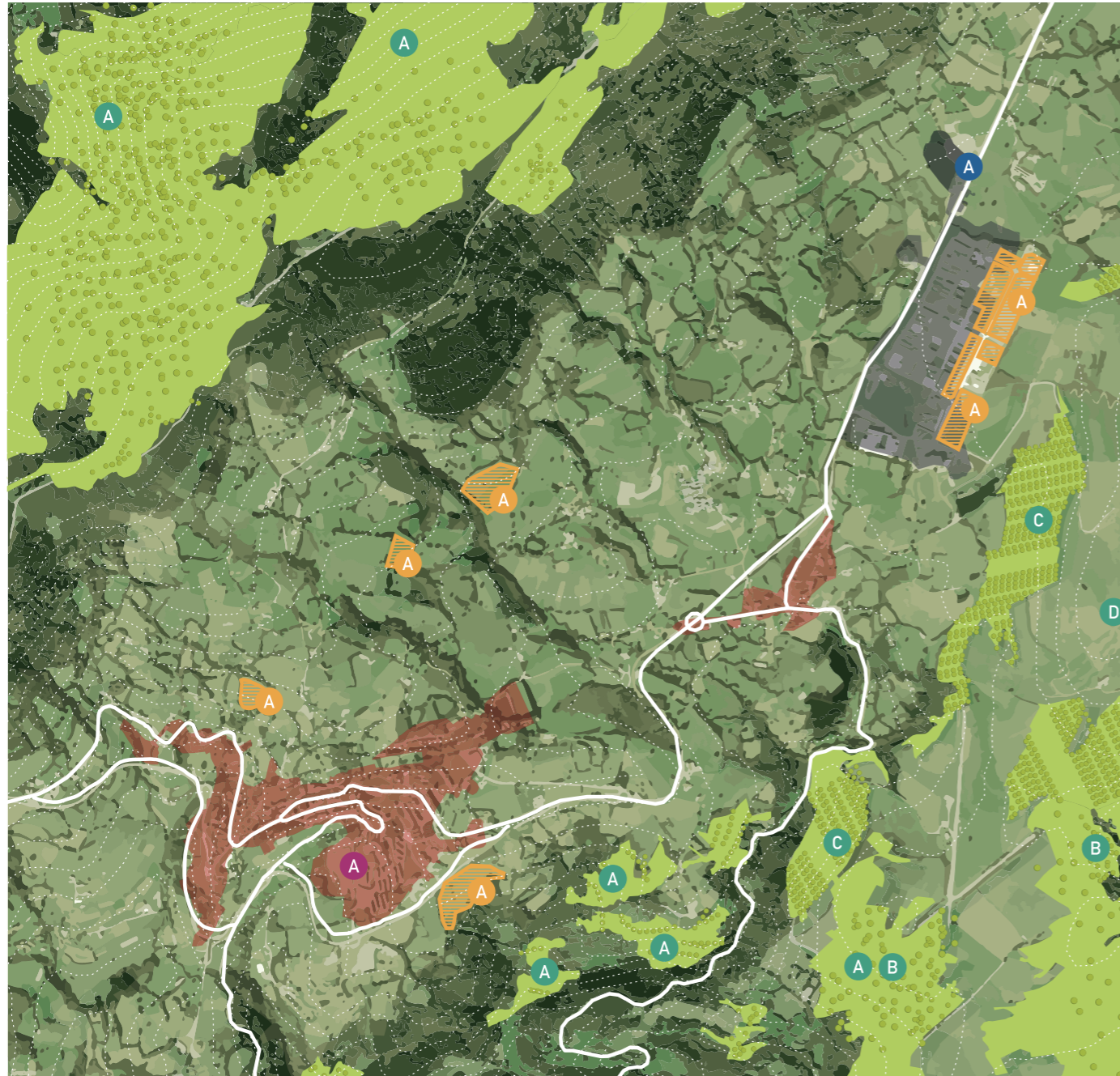


Stakeholdermap Tineo. Source: author



The view of Tineo from the Camino primitivo, the road to Santiago de Compostella. Source: Fotolia

Tineo



Agenda point 1: Opportunities for the advancement of the regional energy transition

- A** Exploit opportunities for solar power to diversify rural economy



Agenda point 2: Enhancement and protection of the natural landscape

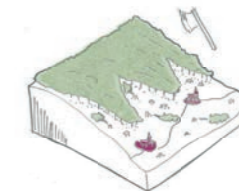
- A** Ecological reconstruction of farmland



- B** Slope greening. Use abandoned lands on sloped mountainsides to replant trees and mitigate the risk of landslides

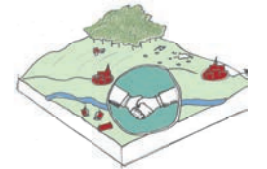


- C** Exploit the opportunities for the forestry sector

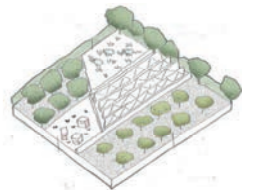


Agenda point 4: the allocation of economic activity

- A** Create incubator centre for rural communities

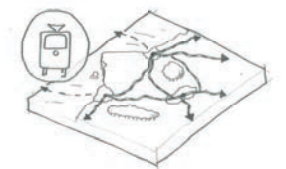


- D** Traditional farming. Facilitate eco-farming initiatives to support rural entrepreneurs and bring back cultural landscape.



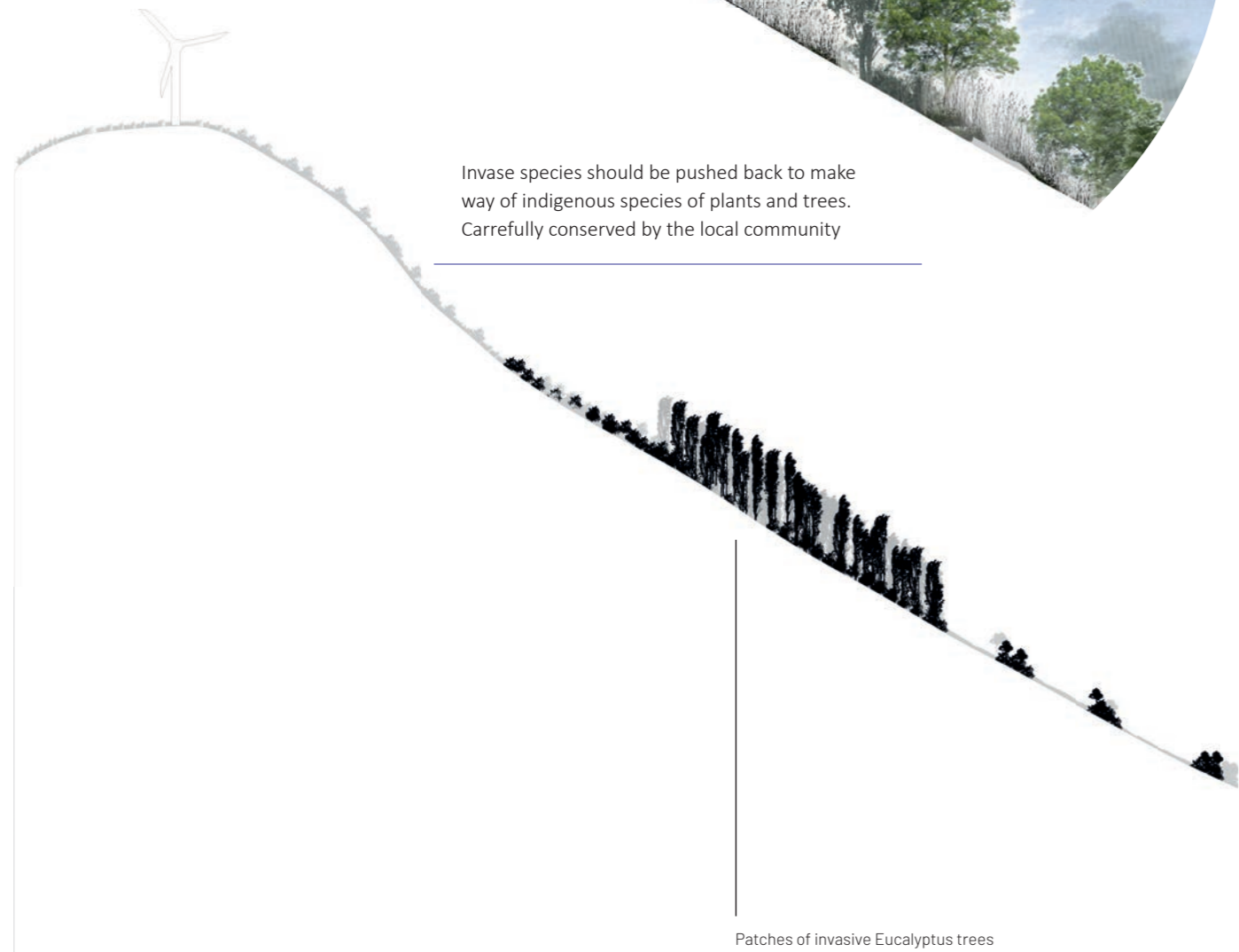
Agenda point 5: development of public transport and infrastructure

- B** Strengthening of public transport network





Invasive species should be pushed back to make way of indigenous species of plants and trees. Carrefully conserved by the local community



Patches of invasive Eucalyptus trees



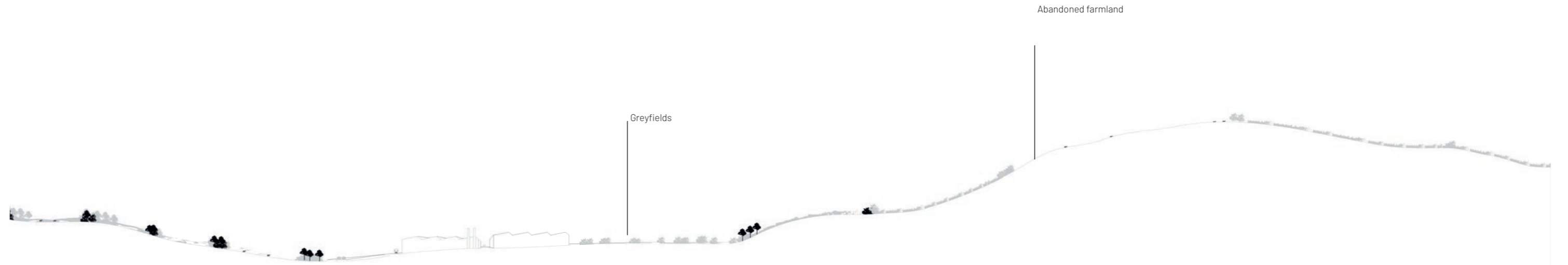
The industrial greyfields can be reuse to facilitate solar power production



Greyfields



New forestry plantations to support the local economy and recycle abandoned farmland



Abandoned farmland



5.4 – Implementation strategy

CHC	Cantabrian Hydrographic Confederation
HUNOSA	Hulleras del Norte SA
edphcenergia	HidroCantábrico Distribución Eléctrica SAU
INDUROT	Institute of Natural Resources and Territorial Planning
FAEN	Asturian Energy Foundation
VCCOO	Workers' Commissions of Asturias
VFADE	Asturian Federation of Businessmen
ACOIVAN	Merchants and Industrial Association of Valle del Nalón
COPAE	Council of Ecological Agricultural Production of the Principality of Asturias
IDEPA	Economic Development Agency of the Principality of Asturias
CTA	Consortium of Transports of Asturias
ASLA	Automoviles Luarca, SA
RENFE	National Network of the Spanish Railways
FEFE	Spanish Railways of Narrow Road

TABLE 5.1 List of abbreviations. Source: author

It is recognised that the opportunities that lay within shrinkage are not enough to address all the negative consequences that are brought about by shrinkage. Opportunities for environmental restoration and renewable energy are of great importance to the sustainable development of any region. However, it is acknowledged that investment into these opportunities should not lead resources away from basic services such as healthcare. This could only lead to the further degradation of the quality of live in the region. A plan that only addresses the opportunities in shrinkage but ignores the necessities could never attain sufficient legitimacy to be implemented.

The implementation of the regional design requires several changes to the region planning system. Based on a stakeholder analysis this section gives a serious of strategies to engage the stakeholders and implement the various aspects of the plan. The section concludes with a phasing of the design that highlights the most pivotal policies and projects.

In this section, implementation is not so much the construction of concrete projects, rather it is the integration of the spatial agenda into the planning process. In several cases, this means that issues from the spatial agenda need to be developed further by the relevant stakeholders.

As was explained in chapter 3, the regional planning system is lacking a resilient framework for interregional and interdepartmental collaboration. For the regional design to be integrated in to the planning process of the region the power disbalance between the regional government, the councils and the large private actors needs to be addressed. Further, the region must regain control over those issues that are best addressed from a regional perspective. Simultaneously, it must find better ways to collaborate with lower authorities, private actors, and civic groups.

Stakeholder analysis

The stakeholders were already listed in the preceding section on the regional spatial agenda. Table 5.2 shows a sum up of these stakeholders and demonstrates their respective importance to the implementation of the interventions listed in the regional spatial agenda. Aside from the stakeholders listed in the regional spatial agenda, there are also stakeholders which are not directly involved in the implementation of the interventions but are nonetheless relevant to the acceptance of the general plan. Here, these stakeholders are labelled as political stakeholders. The city councils are featured in both groups, this is because they play a role an implementing actor but also as a political actor that can influence the regional planning process in a general way (see Appendix B for full stakeholder analysis).

The stakeholders can be separated into governmental, private, and civic groups. For each stakeholder is assed to what extent they might have a positive or negative impact on the implementation of the regional design. The stakeholder analysis is concluded with a list of recommendations.

In general, there are four types of stakeholders with regards to the plan (see table 5.2). The first group are the leading stakeholders. These stakeholders play coordinating role in the plan. The second group are the neutral stakeholders these are not essential to the overall implementation of the plan but are important to a certain aspect or project of the plan. The third group are the blocker stakeholders, these have usually a lot of power but little interest in the overall regional design, due to their position they can easily block parts of the plan. Finally, there is a groups of support stakeholders, these actors do not have a stake in the region but can be used to support (parts) of the plan, for instance by providing funding.

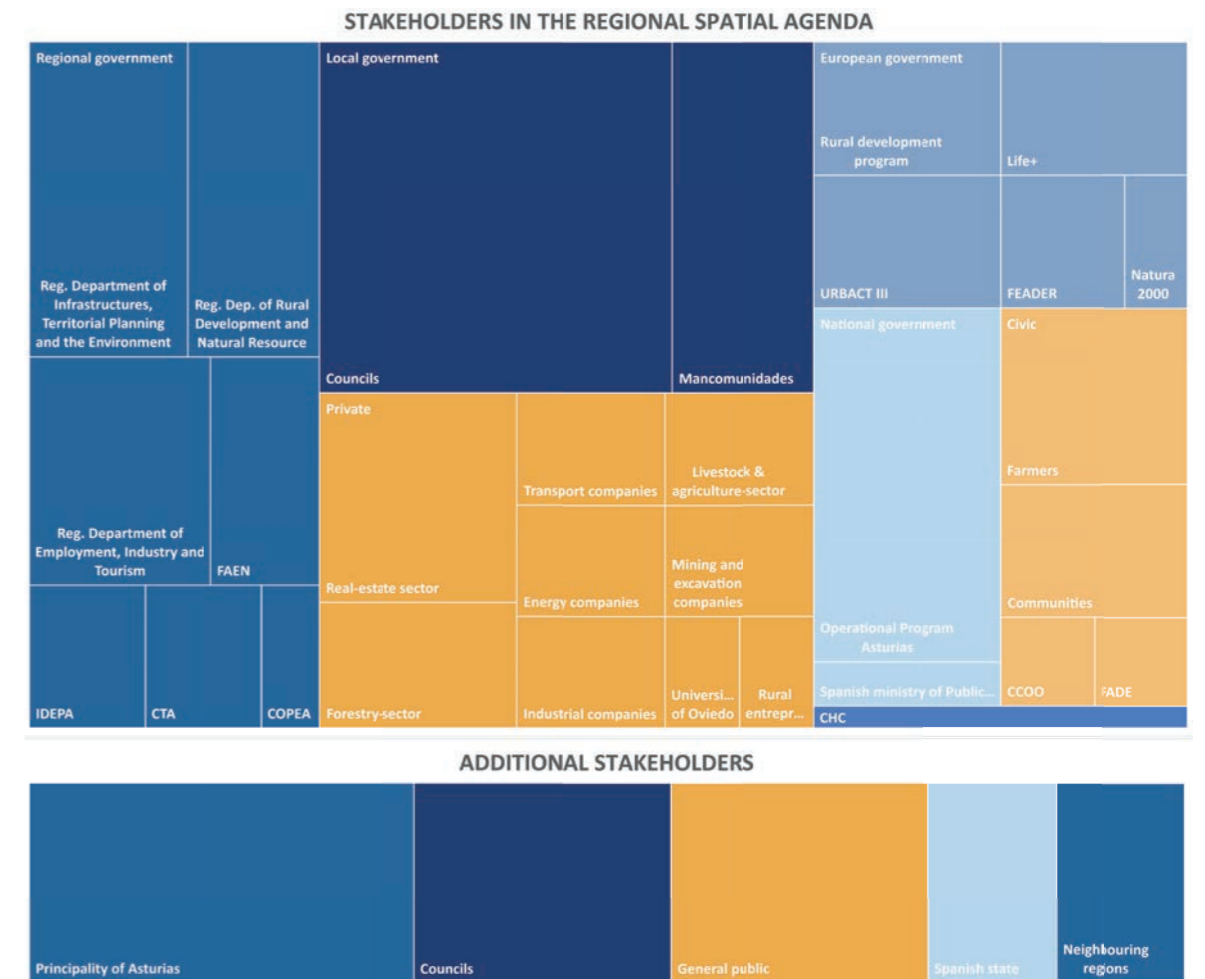


TABLE 5.2 Stakeholders listed in the region spatial agenda. The numbers indicate the frequency with which the stakeholders appear in the spatial agenda. Source: author

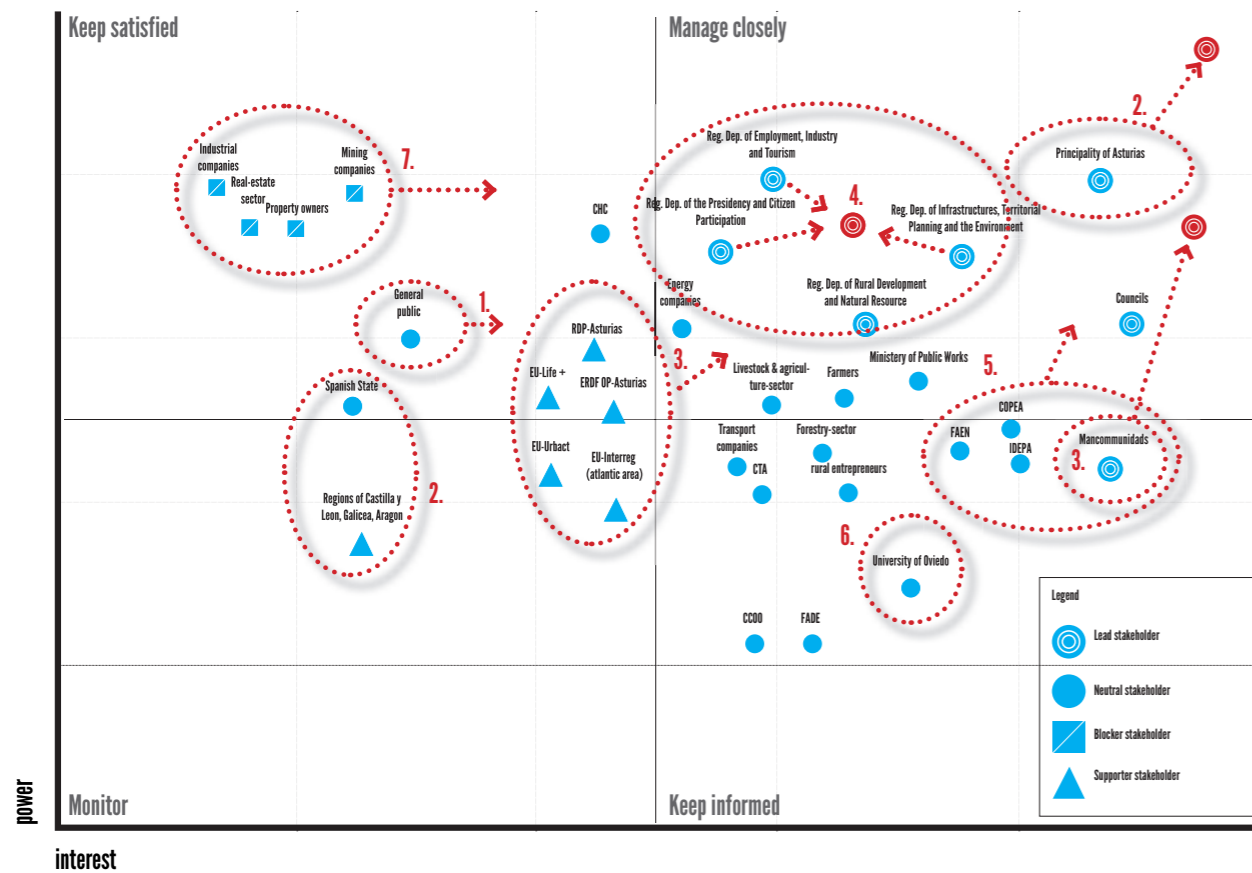


FIG. 5.19 Stakeholders map. Source: author

Engagement strategies

Based on the findings of the analysis the following recommendations are made. In figure 5.19, several of the engagement strategies are demonstrated in the stakeholder map.

1. Awareness campaign

Awareness is crucial for the legitimacy of the plan. Within the planning system of Asturias, there is little consensus on the general direction that Asturias should take, and shrinkage is above all seen as a mayor disadvantage for the region. Opportunities for environmental mitigation, renewable energy production and city greening are only ever seen as second-order concerns. Economic growth, job creation and reversing shrinkage are the main concerns of the regional decision-makers.

To achieve the objectives of the regional design, planners, decision makers and the general public need to be convinced of two things; 1) regaining growth is a very unlikely scenario 2) the opportunities that stem from shrinkage can significantly improve the liveability of the region and reduce some of the push-factors created by shrinkage.

From literature (Pallagst, 2017; Schatz, 2010) it is clear that the paradigm shift from 'growth-oriented' planning to 'decline-oriented' planning is not something that happens within a year. The experience in Youngstown shows that only after sustained shrinkage for decades planners and decision-makers begin to warm-up to the idea of 'decline-oriented' planning (see chapter 4). However, the experience in Youngstown does demonstrate that it is indeed possible to build a planning campaign around the concept of smart-decline.

Convincing the stakeholders of the benefits that would stem from the opportunities listed in the regional spatial agenda requires more than a campaign. The stakeholders need to be shown the potential benefits of the interventions. The best way to do this is to include the stakeholders into the planning and design process. In such a way, they can be shown in real-time what their benefits might be. What is more, including the stakeholders in the process will make them more sympathetic and understanding to the regional design as whole (Kempenaar, 2017).

2. Build capacity for spatial planning at regional level

The regional government is lacking in both financial resources and political legitimacy to conduct large scale spatial plans. This has created a mismatch in power between the regional government, the local city councils and the larger private actors. Before the regional government could implement a plan such as the regional design, this needs to be addressed.

There are two ways in which the capacity of the regional government can be increased. The first is related to the regional elections, which dictate the legitimacy of the regional government. Regional elections are not considered to be within the scope of this plan.

The second way in which the regional government can gain more capacity is through the nation state. As has been described in chapter 3 the nation state controls the expenditure

of the regional government. Therefore, the best way for the regional government to increase its capacity is to lobby for more revenue from the nation state.

Already an initiative has been undertaken by the regions of Galicia, Castilla y Leon, Aragorn and Asturias to lobby for more resources. All four of these regions struggle with the consequences of shrinkage and are struggling to keep their regions liveable. The regional design proposed in the previous sections could be a useful argument that extra revenue is not only required to sustain the provision of services, but also to develop opportunities that are valuable to the nation state as whole.

3. EU support; the regional operational programme and the ITs

The support of the various European structural funds is of great importance to the success of the plan. Two things are important when it comes to the European structural investment funds (ESIF). First, are the priorities of the various funds which determine which projects are entitled to funding. Second, is the way in which these funds are allocated.

The investment priorities of the various European funds such as the ERDF, EMFF and the EAFRD are formulated for 7-year periods. The most recent being the period of 2014 to 2020. In an ideal scenario, the region of Asturias could lobby for the adoption of certain investment priorities that are directly related to shrinkage. As Haase, Athanasopoulou, and Rink (2013) indicate, the current EU documents do not mention shrinkage explicitly. Mentioning shrinkage as a priority could help to make governments more attentive to the needs to adapt cities and regions for shrinkage.

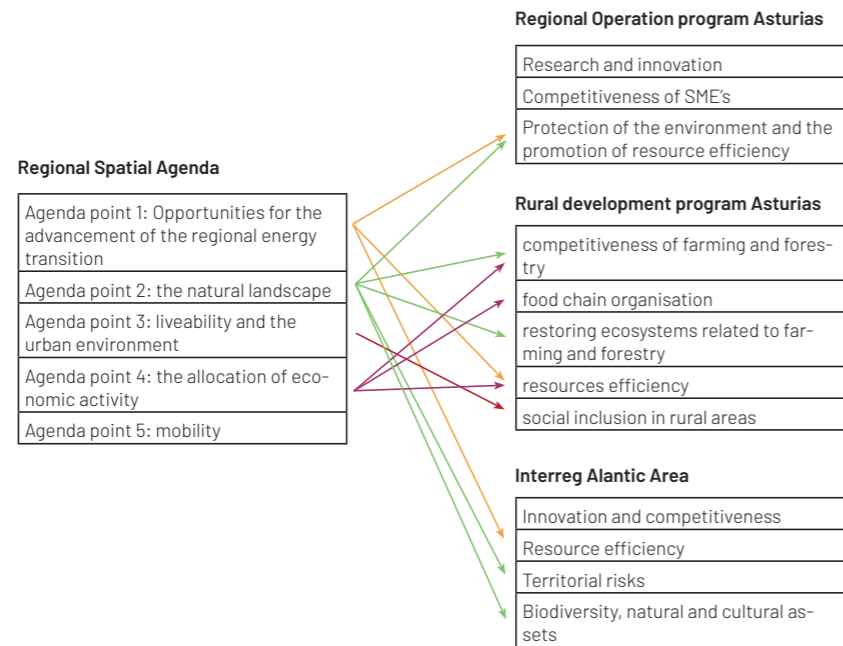


FIG. 5.20 Connections of the Regional design to various European programs. Source: author

However, lobbying for these priorities is probably more a task for the national government as a member state of the EU. Where the region is likely to have more influence is in the selection process where priorities are adopted in the regional programs. Currently, Operational Program (OP) of Asturias has devoted most resources to 'Strengthening research, technological development and innovation (25.26 %); Enhancing the competitiveness of SMEs (30,90 %);' and 'Protecting the environment and promoting resource efficiency (20.26 %)' (europa.eu, n.d.). The priorities of the OP are not ideally aligned with the objectives listed in the regional design (the last point concerning the environment seem to suit the objectives of the design, but in reality is spend almost solely on the waste-water system (europa.eu, n.d.).

The upcoming period of 2021-2028 is an opportune time to readjust the operational programs of the RDP and OP. The investment priorities should be better aligned with the various projects and interventions listed in the regional design. What is more, more funding should be made available for technical assistance to help the regional government make the necessary organisational transformations, such as the creation of new platforms for municipal cooperation, that would be required for the implementation of the regional design. The region should also look to other programs such as the INTERREG Atlantic area. This program can be of use if the region collaborates with its neighbouring regions. Already the spatial agenda overlaps with many of the funding priorities of these programs (see figure 5.20).

4. New platforms for cooperation

Many of the actions listed in the regional spatial agenda require the horizontal and vertical governmental collaboration. These actions were not formulated based on the competences of the local and regional governments, as such there is a significant overlap and, in several cases regional collaboration is essential to the implementation of a given action.

As was elaborated in chapter 3, Asturias has currently too entities for regional collaboration, mancomunidades and consortia. However, neither of these entities is suited to implement the regional design. The mancomunidades can only address competences on the municipal level, which makes them ineffective in plans that require vertical coordination. The consortia do have the ability to coordinate vertically, but they are single-purpose which makes them unsuited to implement the wide spectrum of interventions as proposed in the regional design.

In the conservative planning system of Asturias, where self-governance is valued highly, instituting a new regional body with its own competences is likely to receive resistance from the various public bodies, especially it is instituted top-down. What is more, though the implementation of the regional design does concern the competences of regional and local governments, it is not necessary that these competences be controlled by one body. Therefore, a different approach is proposed.

Instead of instituting a new body, it is advised to organise a programme for regional cooperation, the Shrinkage-programme. The model for this programme is taken from the Dutch 'Delta-programma' (Vreugdenhil & Wijermans, 2012). The framework would entail a series of planning arenas organised around the respective themes listed in the spatial agenda and around the four different sub-zones that have been identified in the

region (see figure 5.21). The programme would be organised by the regional government of Asturias, and overseen by the department of infrastructures, territorial planning and environment.

Each arena would be attended by different public bodies (regional departments, municipalities, mancomunidades, consortia, and hydrographic confederations) depending on the theme and subzone. The arenas need not take away any competences from these respective public bodies and are therefore less of a threat to local autonomy. Decisions formulated in the arenas should not be enforced through autonomic law but through mutual contractual agreements by the relevant governments.

To incentivise the actors to participate in the Shrinkage-programme financial resources should be channelled through the programme. In other words, regional funding from programmes like the RDP and the OP should be granted under the condition of collaboration through the Shrinkage-programme. In the next section the institutionalization of this programme is further elaborated.

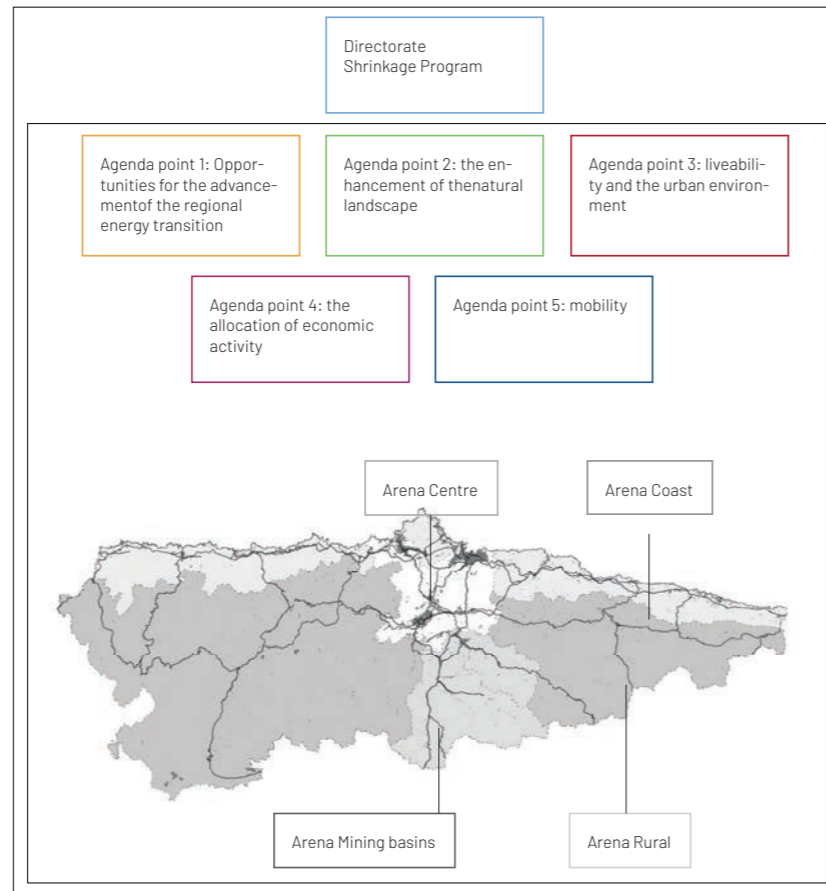


FIG. 5.21 The shrinkage programme modelled on the dutch 'Delta-programma'. 5 general themes and 4 sub-regions. Source: author

5. Private and civic engagement

The participation of private parties and civic groups in the planning process is of great importance for the implementation of the regional design. Firstly, participation will help to adjust planning interventions to the needs of the local populations and businesses. Secondly, participation will make it easier to gain (financial) support for the implementation of the regional design.

Participation with civic groups needs to be organised on the municipal level. In a select few councils, civic assemblies are already purposed to advise the local authorities. This model should be rolled out over the other councils as well. In certain cases, when councils are very small it is advisory to organise these civic assemblies on the level of the mancomunidades.

Engagement with the private parties should be led by the regional governments, through its respective development agencies, such as the IDEPA, COPEA and the FEAN. These agencies already have a good network within their respective sectors and would serve as a useful basis to reach out to the private parties. The various projects and policies in the spatial agenda should be further developed in collaboration with the private actors. Naturally, the goal would be to identify projects wherein private and public actors can partner-up.

6. Knowledge system

Despite being affected by shrinkage for over 40 years, the region of Asturias has a limited view of the impact of shrinkage, in particular the spatial impact (vacancy, brownfields, farmland abandonment and technical infrastructure) is understudied. This is a problem, because a better overview of the effects of shrinkage will be essential to better align the regional design with the reality of shrinkage. What is more, a better understanding of the effects of shrinkage will help actors to understand the common challenges and opportunities and strengthen the argument for cooperation.

The region must work together with the councils, land owners and knowledge institutes such as the university of Oviedo to create an extensive monitoring system that keeps a better track of the (spatial) impact of shrinkage.

7. Incentivising the regeneration of vacant land

There is one group of stakeholders that are instrumental to the implementation of the plan, the land owners. Most of the vacant land in Asturias is not owned by public parties, but by industrial companies, real estate developers and private persons. Only industrial greyfields are owned by public authorities. Accessing this land for new developments requires the cooperation of the land owners. This presents a problem given that the interventions proposed in the regional spatial agenda do not directly lead to positive monetary incentives for private parties. In the current system, land owners are not discouraged to keep undeveloped vacant land. Councils are incentivised to support this activity through the land tax system, which rewards any land that is consolidated whether it is used or not. What is more, weak environmental legislation does not oblige industrial land owners to clean up polluted land.

There are several actions which can be undertaken to address this problem and persuade the land owners to participate in the implementation. The initiate changes in the land tax system to penalize the keeping of vacant land. In principle it should become unattractive to keep vacant land for a long time. The second action is a stronger enforcement of environmental law, which would force industrial companies to clean up brownfields. Under the currently system, companies can keep brownfields untreated for undefined periods, under the condition that they pay a fine. The third action is concerned with the financial benefits that councils receive from consolidated but vacant land. This should be addressed by implementing a fine for councils that are keeping vacant land when commercial development is absent.

Once the negative incentives are in place, land owners are left with three options; 1) they find a developer that is prepared to initiate a new development 2) they sell the land to the public sector 3) they engage with the regional design in exchange for lower costs.

It should be noted that not all interventions proposed in the regional agenda are necessarily long term. Interventions such as urban farming can be short term uses, after which the land owner might still be able to develop the land.

5.5 – Institutional design

In this section, a more detail explanation will be given concerning the shrinkage-programme as mentioned above. The purpose of the shrinkage-programme is to not override the authorities of regional and sub-regional actors, but to create arenas for policy making wherein common agreements can be made. This organisational structure presented in this section draws heavily on the Dutch 'Delta-programma' as described by Vreugdenhil and Wijermans (2012).

Within the Shrinkage-programme nine arenas have been identified. Four of these arenas are defined related to the sub-regions that followed out of the regional diagnosis in chapter 3, the other five are concerned with the general themes in the regional spatial agenda (see above). Within each arena local authorities and regional authorities such as councils, mancomunidades, consortia and departments of the regional government develop plans in collaboration with private and civic groups. These arena's will be supported by a knowledge network, which will consist of various departments of the university of Oviedo. Each arena would be led by a director whose task it would be to keep the synergy between the different arenas. The arenas would report both to the regional governments as well as to the local decision makers. The local decision makers keep the authority over their respective competences, and the regional governments can choose to support the local authorities through its own regulations and funding.

The programme is meant to respect the local autonomy as much as possible, non the less it is essential that certain hierarchies are established. An important hierarchical relationship is that the four sub-regional arenas are required to integrate the results of the general themes. What is more, in circumstances where the arenas cannot arrive at a decision the director of the Shrinkage-programme could intervene. In figure 5.22 a diagram is shown that demonstrates the relationships between all the respective bodies.

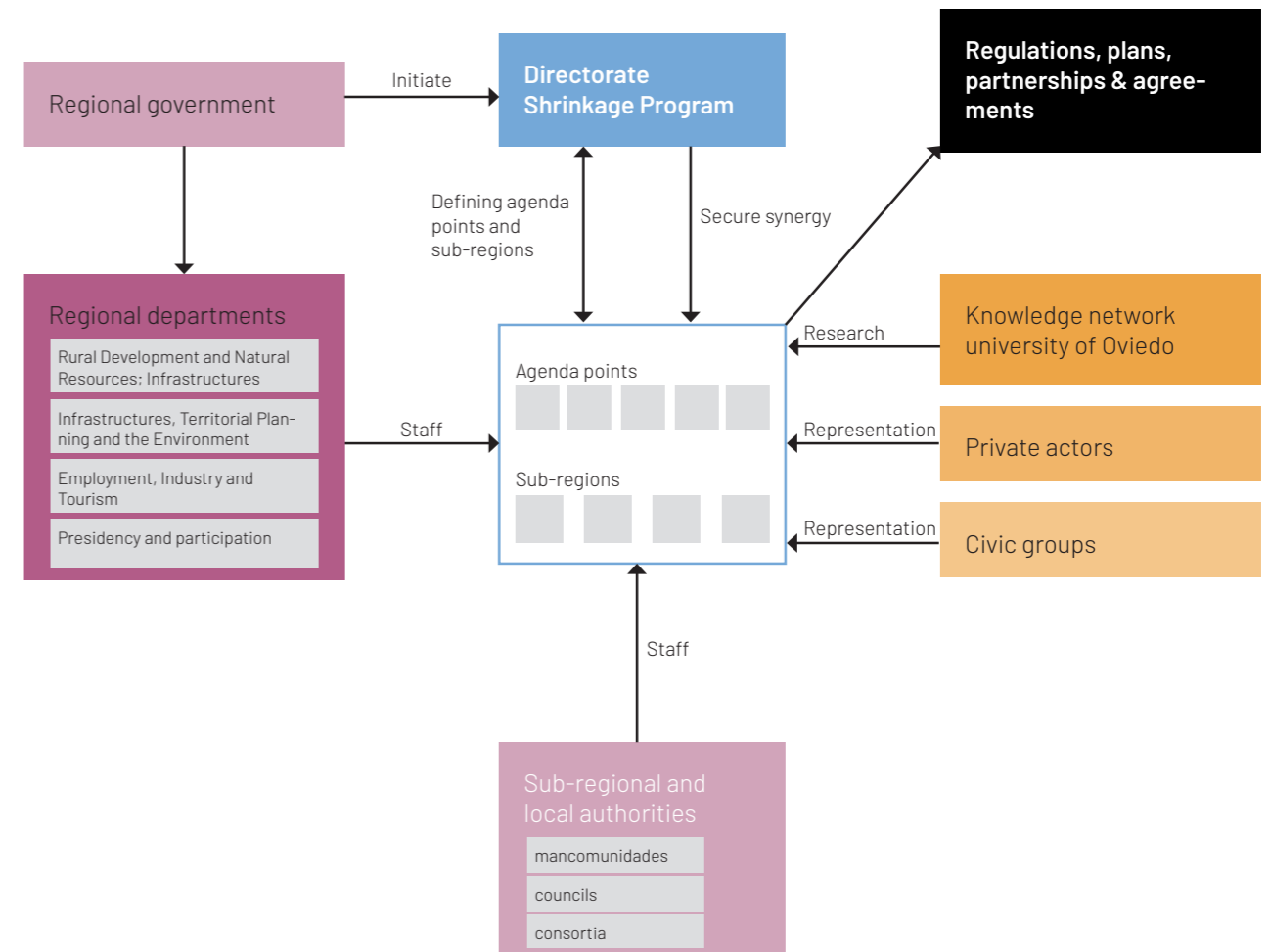


FIG. 5.22 Organisation structure of the Shrinkage-programme Source: author

5.6 – Phasing

As was explained in chapter 2, a regional design is not meant as a blueprint for implementation. The goal of a regional design is to influence the spatial planning process, and through that influence bring about regional transformation. The influence of the regional design is highly dependent on the way it is linked to the stakeholders and on how it is fitted in to the institutional context.

This section outlines the relative phases in which the design can influence the planning process. It also highlights the formal planning documents and procedures which the design should influence to have the biggest effect (see figure 5.23). The phasing is based on the strategic spatial planning process as developed by Albrechts (2010).

Agenda setting

In the first phase of the process the most important task is to influence the ambitions and goals of the relevant governments. It is essential for the local governments to stop seeing shrinkage as a problem that needs to be reversed and to start seeing it as an opportunity to make the region a more liveable and more sustainable place. The regional design displayed above should be instrumental to arouse the discussion concerning the shared responsibilities and opportunities. The regional design should be used as a starting point to engage with the various public bodies. In this phase the public authorities will have the opportunity to advocate their own agendas and push for changes in the regional design. Together they should be able to shape both the content as well as the organisational structure of the regional design. It is important that first the public actors find common grounds with regards to the regional design, only after that is accomplished can the private actors and civic groups be engaged. If this is not done, then it might lead to confusions and misplaced expectations.

Alongside the regional design process would be the awareness campaign, wherein the private parties and civic groups are made aware about the intentions of the regional design.

Finally, the awareness campaign needs to be accompanied by the initiation of the knowledge network. As explained above, a better overview regarding the impact of shrinkage over the territory goes hand in hand with the awareness campaign.

This phase would end with a second iteration of the regional design. Wherein the interest and ambitions of the respective governmental bodies would be integrated. Shortly after the publication of the second regional design should be the publication of the AVANCE DROT. The AVANCE DROT would be the first official proposal wherein the regional design and its organisational structure would be institutionalised.

Kick-off report

The publication of the second regional design and the AVANCE DROT form the start of the second phase. This phase is mainly concerned with the outreach to institutions and

actors that lie outside the regional and local governments. In this phase the regional government starts its first lobby campaign towards the higher-level governments, meaning the Spanish state and the relevant institutions and programs of the EU. In this phase it is essential that the region makes use of its relationship with the surrounding regions – which are struggling with similar concerns – to form a united front towards these higher-level governments.

This is also the first phase where the region reaches out to the various private actors and civic groups. These stakeholders should be engaged via the local councils and via the public agencies of the regional government. Again, the basis for this should be the regional design. The private actors and civic groups should now be integrated into the design process. By integrating these new actors into the process, it is inevitable that aspects of the regional design change, agenda points might be added or removed, and new stakeholders can be involved.

The conclusion of this phase would be the publication of the third iteration of the regional design. After the publication of regional design should follow the DROT 2020, which would contain the regional directives and the formal organisation of the Shrinkage-programme.

Integrated strategic plan

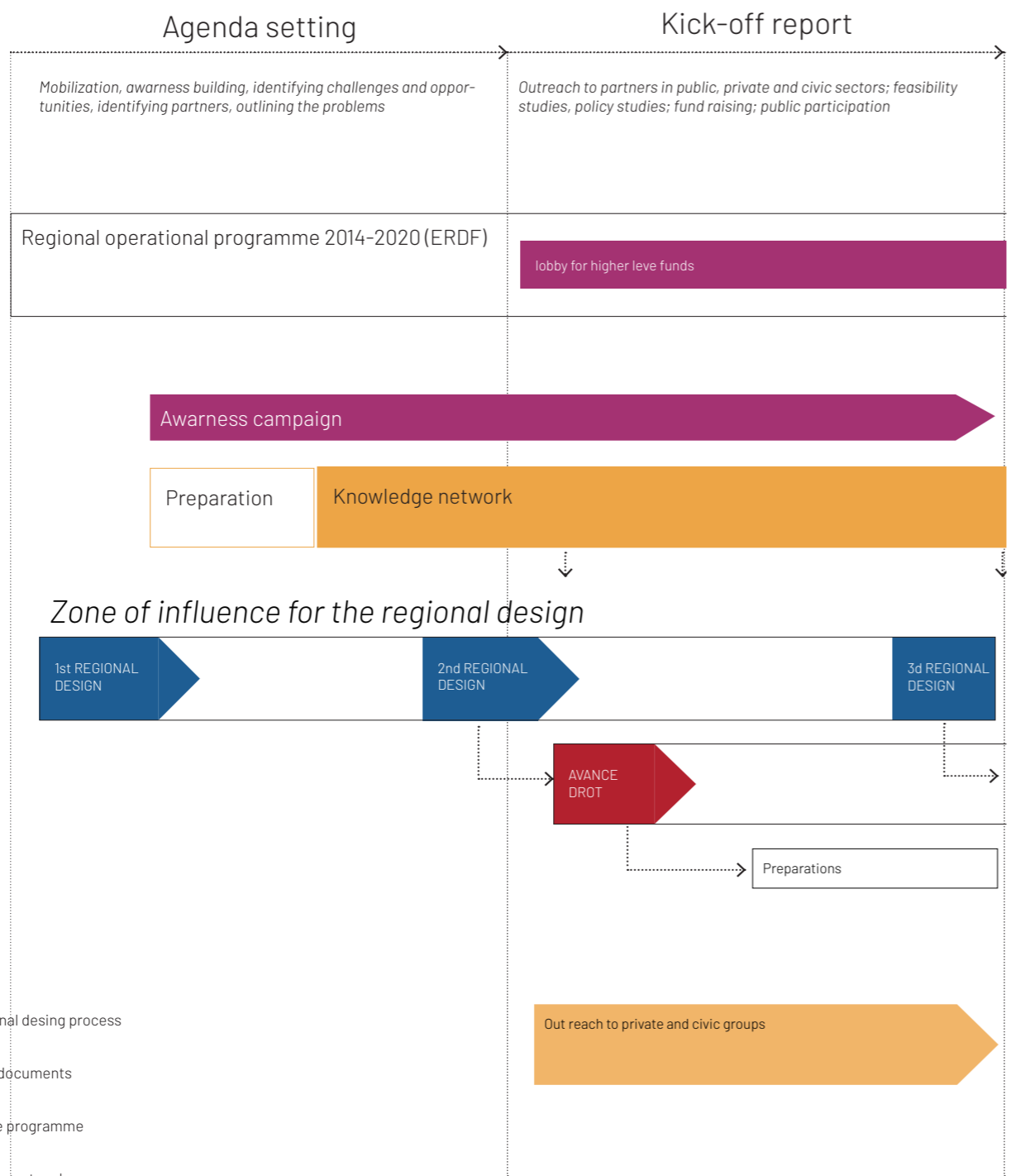
The third phase is initiated with the official publication of the DROT 2020. In this phase the main tasks are setting up contractual agreements between public, private and civic parties. It is in this phase that the Shrinkage-programme will be initiated.

This is the first phase where the support of supra-regional organisations such as the nation state and the EU is required. Programs such as the Operational Programme Asturias can assist in the initiation of the shrinkage-programme by providing technical assistance, for instance by supporting management trainings, evaluation and monitoring.

After the publication of the DROT and the initiation of the Shrinkage-programmes, agreements and decision need to be made between public, private and civic actors regarding the implementation. These agreements will be made in the various planning arenas mentioned in the paragraph on institutionalisation. The decisions made in the planning arenas would entail things like local land use plans, public-private investments and the initiation of new projects. This phase would end with a series of lower scale implementation plans for the four sub-regions.

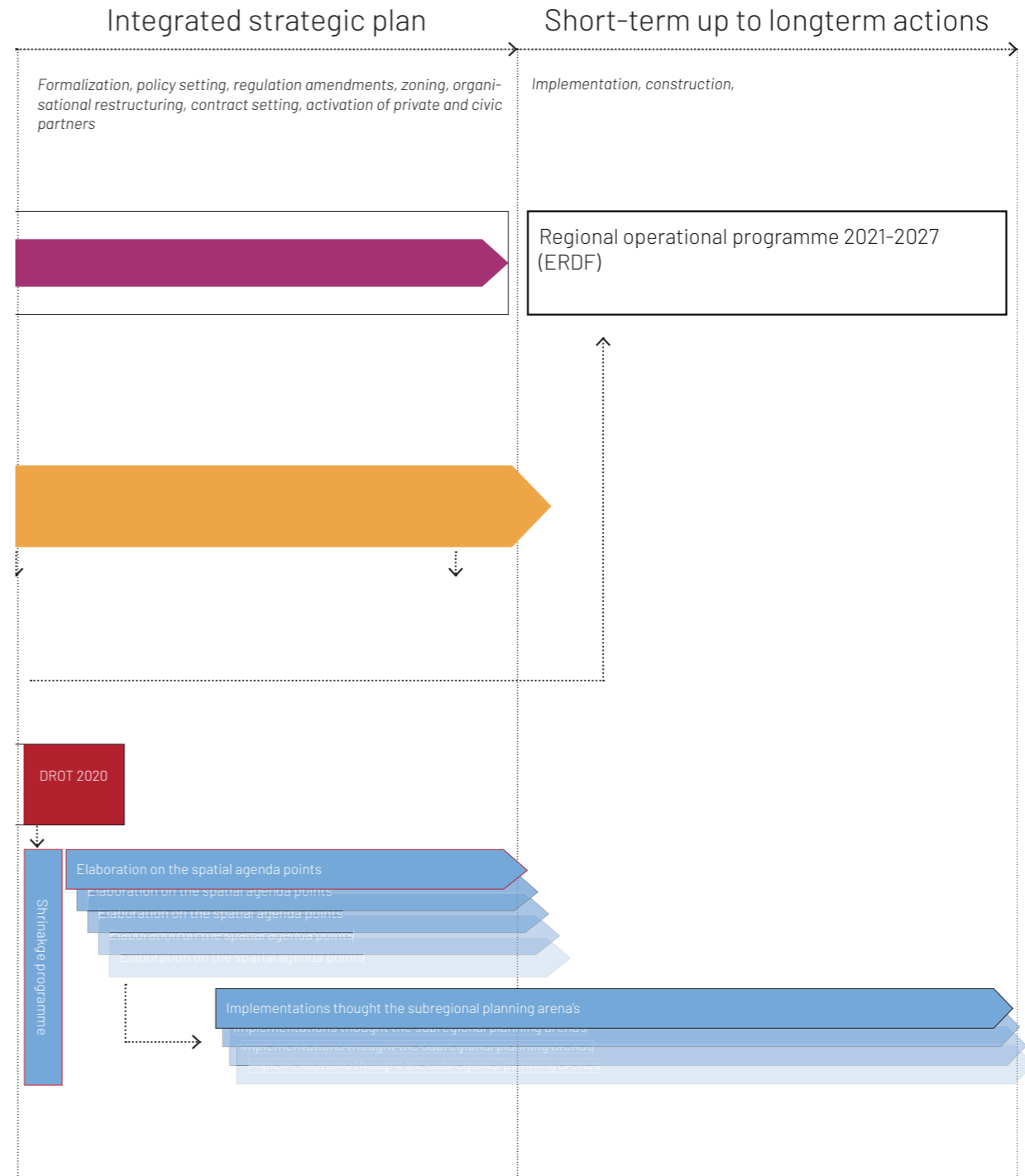
Short-term up to long-term actions

The final phase is concerned with the implementation of the regional design through the shrinkage programme. Although the regional design has been formalised in the previous phases a certain level of flexibility needs to be maintained. After the first series of interventions are implemented, the results should be evaluated. Based on this evaluation adaptations and changes might need to be made to the regional design or to the lower-level implementation plans. Therefore, the shrinkage-programme needs to be maintained until all the actions are completed.



- Legend
- The regional desing process
 - Planning documents
 - Shrinkage programme
 - Knowledge network
 - Campaigns

FIG. 5.23 Phasing. Source: author





A former coal mine in the centre of Mieres, Asturias. Source: author

6 – Conclusions & discussion

This thesis set out to explore the opportunities for sustainable spatial development in shrinking regions through research and the discipline of regional design. The chosen methodology for this thesis was a case study approach, which allowed the thesis to study the phenomenon of shrinkage in its context. The selected case for this thesis was the Spanish region of Asturias.

The thesis was built up around the main research question: How can regional spatial development be directed to exploit the opportunities that stem from shrinkage? The short answer to this question is that regular planning procedures are ill suited, to 1) recognise the opportunities and 2) to exploit them. A design approach, such as demonstrated in this thesis is more versatile and looks beyond the interests and jurisdictions of the stakeholders. As such, it is a useful tool to identify opportunities and argue for the necessary partnerships that are required for this collaboration. However, the adoption of the regional design into the planning system is not a straightforward affair and does require the institutionalization of frameworks for regional cooperation. To explore the main research question in more detail, the following sub-research questions have been pursued: 1) What are the manifestations of shrinkage in the territory and planning system of Asturias? 2) What are principles and strategies for design and planning that can be used to exploit the opportunities in shrinkage? 3) How can these principles and strategies be integrated in to a regional design that guides regional spatial development? This chapter discusses the most notable results from the thesis with regards to the first three sub-questions. The chapter then concludes with the limitations and implications of the research and a general conclusion.

1) What are the manifestations of shrinkage in the territory and planning system of Asturias?

To answer the first research question, a thorough diagnosis of the territorial characteristics and regional planning system was conducted. The diagnosis drew on data gathered through semi-structured interviews, primary and secondary literature review, mapping and observation.

The categorisation of Bernt et al. (2012) was a useful framework by which to analyse the manifestations of shrinkage. However, the categorisation did not reveal the nuanced interaction between shrinkage and certain regional trends, both in the planning system as well as in the environment. For example, the process of shrinkage has been accompanied by radical transformation of the natural systems, which has resulted in numerous environmental threats, such as an increase in wild fire risk. This calls for the need to

extensively monitor the effects and consequences of shrinkage, something which has not been done in Asturias.

One of the core insights of this part of the research is the dynamic which occurs between the manifestations of shrinkage and the regional planning system. The Asturian planning system is coping with a power disbalance between the regional government, the local councils and the private companies. This power disbalance has partially sprung from the process of shrinkage. The anxiety held by the authorities concerning the loss of employment has reinforced the position of larger private parties which contribute significantly to the regional economy. What is more, a decreased revenue has diminished the region's authority over the local councils. The lack of sufficient revenue has made local councils increasingly dependent on income from the land tax system which has made them relatively laissez-faire towards sprawl and speculation. Finally, the heightened concerns for shrinkage and economic performance have side-lined concerns for natural ecosystems and the quality of the urban environment. Leaving environmental trends, both in and outside the cities, relatively unchecked.

In answering this research question two important contributions were made to the existing literature. First, is the relationship between shrinkage and the rise of certain environmental threats. Several studies point to the environmental benefits of decline for (regional) ecosystems (Coleman & Rowthorn, 2011). However, in this study it has become clear that without intervention a beneficial result for the environment is not a foregone conclusion. This finding highlights the need for sustainable development and planning in shrinking regions. The second contribution concerns the complex relationship between shrinkage and the internal dynamics of the regional planning system. The findings in the study suggest that although there might be more opportunities in shrinking regions to develop and improve the urban and regional environment, the actors in the regional planning system are even less interested towards these opportunities than they would be in growing regions. This finding highlights the need to address the attitudes and incentives for the actors in the planning systems of shrinking regions.

2) What are principles and strategies for design and planning that can be used to exploit the opportunities in shrinkage?

This question is pursued through the study of literature on shrinkage and planning. Additionally, the theoretical knowledge is used to understand the benefits of alternative land uses and their implementation.

Planning and design principles for shrinking regions have only been studied by a handful of scholars and are still lacking in empirical data (Muller & Siedentop, 2004; Schatz, 2010; Schlappa & Neil, 2013). The planning principles discussed in chapter four show remarkably little difference with those that would be considered good principles in a growing context. The planning principles provided by literature are therefore not particularly helpful to give direction to the regional planning process. They should be regarded as necessary conditions wherein strategies for shrinkage can be applied.

The examples of planning strategies that were studied proved to be much more insightful as to the possible directions that planners can take in shrinking contexts. This

calls for more case-studies on shrinkage strategies. However, except for Stadtumbau-Öst these strategies were all implemented below the regional scale. This raises questions as to how these strategies and principles might fare on a regional level.

The theories regarding energy landscapes, ecosystem planning and adaptive reuse prove useful in identifying the benefits of alternative land uses (Bullen & Love, 2010; Goldstein et al., 2012; Gómez-Baggethun & Barton, 2013; Dagmar Haase, 2013; Sijmons, Hugtenburg, Feddes, & Hoorn, 2014). By assessing the potential of these land uses through regional design it became clear that the opportunities in shrinkage go beyond the improvement of local environments. Depending on its scale and impact, shrinkage can harbour opportunities to address regional environmental problems.

All three of the theories are well-grounded in the empirical research. However, all three are faced with a difficulty of not being recognised in decision-making processes. The shrinking context provides an opportunity to alternative land uses, because the demand for traditional land uses is reduced. However, as the research in Asturias showed, convincing decision-makers of the value of these interventions remains a challenge.

As demonstrated in the final section of chapter four, regional design could be a useful tool to highlight how alternative land uses could potentially benefit stakeholders in the region and convince them to break the planning deadlock. It demonstrates how various stakeholders might benefit from the cooperating with regards to certain interventions. What is more, it shows how, by participating on a regional level, these stakeholders can gather more support from supra-regional organisations, such as the national governments and operational programmes of the European structural investment funds.

In answering this research question three important contributions were made to the existing literature. The first contribution concerns the importance of empirically tested planning strategies over the need for relatively abstract planning principles. The planning principles that can currently be found in literature are unambiguous and do not offer any direction for planners and decision makers. The second contribution concerns the potential of alternative land use to address regional environmental issues such as flooding, fire risk and landslide risk. Up until now, the literature has mainly focus on the potential benefits of greening vacant lots in urban contexts (Dagmar Haase, 2013; Dagmar Haase, Haase, & Rink, 2014; Nassauer & Raskin, 2014). By analysing shrinkage on a regional scale, the thesis has demonstrated that the opportunities within shrinkage have the potential to address serious environmental issues, in certain cases they might even generate potential for economic development.

Finally, regional design has been demonstrated to be a potentially useful tool by which the various stakeholders could be engaged in the process of planning for shrinkage and convinced of the benefits that would be generated through alternative land uses. A regional design process might be an excellent tool to break the planning deadlock with which many shrinking cities and regions are coping (K. Pallagst, Fleschurz, & Said, 2017; Schlappa & Ferber, 2013).

3) How can these principles and strategies be integrated in to a regional design that guides regional spatial development?

The third research question uses the discipline of regional design to integrate the principles and strategies of chapter four into an integral proposal for the case region. The regional design serves two purposes. First, it demonstrates the potential that can be obtained through the exploitation of opportunities that stem from shrinkage in an integrated approach. Secondly, it positions regional design as a useful tool by which to integrate these opportunities into the planning system.

In the regional design, a series of spatial interventions and policies is proposed through the spatial agenda. The interventions and policies show a wide variety of options that are open to a shrinking region such as Asturias. Shrinkage provides much more than merely opportunities to increase green space in cities. Several agenda points show how opportunities in shrinkage can be exploited to enhance regional ecosystems and to mitigate environmental risks, such as flooding, wildfires and landslides. What is more, the transformations of the natural systems, particularly the rise in forest land creates the new opportunities to enhance underdeveloped sectors such as forestry. Even the surplus infrastructures of the mining industry provide an opportunity to contribute to the energy transition. The agenda also calls attention to the need to safeguard natural and cultural landscapes and enhance public transport systems as valuable assets to a sustainable region.

Convincing the stakeholders of the need for the regional design is the biggest challenge. This is an issue that cannot be solved by a single regional design iteration with minimal stakeholder involvement. Chapter five concludes with a proposal for a regional design process, wherein the proposed regional design features as a first document with which the regional stakeholders can be engaged into a regional design process. The act of regional design could prove to be a useful addition to the regional planning system of Asturias, which is currently lacking a framework that includes stakeholders into the planning process.

By answering these questions three important contributions are made to the existing literature. Firstly, the regional design outlined in the previous chapter is one of the few examples that demonstrates how the various shrinkage strategies could be integrated into one holistic approach. Secondly, it demonstrates how such an approach would need to be supported through regional platforms for cooperation. Creating such platforms is a highly contextual affair. The example in chapter five merely shows a possible way in which these platforms can be formed. Finally, the discipline of regional design is 'fitted' into the regional planning system of Asturias.

6.1 – Discussion

Limitations in the application

Although the proposal in the preceding pages is grounded in the contextual limitations of Asturias there are still significant challenges to the application. The first limitation with

regards to the application of the proposal is concerned with the need for political strength from the regional government. As was explained in paragraph 5.5 the strength of the regional governments is not merely decided by the amount of resources that are available to the government, a lot of the legitimacy of the regional government is dependent on the democratic election process. This is something that lies outside the scope and influence of the planning and design discipline. The feasibility of any regional approach such as proposed in the preceding pages might simply be dependent on the presence of a majority government.

The second limitation is concerned with the variety of political parties among the local authorities. Again, this lies outside the scope of planners and designers, but is none the less relevant to the feasibility of the regional design. In the current political climate of Asturias, long-term planning efforts are swept of the table with every newly elected government. Naturally this is a problem that is faced by every planning effort that takes place within Europe. However, the highly conflicted political climate of Asturias does make this more of a worry.

The third limitation is related to the particularly legislative planning culture of Asturias, which has consequences for both the use of regional design as well as for the institution of the Shrinkage-programme. Regional design, be it under different names, is used widely across the world (Neuman & Zonneveld, 2018). However, as Balz and Zonneveld (2015) argue the amount of influence that a regional design can have is dependent on the flexibility of the planning system. The Asturian planning system is rather bureaucratic, and open-ended planning methods, such as regional design, are uncommon. This raises doubts about the level of legitimacy that would be granted to the regional design (process) by the Asturian planners and decision makers. A similar issue goes for the shrinkage-programme, which proposes a novel way of inter-regional cooperation. The models for municipal cooperation in Asturias are limited to two entities, mancomunidades and consortia. The importance of is undisputable given that they are written into the national constitution. The role of a flexible form of cooperation, such as proposed in the shape of the shrinkage-programme, has no predecessor in the Asturian planning system.

The fourth limitation is related to the need for critical mass to trigger the necessary paradigm shift with regards to shrinkage. In chapter four the example of the American city of Youngstown is given. The regional authorities of Youngstown and its surrounding region were able to lead a relatively successful campaign that persuaded stakeholders of the potential benefits of a smart decline approach. This paradigm shift was largely dependent on a new wave of young planners in the local authorities, who were convinced of the need for a new planning approach (Schatz, 2010). Within the scope of this thesis, it is impossible to say whether such a critical mass is present or not in Asturias.

Limitations of the study

Although this thesis was extensively prepared, there are notable limitations to the methodology used. The data which was used for the diagnosis of the region was limited. For instance, no data base was kept regarding the extend of vacancy in the region, nor was there any data regarding the locations of brownfields. Potentially the lack of this data left certain insights undisclosed. According to several interviewees (interview 2, 6)

the region of Asturias is in the process of gathering more data. This creates a promising perspective for future research in the region.

In the research design, it was decided that due to practical and time-related issues it would be unfeasible to integrate local stakeholders extensively into the process. Local stakeholders were only consulted once. Though the stakeholders were asked to reflect on the preliminary design the stakeholders were not consulted multiple times in the design process. Therefore, the regional design that is presented in chapter 5 is less grounded in the interests and capabilities of the local stakeholders as it would be in case of a regional design effort undertaken by the regional authorities in Asturias. Potentially, consulting the stakeholders in multiple rounds of the design process could have uncovered aspects that are now overlooked by the regional design proposed.

In an ideal scenario, these limitations could be addressed by conducting a full-scale regional design process in a shrinking region, wherein the relevant stakeholders would take part and resources would be made available to close the gaps in the data. Only through a real-world test would it be possible to assess to what extent regional design could be used to influence the regional planning process.

Recommendations for future research

This thesis investigated how regional development could be directed to exploit the opportunities within shrinkage. The research was limited to the case region of Asturias. For future research, it would be interesting to compare the opportunities and challenges of other regions with those of Asturias. This could shed more light on the transferability of interventions and policies.

The thesis calls for more empirical research into actual policies and strategies for shrinkage planning and design. Too little is known about the success of the presented interventions. This poses a challenge to the advancement of this field in planning theory and practice.

Through this thesis an important research gap was uncovered. Namely, the difficulty to gather stakeholder support for non-growth strategies and alternative land uses in shrinking contexts. Many scholars have pointed to the opportunities for ecosystems, adaptive reuse and renewable energy systems (Dagmar Haase, 2013; Dagmar Haase et al., 2014; Hollander, Pallagst, Schwarz, & Popper, 2009; Karina Pallagst, Mulligan, Cunningham-Sabot, & Fol, 2017; K. M. Pallagst, 2007). Up until now, much of the discussion on shrinking cities and regions has indicated do and don'ts for shrinking regions, but has shed little light on how to convince the stakeholders that this direction is desirable. The regional design process is a potential vehicle to accomplish this. However, more empirical research should be done to assess how this discipline could shape and influence the interaction between the stakeholders.

On several occasions this thesis has highlighted the important role of the national and European governments as supporters of shrinkage mitigation. Currently, most of the policies and funding mechanisms are calibrated to support and incentivise growth (Schlappa & Neil, 2013). Strategies aimed at downsizing and optimising urban and regional systems will become increasingly important as the European regions continue to shrink. More research should be done into how the national and European governments can align policies and funding mechanisms to support such strategies.



Central Termica Soto Ribera, one of the many coke-fired energy plants in Asturias. Source: author

7 – Reflection

This thesis set out to uncover the opportunities that stem from shrinkage for regional spatial development. The aim was to understand what these opportunities were and how they could be used to support sustainable development in shrinking regions. For this reflection five aspects of the thesis are discussed; the relationship between research and design in the thesis; the relationship between the research studio and the thesis topic; An elaboration on the research method and approach in relation to the graduation studio; the societal relevance; and finally the ethical considerations.

7.1 – Research and design

In this thesis, the design draws heavily upon the research. In this thesis design played two pivotal roles, first as a tool to illustrate the opportunities for regional development that stem from shrinkage. Secondly, as a tool to integrate these opportunities into the regional planning system and the local institutional framework.

The thesis draws on theoretical knowledge from shrinkage, spatial planning and regional design literature. Subsequently, this theoretical knowledge is applied to diagnose the case of Asturias. The theoretical background was used to diagnose the region with respect to the spatial manifestations of shrinkage and the state of the regional planning system. Based on extensive literature research, the thesis identified planning and design principles and strategies that could exploit the spatial manifestations of shrinkage and enhance the regional planning system. Then, these principles were integrated into a regional design proposal, which advocates for the implementation of several policies, projects and organisational transformations to address the various challenges and opportunities, as identified in the diagnosis.

7.2 – The thesis topic and the research studio

This thesis was conducted under the research group ‘complex cities’. The Complex cities research group is focused on the studying spatial change by drawing on knowledge from a wide variety of disciplines, such as planning, design, political science, geography and history. The group is concerned with the study of different regions and cities from around the globe. The relationship between institutional and spatial change is of particular importance to the group. Students of the research group are not only expected to imagine spatial transformations but also to understand how such transformations should be managed by the relevant institutions. Finally, the engagement of stakeholders and the mediation between their interests and powers are a crucial subject for this research group.

This research and design project fits well within the scope of the research group. The diagnosis chapter of the thesis draws on various disciplines such as geography, planning,

and political science. The regional design proposal of chapter five is not only concerned with the physical transformation of the territory but also the design is supported by and elaborate implementation strategy that proposes new government institutions and legal amendments to the land use system. What is more, the implementation strategy features an extensive list of engagement strategies with which the various stakeholders should be involved in the project.

7.3 – Research methods and approach in relation to the graduation studio

The Complex Cities studio distinguished its self from other studio through its emphasis on the use of research methods from the social sciences, such as semi-structured interviews.

The approach of this thesis was guided by this emphasis. The methodology of this thesis combined theoretical knowledge with extensive spatial analysis of the case study. The methodology included the study of the regional planning system. The thesis drew on several sources of data including: semi-structured interviews, primary and secondary literature, and observation. By triangulating between the sources, the thesis was able to ensure the validity of the results.

Special attention should be paid to the role of regional design in this thesis. As was explained in the second chapter, there is a certain variety in the interpretations of regional design (Balz & Zonneveld, 2015; Kempenaar, 2017; Neuman & Zonneveld, 2018; Nijhuis, 2017). It is important to be clear as to where this thesis should be placed with regards to those interpretations. The presented regional design, as presented in chapter five, bares more resemblance to the discourse displayed by Neuman and Zonneveld (2018) and Kempenaar (2017) than to the interpretation of Nijhuis (2017). In the process of this thesis arguably a larger amount of attention has been paid to the understanding and addressing of the institutional context than to the physical and environmental context. This is not accidental. Based on the semi-structured interviews conducted during the fieldwork, it became clear that the institutional context of Asturias was the biggest challenge for the sustainable development of the region. Therefore, the research has become less embedded into the physical conditions of the region more into the planning and governance conditions of the region.

7.4 – Scientific relevance

The thesis was able to identify several scientifically relevant issues, such as; the environmental risks that are involved when the spatial implications of shrinkage remain unaddressed; the complex dynamic between the impacts of shrinkage and the attitudes held by the actors in the regional planning system; the potential to address regional environmental threats through the opportunities within shrinkage. Aside from these findings the thesis has provided novel empirical material, by which shrinkage can be understood in the regional context of one of Europe’s most shrinking regions. This empirical material might help future researchers to better understand the intricate dynamics of the shrinkage problem. It has also demonstrated how a wide array of possible interventions and policies might be integrated into a single comprehensive planning



FIG. 7.1 The relevant SDG's. Source: medium.com

and design proposal. Finally, the thesis outlined a cooperative planning framework as a possible solution to address the limited capacity for planning on the regional level.

7.5 – Societal relevance

Though a substantial amount of research has been done into the topic of shrinkage. Surprisingly little has been written regarding the opportunities for sustainable development in shrinking regions. As this thesis has shown, shrinkage generates various opportunities to enhance natural systems, improve the built environment and provide new valuable resources. The significance of these opportunities is illustrated by the way they map on to the agenda of the United Nations (2015). Thus, the thesis and the regional design proposed in it correspond to the following Sustainable Development Goals:

- Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all
The regional design demonstrates at least three lines of action through which renewable energy sources can be integrated into the regional energy system, for instance by identifying the abandoned mining infrastructure of Asturias a potential for thermal energy storage.
- Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable
The regional design demonstrates multiple lines of actions that can help regions and cities to safeguard a safer and more liveable environment. For instance, by showing how the transformation of brownfield land can help to mitigate flood risks in urban areas and simultaneously provide a more liveable urban environment.
- Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
The regional design demonstrates how shrinkage can be used as opportunity to enhance regional ecosystems. For instance, by showing how abandoned farmland can be exploited to enhance natural forests.

Transferability

The regional design that is proposed by the thesis is developed specifically for the case region of Asturias, thus the transferability of the results to other shrinking regions is highly dependent on the geographic characteristics and planning culture.

Still, Asturias is not unique as a shrinking. Many regions in and outside Europe are dealing with very similar issues. Figure x provides an overview of the European NUT 2 regions which are most resembling the characteristics of Asturias. There are a handful of regions in Europe which are influenced by industrial decline, farmland abandonment and ageing, such as the Italian island of Sardinia, several Romanian regions, a few northern regions of Scandinavia. Many more regions share at least two of the three characteristics of Asturias, such as the German Ruhr-regions which have been hit just as hard by the decline of the coal industry, and the south Italian regions where population decline is accompanied by farmland abandonment. In the regional spatial agenda many interventions are outlined

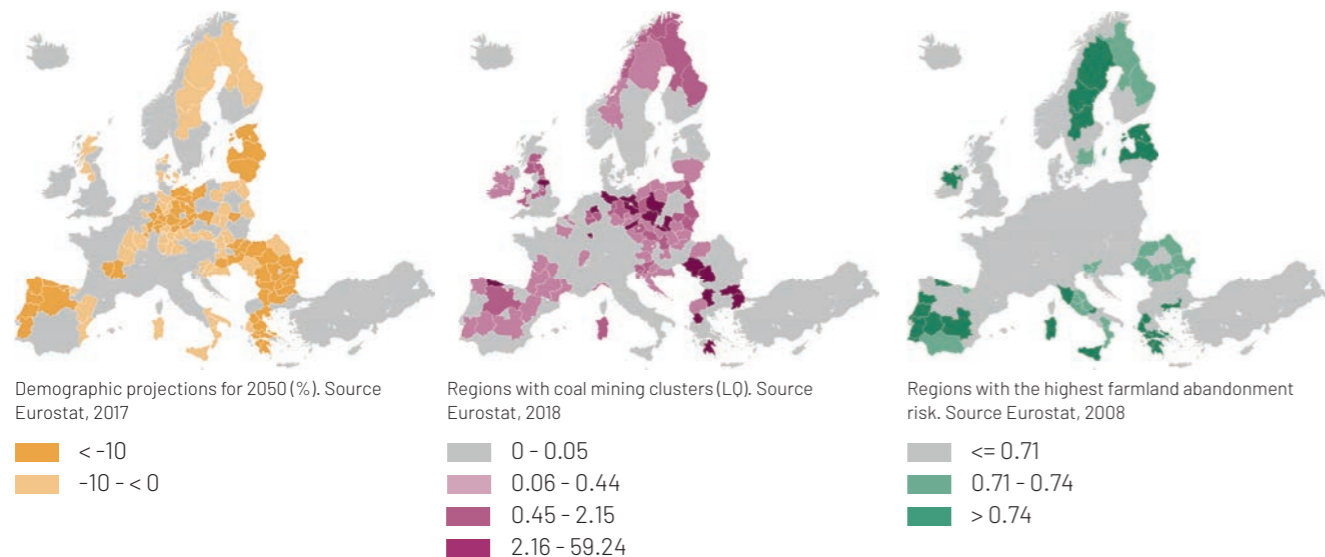


FIG. 7.2 The European NUTS 2 regions which most resemble Asturias. Source: author

that are based on relatively straightforward principles such as the reuse of vacant land for solar energy or the ecological restoration of former mining to support recreational activities. The transfer of these interventions to other regions can be done relatively easily providing that shrinkage has produced similar impacts.

The implementation strategy that accompanies the regional design is more specific to the context of the case study. The possibility to transfer the engagement strategies is therefore limited. However, the need for stronger regional institutions has been called for by multiple authors (Bernt et al., 2012; A. Haase, Athanasopoulou, & Rink, 2013; Schlappa & Neil, 2013). Although the institutional design is specifically formulated based on the particularities of the Asturian planning system, the framework is flexible enough to at least fuel the debate on regional cooperation in other regions.

7.6 – Ethical considerations

Though the regional design poses significant benefits to the region of Asturias, the application of the design would produce certain ethical dilemmas and issues. Here the most important ethical issues are briefly highlighted.

The first ethical issue regards point 3a in the regional spatial agenda, which concerns the consolidation of the rural population in the most central villages and cities. The benefit of this policy would be that the service provision would become less costly and the authorities would have more resources to invest in other developments. However, this action could further isolate those inhabitants and businesses that have chosen to establish themselves in the less accessible parts of the region.

The second issue regards point 4a in the regional spatial agenda, which concerns the out phasing of all industrial activity outside the three industrial clusters of Oviedo, Gijón and Avilés. The result of this action would be remove industrial land from precarious and in accessible zones and to free up more space for alternative land uses. However, this action could speed up the decline in employment in those areas where industry is phased out.

Addressing these two issues, and others like them, before they have occurred is difficult. Probably the easiest way to address them is through integrating the local communities in the planning and design process. By doing that the regional planners and decision-makers can create understanding among the local population and potentially they could find tailor made solutions in case where local people are indeed disadvantaged.



Invasive Eucalyptus trees in Mieres, Asturias. Source: author

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9 – Appendices

9.1 – Appendix A: interviews

List of interviews

1. Senior researcher, University of Oviedo, Regio lab Asturias
Fernando Rubiera Morollón, University of Oviedo, Regio lab Asturias
2. Senior researcher, Indurot, Coordinador del Área de Ordenación del Territorio
Senior researcher, Indurot, Economics of natural resources specialist

Senior planner, Principality of Asturias, Head of Service Management and Urban Discipline
Senior planner, Principality of Asturias
Senior planner, Principality of Asturias
Senior planner, Principality of Asturias, Head Of Cartography Service
3. Director, Principality of Asturias, General Directorate of Rural Development and Agrifood
4. Senior researcher, University of Oviedo, CeCodet
5. Architect, COAA
6. Senior researcher, University of Oviedo, Regio lab Asturias
7. Head of the Social Welfare Area, Avilés Municipality
8. Senior researcher, University of Oviedo, CeCodet
9. Planner, Municipality of Oviedo, Urbanismo e Infraestructuras
Planner, Municipality of Oviedo, Urbanismo e Infraestructuras



Rural trails on the valley slopes of Mieres, Asturias. Source: author

Interview guide

Background

Name(s):

Position(s):

Description of role:

Opening questions

What is your role within the region/municipality?

Probe: position, main interests, way of working, main occupations, relation to shrinkage

Part 1: Key-questions

Can you tell me about the process of shrinkage in Asturias?

Probe: drivers of decline, mechanisms, challenges, winners/losers, projections, spatial manifestations, economic, social, emotional (how is it felt?), spatial (different dynamics in different areas?)

Who do you think are the leading actors that are responding shrinkage?

Probe: who acts, planning process, public, private, civic

Can you tell me about the actions to shrinkage, and their impact?

Probe: plans, programs, legislation, on what scale

Can you tell me about the impact of those actions?

Probe: impact social, economic, gaps

Part 2: reflections on the design

Does the design answer to regional challenges? Do you recognise these opportunities which is spoke about? Do you think they recognised in the region?

Probe: energy, framing, ecosystems, new economies, local communities

Which stakeholders would need to be involved for the design to be implemented?

Probe: stakeholders, financing, collaboration, planning system,

Could such an approach be a valuable addition to existing strategies and policies?

Probe: regional directives, municipal plans, etc

Responses of interviewees

Impact

environmental	social	economical
Rural exodus -> caused by outmigration and aging in the rural regions(interview 4,10)	Fertility, aging, out-migration of youth, delayed couple formation -> caused by lack of employment opportunities for the young (interview 1, 7, 8, 9, 10)	
Firerisk -> caused by locals trying to fight against natural reforestation (interview 2, 4)	Unattractive living and working environment (interview 3) Depopulation of farming areas -> caused partly by farm modernization (interview 4) Loss of culture -> land abandonment (interview 4)	
		Service provision -> the low population and resources make equal service provision across all the 78 municipalities a problem (interview 1,4) Neighbourhood aging (interview 8)

Challenges

environmental	Social	economical	Organisational
Landscape maintenance -> increasingly difficult due too lack of population (interview 2, 4)	Mentality -> focus on industry, not on other opportunities (especially in te cuencas mineras) (interview 1)	Property rights -> Asturias is very owner-oriented, governments have limited influence on private property. Challenge in the rural areas but also when it comes to brownfields (interview 9)	Top-down planning -> running into problems because local authorities are more powerful. There is still no regional plan since 1991 (interview 1, 2, 8)
Environmental risk (pollution, brownfields, degradation, loss of ecosystem service) -> are not valued in the region and therefore projects in those areas get little support. (interview 4)	Housing shortage for younger people (role for vacancy??) (interview 7,8)	Urban sprawl -> caused by liberal policies, land taxes. Smaller municipalities enhance sprawl because larger municipalities are shunning it (industry in the centre, secondhomes in the coastal region) (interview 1)	Localism -> regional collaboration is blocked by huge variety in political parties and the obsession with keeping competences within the authorities (interview 4)
Car-dependency -> Asturias is one of the most polluted regions in Spain due to its lack of public transport (interview 1, 2)	vacant builings and land are not seen as a problem in the region (interview 9, 4, 1)	Plans on standby -> many plans and projects are on standby due to difficulties in financing and regional collaboartion	Sectoralism -> even within institutions collaboration and integration is minimal (interview 1)
Clean-up not a priority. Nobody takes responsibility. The industries that created the brownfields are no longer in existence (interview 2)		fragemented and undocumented property in the rural areas. 15 unknown owners to one house. No instruments to aquire land except voluntary (interview 4, 9)	collaborative framework -> despite ambitions for collaboration, the region is lacking a clear framework that gives voice to the needs and desires of the regional actors (interview 2)

Opportunities		
environmental	Social	economical
Green belts are ambitions for cities like Oviedo (interview 2, 6, 3)	Rural consolidation of services and opportunities. Is already happening but still unguided (interview 1, 4,5)	polycentric city: intermunicipal mobility is key. Local private parties are already treating the central region as a metropolis. (interview 1)
river corridors and peripheral parks are also on the menu (interview 4)	Active aging -> employment for elderly (interview 7, 8)	forestry: forestry sector is underdeveloped in the region, while the region has an increasing amount of forest. Sustainable forestry is also vital to protect other assets from forest fires. (interview 4)
	quality of live -> small cities in Nature, but part of a 1mln metropolis (interview 1)	Ecofarming: ecofarming is on the rise in rural areas. But is currently lacking support from authorities. Initiatives are stranded due to too much bureaucracy (interview 4)
	Brownfields in the city limits can bring green into the cities. Big cities like Oviedo and Gijon could use that. (interview 1)	Nature-conservation: in combination with farming could be an opportunity for more activity in the rural areas
	Working from home. If the connections are good it would be a opportunity. (interview 8)	Biomass: with local tree species such as chestnut and others (interview 2, 4) Knowledge an innovation -> in the central cities (interview 1,6)
		Health care -> eduaction, innovation (elderly care) (interview 6,7)
		Renewable energy -> production and research (interview 6)
		Tourism (interview 6,7)
		Diversify port (interview 2, 6)

Actors		
Public	Private	Civic
Regional government -> theoretically the strongest actor, but due to a lack of plans an policies it is not in control of the region (interview 1,4,....)	universities -> important research and knowledge institues. Also indirectly responisble for much of the regional planning and research (interview 1,5)	Civic consultants -> only in the big municipalities (interview 6)
State governments -> no budget, no knowledge, no authority (interview 4)	Large enterprises -> Hunosa, Acelor, Dubon, Extrata, Alcoa, Garmess, vortiberia, San Goben -> very strong political actors that prefer to keep legislation at bay (interview 1,5)	
Municipalities of the cuencas mineras -> still strong due to economic boom in the past. (interview 5)	Public transport company ->Alsa bus company (obstructed train connection to the airport) (interview 6)	
Consortiums -> transport, waste and water. Useful models for regional collabaortion but still too sectoral to come up with integrated plans (interview 1,7,8)	Hunosa -> old mining company that is attempting to diversify in the direction of renewables and renaturing (interview 2)	
EU -> lost of funding in the past. Has produced little lasting result because it did not entail a wholesome approach (interview 1, 6, 10)		
Municipalities of Gijon, Oviedo and Aviles -> Strongest players but divided by complicated local politics. (interview 6,7)		
Mancomunidad -> most of them failed, except in the rural regions (example sidra) (interview 1, 8)		

Plans

past	present	future
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Aviles reconstruction 1) social cohesion, local community activation 2) innovation and tech 3) rehabilitation and culture (interview 5, 8)

High-speed connection to Leon (waiting for 15 years still no clear story on how it will be implemented/ municipalities competing for station!) (opportunity for blue/green infrastructure??) (interview 4, 6)

Plan demografico 2017: 1 deregulate rural areas (regulation in the rural is not the issue) 2. Improve public space for elderly 3. Old people as opportunity for employment -> just a compilation of possible interventions, not a strategy (interview 1, 8, 9)

ValleNalon -> incubator for innovative technology companies (not able to keep people living in the areas) (interview 1, 2, 6)

Research into heat storage in former mines -> stopped due to problems with acidification (interview 2, 6)

Research and university in Mieres -> failed to fill the capacity of the buildings. Near by cities of Oviedo and Gijon are too attractive to live. (interview 2)

EU-funding -> lost of funding in the past. Has produced little lasting result because it did not entail a wholesome approach (interview 1, 6, 10)

9.2 – Appendix B: Stakeholder analysis

name	Type	est grad	interest explanation	ence and	influence and power explanation	interests / positive impacts	concerns / negative impacts
Reg. Dep. of Rural Development and Natural Resource	Governmental	4	it is the duty of this department to regulate, fund and implement physical planning of regional importance/influence	4	the department approves all planning activity in relation to its domain	* can contribute to the project by changing legislation * limited political strength due to circumstances * can realise governmental support to the project	limited collaboration between departments * limited financial capacity
confederación hidrográfica cantábrica (CHC)	Governmental	4	it is the confederations duty to protect and manage all the basins in the cantabrico. in relation to water safety, water quality, and sanitation	4	all activities that affect the watermanagement in the nalon basin need to be approved by the confederation.	the confederation could be a supporter of the project by changing regulations and integrating the design into the hydrological planning system. It could also provide access to the public funding	if the confederation would be unconvinced by the benefits of the plan it could block the project
Principality of Asturias/regional president	Governmental	5	it is the duty of the regional government to improve the the conditions in Asturias in the most general sense	5	the region is crucial to facilitate/enforce the collaboration between the different departments and councils	* advocates plan on all levels of government and through all sectors * initiates task force * makes regulative and organisational adjustments * proactively engages private sector and lower authorities * creates financial support * lobbies for national and super national support	* limited democratic legitimacy due to minority government * limited financial and human resources
Public agencies (COPEA, FAEN, IDEPA)	Governmental	3	COPEA -> support and monitor ecofarming in Asturias; FAEN -> support and coordinate bus energy projects; IDEPA -> support economic development and innovation in the industrial sector	3	all have limited formal power but are important links to their respective private sectors	finds partners/investors/entrepreneurs in the private sector	does nothing
Councils	Governmental	5	Local authorities responsible for all planning within the bounds of the councils, with the exception of regional plans.	4	have significant political leverage over regional government	* supports task force * engages local private actors and citizens for particular projects * changes local zoning plans to facilitate the plan * collaborates proactively with neighbouring authorities	low resources * reactionary attitude to regional government * unexperienced in public participation
CTA consortium	Governmental	3	efficient transport system, support territorial planning, enforce public transport	3	important link between the government and the transport sector	support the plan convinces private sector to invest in a more sustainable trasport system	does nothing
Mancomunidades	Governmental	3	mostly employment, spatial planning and tourism	3	crucial bodies for regional coordination	* supports task force * engages local private actors and citizens for particular projects * changes local zoning plans to facilitate the plan * collaborates proactively with neighbouring authorities	* lacking in resilience due to voluntary nature * low resources * reactionary attitude to regional government * unexperienced in public participation
EU-regional development funds (ERDF, EAFRD)	Governmental	3	ERDF -> provides funding for infrastructure, innovation, sme's, and low carbon economy; EAFRD -> rural development, rural innovation, agriculture and forestry	3	Can only influence the project by creating incentives in the form of funding	co-finances part of the project	does nothing
EU horizon 2020	Governmental	3	low carbon economy, societal challenges, innovation,	3	Can only influence the project by creating incentives in the form of funding	co-finances part of the project	does nothing
EU programs (interreg, URBACT, FEADER, Life)	Governmental	3	INTERREG -> innovation, competitiveness, resource efficiency, resilience against environmental threats, natural and cultural assets, biodiversity; URBACT -> urban regeneration, mobility, sprawl, housing, civic engagement; LEADER -> rural development, rural cooperation, bottom-up; Life -> support environmental legislation, policy and projects	3	have limited funds available for investment into projects, but can be valuable supported of the implementation process	co-finances the implementation of certain aspects of the plan	does nothing
Department of Employment, Industry and Tourism	Governmental	4	this department carries the competences of employment and training for employment, management and coordination of labor relations, occupational safety and risk prevention labor, mining, energy, industrial development, tourism, design and management of research and technological development and innovation policies	5	the department is an important actor when it comes to the management of industrial land. Especially when that land is owned by the regional government. It is also the main connection to the private sector.	- can contribute to the project by changing legislation - providing funding	could be a negative political force if it sees the project as a waste of resources - could prevent access to industrial lands
Department of Infrastructures, Territorial Planning and the Environment	Governmental	5	it is the duty of this department to regulate, fund and implement physical planning of regional importance/influence	5	the department approves all planning activity in relation to its domain	- can contribute to the project by changing legislation - limited political strength due to circumstances - providing funding	could block activity
Department of the Presidency and Citizen Participation	Governmental	4	this department carries the competences of justice, security, emigration, equality and youth policies.	4	department is not directly involved in spatial planning.	- can contribute to the project by changing legislation - limited political strength due to circumstances - providing funding	could be a negative political force if it sees the project as a waste of resources
Spanish state	Governmental	2	the Spanish state has an interest in addressing national issues which include population decline, industrial decline and agricultural abandonment	3	the Spanish state controls the revenue supply for the Acs	* can create more revenue to provide the region with more space to invest in innovative plans	* reduces revenue due perceived reduced cost of a smaller population
Spanish ministry of Public Works	Governmental	4	this ministry carries out the construction of national infrastructure (HSR)	3	this ministry is crucial in the execution of the HSR	* aligns national infrastructure objectives with the plan * completes the construction of the high speed rail	* ignores plan * fails to complete high speed rail
Department of the Presidency and Citizen Participation	Governmental	3	this department carries the competences of justice, security, emigration, equality and youth policies.	3	department is not directly involved in spatial planning but is crucial to collaboration with citizens, is running important parallel programmes.	- can contribute to the project by changing legislation - limited political strength due to circumstances - providing funding	could be a negative political force if it sees the project as a waste of resources
Region of Castilla y Leon, Galicia, Aragon	Governmental	2	these regions share similar problems with regards to population decline, industrial decline and agricultural abandonment	2	can realise governmental support through lobbying	* knowledge partner * lobby-partner towards national gov.	n.a.
University of Oviedo (regiolab, cecodet, indurot)	university	4	the university is an important knowledge partner with regards to regional planning	2		*knowledge partner * acts as political advocate for the plan	advocates against plan
Transport companies (ALSA, RENFE, FEFE)	Private sector	3	interested in developing public transport system	3	strong political powers	support plan by aligning mobility network	does nothing

9.3 – Appendix C: Theory paper

name	Type	est grad	interest explanation	ence and influence and power explanation	interests / positive impacts	concerns / negative impacts
rural entrepreneurs	Private sector	4	interested in developing rural business	can influence government through 3 unions	can invest in parts of the plan	does nothing
livestock & agriculture-sector	Private sector	4	interested in maintaining the agriculture industry	can influence government through 3 unions	can invest in parts of the plan	does nothing
Forestry-sector	Private sector	4	interested in developing forestry sector	can influence government through 3 unions	can invest in parts of the plan	does nothing
TSK, ENCE and other energy companies	Private sector	3	have an interest in developing opportunities for renewable energy	can influence government through 4 unions	can invest in parts of the plan	does nothing
Industrial companies	Private sector	1	has an interest to be a little restricted by planning as possible	4 strong political powers		can block parts of the plan
real-estate sector	Private sector	2	have an interest to sell undeveloped land and vacant properties	4 have full control over properties	can support plan by investing in parts of the plan	can block parts of the plan
mining companies	Private sector	4	it is in the companies interest and ambition to regenerate the prevailing brownfields in the Nalon and Caudal valleys.	the company owns the majority of brownfields and mining sites in the 4 Nalon and Caudal vally	the company is supportive of regenerative project on the brownfields.	the companies proposed projects have been mainly focused on the creation of business parks and residential housing. It might not be interested in nature based approaches
general public	Civic sector	2		4		
property owners	Civic sector	4		4		
CCOD (consumer union)	Civic sector	3	It is in the unions interest to lobby for improvements for job opportunity, service provision, skill training	the union has shown the ability to hinder public projects through their 3 political power.	the union could aid the plan by raising political support for the plan	the union is unlikely to support public spending on projects that are not focused on employment or service provision. The union might even obstruct the plan.
Farmers	Civic sector	4	interested in maintaining the agriculture industry	can influence government through 3 unions	can invest in parts of the plan	does nothing
FADE	Civic sector	5	interested in maintaining the agriculture industry	can influence government through 4 unions	can invest in parts of the plan	does nothing

Spatial planning in shrinking regions

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Strategies and approaches for practitioners

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Abstract – According to recent studies a significant portion of European regions and cities are dealing with shrinking population figures. The process of shrinkage can have a far reaching spatial impact upon cities and regions. It can bring both problems as well as opportunities. This poses a serious challenge for spatial planners in the European context. This paper synthesises and evaluates the current literature on planning strategies concerned with shrinking, to assess to what extent practitioners can draw on this literature to put forward strategies to respond to shrinkage. This paper outlines and explains the main gaps within the literature. It concludes that although the literature has advanced in the recent years, it still leaves basic questions unanswered, leaving much of the problem to be solved on the local level.

Keywords: shrinkage, strategies, spatial planning

1. Introduction

In the developed world shrinkage is becoming more and more relevant. A significant portion of cities in Europe, the US and Japan can no longer expect growth (see figure 1). Shrinkage is not a new phenomenon, but the persistence with which it is affecting cities in the developed world is unprecedented (K. Pallagst, Mulligan, Cunningham-Sabot, & Fol, 2017). For many cities in the developed world population growth is simply no longer on the cards.

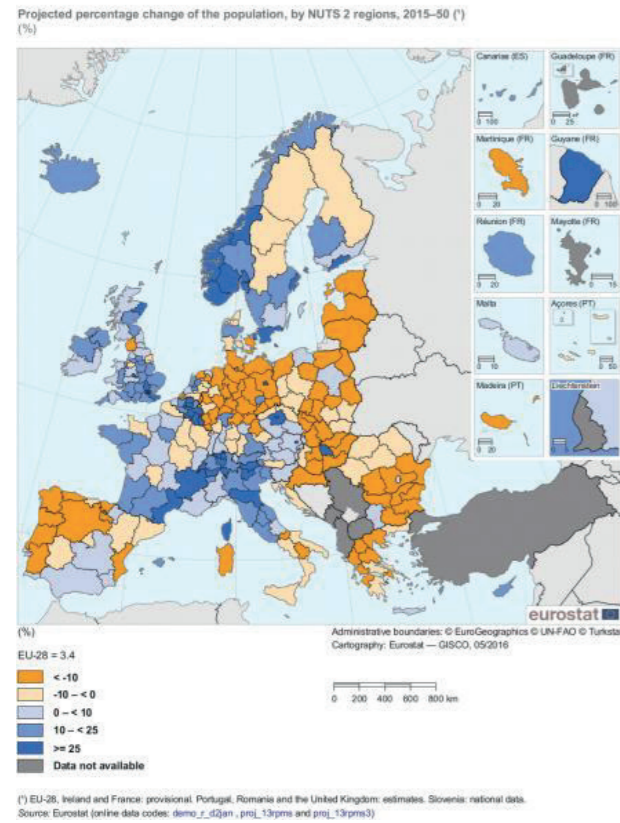


Figure 1: Map of the predicted population change by 2050 per NUTS 2 region (source: Eurostat (2017))

Shrinkage is perhaps first and foremost an economic and a social issue, nevertheless its impact on the built environment can be extensive. Among other things, shrinkage can cause vacancy, brownfields, underused infrastructure, underused social services and land abandonment (Bernt et al., 2012), all of which can have a negative transformative effect on the built environment. However, several authors have argued that spatial planners and designers not only need to respond to shrinkage to ensure that cities and towns remain functional and liveable, but also to capitalise on the opportunities that stem from shrinkage (Haase, Haase, & Rink, 2014; Hollander, Pallagst, Schwarz, & Popper, 2009; Cristina Martinez-Fernandez, Kubo, Noya, & Weyman, 2012; Sousa & Pinho, 2015; T. Wiechmann & Pallagst, 2012).

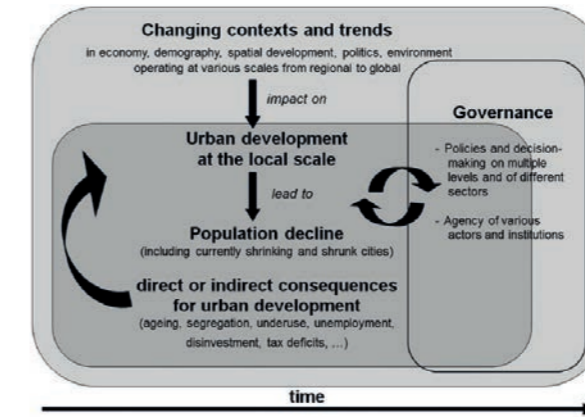


Figure 2. The conceptual diagram of shrinkage (source: A. Haase, Matthias Bernt, Katrin Großmann, Vlad Mykhnenko, and D. Rink (2013)).

Shrinkage is a complex multifaceted issue with a rather simple indicator, namely population decline. Annegret Haase, Matthias Bernt, Katrin Großmann, Vlad Mykhnenko, and Dieter Rink (2013) provide one of the most comprehensive explanations of the issue to date. In their theoretical framework, they frame shrinkage as being driven by an interplay of macroregional trends, local urban development, government policies and local agents. What is more, they added a feedback-loop which shows how the direct and indirect consequences of shrinkage further drive the process (see figure 2). Thus, linking shrinkage to macroregional drivers sheds light on the limits of the local actors' ability to confront the problem. Moreover, the feedback loops that have been included into the model help explain why shrinkage is a structural issue that ties into social, economic, political and physical aspects.

In the last two decades, researchers have tried to come to grips with the complexities of shrinkage. Recent work by Ferber and Schlappa (2016) and Haase et al. (2014) has deepened knowledge concerning the implementations of certain strategies, yet the field has remained fragmented on several issues.

This literature review synthesises and evaluates the current literature on planning strategies and policies concerned with shrinking, to assess the extent to which professional planners can draw on this literature to enact strategies to deal with this phenomenon. It largely omits topics concerning the conceptualisation and causation of shrinkages.

In the following section, this paper gives a summary of the most prominent strategies that deal with shrinkage. Subsequently, the paper outlines the main gaps within the literature.

2. Strategies

There is a great variety in the approaches and strategies that have come forth from literature. There are many questions concerning the scientific underpinning of several strategies as well as debates on what would be the right scale of action. This variety can be sorted into two approaches: reaction and adaptation (Sousa & Pinho, 2015). Reaction is an approach that focusses on reversing shrinkage or re-growth. This approach is generally mostly concerned with economic development. Local governments and even national governments investing energy and resources into regaining growth, especially in the early stages of the process of shrinkage when it is not yet clear whether the shrinkage is a short demographic shock or a long incremental decline (Thorsten Wiechmann & Bontje, 2015). Adaptive strategies have seen an increase in recent years, mainly in German and American contexts. Adaptation requires a different kind of a mind-set from planners and decision-makers. Most importantly it requires them to concede that at least some of their territory will not bounce back from shrinkage, and that alternatives to traditional residential and commercial functions ought to be considered.

It should be added that though this categorisation makes sense when regarding the strategies in isolation, the two are often interwoven. Cities or regions that are going for re-growth strategies often try to adapt to the effects of shrinkage at some stage, and vice versa cities that are adapting to the impacts of shrinkage are hoping that

making their cities greener and ecologically sound will improve their appeal to new populations (see Anne Power, Jörg Plöger, and Astrid Winkler (2008) for an overview of strategies used by shrinking cities).

2.1 Reaction

Back on the same track

A common approach for cities that are faced with declining populations – and perhaps the most dogmatic – is to try and reassert their economies by boosting whatever sectors were driving their economy in the first place. Most often this occurred in cities with large industrial sectors in post-socialist countries in Central and Eastern Europe but has also been observed in Mediterranean countries (Moral, Méndez, & Trigo, 2012). It basically entails city or national governments trying to reindustrialise their economy by attracting FDIs and private investors (Bernt et al., 2012).

Though reindustrialisation might have had some effect in the initial stages of the industrial restructuring, the strategy often failed to be a long-term solution because the industrial restructuring was driven by trends that far exceeded the city and the nation state (Sousa & Pinho, 2015).

New Horizons: Knowledge clusters, cultural development, city branding, revitalization

The second version of re-growth is a much more nuanced approach whereby a city acknowledges that its current path of development no longer suffices. Redefines and rebranding are crucial terms to this strategy, as well as regeneration and revitalization. The ‘creative edge’ and the IT-sectors are positioned as crucial to the attracting and retaining of young well-educated people (Sousa & Pinho, 2015). Mainly because the out-migration of young people is one of the prime concerns of the shrinking city (Rink, Haase, Grossmann, Couch, & Cocks, 2011).

Several cities have attempted to form knowledge clusters to enhance innovation in the region (C. Martinez-Fernandez & Wu, 2006), such as in Sosnowiec where economic zones were used to create attractive condition for companies in service and IT-sectors (Bernt et al., 2012). Others have tried to stimulate cultural sectors to attract and retain younger people, for instance by building flagship projects like museums and cultural centres (see for instance the Guggenheim in Bilbao and the Oscar Niemeyer pavilion in Asturias (see figure 3)).



Figure 3: Oscar Niemeyer cultural centre in Aviles (source: Zarateman (2011))

This approach has shown to help shrinking cities and regions to move away from an one-sided economic model and possibly retain parts of the population or even attract some new inhabitants (Anne Power et al., 2008). However, it is not a strategy that speaks to the particularities of shrinkage, rather it is applicable to any city which seeks a competitive advantage (Sousa & Pinho, 2015). This puts shrinking cities and regions in immediate competitions with other regions that might have a more stable population and probably more resources (Moral et al., 2012).

One of the main problems with re-growth strategies in general is its pre-occupation with economic development. As Thorsten Wiechmann and Bontje (2015) point out, though economy and employment are still important, the main driver of demographic decline within Europe is no longer declining economic development but natural population change, i.e. mortality- and fertility-rates. It is questionable to what extent attracting new economic development can cause enough inward migration to compensate the natural population decline.

2.2 Adaptation

Right-sizing the city

Right-sizing is probably the most noteworthy strategy for dealing with shrinkage. It concerns large scale restructuring of mostly housing stock and infrastructure. There have been many varieties of this strategy. It was made famous in the pioneering Stadtbau-Ost, an German state-led program that basically demolished large parts of the East-German housing stock to re-densify the inner-cities (Rink, Haase, Bernt, & Mykhnenko, 2010).



Figure 4: Stadtbau-Ost (source: Bethke)

In Germany, the strategy was mainly focused on the housing stock, ignoring many of the other aspects that come with shrinkage, such as social segregation, unemployment, and tax deficits.

In the US, there have been investigations into its applicability for technical infrastructures, but these have been sceptical as to the feasibility of such an approach (Hornbeek & Schwarz, 2009). Mostly, because of the relative high-cost of such large-scale demolition-programs and the technical difficulty of downscaling technical infrastructures such as power-supply and sewage-pipes.

Participation society / Public-private collaboration

The value of participation has been advocated by several authors (Strohmeier & Bader, 2004; Sucato, 2006; Vargas-Hernandez, 2007) as a good way to compensate the lack of (financial) resources on the government side and to enhance the citizens self-reliance to deal with the consequences of shrinkage.

Opening up to the citizens-led bottom-up initiatives has the potential to fill up those vacant spaces that have been left behind, and could be a good way to impede further deterioration of a neighbourhood. Once again good examples come from the German practice, in Gera and small city in Germany, citizens have come together to find new functions for the vacant land that has dominated their city centre (iba-thuringen, 2017).

On a higher scale the collaboration with private actors has been deemed as vital to at least retain and facilitate those sources of employment that are still in the city or region (Sousa & Pinho, 2015).



Figure 5: Citizen-led initiatives in Gera, Germany (source: Walther (2015))

It should be noted that although this strategy does respond to some aspects of shrinkage, namely reduced government, participation has been regarded by many as universally important for both shrinking and growing cities (Sousa & Pinho, 2015), reflecting a larger trend in the planning discipline (Lane, 2005).

Opportunity: environmental mitigation, ecosystem restoration, beautification

Finally, Hollander et al. (2009) identify the potential of vacant land and buildings for a qualitative transformation of the city in terms of ecology and liveability. They argue that the relieved pressure on land markets opens possibilities for new land-uses that might have been inconceivable in a more competitive land market. Converting vacant land into parks or urban forest does not only stave of the negative stigma of shrinkage but also has the potential to position a city as a more sustainable and green alternative in contrast to the overcrowded metropolises (Haase et al., 2014).

Two examples of this strategy can be found in Germany, which are the ‘Emscher Park’ (see figure 6) in the Ruhr-area and the ‘Fuerst Pueckler Land’ in Eastern Germany (Hollander et al., 2009). These parks are by no means a complete transformation, but are strategic interventions that reframe the decaying industrial infrastructure as valuable industrial heritage. Other examples include the reconversion of vacant land into assets in storm water management, whereby vacant lots can be used to retain some of the storm water run-off. Yet, more examples include the planning of urban forest or urban farming.



Figure 6: Emscher Park, a reconversion of an industrial area to a park (source: Disk/Cat (2010))

3. Discussion

While a number of the above named strategies have been tried and tested for some years (Stadtumbau-Ost had been initiated in 2002 (Thorsten Wiechmann, 2008)), there still remain many gaps within the existing literature concerning the effectiveness and transferability of these strategies. The following section discusses the main complications within this debate.

Regional gap

One of the most profound gaps in the literature concerns the level of action and its relation to interregional competition. This gap originates from the fact that most of the literature concerning shrinkage is developed from the perspective of the city. While many authors identify the importance of the region as a level of action, and the relationship between the city and the surrounding region (Jessen, 2006; K. M. Pallagst, 2007; Schlappa & Neil, 2013; Strohmeier & Bader, 2004; Troeger-Weiß & Domhardt, 2007). Without a regional perspective, there is a risk that strategies may be neutralized by the efforts of neighbouring cities, or that once successful strategy furthers the process of shrinkage in another part of the region (Schlappa & Neil, 2013).

Many cities that have managed to turn shrinkage around (like Leipzig, Liverpool, Sheffield (Anne Power et al., 2008)) have done so largely by attracting in-migration from their surrounding region (Thorsten Wiechmann, 2008). This is not only a concern for those which are pursuing re-growth, also the regions and cities that seek to consolidate their population should consider that every change within the city influences the surrounding region. By focussing too much on shrinkage at the level of the city, the relation of the city to its neighbouring territories is marginalised. What is more, the strategies are mainly discussed on the scale of the city, leaving questions as to whether these strategies have a regional equivalent.

Complexity and integration

Another gap occurs in the contrast between the complexity of the shrinkage process and the one-sidedness of some of the above-named strategies. As mentioned in the introduction of this paper, shrinkage is a multifaceted issue. Strategies that are only concerned with one aspect of shrinkage are bound to miss out on some important issues.

For example, most the right-sizing strategies are mainly focused on the (social) housing sector. Yet there are still concerns for dilapidating infrastructure, dwindling public services and reduced municipal capacity (Rink et al., 2010). This does not mean that right-sizing is a bad strategy, but rather that it should be embedded in an overarching strategy. There have been some studies that have listed the strategies that have been implemented in shrinking contexts (see Bernt et al. (2012); Mckinsey (2016); Anne Power, Jörg Plöger, and Astrid Winkler (2008)). However, these studies have been little more than summation of strategies that have been applied by various cities, they have not conceptualised how these strategies work together on a regional scale. An integrative discourse on the strategies for a shrinking city or regions is called for. However, there is little discussion on what this might look like.

Transferability

The transferability of the strategies is another important gap in the literature. This gap has a lot to do with the debate concerning the conceptualisation of shrinkage. The debate has settled on the premise of there being a ‘plurality of shrinkage’ situations (Annegret Haase et al., 2013), which helps to understand the incredible variety of this phenomenon. However, this plurality also makes comparisons tricky.

Most of the strategies that have been discussed in this paper come with few criteria for implementation. Leaving important questions unanswered. For instance, when does it make sense for a city to invest in greening, and when can it still be an option to attract new economic development? Temporal and bottom-up practices are an attractive concept, but to what extent is it a viable option in a region which is coping with an aging population?

Feedback loops and impacts

Finally, there remains the question of impact. The strategies that are listed in this paper give an insight as to what practitioners can do, but there is much uncertainty as to the effect of these strategies. Admittedly, some of these strategies have a clear impact, for instance that urban forestation can bring recreative facilities to an area, but this is no answer to the question of how that strategy links into the overarching issue of shrinkage, which is what planners and decision makers will most want to know.

Even within single in-depth case studies, it seems to be difficult to estimate the impact of an implemented strategy. There are two reasons for this gap. Firstly, the plurality of shrinkage (Annegret Haase et al., 2013) allows for so many variables that it is almost impossible to find a straight forward cause and effect relationship.

Secondly, estimating the impact of a strategy requires that there is a clear objective that the strategy needs to attain. What is this goal supposed to be? Re-growth seems a bad candidate for a goal since most of the cities and regions in the developed world cannot reasonably expect to achieve it, given the prospects of shrinkage in the developed world. Limiting decline seems more realistic, but still leaves questions such as; what amount of decline would be acceptable in a shrinking context? More still, decline of the population is not the main problem of shrinkage but rather the effect that this decline has on the way a territory functions. This raises more complex questions concerning minimal liveability and functionality (Hollander et al., 2009).

Moreover, many of the strategies that are concerned with the opportunities that stem from shrinkage, use those opportunities to solve other problems concerning ecosystems, water management and liveability, such as in Chicago where vacant land is utilised to store storm water run-off (Hollander et al., 2009). How high should such initiatives be on the priority list of a city or region dealing with shrinkage? Not governments will be willing to spend their already reduced financial resources on projects that provide environmental services when their main concern is a declining population. Are these strategies to be discarded since they do not answer to the problem?

4. Conclusion

This paper synthesises and evaluates the current literature on planning strategies and policies concerned with shrinking, to assess the extent to which practitioners can draw on its insights for dealing with shrinking cities and regions. Even though the research on shrinkage has been developing for more than two decades, there remain vital gaps within this literature.

Most of the literature concerning shrinkage has been overly occupied with the scale of the city, while the importance of the regional scale as a level of analysis and action has been understood for quite some time, albeit the regional scale has so far been neglected both in research and practice. Therefore, few strategies have been studied and implemented on a regional level. What is more, most strategies do not address shrinkage in its totality, while this is not to the discredit to any one strategy, it does accentuate the need for more holistic strategies for dealing with shrinkage. Finally, too little research has been devoted to the transferability and the impact of such strategies.

Because of the complexity and contextual nature of the shrinking process, it is unreasonable to expect a universal strategy that can be applied in any context. However, so many basic questions remain that practitioners will have to rely on their own judgement to decide which strategy to apply when and where. Given that shrinkage is an overarching problem for much of the developed world, it is doubtful whether so much of the response to shrinkage should be left to the interpretation of local practitioners.

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